



MultiStore Hands-On Advanced Labs Data ONTAP 8.1 7-Mode

Scott Gelb, Insight Integrated Systems

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1 LAB INFORMATION

This lab is pre-configured with Data ONTAP simulators that represent two physical FAS Controllers, as well as three vFiler units.

See Appendix A for a reference on how the lab was configured.

All Passwords are **netapp123**:

Windows LAB\Administrator : netapp123

NetApp and Linux root : netapp123

Table 1) Internal Lab IP Addresses

System	IP Address	Notes
Windows Server 2008 R2	192.168.150.11	RDP Jumphost, lab.local domain, CIFS shares and iSCSI LUNs
CentOS 6 Linux	192.168.150.31	OnCommand 5 and NFS mounts
FAS6280	192.168.150.210	Data ONTAP Simulator
FAS3270	192.168.150.211	Data ONTAP Simulator
vfiler1	192.168.150.221	vFiler unit for vFiler migrate
vfiler2	192.168.150.222	vFiler unit for vFiler DR
vfiler3	192.168.150.223	vFiler unit for DataMotion

The Windows jumphost is the machine that has access to all resources:

- System Manager 2.0R1
- PuTTY for SSH access (all sessions are preconfigured)
- NetApp Management Console 3.1
- OnCommand 5 Console shortcut

Table 2) Data ONTAP Simulator Lab Configuration

Data ONTAP Simulators (v filer0)	FAS6280	FAS3270
user	root	root
passwd	netapp123	netapp123
IP	192.168.150.210 (e0a)	192.168.150.211 (e0a)
Subnet	255.255.255.0	255.255.255.0
GW	192.168.150.2	192.168.150.2
IPSpace	default-ipspace	default-ipspace
dns domainname	lab.local	lab.local
dns server	192.168.150.11	192.168.150.11
Admin Host	192.168.150.31	192.168.150.31
rootvol	root	root
CIFS	domain	domain
CIFS Netbios Name	fas6280	fas3270
CIFS Admin	administrator	administrator
CIFS Admin Passwd	netapp123	netapp123
CIFS Share	C\$	C\$
NFS Export	/vol/root	/vol/root

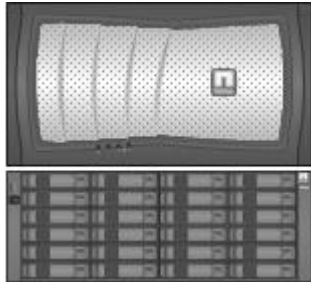
Table 3) Data ONTAP Simulator vFiler Units

v Filer Units	v filer1	v filer2	v filer3
user	root	root	root
passwd	netapp123	netapp123	netapp123
IP	192.168.150.220 (e0b)	192.168.150.221 (e0b)	192.168.150.222 (e0b)
Subnet	255.255.255.0	255.255.255.0	255.255.255.0
GW	192.168.150.2	192.168.150.2	192.168.150.2
IPspace	ipspace1	ipspace1	ipspace1
DNS domain	lab.local	lab.local	lab.local
DNS server	192.168.150.11	192.168.150.11	192.168.150.11
Admin Host	192.168.150.31	192.168.150.31	192.168.150.31
rootvol	vfiler1_root	vfiler2_root	vfiler3_dmotion_root
nasvol	vfiler1_nas	vfiler2_nas	vfiler3_dmotion_root
sanvol	vfiler1_san	vfiler2_san	vfiler3_dmotion_root
CIFS	domain	domain	domain
CIFS Netbios Name	vfiler1	vfiler2	vfiler3
CIFS Admin	administrator	administrator	administrator
CIFS Admin Passwd	netapp123	netapp123	netapp123
CIFS Share	vfiler1_nas	vfiler2_nas	vfiler3_root/nas
NFS Export	/vol/vfiler1_nas	/vol/vfiler2_nas	/vol/vfiler3_root/nas
iSCSI LUN	/vol/vfiler1_san/vfiler1_lun1	/vol/vfiler2_san/vfiler2_lun1	/vol/vfiler3_dmotion_root/vfiler3_lun1

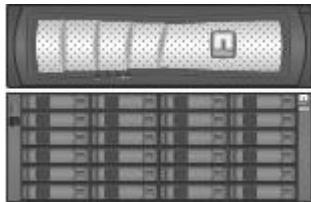
At the beginning of this lab, all vFiler units reside on the Data ONTAP Simulator representing a FAS6280.

Figure 1) Data ONTAP Simulator and vFiler Unit Layout

FAS6280



FAS3270



The Windows Server 2008R2 desktop is pictured below. On the desktop you will see a number of icons that have been placed there for your use in the lab:

Icons Column 1 top to bottom

- System Manager 2.0R1
- NetApp Management Console (NMC 3.1)
- OnCommand 5 Console (new DFM)
- Data Fabric Manager Console (legacy DFM)

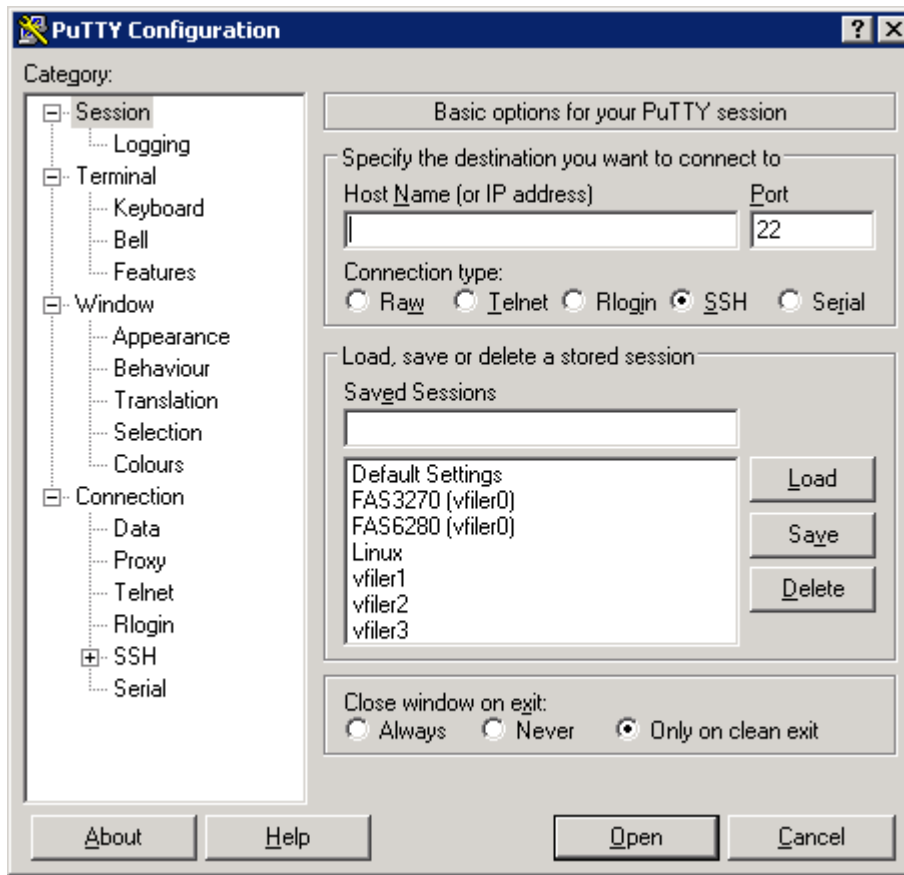
Icons Column 2 top to bottom

- vFiler Shares (shortcuts to all vFiler CIFS shares and iSCSI drives)
- Putty



2 VFILER MANAGEMENT

1. Double Click the PuTTY icon, select the session for FAS3270 (vfiler0), and login as root :
netapp123



2. Create a test vFiler unit using the CLI. The initial command is show below - you can copy and paste the command directly into the PuTTY window to avoid spelling mistakes. Continue following the output of the command and provide answers where indicated in bold.

```
vfiler create test -s ipspace1 -i 192.168.150.223 /vol/vfiler1_root  
/vol/vfiler1_nas /vol/vfiler1_san  
Configure vfiler IP address 192.168.150.223? [y]: y  
Interface to assign this address to {e0b}: e0b  
Netmask to use: [255.255.255.0]: 255.255.255.0  
Please enter the name or IP address of the administration host: 192.168.150.31  
Do you want to run DNS resolver? [n]: y  
Please enter DNS domain name []: lab.local  
Please enter the IP address for first nameserver []: 192.168.150.11  
Do you want another nameserver? [n]: n  
Do you want to run NIS client? [n]: n  
Default password for root on vfiler test is "".  
New password: netapp123  
Retype new password: netapp123  
Do you want to setup CIFS? [y]: y  
Do you want to make the system visible via WINS? [n]: n  
  (1) Multiprotocol filer  
  (2) NTFS-only filer  
Selection (1-2)? [1]: 1  
Enter the password for the root user []: netapp123  
Retype the password: netapp123  
  The default name for this CIFS server is 'TEST'.  
Would you like to change this name? [n]: n  
  Data ONTAP CIFS services support four styles of user authentication.  
  Choose the one from the list below that best suits your situation.  
  (1) Active Directory domain authentication (Active Directory domains only)  
  (2) Windows NT 4 domain authentication (Windows NT or Active Directory domains)  
  (3) Windows Workgroup authentication using the filer's local user accounts  
  (4) /etc/passwd and/or NIS/LDAP authentication  
Selection (1-4)? [1]: 1  
What is the name of the Active Directory domain? [lab.local]: lab.local  
Enter the name of the Windows user [Administrator@LAB.LOCAL]:  
Password for Administrator@LAB.LOCAL: netapp123  
  (1) CN=computers  
  (2) OU=Domain Controllers  
  (3) None of the above  
Selection (1-3)? [1]: 1  
Do you want to create the TEST\administrator account? [y]: y  
Enter the new password for TEST\administrator: netapp123
```

3. Show the vFiler status. The -r option will show you network and volume details for each vfiler. The -a option will show you more details. Try all three!

```
vfiler status  
vfiler status -r  
vfiler status -a
```

4. Rename your vFiler:

```
vfiler rename test fas3270_vfiler1  
vfiler status
```

5. Change the vFiler limit (max vfiler on the system):

NOTE: to increase this value, you must reboot for it to take effect. Limits are based on memory. The Data ONTAP Simulator is limited to a maximum of 11 and defaults to 3. This lab is preset to a maximum of 4.

vFiler Limits	
FAS Controllers with <1GB RAM	11 max vFiler units
FAS Controllers with >=1GB RAM	26 max vFiler units
FAS Controllers with >=2GB RAM	65 max vFiler units

Here we change the vfiler limit in this lab to a maximum of 5.

```
vfiler limit
vfiler limit 5
vfiler limit
```

6. Allow and disallow protocols per vFiler unit. You can show all protocols, which by default are all enabled. However, the protocol must be licensed on vfiler0 in order for the vFiler unit to use it.

```
vfiler status -a
```

Disallow rsh, ftp and http:

```
vfiler disallow fas3270_vfiler1 proto=rsh proto=ftp proto=http
vfiler status -a      # confirm
```

Allow ftp:

```
vfiler allow fas3270_vfiler1 proto=ftp
vfiler status -a      # confirm
```

7. Using vFiler run and vFiler context to run commands in a vFiler.

Using the vfiler context command will take you into a command menu just for that specific vfiler. Notice that the command prompt changes after you execute this command.

```
vfiler context fas3270_vfiler1
fas3270_vfiler1@fas3270> vol status
```

Use the same command to return to the main context of vfiler0.

```
fas3270_vfiler1@fas3270> vfiler context vfiler0
```

From the command shell, you can also run a command directly to a vfiler without switching context:

```
vfiler run fas3270_vfiler1 vol status
```

You can use this same method to run a command against all vFiler units from vfiler0. Notice how vfiler0 sees ALL volumes and fas3270_vfiler1 only sees its own volumes.

```
vfiler run * vol status
```

If you use qtrees, you can see which volumes and qtrees are owned by which vFiler unit:

```
qtree status -v
```

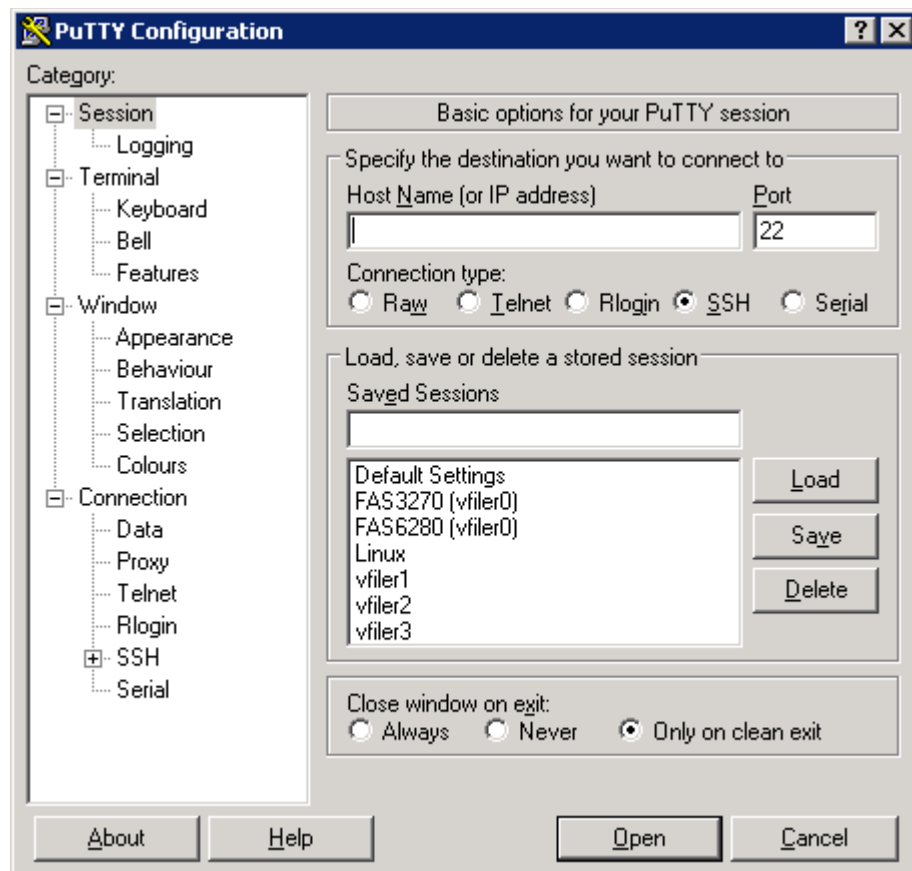
8. Interactive and non-interactive ssh directly to the vFiler unit.

Data ONTAP 8.1 7-Mode adds a fully interactive secure shell to vFiler units. In addition, the former non-interactive secure shell is also available. To use either of these shells, you first need to set up ssh on the vFiler unit. Hit enter for all defaults in the command output.

```
vfiler run fas3270_vfiler1 secureadmin setup ssh
```

To test the newly configured secure shell, double-click the PuTTY icon and select the *Linux* session, authenticating as root : netapp123

NOTE: Ignore the "Access Denied" message after entering the root login id.



How to use interactive ssh login to a vfiler. Answer "yes" to the fingerprint question and use the **netapp123** password. Note that the vol status only shows volumes accessible to vfiler1.

```
[root@ ~]# ssh -l root 192.168.150.223
fas3270_vfiler1@fas3270> vol status
fas3270_vfiler1@fas3270> exit
```

How to use non-interactive ssh login to the same vfiler. Again, use the same netapp123 password.

```
[root@ ~]# ssh -l root 192.168.150.223 vol status
```

9. Stop and start a vFiler unit.

NOTE: **All** vFiler units are started on system boot, even if they were stopped prior to boot. The `vfiler stop` command is not persistent across reboots. You can set a loader environment variable to disable **all** vFiler network connectivity at boot by running `setenv no-vfiler-ips? true` at a boot loader prompt. You **COULD** also put `"vfiler stop vfilename"` in the `/etc/rc` file, but the vfiler would run for a short while after boot.

```
vfiler stop fas3270_vfiler1
vfiler start fas3270_vfiler1
```

10. Destroy a vFiler unit. When this command is issued, all the volumes assigned to the vFiler unit are reassigned to `vfiler0`, including the vFiler root volume that contains all of the configuration for the vFiler unit.

```
vfiler stop fas3270_vfiler1
vfiler destroy fas3270_vfiler1
vfiler status -a
```

11. Recreate the vFiler unit you just destroyed. As long as the root volume is preserved, you can recreate the vfiler unit. If the data volumes were destroyed, they can be recreated using the same volume names.

```
vfiler create fas3270_vfiler1 -r /vol/vfiler1_root -b fas3270_vfiler1
```

NOTE: We didn't specify the other 2 volumes that were in the vFiler unit, but they are added back from the root volume configuration. You will see the .223 address is not configured after the `"-r"` to recreate so an `ifconfig` is needed to rebind to `e0b` (below).

```
vfiler status -a
```

To reconfigure the network interface:

```
ifconfig e0b 192.168.150.223 netmask 255.255.255.0 up
vfiler status -a
```

12. Create another vFiler unit (fas3270_vfiler2):

```
vfiler create fas3270_vfiler2 -s ipspace1 -i 192.168.150.224 /vol/vfiler2_root  
/vol/vfiler2_nas /vol/vfiler2_san
```

```
Configure vfiler IP address 192.168.150.224? [y]: y  
Interface to assign this address to {e0b}: e0b  
Netmask to use: [255.255.255.0]: 255.255.255.0  
Please enter the name or IP address of the administration host: 192.168.150.31  
Do you want to run DNS resolver? [n]: y  
Please enter DNS domain name [:] : lab.local  
Please enter the IP address for first nameserver [:] : 192.168.150.11  
Do you want another nameserver? [n]: n  
Do you want to run NIS client? [n]: n  
Default password for root on vfiler test is "".  
New password: netapp123  
Retype new password: netapp123  
Do you want to setup CIFS? [y]: y  
Do you want to make the system visible via WINS? [n]: n  
  (1) Multiprotocol filer  
  (2) NTFS-only filer  
Selection (1-2)? [1]: 1  
Enter the password for the root user [:] : netapp123  
Retype the password: netapp123  
  The default name for this CIFS server is 'fas3270_vfiler2'.  
Would you like to change this name? [n]: n  
  Data ONTAP CIFS services support four styles of user authentication.  
  Choose the one from the list below that best suits your situation.  
  (1) Active Directory domain authentication (Active Directory domains only)  
  (2) Windows NT 4 domain authentication (Windows NT or Active Directory domains)  
  (3) Windows Workgroup authentication using the filer's local user accounts  
  (4) /etc/passwd and/or NIS/LDAP authentication  
Selection (1-4)? [1]: 1  
What is the name of the Active Directory domain? [lab.local]: lab.local  
Enter the name of the Windows user [Administrator@LAB.LOCAL]:  
Password for Administrator@LAB.LOCAL: netapp123  
  (1) CN=computers  
  (2) OU=Domain Controllers  
  (3) None of the above  
Selection (1-3)? [1]: 1  
Do you want to create the FAS3270_VFILER2\administrator account? [y]: y  
Enter the new password for FAS3270_VFILER2\administrator: netapp123
```

13. Using config dump to save settings including cifsshare and other configuration settings for every vFiler unit on the system:

```
vfiler run * config dump -f -v dump1.txt
```

Check the vfiler0 dump file at [\\192.168.150.211\c\\$\etc\configs](#)

Check the vfiler1 dump file at [\\192.168.150.223\c\\$\vol\vfiler1_root\etc\configs](#)

Check the vfiler2 dump file at [\\192.168.150.224\c\\$\vol\vfiler2_root\etc\configs](#)

14. Using FlexShare to prioritize volumes in vFiler units. FlexShare allows you to set priority of access to volumes on the NetApp storage system. It has 5 grades of priority from VeryLow to VeryHigh. With this functionality you can control priority of access to vFiler units by setting one vFiler unit's volume to low and another to high.

Show no priority set yet:

```
priority show
priority show volume -v
```

Enable FlexCache priority:

```
priority on # enable priority defaults
priority set io_concurrency=512 # disable disk controls
```

Set very high priority on fas3270_vfiler1_nas volume and very low priority to fas3270_vfiler2_nas volume

```
priority set volume vfiler1_nas level=VeryHigh system=VeryHigh
priority set volume vfiler2_nas level=VeryLow system=VeryLow
```

Show priority is set:

```
priority show
priority show volume -v
```

Create 2 CIFS shares for testing:

You could also use NFS or create LUNs with iSCSI, then apply priority to those volumes.

```
vfiler run fas3270_vfiler1 cifs shares -add vfiler1_nas /vol/vfiler1_nas
vfiler run fas3270_vfiler2 cifs shares -add vfiler2_nas /vol/vfiler2_nas
```

Open CIFS shares (administrator | netapp01) in a Windows Explorer window:

\\192.168.150.223\\vfiler1_nas

\\192.168.150.224\\vfiler2_nas

Begin the copy process – take a large file or directory and copy to each share (copy something from the C: drive)

Start a copy of **the large directory or file** to vfiler2_nas first (low priority) then to vfiler1_nas soon after (high priority) and the vfiler1_nas copy will run faster.

This test doesn't show exact throughput (not using a metric other than watching), however it shows how FlexShare works.

Turn off priority:

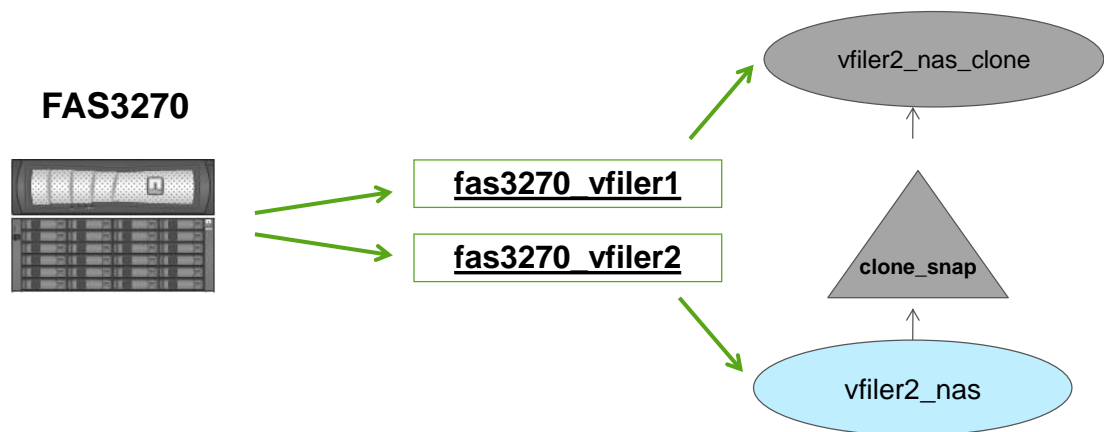
```
priority off
```

NOTE: On a system with FlashCache cards, you can selectively cache volumes AND enable priority on those volumes. What this means in a multi-tenant architecture is that you can cache and give high FlexShare priority to certain tenant volumes, and turn off cache and give lower priority to other tenant volumes.

15. FlexClone a vFiler volume and add that clone to another vfiler unit. This is very useful in a test/dev environment, or moving data from test to production. Another use case here would be taking internal production data and sharing it out on a vfiler that is in a DMZ. These commands all need to be run from vfiler0:

```
snap create vfiler2_nas clone_snap
vol clone create vfiler2_nas_clone -s none -b vfiler2_nas clone_snap
vfiler run * vol status
vfiler status -a
vfiler add fas3270_vfiler1 /vol/vfiler2_nas_clone
vfiler status -a
```

Figure 2) FlexClone Between vFiler Units



16. Move the source of the cloned volume from one vfiler to another.

```
vfiler move fas3270_vfiler2 fas3270_vfiler1 /vol/vfiler2_nas
```

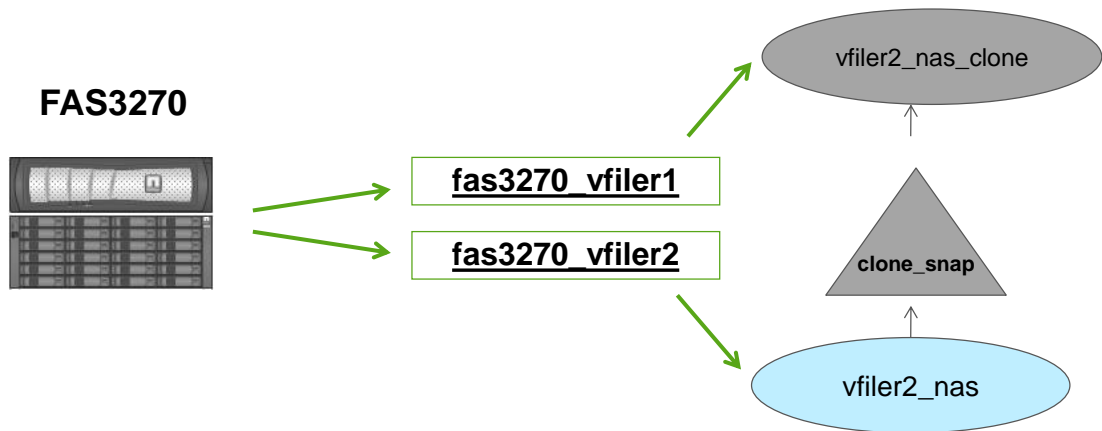
This command may fail because the volume is a CIFS share. If so, delete the share and rerun the command.

```
vfiler run fas3270_vfiler2 cifs shares -delete vfiler2_nas
```

```
vfiler move fas3270_vfiler2 fas3270_vfiler1 /vol/vfiler2_nas
```

```
vfiler status -a
```

Figure 3) Move A Clone Source Between vFiler Units



17. Remove a volume from vfiler1 and it is reassigned back to vfiler0. You can then add the volume back to vfiler2. This achieves the same object as vfiler move but here you see the remove and add functions.

```
vfiler remove fas3270_vfiler1 /vol/vfiler2_nas_clone
```

```
vfiler run * vol status
```

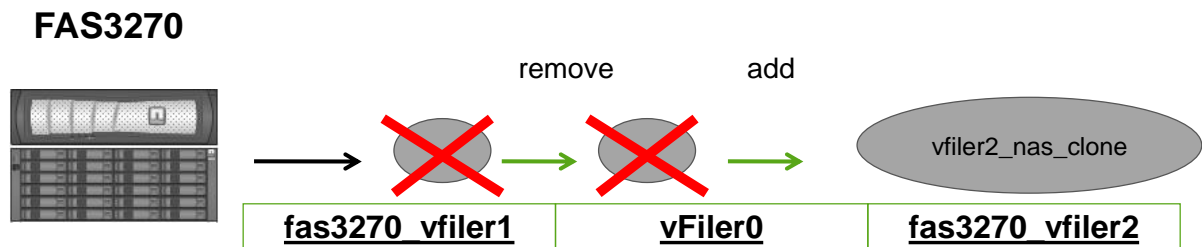
```
vfiler status -a
```

```
vfiler add fas3270_vfiler2 /vol/vfiler2_nas_clone
```

```
vfiler run * vol status
```

```
vfiler status -a
```

Figure 4) Add and Remove Volumes From vFiler Units



18. Destroy vfiler1 and add all its resources to vfiler2 (both network and volumes):

```
vfiler stop fas3270_vfiler1
vfiler destroy fas3270_vfiler1

vfiler add fas3270_vfiler2 -i 192.168.150.223 /vol/vfiler1_san /vol/vfiler1_nas
/vol/vfiler2_nas

vfiler status -a
```

19. Remove an IP and volume from vfiler2:

```
vfiler remove fas3270_vfiler2 -i 192.168.150.223
vfiler remove fas3270_vfiler2 /vol/vfiler1_san
vfiler status -a
```

20. Stop and destroy vfiler2 and destroy the clone volume for the next labs:

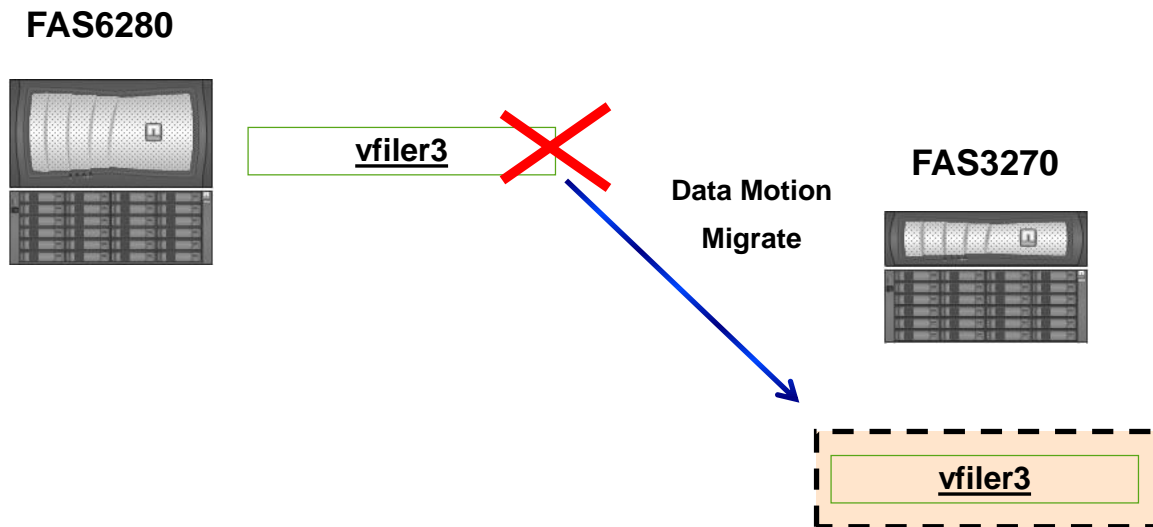
```
vfiler stop fas3270_vfiler2
vfiler destroy fas3270_vfiler2
vfiler status -a
vol offline vfiler2_nas_clone
vol destroy vfiler2_nas_clone
```

3 DATAMOTION FOR VFILER

DataMotion for vFiler in Data ONTAP 8.1 contains a number of enhancements. vFilers can now be nondisruptively moved between any type of controller and any type of disk.

This lab will walk you through performing a complete DataMotion for vFiler operation.

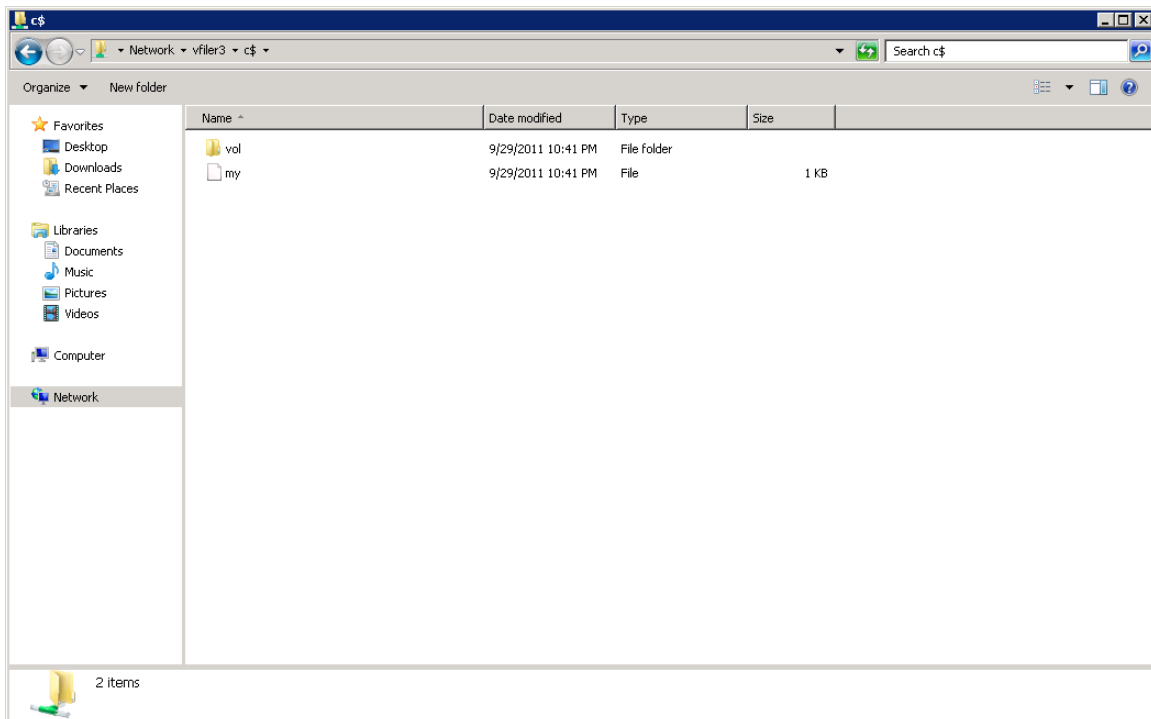
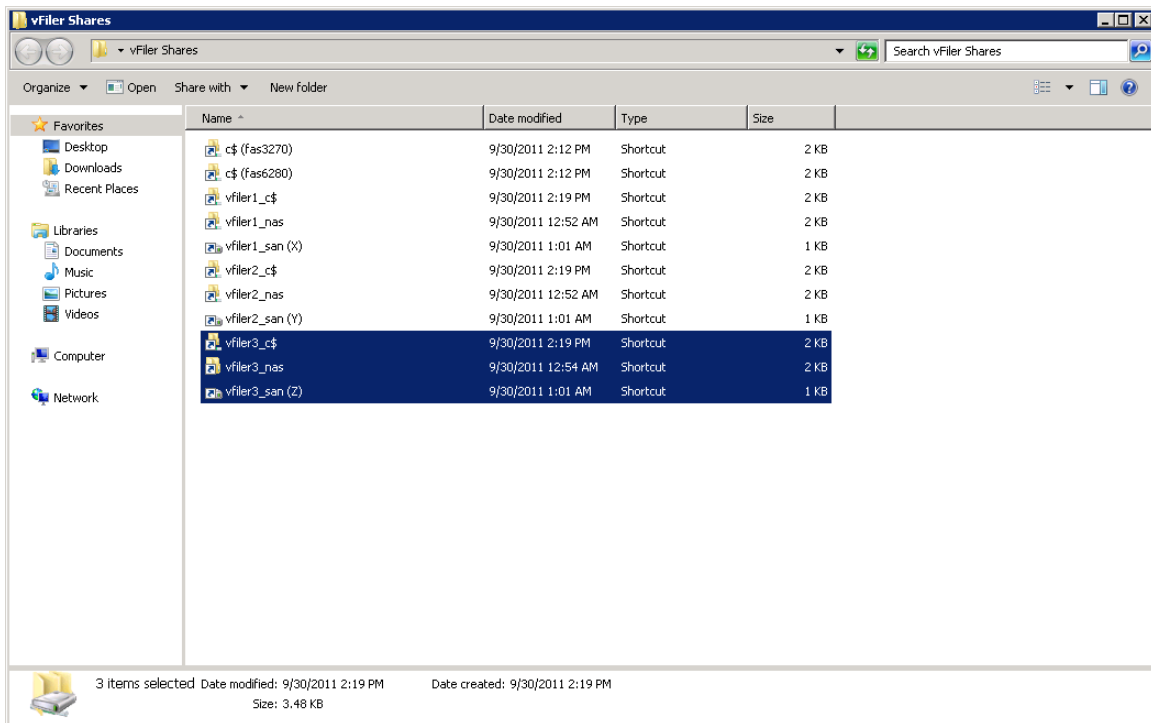
Figure 5) DataMotion for vFiler Diagram

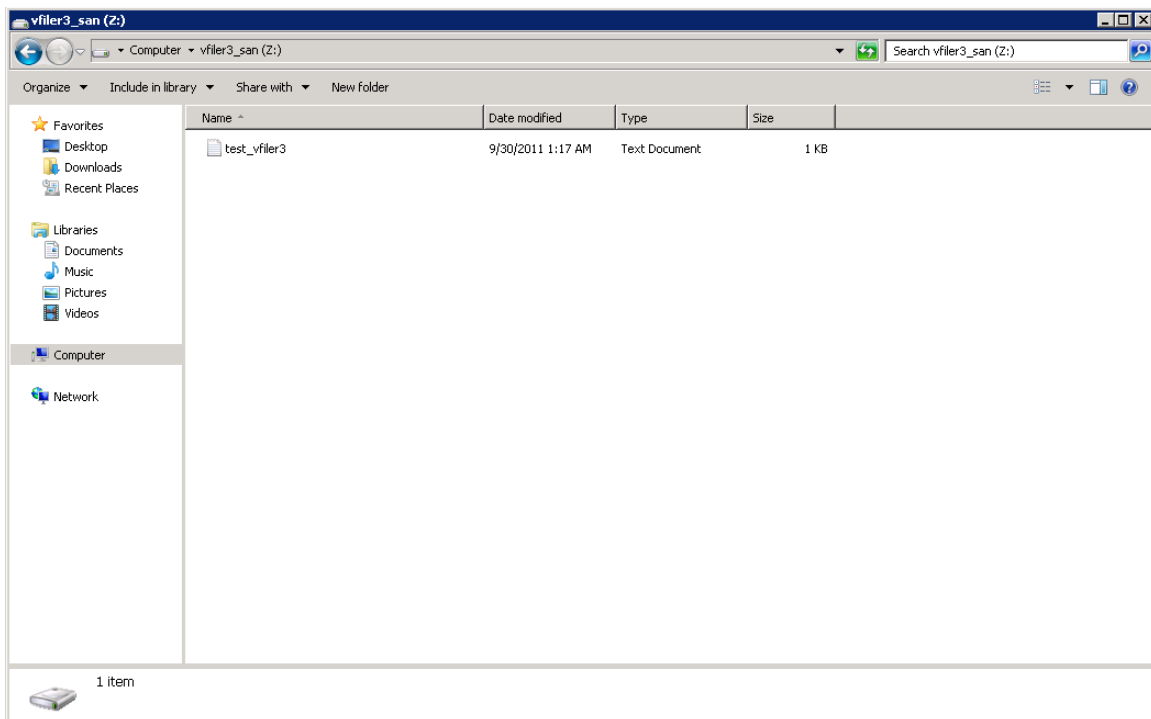
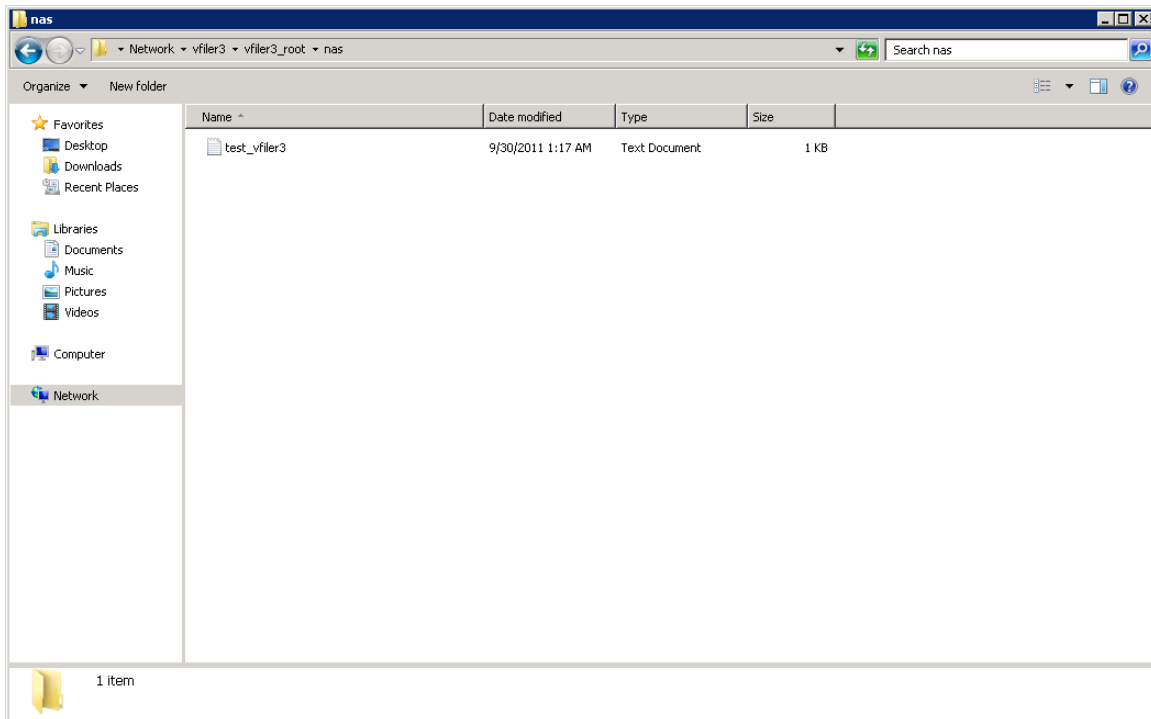


1. To begin this lab, open several SSH sessions. Double-click the PuTTY icon and login to the "FAS6280 (vfiler0)", "FAS3270 (vfiler0)", and "Linux" sessions, authenticating as root : netapp123. You should already have two of these sessions open.
2. Display your access to the NAS (CIFS and NFS) and SAN (iSCSI) connections on vfiler3. In the Linux PuTTY window, check the nfs mount:

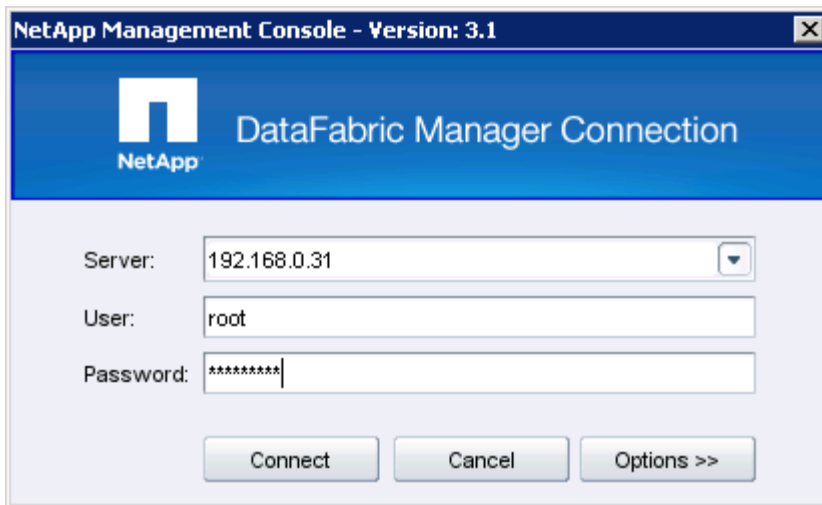
```
[root@ ~]# ls -l /root/vfiler3
total 0
-rw-r--r-- 1 root root 12 Sep 30 01:17 test_vfiler3.txt
```

On the Windows machine, double-click “vFiler Shares” then click into each of the 3 vFiler shortcuts and confirm access to vfiler3_C\$, vfiler3_nas and vfiler3_san.

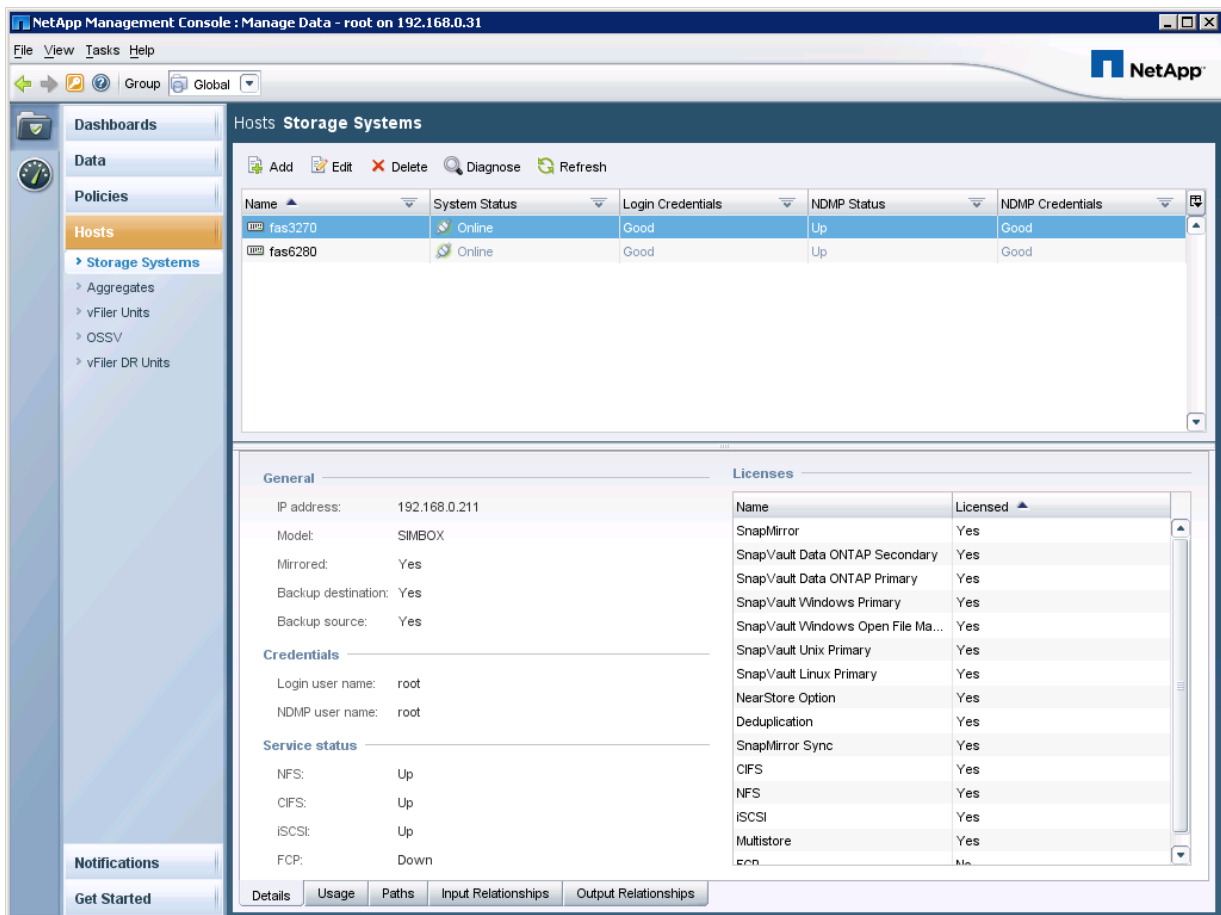




3. To get started with the DataMotion for vFile process, double-click the NetApp Management Console (NMC) on the Windows 2008 Desktop. Enter the password "netapp123" then click **Connect**.



4. Click on the **Hosts** pane on the left.



- Click on **vFile Units** and select **vfiler3** in the window. Click the **Start migration** button.

NetApp Management Console: Manage Data - root on 192.168.0.31

File View Tasks Help

Group Global

Hosts vFile Units

Add Setup Delete Start migration Update Cancel Cut over Roll back Clean up

Name	IP Address	IP Space	Hosting Storage ...	System Status	Migration Status
vfiler1	192.168.0.220	ipSPACE1	fas6280.lab.local	Online	Not started
vfiler2	192.168.0.221	ipSPACE1	fas6280.lab.local	Online	Not started
vfiler3	192.168.0.222	ipSPACE1	fas6280.lab.local	Online	Not started

General

Protocols: CIFS, NFS, iSCSI

Mirrored: Yes

Backup destination: Yes

Backup source: Yes

Service status

NFS: Up

CIFS: Up

iSCSI: Up

Hosting storage system settings

Host name: fas6280

IP address: 192.168.0.210

System status: Online

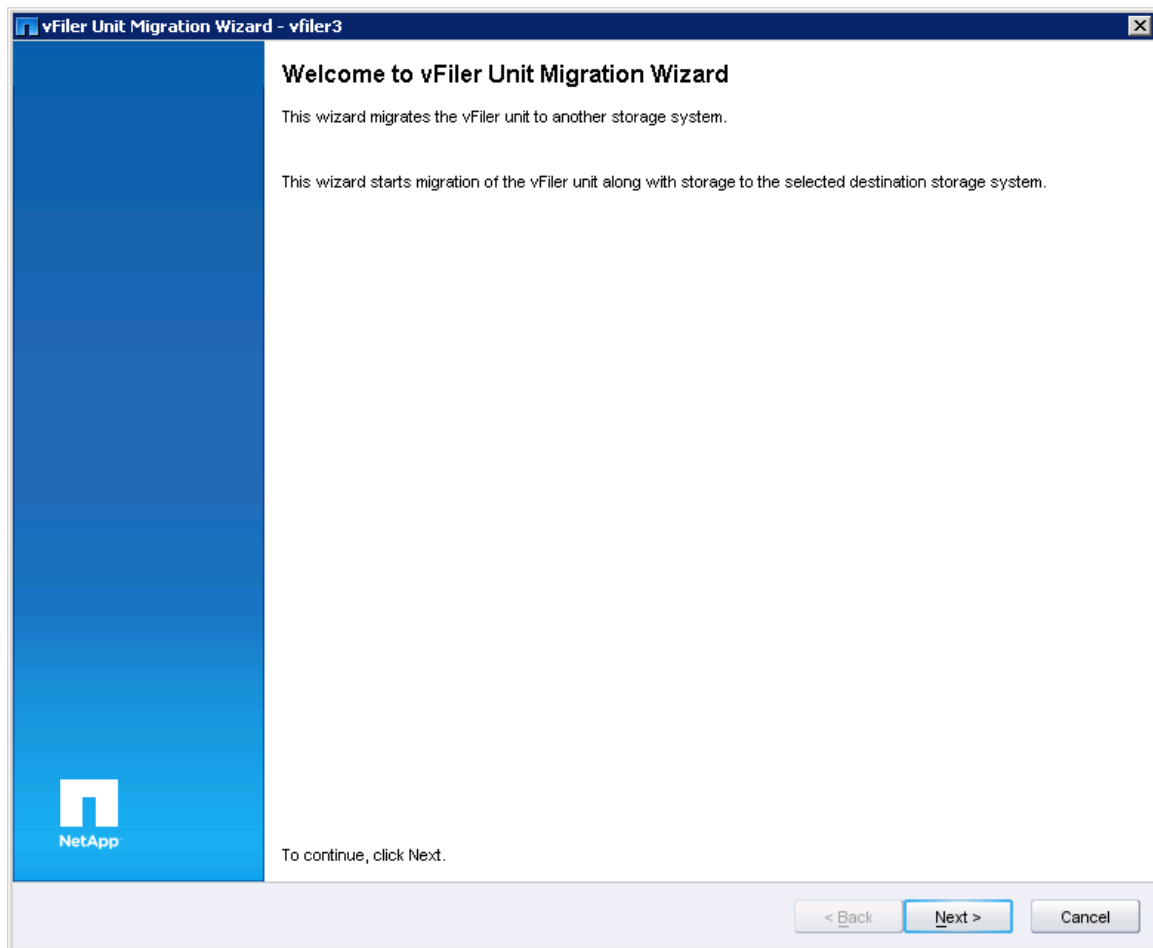
Login credentials status: Good

NDMP status: Up

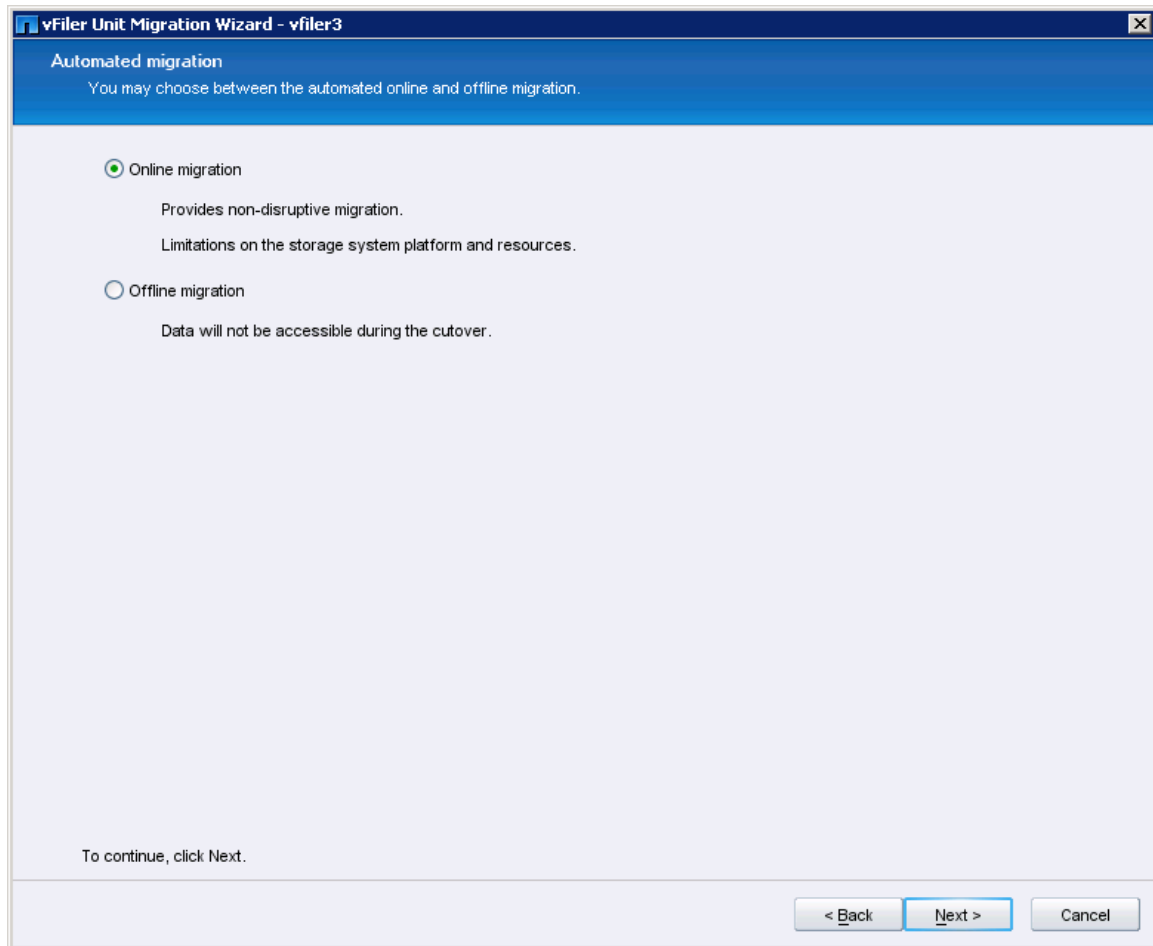
NDMP credentials status: Good

Details Network Settings Paths Input Relationships Output Relationships Migration

6. Click **Next**.



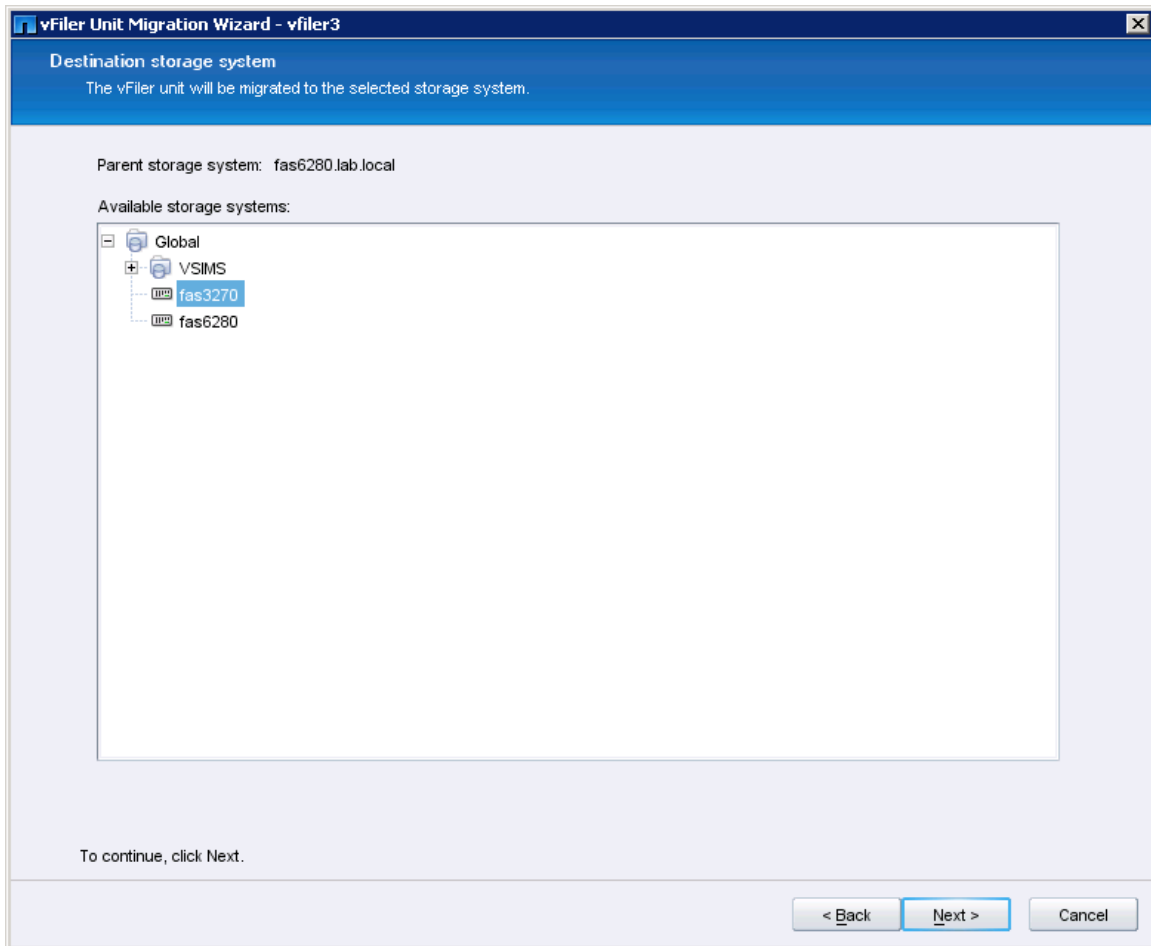
7. Select **Online migration** and click **Next**.



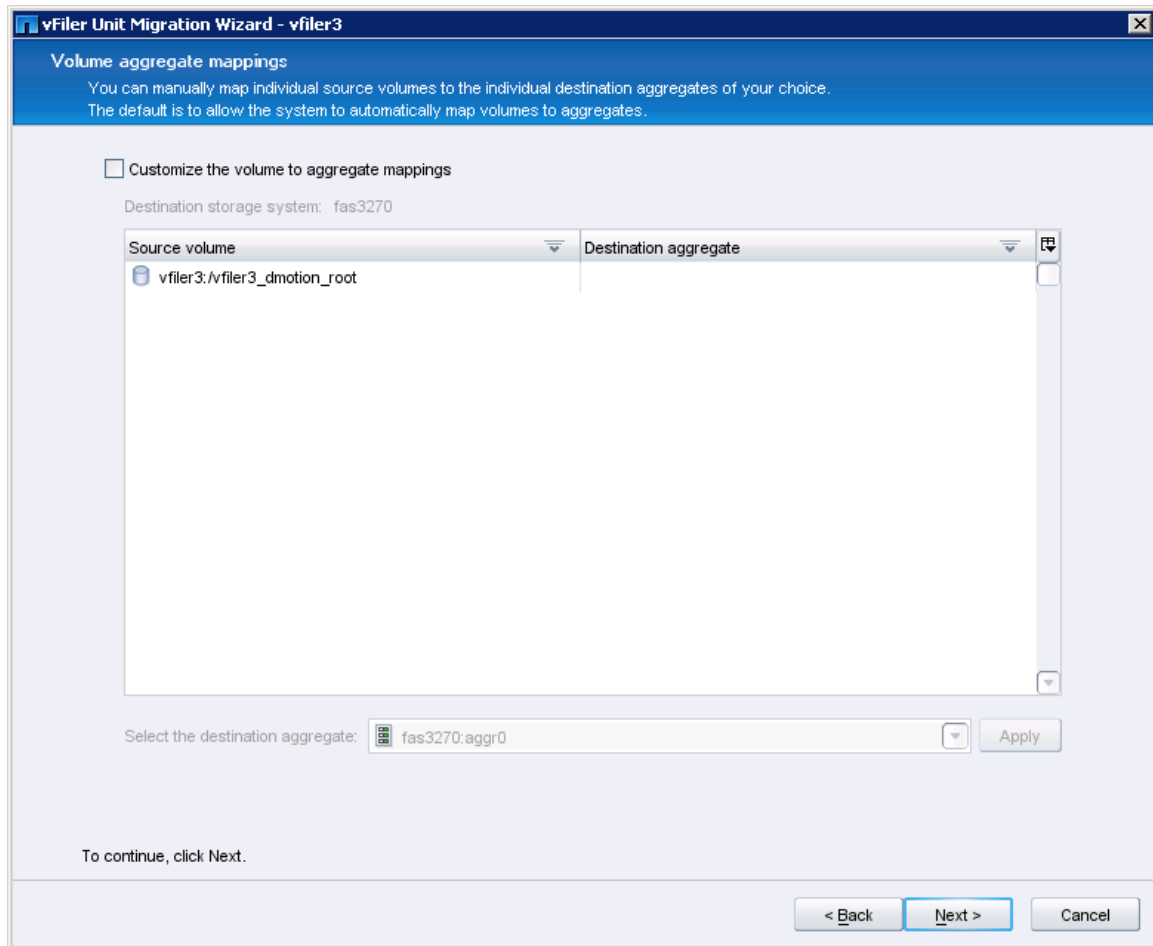
NOTE: Online migration is the key to DataMotion for vFiler. This method of migration allows vFiler units to be moved non-disruptively between NetApp storage systems with a maximum pause in I/O of 120 seconds.

Offline migration will migrate vFiler units disruptively. The vFiler unit will be stopped and there is an undetermined amount of time for the pause in I/O while data cutover occurs.

8. Select **fas3270** and click **Next**.



9. Click **Next** (take defaults– we only have one aggregate on each Simulator).



The screenshot shows the 'vFiler Unit Migration Wizard - vfiler3' window. The title bar is blue with the text 'vFiler Unit Migration Wizard - vfiler3' and a close button. The main window has a blue header bar with the text 'Volume aggregate mappings'. Below the header, there is a paragraph of text: 'You can manually map individual source volumes to the individual destination aggregates of your choice. The default is to allow the system to automatically map volumes to aggregates.' Below this text is a checkbox labeled 'Customize the volume to aggregate mappings'. Below the checkbox is the text 'Destination storage system: fas3270'. Below this text is a table with two columns: 'Source volume' and 'Destination aggregate'. The 'Source volume' column has a dropdown arrow and a list item 'vfiler3:/vfiler3_dmotion_root'. The 'Destination aggregate' column has a dropdown arrow and a list item 'fas3270:aggr0'. Below the table is a text box labeled 'Select the destination aggregate:' with a dropdown arrow and a list item 'fas3270:aggr0'. To the right of the text box is an 'Apply' button. Below the text box is the text 'To continue, click Next.' At the bottom of the window are three buttons: '< Back', 'Next >', and 'Cancel'.

vFiler Unit Migration Wizard - vfiler3

Volume aggregate mappings

You can manually map individual source volumes to the individual destination aggregates of your choice. The default is to allow the system to automatically map volumes to aggregates.

☐ Customize the volume to aggregate mappings

Destination storage system: fas3270

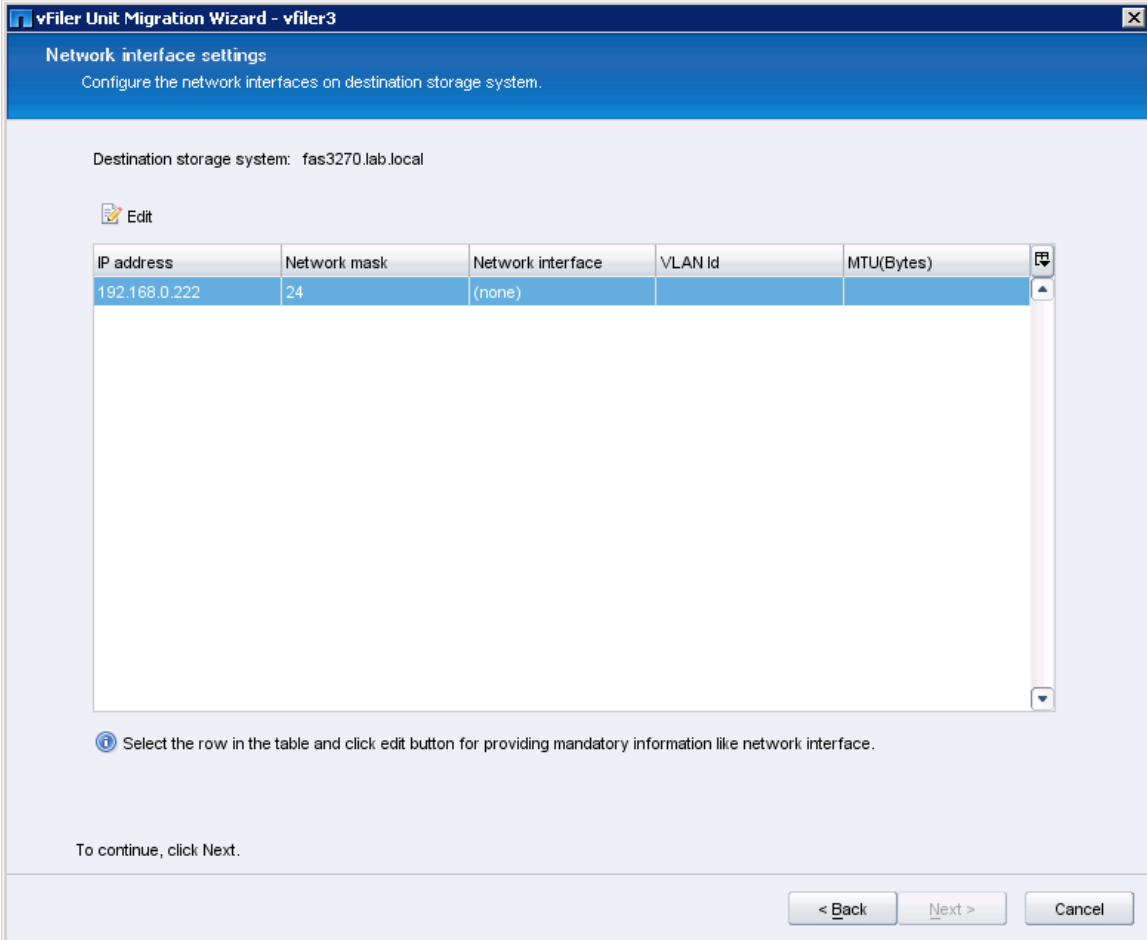
Source volume	Destination aggregate
vfiler3:/vfiler3_dmotion_root	fas3270:aggr0

Select the destination aggregate: fas3270:aggr0

To continue, click Next.

< Back Next > Cancel

10. Click **Edit**.



The screenshot shows a window titled "vFiler Unit Migration Wizard - vfiler3". The main heading is "Network interface settings" with the instruction "Configure the network interfaces on destination storage system." Below this, it states "Destination storage system: fas3270.lab.local". There is an "Edit" button with a pencil icon. A table with five columns is shown: "IP address", "Network mask", "Network interface", "VLAN Id", and "MTU(Bytes)". The first row contains the values "192.168.0.222", "24", "(none)", and is empty for the last two columns. Below the table is a large empty rectangular area. An information icon and text state: "Select the row in the table and click edit button for providing mandatory information like network interface." At the bottom, it says "To continue, click Next." and there are three buttons: "< Back", "Next >", and "Cancel".

Destination storage system: fas3270.lab.local

Edit

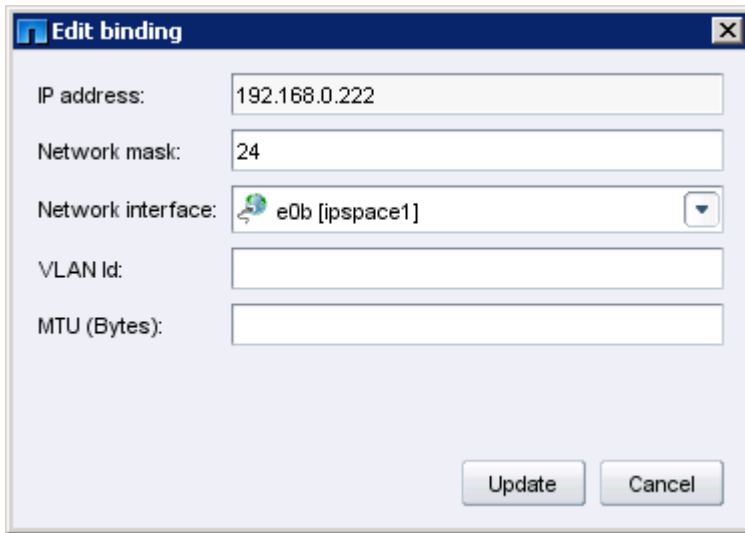
IP address	Network mask	Network interface	VLAN Id	MTU(Bytes)
192.168.0.222	24	(none)		

Select the row in the table and click edit button for providing mandatory information like network interface.

To continue, click Next.

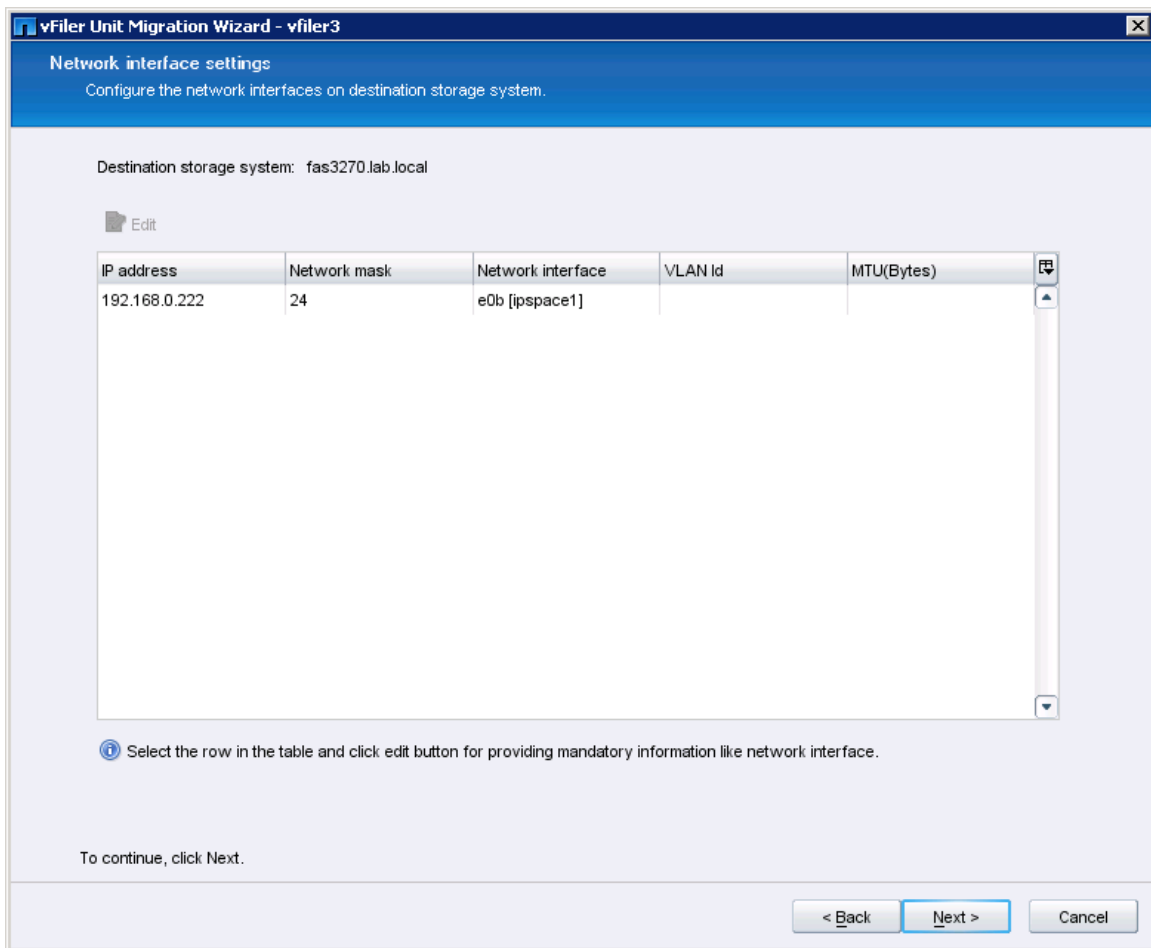
< Back Next > Cancel

11. Select **e0b** for the network interface and click **Update**, then click **Next**.



The 'Edit binding' dialog box contains the following fields and controls:

- IP address:** 192.168.0.222
- Network mask:** 24
- Network interface:** e0b [ipspace1] (selected from a dropdown menu)
- VLAN Id:** (empty field)
- MTU (Bytes):** (empty field)
- Buttons:** Update, Cancel




The 'vFiler Unit Migration Wizard - vfiler3' window shows the 'Network interface settings' step. It includes a table of network configurations and navigation buttons.

Destination storage system: fas3270.lab.local

Edit

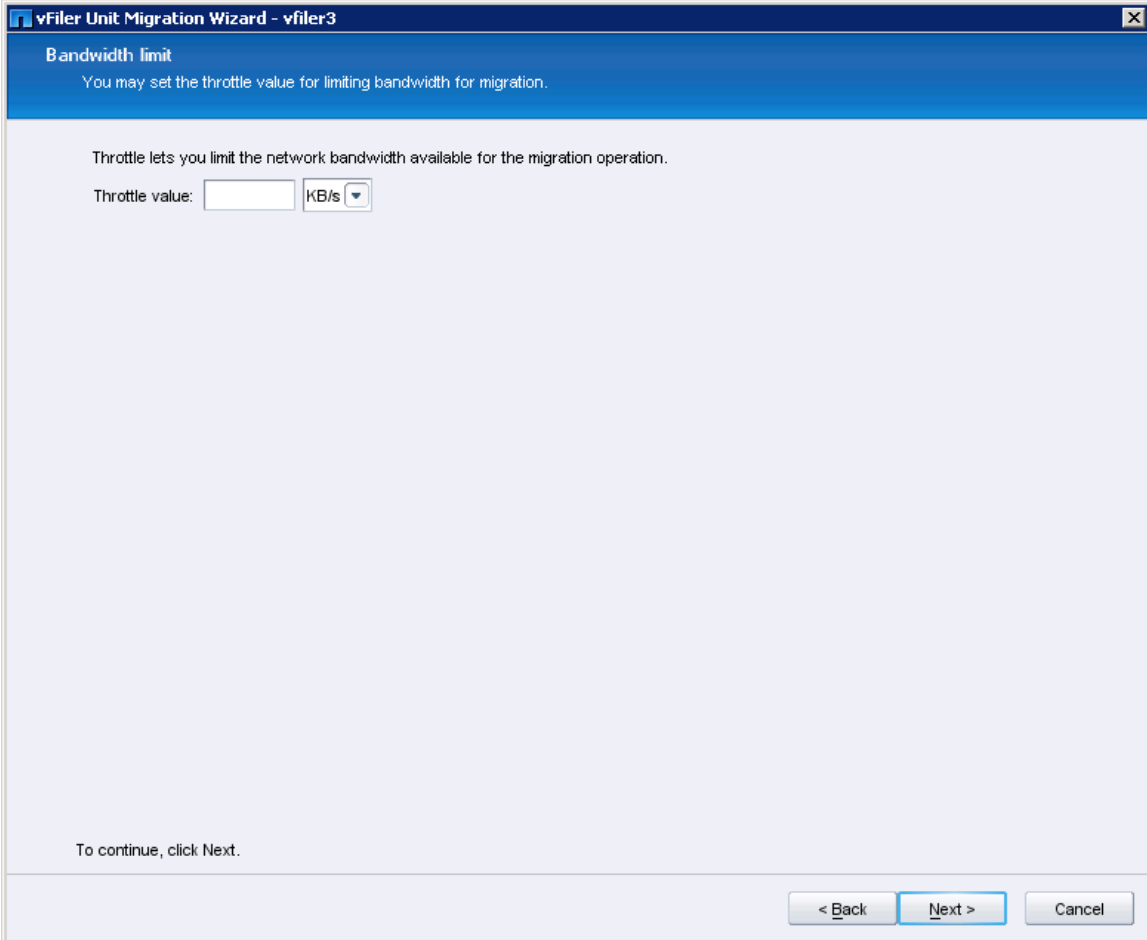
IP address	Network mask	Network interface	VLAN Id	MTU(Bytes)
192.168.0.222	24	e0b [ipspace1]		

 Select the row in the table and click edit button for providing mandatory information like network interface.

To continue, click Next.

< Back Next > Cancel

12. Click **Next** (no SnapMirrorthrottle).



The image shows a screenshot of the 'vFiler Unit Migration Wizard - vfiler3' window. The window has a blue title bar and a blue header area. The header area contains the text 'Bandwidth limit' and 'You may set the throttle value for limiting bandwidth for migration.' Below the header, the main area is light blue and contains the text 'Throttle lets you limit the network bandwidth available for the migration operation.' and 'Throttle value:'. To the right of 'Throttle value:' is a text input field and a dropdown menu showing 'KB/s'. At the bottom of the window, there is a footer area with the text 'To continue, click Next.' and three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a blue border.

vFiler Unit Migration Wizard - vfiler3

Bandwidth limit
You may set the throttle value for limiting bandwidth for migration.

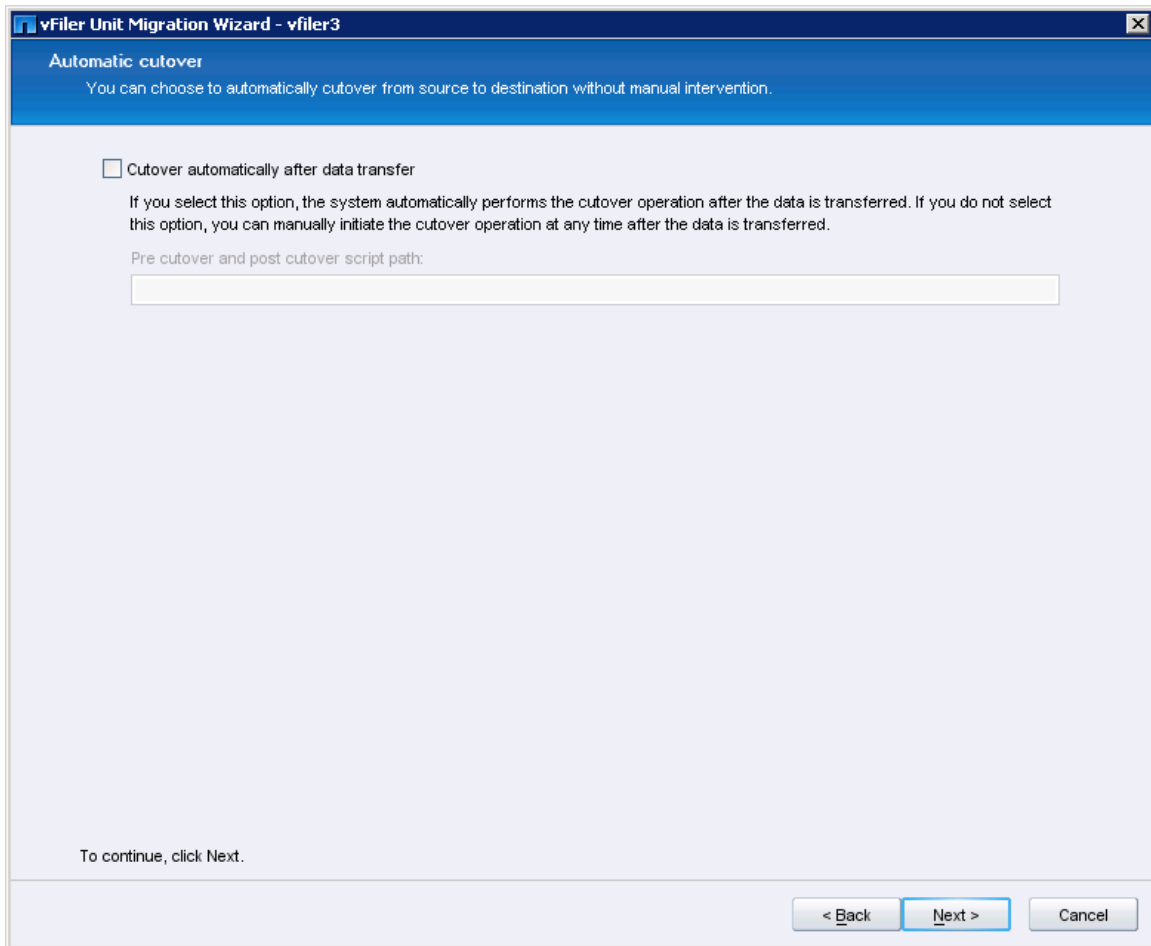
Throttle lets you limit the network bandwidth available for the migration operation.

Throttle value: KB/s

To continue, click Next.

< Back Next > Cancel

13. Click **Next**. We won't cutover now so you can see how to do this manually.



The image shows a Windows-style dialog box titled "vFiler Unit Migration Wizard - vfiler3". The dialog has a blue header bar with the title and a close button (X). Below the header, the text "Automatic cutover" is displayed, followed by a subtitle: "You can choose to automatically cutover from source to destination without manual intervention." The main area of the dialog contains a checkbox labeled "Cutover automatically after data transfer". Below this checkbox, there is a paragraph of text: "If you select this option, the system automatically performs the cutover operation after the data is transferred. If you do not select this option, you can manually initiate the cutover operation at any time after the data is transferred." Below this text is a text input field with the label "Pre cutover and post cutover script path:". At the bottom of the dialog, there is a footer area with the text "To continue, click Next." and three buttons: "< Back", "Next >" (which is highlighted with a blue border), and "Cancel".

vFiler Unit Migration Wizard - vfiler3

Automatic cutover
You can choose to automatically cutover from source to destination without manual intervention.

☐ Cutover automatically after data transfer

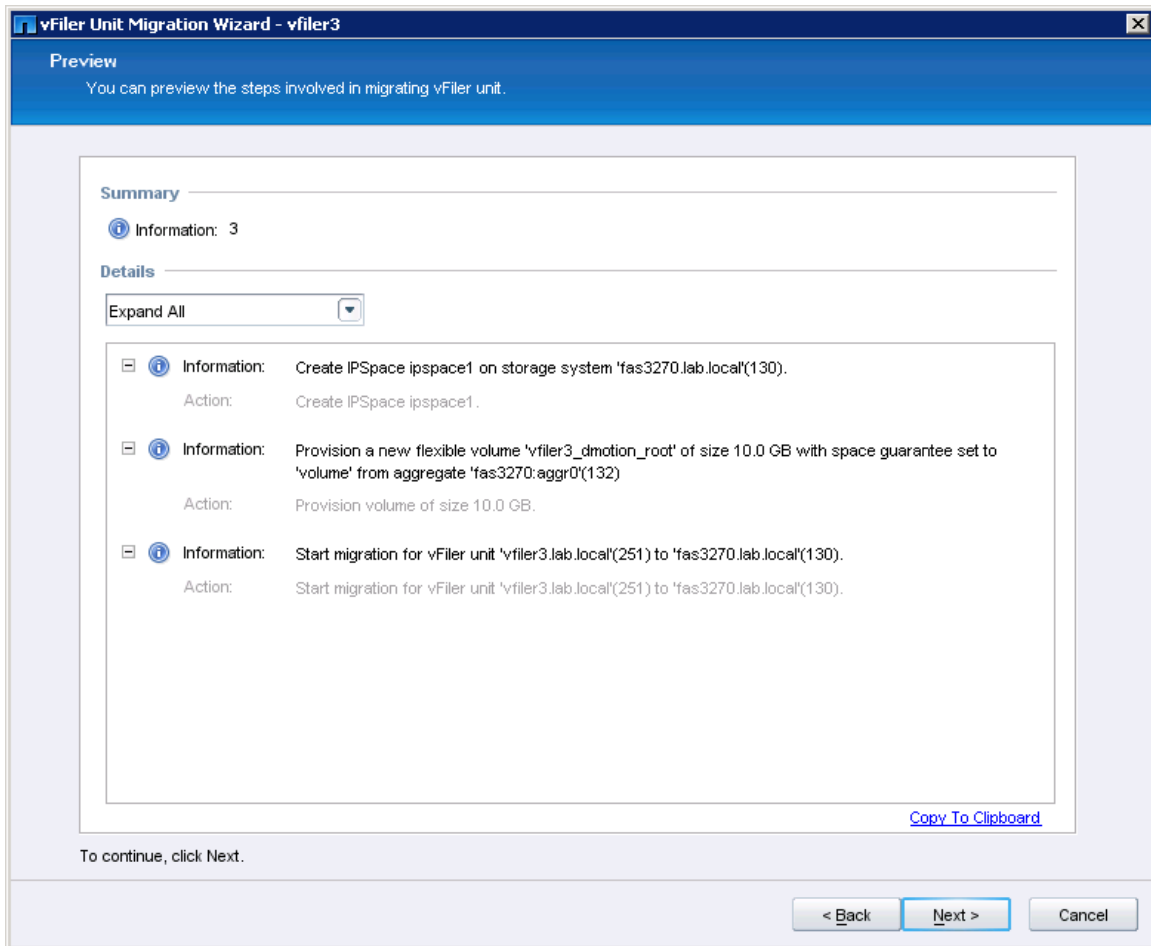
If you select this option, the system automatically performs the cutover operation after the data is transferred. If you do not select this option, you can manually initiate the cutover operation at any time after the data is transferred.

Pre cutover and post cutover script path:

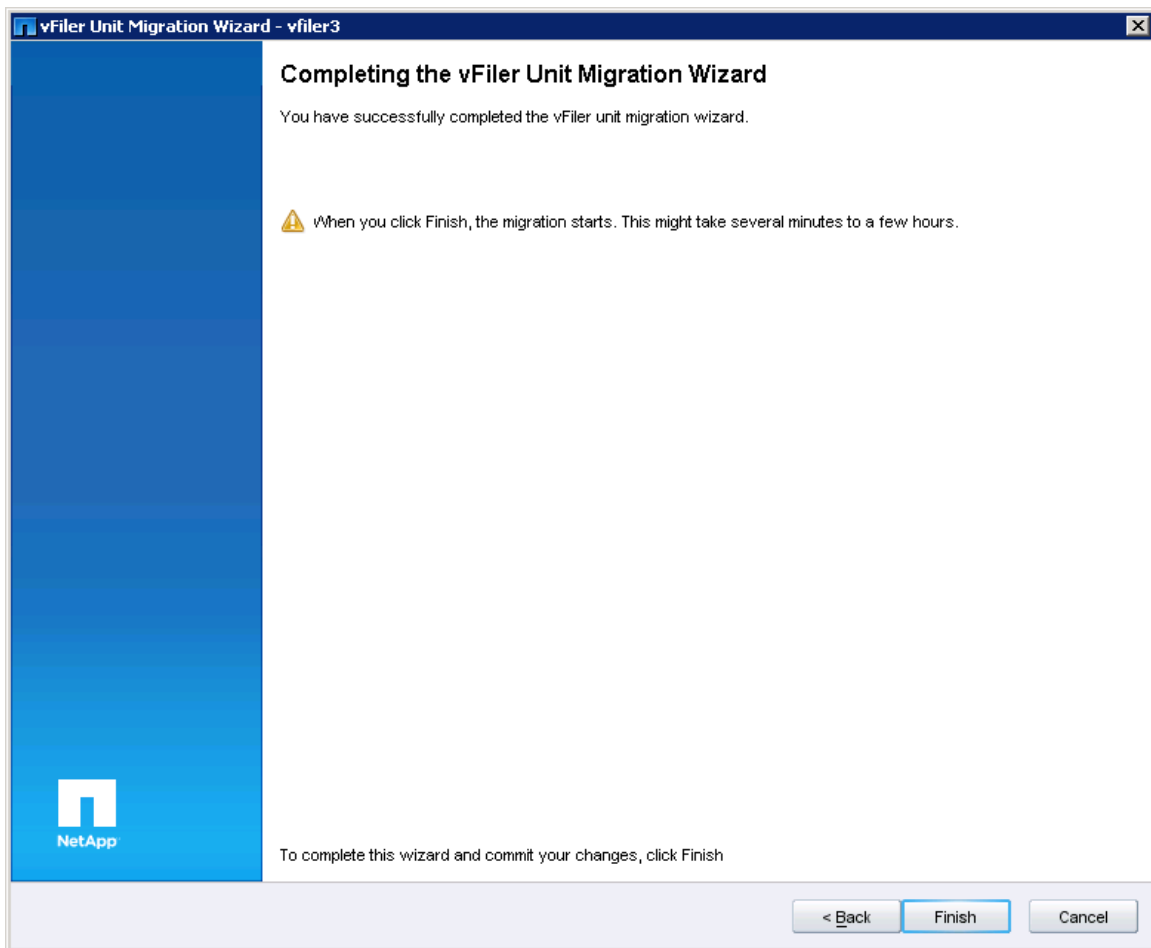
To continue, click Next.

< Back **Next >** Cancel

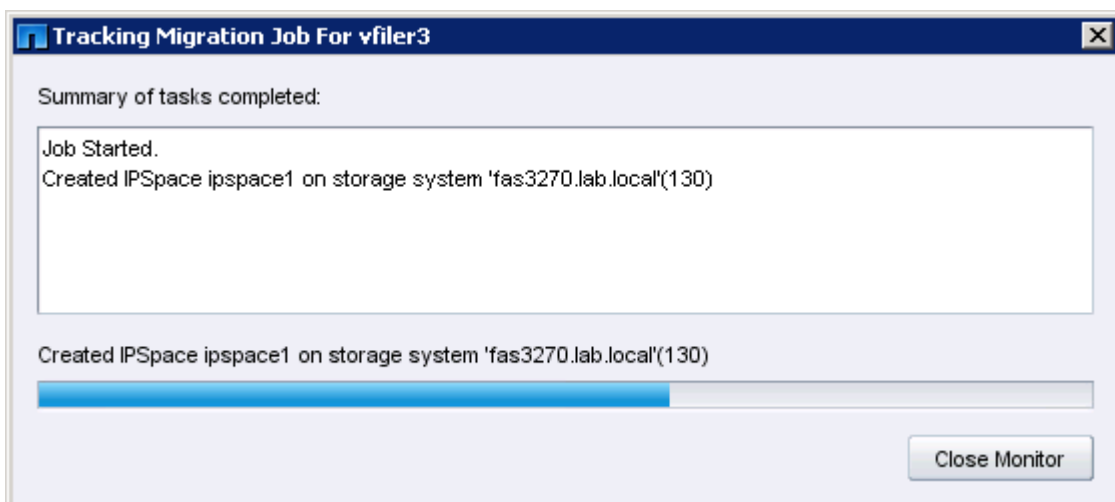
14. Click **Next** on the information screen.



15. Click **Finish**.



16. You will be able to watch the status of the job as it progresses.



17. When the Status is shown as *Started, cutover required*, click the **Cut over** button. You can also run **Update** to resync the mirrors if a long period has passed. The cutover process will take a while to begin, but once the cutover has begun, the pause in I/O from clients will not exceed 120 seconds.

The screenshot displays the NetApp Management Console interface. The title bar reads "NetApp Management Console: Manage Data - root on 192.168.0.31". The left sidebar contains navigation options: Dashboards, Data, Policies, Hosts, Storage Systems, Aggregates, vFiler Units (selected), QSV, and vFiler DR Units. The main panel is titled "Hosts: vFiler Units" and features a toolbar with buttons: Add, Setup, Delete, Start migration, Update, Cancel, Cut over, Roll back, and Clean up. Below the toolbar is a table with the following data:

Name	IP Address	IP Space	Hosting Storage System	System Status	Migration Status
vfiler1	192.168.0.220	ipspace1	fas6280 lab local	Online	Not started
vfiler2	192.168.0.221	ipspace1	fas6280 lab local	Online	Not started
vfiler3	192.168.0.222	ipspace1	fas6280 lab local	Online	Started, cutover required

Below the table, there are two sections: "General" and "Hosting storage system settings".

General

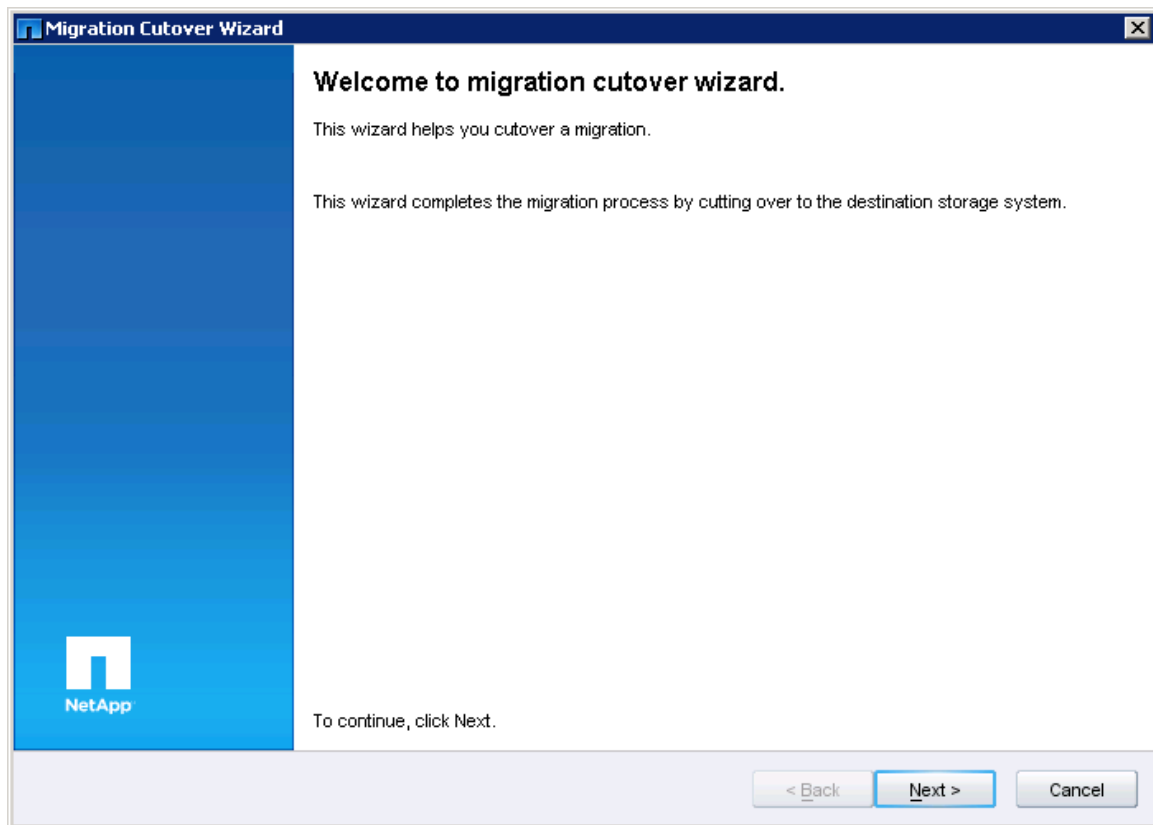
- Protocols: CIFS, NFS, iSCSI
- Mirrored: Yes
- Backup destination: Yes
- Backup source: Yes
- Service status:
 - NFS: Up
 - CIFS: Up
 - iSCSI: Up

Hosting storage system settings

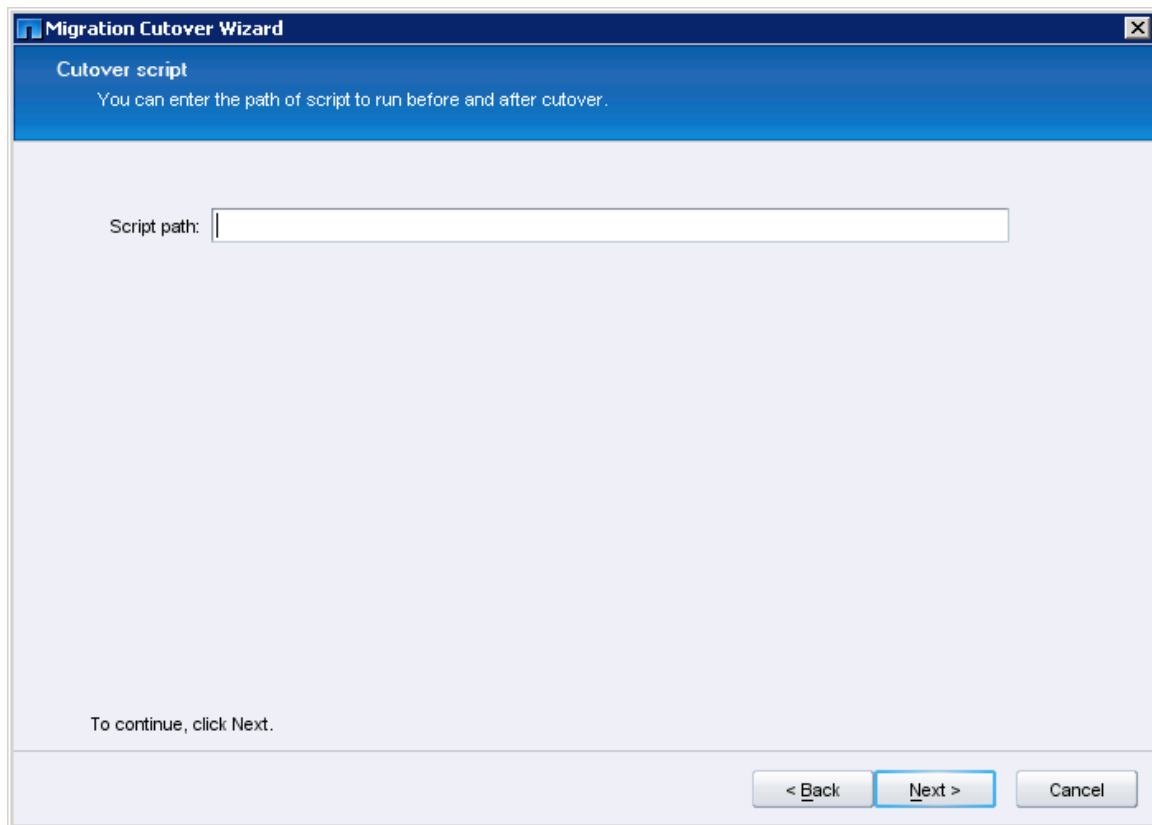
- Host name: fas6280
- IP address: 192.168.0.210
- System status: Online
- Login credentials status: Good
- NDMP status: Up
- NDMP credentials status: Good

At the bottom, there are tabs for: Details, Network Settings, Paths, Input Relationships, Output Relationships, and Migration.

18. The migration cutover wizard starts. Click **Next**.



19. Click **Next**.



The screenshot shows a Windows-style dialog box titled "Migration Cutover Wizard". The dialog has a blue header bar with the title and a close button (X). Below the header, the text "Cutover script" is displayed, followed by the instruction "You can enter the path of script to run before and after cutover." A text input field labeled "Script path:" is provided for the user to enter a script path. At the bottom of the dialog, there is a footer area with the text "To continue, click Next." and three buttons: "< Back", "Next >", and "Cancel". The "Next >" button is highlighted with a blue border, indicating it is the recommended action.

Migration Cutover Wizard

Cutover script

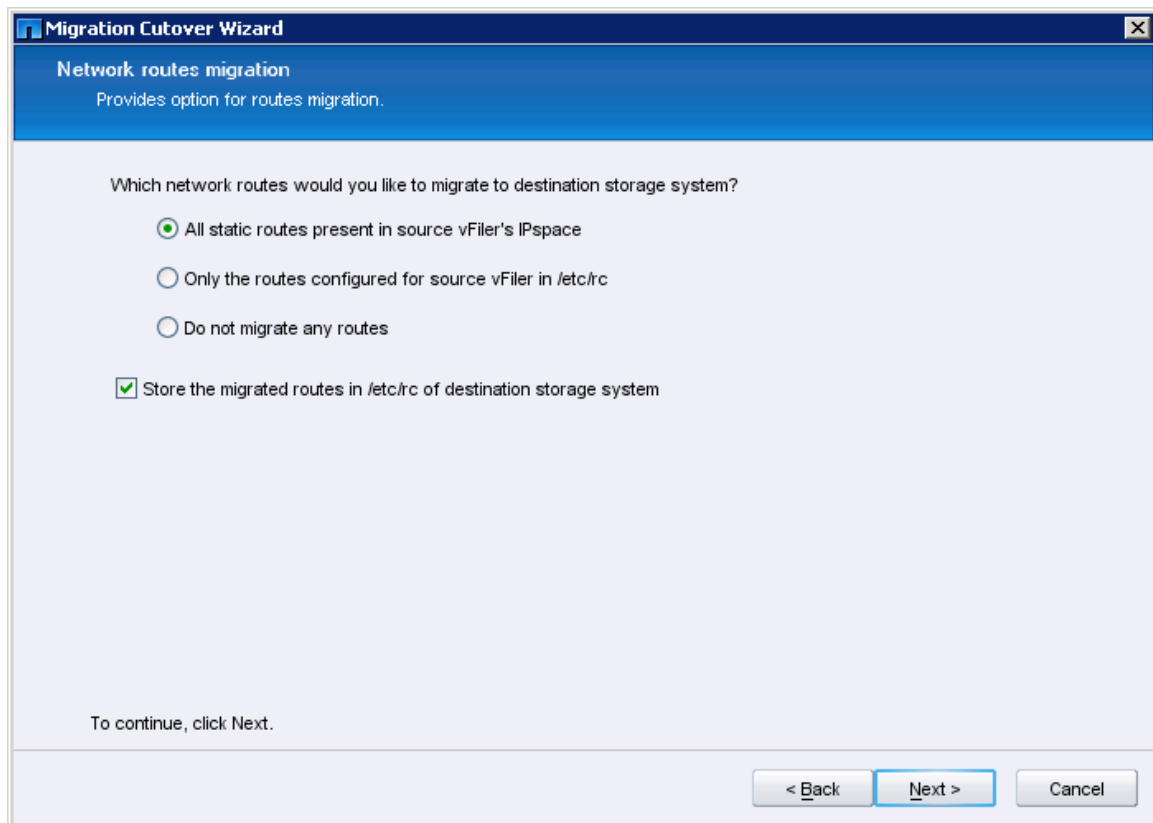
You can enter the path of script to run before and after cutover.

Script path:

To continue, click Next.

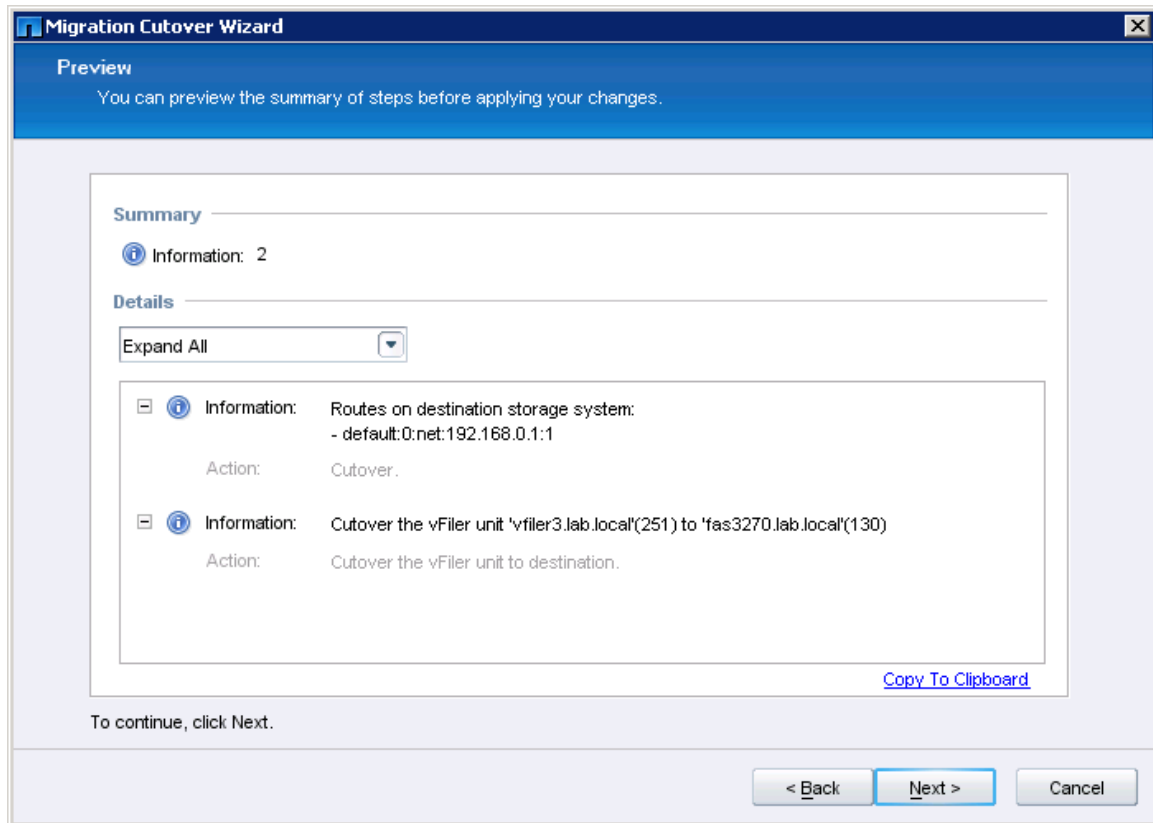
< Back Next > Cancel

20. Leave the defaults (All static routes radio button and Store the migrated routes checkbox) and click **Next**.

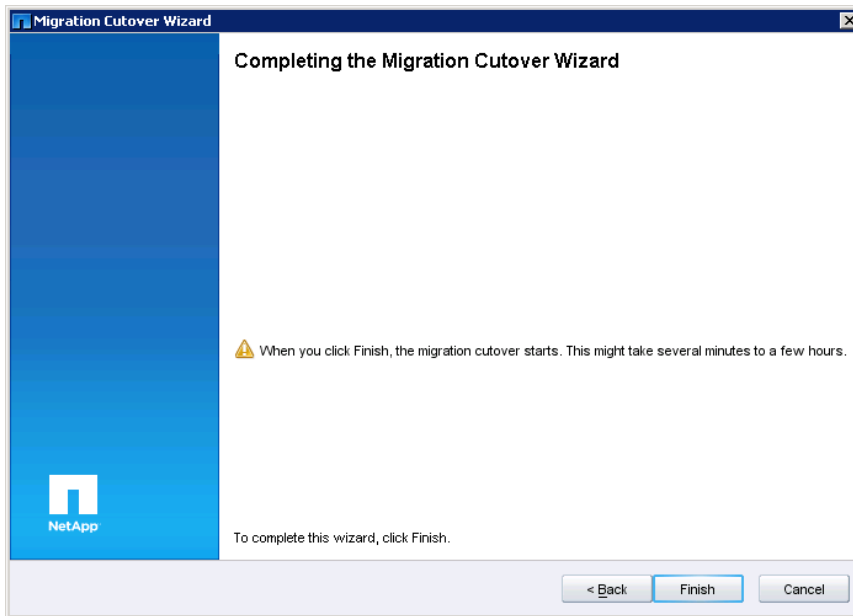


The screenshot shows a window titled "Migration Cutover Wizard" with a sub-header "Network routes migration" and the text "Provides option for routes migration." Below this, a question asks "Which network routes would you like to migrate to destination storage system?". There are three radio button options: "All static routes present in source vFiler's IPspace" (which is selected), "Only the routes configured for source vFiler in /etc/rc", and "Do not migrate any routes". Below the radio buttons is a checked checkbox labeled "Store the migrated routes in /etc/rc of destination storage system". At the bottom left, it says "To continue, click Next." At the bottom right, there are three buttons: "< Back", "Next >" (which is highlighted with a blue border), and "Cancel".

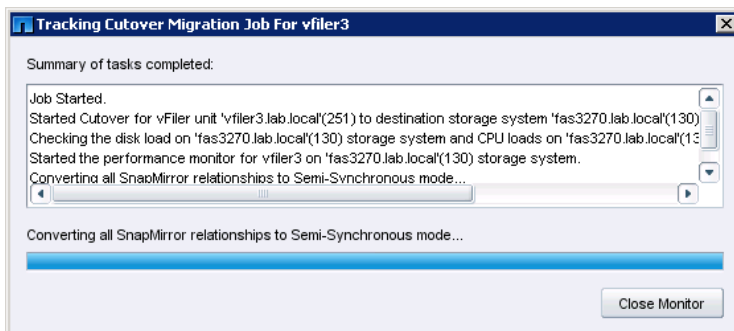
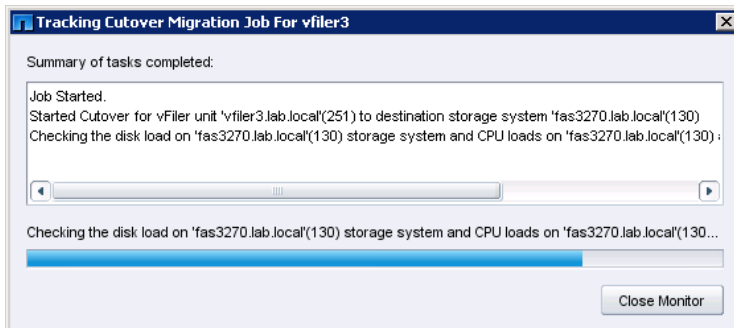
21. Click **Next**.



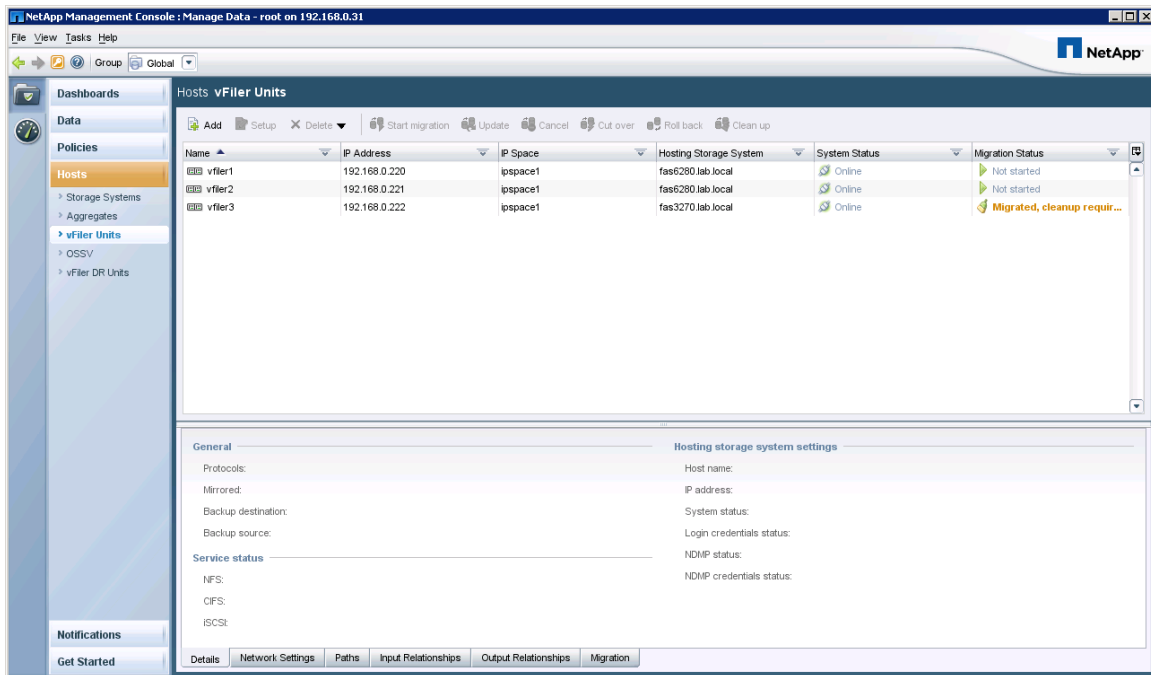
22. Click **Finish**.



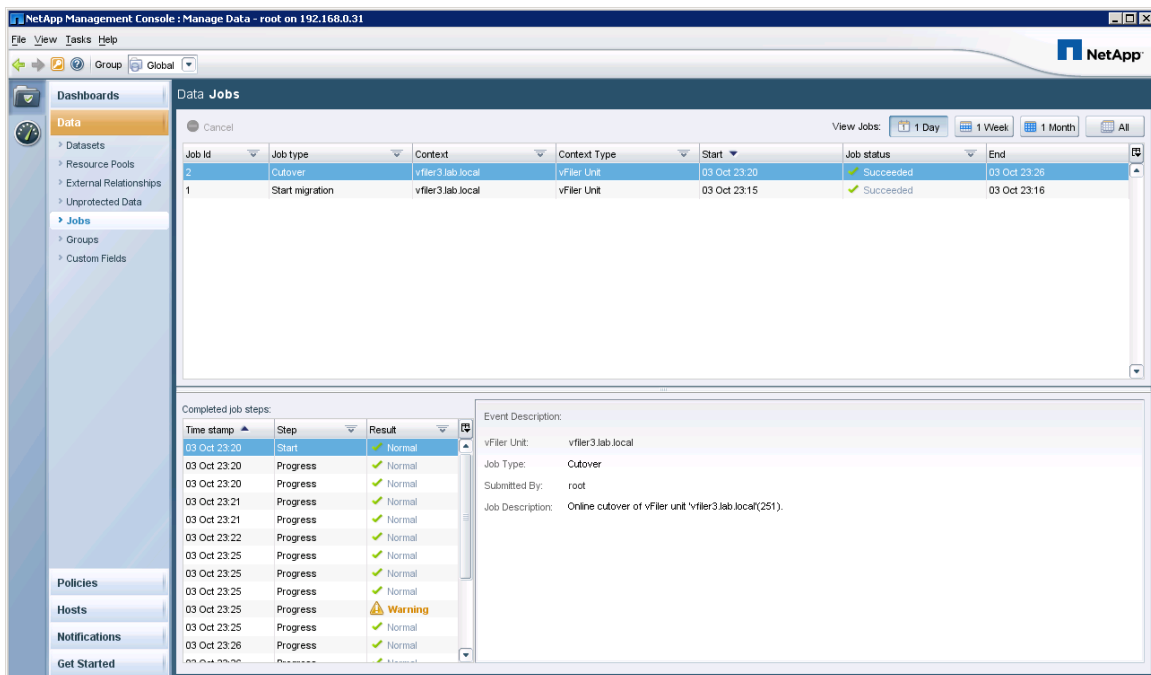
23. You will be able to watch the cutover job as it completes.



24. When the job window closes, the Migration Status is *Migrated, Cleanup Required*.



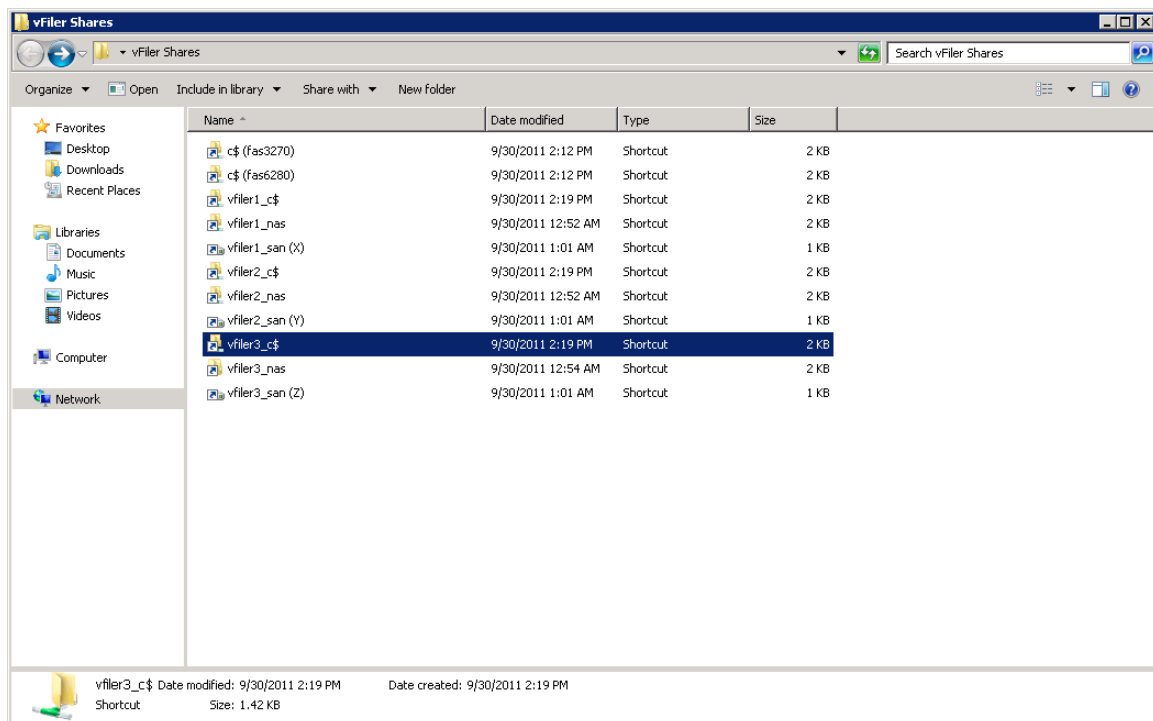
25. To see all jobs, click on the **Data** pane and select **Jobs**.



26. After this process you can again verify that after vfiler3 moved from the FAS6280 to the FAS3270 there is no outage to the data. Display your access to the NAS (CIFS and NFS) and SAN (iSCSI) connections on vfiler3. In the Linux PuTTY window, check the nfs mount:

```
[root@ ~]# ls -l /root/vfiler3
total 0
-rw-r--r-- 1 root root 12 Sep 30 01:17 test_vfiler3.txt
```

On the Windows machine, double-click “vFiler Shares” then click into each of the 3 vFiler shortcuts and confirm access to vfiler3_C\$, vfiler3_nas and vfiler3_san.



27. If you want to try some additional functionality, try the **Rollback** function in the NMC. This moves vfiler3 back to the FAS6280. The **Clean Up** operation removes all the original source volumes, SnapMirror configuration, Snapshots, and vfiler configuration from the FAS6280.

4 VFILER MIGRATE (CLI)

In the previous section you migrated a vFiler unit nondisruptively using the Online Migration capability of Provisioning Manager. Here we will show you how to perform the same migration using the **vfiler migrate** CLI command. If you recall, Provisioning Manager also has an Offline Migration capability. This is the same capability that you can manage from the CLI.

Both the Offline Migration and the CLI **vfiler migrate** command use Asynchronous SnapMirror for mirroring and cutover of data. This means that the cutover may take an unknown amount of time based on the load of the system, and the cutover can not happen during a guaranteed time. Both of these methods are disruptive.

In this lab we will migrate **vfiler1** from the FAS6280 simulator to the FAS3270. In this lab environment, the NFS and iSCSI clients will not see an outage because there is no load on the system and very little data in the volumes being mirrored. If you leave a CIFS window open to the **vfiler1** CIFS share, you will notice a disconnection.

NOTE: The **snapmirror.conf** file on the 3270 will update every 3 minutes by default (you would change this for a production migration). Volumes must be the same name on the source and target systems. IP space names must be the same name on source and target systems (they were pre-created for these labs). The mirrors run from **vfiler0** (physical controller) and not to the vFiler units directly.

For information on how to move vFiler units between controllers in the same HA pair, using **vfiler migrate** (-m nocopy), see Appendix D.

1. To begin a **vfiler migrate** process, first show the status:

```
fas3270> vfiler status -a
```

2. Then you'll execute the **migrate start** command. Note that we are executing this command from the destination system, not from the source, so we have to provide a login and password for the source system.

```
fas3270> vfiler migrate start -c secure -l root:netapp123 vfiler1@fas6280
```

3. When prompted, answer **y** to keep the same **.220** IP address. Enter **e0b** for the interface, and use **255.255.255.0** for the subnet.

4. Now you can show the status of the migration. Wait until SnapMirror status shows as **Idle** for all three volumes.

```
fas3270> vfiler migrate status vfiler1@fas6280
```

```
fas3270> snapmirror status
```

5. Once the SnapMirror status shows as **idle**, you can complete the migration. When you enter this command, the vFiler unit on the source system is stopped. A final incremental SnapMirror update is processed, and the vFiler unit is then started on the destination system.

```
fas3270> vfiler migrate complete -c secure -l root:netapp123 vfiler1@fas6280
```

6. You can now see that the vfiler unit has been moved:

```
fas3270> vfiler status -a          # vfiler1 running on the 3270
```

```
fas6280> vfiler status -a          # vfiler1 is gone on the 6280
```

7. As with the previous DataMotion for vFiler session, you can confirm that CIFS, NFS and iSCSI access continues for **vfiler1** even though it has moved physical controllers.

NFS (Linux)

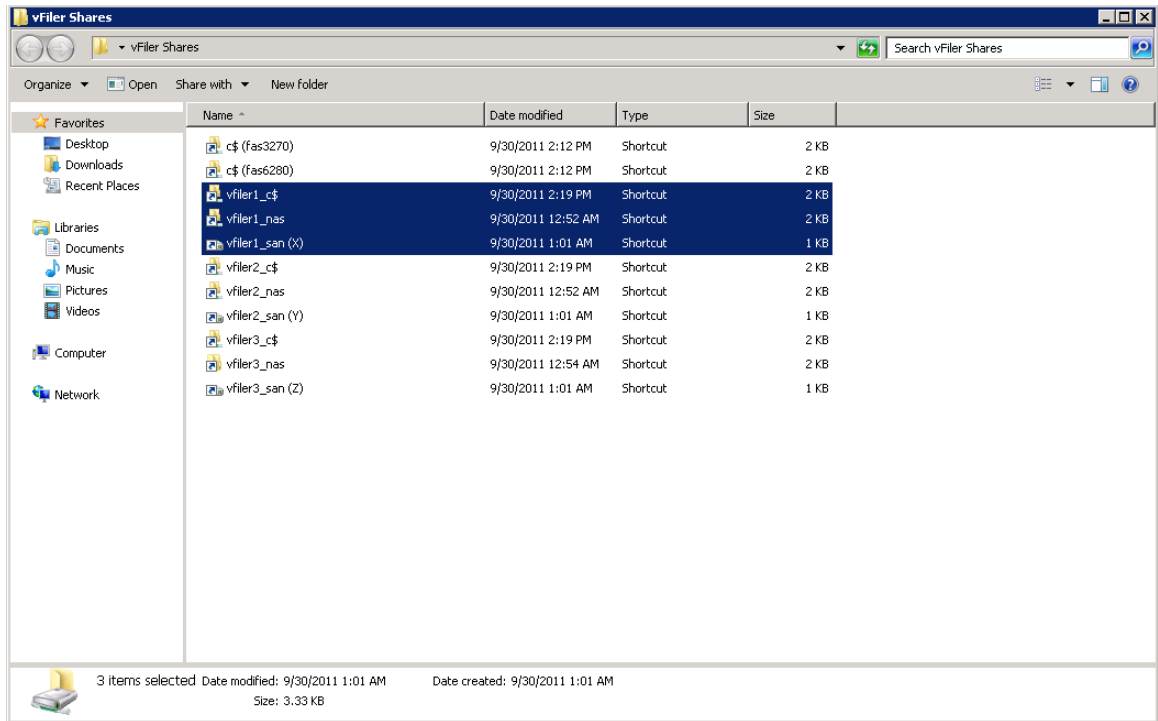
```
[root@ ~]# ls -l /root/vfiler1
total 0
-rw-r--r-- 1 root root 12 Sep 30 01:17 test_vfiler1.txt
```

CIFS (access from vFiler Shares on desktop)

```
\\192.168.150.220\vfiler1_nas
```

iSCSI (access from vFiler Shares on desktop)

x: \



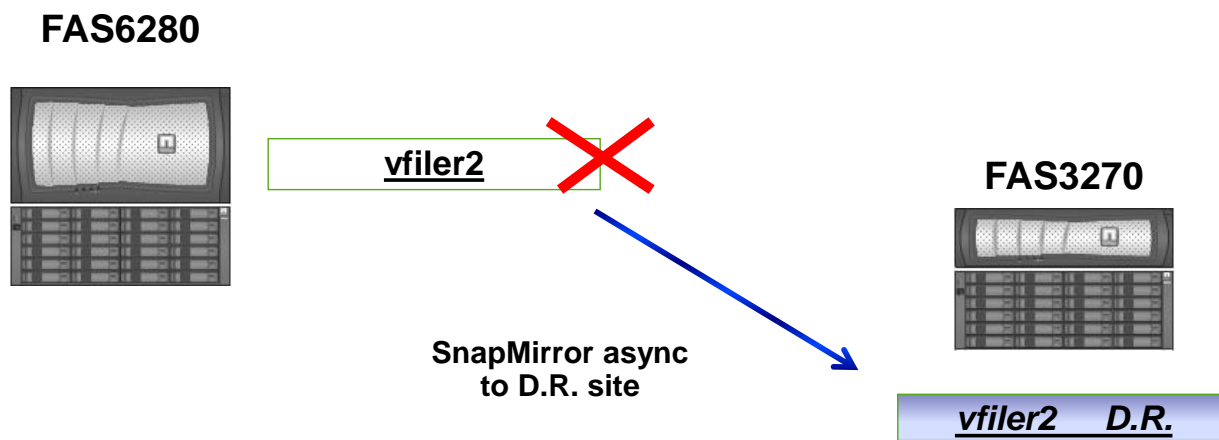
5 VFILER DR

A new plugin is available for the NetApp Management Console (NMC) that allows you to configure and activate vFiler DR relationships. This lab will show you how to use the plugin to configure a new vFiler DR relationship. You will then use the CLI to simulate an outage and activate the DR vFiler, and resync it with the source site.

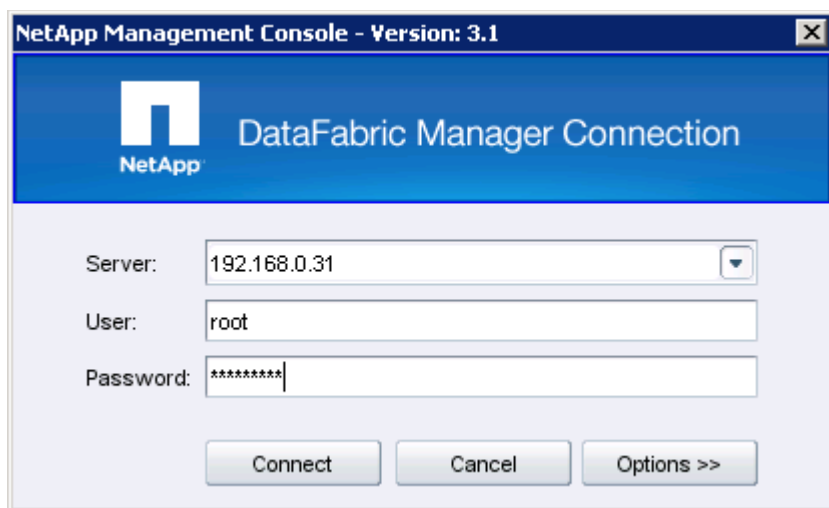
5.1 CONFIGURING VFILER DR WITH THE ONCOMMAND 5 NMC PLUGIN

```
** The equivalent CLI to the GUI below **  
fas3270> vfiler dr configure -u -c secure -l root:netapp123 vfiler2@fas6280
```

Figure 6) vFiler DR Diagram



1. Double Click the NetApp Management Console (NMC) on the Windows 2008 Desktop. Enter the password **netapp123** then click **Connect**.



Click on the **Hosts** pane on the left.

The screenshot shows the NetApp Management Console interface. The title bar reads "NetApp Management Console : Manage Data - root on 192.168.0.31". The top menu includes "File", "View", "Tasks", and "Help". Below the menu is a navigation bar with "Group" and "Global" options. The left sidebar contains a "Dashboards" section with a "Protection" link and a "Provisioning" link. Below this is a "Data" section with links for "Policies", "Hosts", "Notifications", and "Get Started". The main content area is titled "Dashboards Protection" and contains several panels:

- Failover Readiness:** Shows a green bar with a checkmark and the word "Normal". Below it, "Total Datasets" is 0.
- Top Five Events:** A table with "Event" and "Source" columns.

Event	Source
Interface Status Down	fas6280:e0c
Interface Status Down	fas6280:e0d
Interface Status Down	fas3270:e0c
Interface Status Down	fas3270:e0d
Snapshot Full	vfiler2:/vfiler2_root.sn...
- Dataset Protection Status:** A table with status and count.

Status	Count
Baseline Failure	0
Lag Error	0
Lag Warning	0
Job Failure	0
Protection Suspended	0
Uninitialized	0
Protected	0
- Protected Data:** A table with data type and count.

Data Type	Count
Datasets	0
Volumes	0
Ctrees	0
OSSV Directories	0
- Unprotected Data:** A table with data type and count.

Data Type	Count
Datasets	0
Volumes	15
Ctrees	15
- Dataset Lags:** Shows "No data available".
- External Relationship Lags:** A table with "Source", "State", and "Lag" columns. It shows "No data available".

2. Click **vFiler DR Units** and select **vfiler2**. Click the **Protect** button.

The screenshot shows the NetApp Management Console interface. The left sidebar contains navigation options: Dashboards, Data, Policies, Hosts (selected), Storage Systems, Aggregates, vFiler Units, OSSV, and vFiler DR Units. The main content area is titled 'Hosts vFiler DR Units' and features a table with columns: Name, Host, Status, Protection Role, and Protection Status. The table lists three vFiler units: vfiler1, vfiler2, and vfiler3. vfiler2 is selected, and its details are shown in the 'Details' section below the table. The details section includes 'Licensed Protocols: NFS,CIFS,ISCSI', 'Allowed Protocols:', 'IP Space: ipspace1', 'Service status', 'RSH:', 'NFS:', 'CIFS:', 'iSCSI:', 'Hosting storage system', 'Host name: fas6280', 'IP address: 192.168.0.210', 'System status: Online', and 'Login credentials status: Good'.

Name	Host	Status	Protection Role	Protection Status
vfiler1	fas6280	Running		
vfiler2	fas6280	Running		
vfiler3	fas3270	Running		

Details

Licensed Protocols: NFS,CIFS,ISCSI
Allowed Protocols:
IP Space: ipspace1

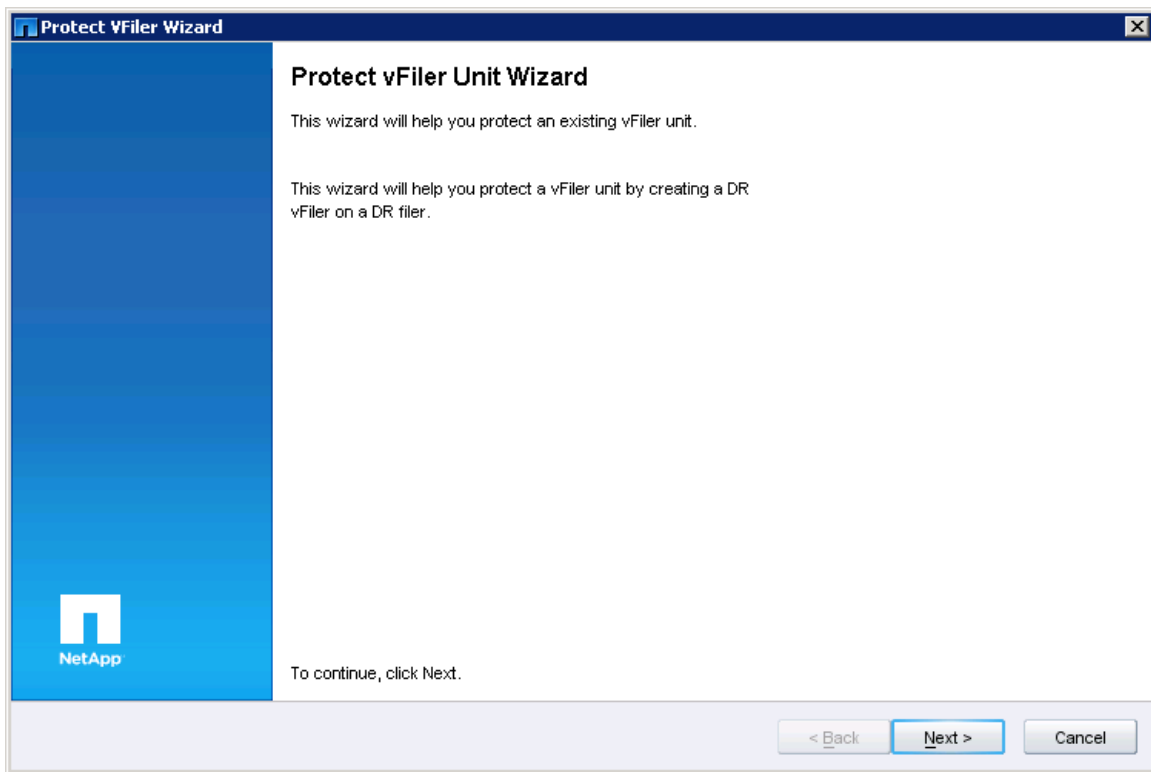
Service status

RSH:
NFS:
CIFS:
iSCSI:

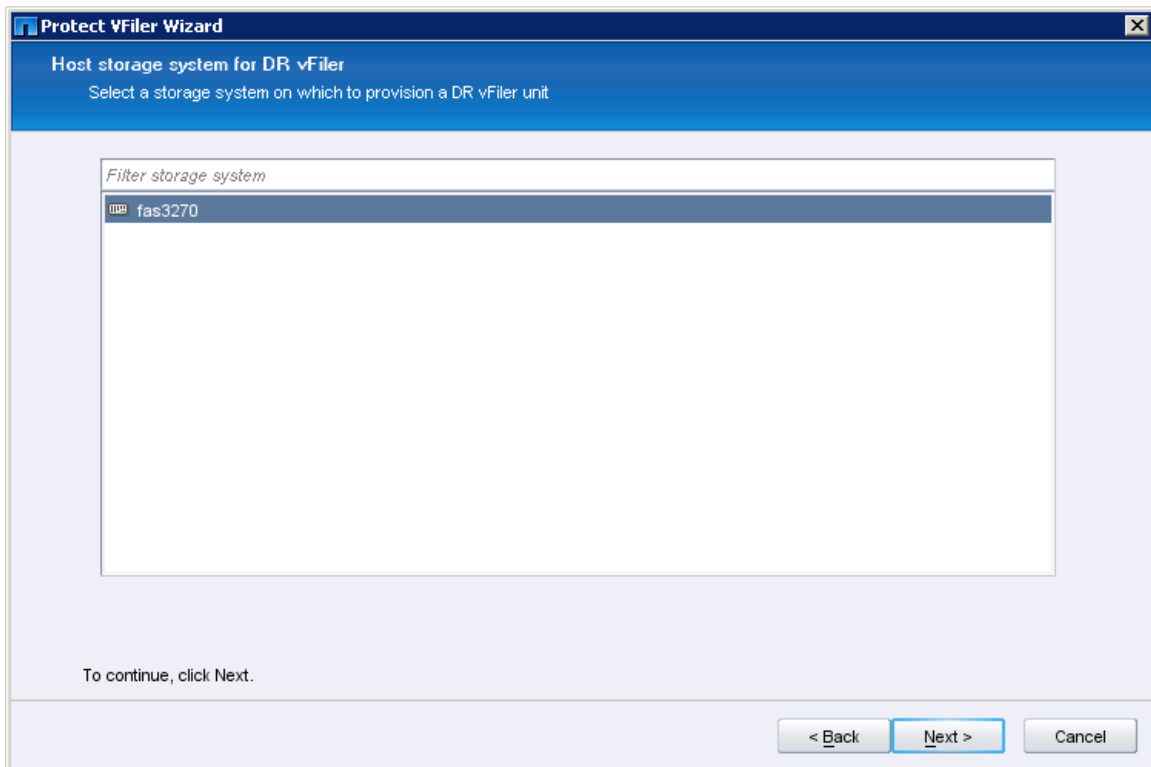
Hosting storage system

Host name: fas6280
IP address: 192.168.0.210
System status: Online
Login credentials status: Good

3. Click **Next**.



4. Click **Next** as there is only one storage system in the list.



5. Click **Next**, as we are keeping the same IP and interface settings.

The screenshot shows the 'Protect Vfiler Wizard' window, specifically the 'Network Interfaces for DR vFiler (Optional)' step. The title bar reads 'Protect Vfiler Wizard'. The main heading is 'Network Interfaces for DR vFiler (Optional)' with a subtitle 'Customize the network interface configuration for DR vFiler'. There is a checkbox 'Customize the ip settings' which is unchecked. Below it, the 'Parent storage system' is listed as 'fas3270.lab.local'. There are three icons: 'Add', 'Edit', and 'Delete'. A table with three columns is shown: 'IP address', 'Network mask', and 'Network interface'. The table is currently empty. At the bottom, there is a message 'To continue, click Next.' and three buttons: '< Back', 'Next >', and 'Cancel'.

IP address	Network mask	Network interface
------------	--------------	-------------------

6. Click next to use the default protection values. The destination volumes have been precreated as part of the lab. In a real-world scenario you would need to create these.

The screenshot shows the 'Protect Vfiler Wizard' window, specifically the 'Configure protection volume settings' step. The title bar reads 'Protect Vfiler Wizard'. The main heading is 'Configure protection volume settings' with a subtitle 'Each volume on the primary must exist on the DR filer. Verify or change the aggregate mapping and sync settings as required.' A table with three columns is shown: 'Primary Volume', 'Protection Volume', and 'Sync Settings'. The table contains three rows of data. At the bottom, there is a message 'To continue, click Next.' and three buttons: '< Back', 'Next >', and 'Cancel'.

Primary Volume	Protection Volume	Sync Settings
aggr0:vfiler2_root	aggr0:vfiler2_root <Existing>	Unchanged (Async)
aggr0:vfiler2_nas	aggr0:vfiler2_nas <Existing>	Unchanged (Async)
aggr0:vfiler2_san	aggr0:vfiler2_san <Existing>	Unchanged (Async)

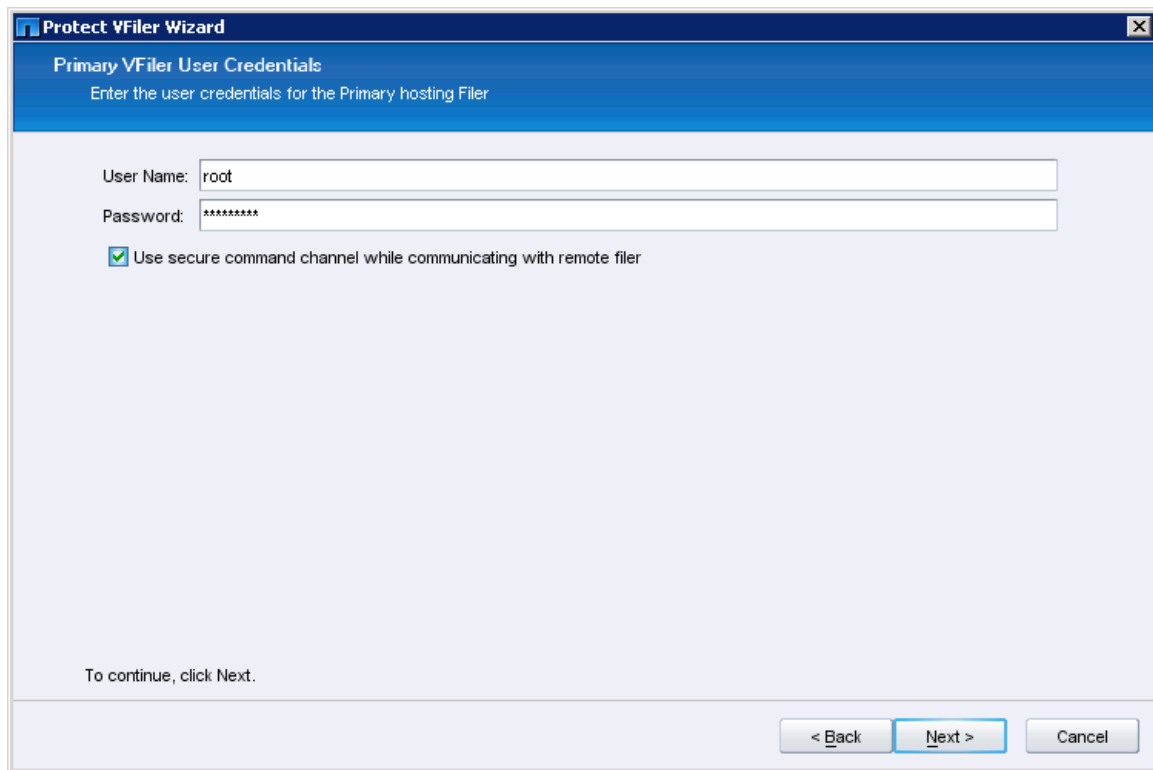
7. Click **Next** to use the same DNS and NIS settings.

The screenshot shows the 'Protect VFile Wizard' window with the title 'DNS and NIS Settings (Optional)'. Below the title bar, it says 'Specify the optional DNS and NIS settings.' There are two sections: 'DNS domain' and 'NIS domain'. Each section has a 'Servers:' label, a text input field, and 'Add' and 'Delete' buttons. Below each input field is a larger, empty rectangular area with up and down arrow buttons on the right side. At the bottom left, there is an information icon and the text 'Enter either IPv4 or IPv6 address.' At the bottom right, there are three buttons: '< Back', 'Next >', and 'Cancel'.

8. Click **Next**. If you needed to specify alternate source or destination IP addresses, you could do that here (for example, if you have a specific network for SnapMirror replication).

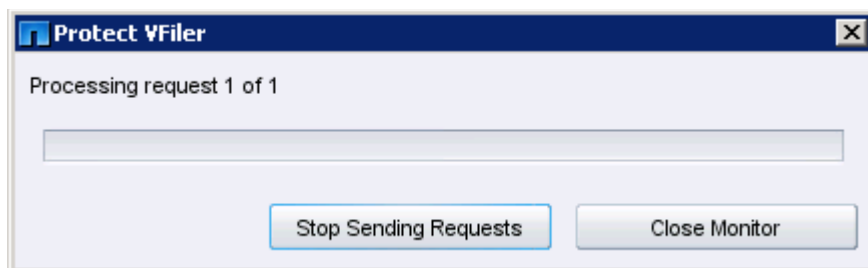
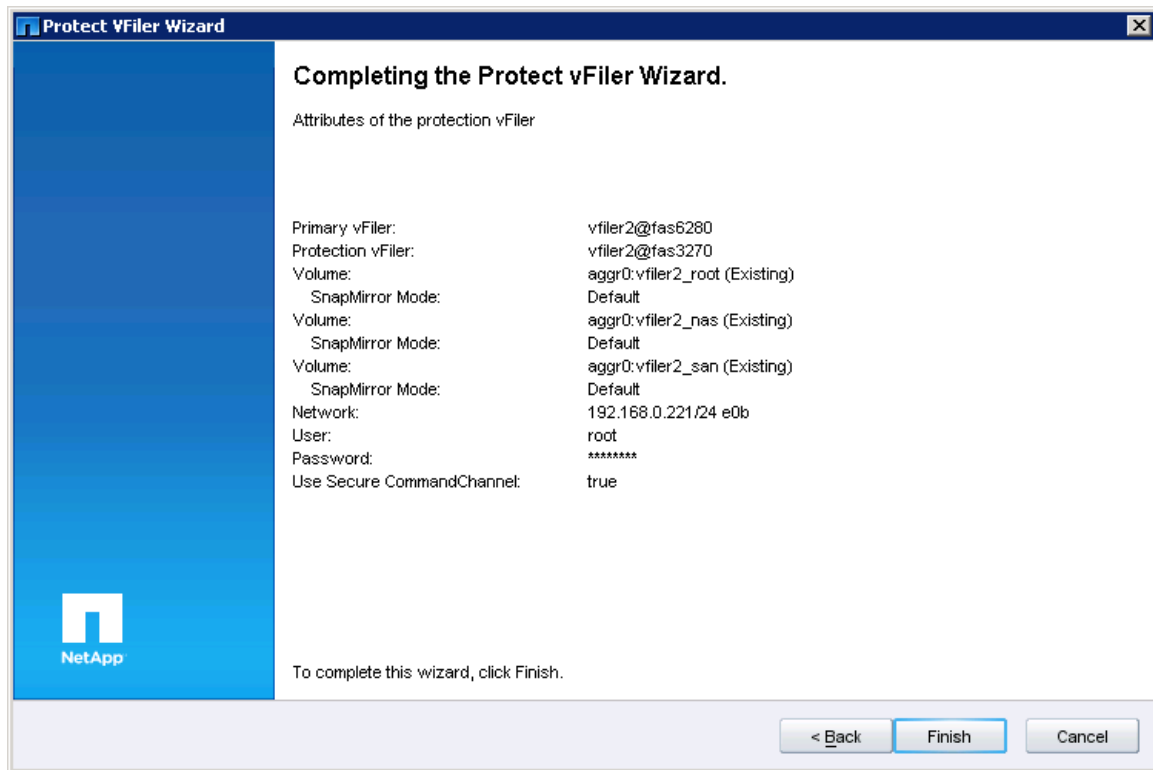
The screenshot shows the 'Protect VFile Wizard' window with the title 'Alternate Hostname or IP Address (Optional)'. Below the title bar, it says 'Specify an alternate source and destination hostname or IP address of the storage controllers to use for the DR mirror, e.g. if a dedicated network for replication is present.' There are two labels: 'Alternate Source:' and 'Alternate Destination:', each followed by a text input field. At the bottom left, there is the text 'To continue, click Next.' At the bottom right, there are three buttons: '< Back', 'Next >', and 'Cancel'.

9. Enter the appropriate credentials for the source system (**root : netapp123**), and check the **Use secure command channel**, then click **Next**.



The image shows a Windows-style dialog box titled "Protect Vfiler Wizard". The main heading is "Primary Vfiler User Credentials" with a subtitle "Enter the user credentials for the Primary hosting Filer". There are two text input fields: "User Name:" containing "root" and "Password:" containing "*****". Below these is a checkbox labeled "Use secure command channel while communicating with remote filer" which is checked. At the bottom left, it says "To continue, click Next." At the bottom right, there are three buttons: "< Back", "Next >" (which is highlighted with a blue border), and "Cancel".

10. Click **Finish**.



11. Once the DR relationship has been defined, you can view it both in the NMC as well as the CLI.
NOTE: The NMC refreshes DR relationships slowly, so it may take several minutes for the Protection Role to show as **DR Backup**.

NetApp Management Console : Manage Data - root on 192.168.0.31

File View Tasks Help

Group Global

NetApp

Dashboards

Data

Policies

Hosts

Storage Systems

Aggregates

vFiler Units

vFiler DR Units

Notifications

Get Started

Hosts vFiler DR Units

Create Edit Protect Delete Start Stop Activate Resync Refresh

Name	Host	Status	Protection Role	Protection Status
vfiler1	fas6280	Running	Primary	Ok
vfiler2	fas3270	Stopped	DR Backup	Ok
vfiler2	fas6280	Running	Primary	Ok
vfiler3	fas3270	Running	Primary	Ok

Details

Licensed Protocols: NFS,CIFS,iSCSI

Allowed Protocols:

IP Space: ipspace1

Service status

RSH:

NFS:

CIFS:

iSCSI:

Hosting storage system

Host name: fas3270

IP address: 192.168.0.211

System status: Online

Login credentials status: Good

Details Network Settings Storage Settings

12. You can also show the vfiler status using the CLI:

```
fas3270> vfiler status
vfiler0                running
vfiler3                running
vfiler2                stopped, DR backup
```

5.2 ACTIVATE A DR VFILER

The elegance of vFiler DR is that it breaks all mirrors automatically, and it also contains the shares, exports, iSCSI mappings, IP addresses, and other settings from the source vFiler unit. Without vFiler DR, you would have to manually break mirrors, and recreate all of the configuration manually at the DR destination site. Note: You could activate from the vFiler DR plugin in the NMC above, but we will show via CLI.

Here you will shut down vfiler2 on the FAS6280 system, to simulate a disaster at the source site. The destination vfiler2 will be activated on the FAS3270 system.

1. First, you will simulate a disaster on the source system:

```
fas6280> vfiler stop vfiler2
```
2. Next, activate the DR vFiler on the destination system:

```
fas3270> vfiler dr activate vfiler2@fas6280
```
3. Display the vFiler status on each system. Obviously in a real disaster you may not be able to see that the vfiler on the source system is stopped, but this is a valid use case for DR testing.

```
fas6280> vfiler status -a
```



```
fas3270> vfiler status -a
```
4. As with the previous sessions, you can confirm that CIFS, NFS and iSCSI access continues for vfiler2 even though it has moved physical controllers.

NFS (Linux)

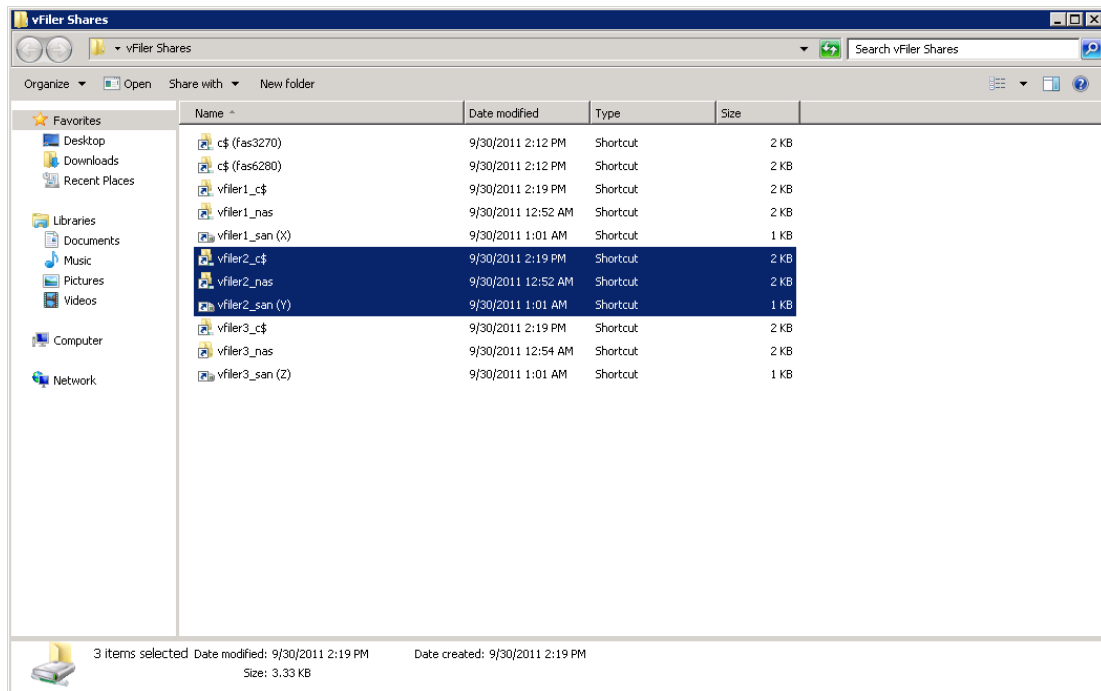
```
[root@ ~]# ls -l /root/vfiler2
total 0
-rw-r--r-- 1 root root 12 Sep 30 01:17 test_vfiler2.txt
```

CIFS (access from vFiler Shares on desktop)

\\192.168.150.221\vfiler2_nas

iSCSI (access from vFiler Shares on desktop)

x: \

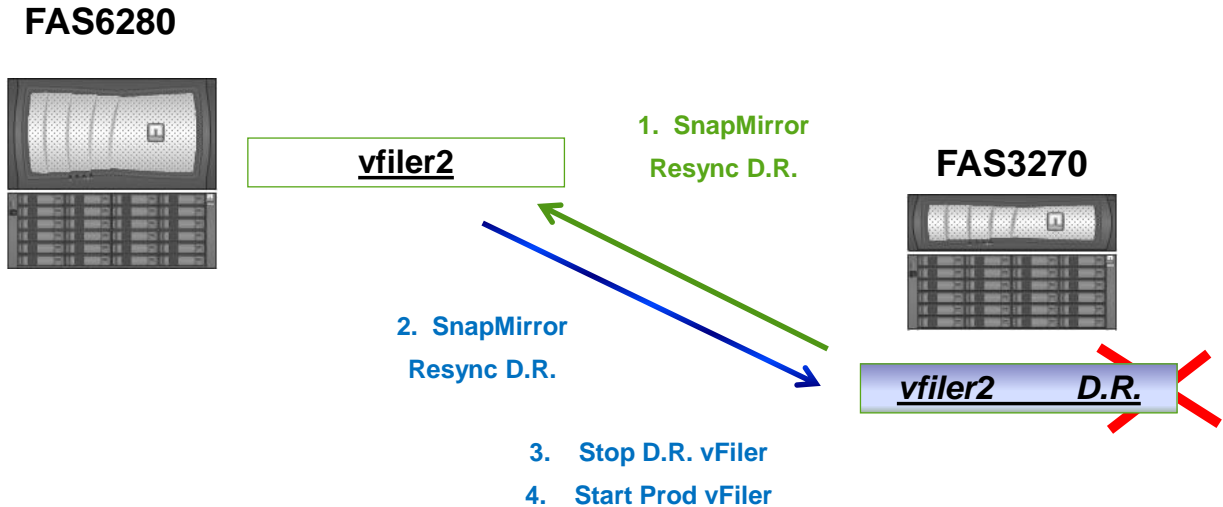


5.3 RESYNC A DR VFILER

Now that you've simulated a disaster and seen how to bring up a DR vFiler at a destination site, you'll want to know how to resync the destination site with the source once the disaster is over. Note: You could resync from the vFiler DR plugin in the NMC above, but we will show via CLI.

In this section you will perform a vFiler DR resync back to the FAS6280 system, failover the DR vfiler, and resync again back to the destination. This will return vfiler2 back to the source system in the same state it was before we simulated a disaster above.

Figure 7) vFiler DR Resync Diagram



1. To resync the running DR vfiler2 back to the source production site:

```
fas6280> vfiler dr resync -c secure -l root:netapp123 vfiler2@fas3270
fas6280> vfiler dr status vfiler2@fas3270
fas6280> snapmirror status
fas6280> vfiler status -a
```
2. Once the SnapMirror status in step 1 shows as **Idle**, you can then stop the DR vFiler and activate it again on the source production site. NOTE: Make certain you issue the commands on the correct simulators.

```
fas3270> vfiler stop vfiler2
fas6280> vfiler dr activate vfiler2@fas3270
fas3270> vfiler status -a
fas6280> vfiler status -a
```
3. Now, in order to restore the DR relationship so that the DR vFiler on the FAS3270 returns to the correct state of *Stopped, DR Backup*, you will need to again resync the relationship.

```
fas3270> vfiler dr resync -c secure -l root:netapp123 vfiler2@fas6280
fas3270> vfiler dr status vfiler2@fas6280
fas3270> snapmirror status
fas3270> vfiler status -a
```

4. Finally, you can release the SnapMirror relationships which are left over from the resync of the original source volumes:

```
fas3270> snapmirror release vfiler2_root fas6280:vfiler2_root
```

```
fas3270> snapmirror release vfiler2_san fas6280:vfiler2_san
```

```
fas3270> snapmirror release vfiler2_nas fas6280:vfiler2_nas
```

5.4 VFILER DR USING EXISTING SNAPMIRROR

A new option (**-u**) was introduced in Data ONTAP 7.3.5 and Data ONTAP 8.1 7-mode to allow creation of a vFiler DR relationship using an existing SnapMirror relationship. This means that if you have existing SnapMirror relationships between two storage controllers, you can use them to initialize a vFiler DR relationship. All volume mirrors must be initialized prior to using this option.

1. Here, we will delete the existing DR relationship for vfiler2 on the FAS6280, use the volumes to create new initialized SnapMirror relationships with the FAS3270, and then use those relationships to create a new DR vfiler. This simulates a situation where you already have mirrored volumes and do not wish to perform a new baseline.

```
fas3270> vfiler dr delete vfiler2@fas6280
fas3270> vol restrict vfiler2_root
fas3270> vol restrict vfiler2_nas
fas3270> vol restrict vfiler2_san
fas3270> snapmirror initialize -S fas6280:vfiler2_root vfiler2_root
fas3270> snapmirror initialize -S fas6280:vfiler2_nas vfiler2_nas
fas3270> snapmirror initialize -S fas6280:vfiler2_san vfiler2_san
fas3270> snapmirror status
```

2. Once the SnapMirror status shows **Idle**, you can create the vFiler DR relationship using the **-u** option:

```
fas3270> vfiler dr configure -u -c secure -l root:netapp123 vfiler2@fas6280
```

When prompted, use the same IP address. Enter **e0b** as the interface, and 255.255.255.0 for the subnet mask. Answer **N** to use the same DNS settings.

3. You can now check the status and you will see that the vFiler DR relationship has been created.

```
fas3270> snapmirror status
fas3270> vfiler status
```

4. **NOTE:** When using the **-u** command, the vFiler DR configure process will change the existing settings in `/etc/snapmirror.conf` to every 3 minutes. In a production scenario you will want to change these settings back to an interval of your choosing.

CLEANUP

Stop the DR vFiler on the FAS6280 and activate the vFiler unit on the FAS3270:

```
fas6280> vfiler stop vfiler2
fas6280> vfiler status -a
fas3270> vfiler dr activate vfiler2@fas6280
fas3270> vfiler status -a
```


6 MOVING THE VFILER ROOT VOLUME

To move the root volume into a different aggregate, the vfiler must be stopped, destroyed and recreated using the same root volume name. The new root must be renamed to the old root name.

NOTE: You can rename any vFiler volume (including root) with **vol renameold new** at any time, however to actually move the root volume requires that we destroy and recreate the vFiler using the same name of the root volume before/after the move to another aggregate.

The procedure below will move the vfiler1_root volume to newroot (which will become vfiler1_root)

1. Create anew root volume, restrict it, and vol copy the existing root to the newroot:

```
fas3270> vol create newroot -s none aggr0 20m  
  
fas3270> vol restrict newroot  
  
fas3270> vol copy start -S vfiler1_root newroot
```

2. Stop and destroy the vfiler:

```
fas3270> vfiler stop vfiler1  
  
fas3270> vfiler destroy vfiler1
```

3. Rename volumes so the newroot is the same name as oldroot

```
fas3270> vol rename vfiler1_root oldroot  
  
fas3270> vol rename newroot vfiler1_root
```

4. Online the new root volume and recreate the vfiler:

```
fas3270> vol online vfiler1_root  
  
fas3270> vfiler create vfiler1 -r /vol/vfiler1_root
```

5. **NOTE:** The e0b interface will not be configured and needs to be configured. You will need to ifconfig the interface. You will also need to update the rc file in a production environment.

```
fas3270> vfiler status -a  
  
fas3270> ifconfig e0b alias 192.168.150.220  
  
fas3270> vfiler status -a
```

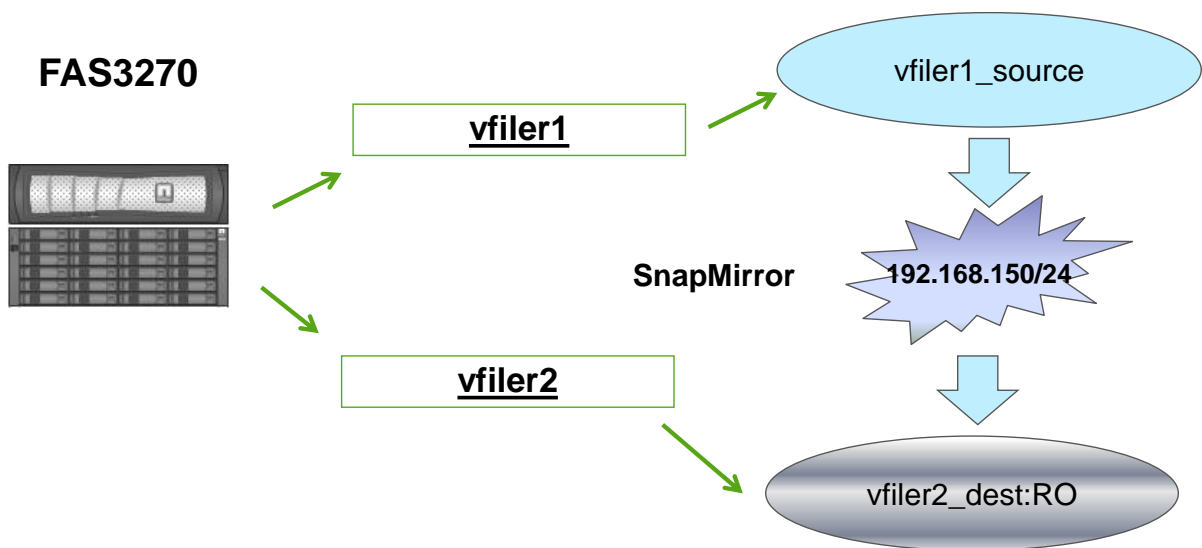
7 SNAPMIRROR BETWEEN VFILER UNITS

Here we show two methods of mirroring between vfiler units on the same physical controller, one using the vfiler network, and the other using physical filer loopback address (vfiler0). The advantage of mirroring from a vfiler is if the vfiler moves, then the mirror follows. If you are mirroring from vfiler0, mirrors need to be resynced when moved to a new target controller. The advantage in mirroring from vfiler0 is if there is a DMZ or no network route between vFiler units, you can still replicate data.

NOTE: If you run snapmirror from the vFiler, the logs are in /etc/log/snapmirror of the vFiler, not vfiler0. Logs reside wherever the mirror runs (on both source and target).

NOTE: If you plan on using snapmirror multipathing, that is only supported in vfiler0 and not in individual vfilers. This is also required for snapmirror compression, so using vfiler0 for mirrors is most useful in these environments.

Figure 8) SnapMirror Using The vFiler Network



SNAPMIRROR USING THE VFILER NETWORK

1. Confirm you can ping both vfilers:

```
fas3270> ping 192.168.150.220
```

```
fas3270> ping 192.168.150.221
```

2. Next, create the volumes you want to mirror and add them to both vFiler units.

```
fas3270> vol create vfiler1_source -s none aggr0 20m
```

```
fas3270> vfiler add vfiler1 /vol/vfiler1_source
```

```
fas3270> vol create vfiler2_dest -s none aggr0 20m
```

```
fas3270> vfiler add vfiler2 /vol/vfiler2_dest
```

3. Now you can turn on SnapMirror and mirror the volumes.

```
fas3270> vfiler run * snapmirror on
```

```
fas3270> vfiler run * options snapmirror.access *
```

```
fas3270> vfiler run vfiler2 vol restrict vfiler2_dest
```

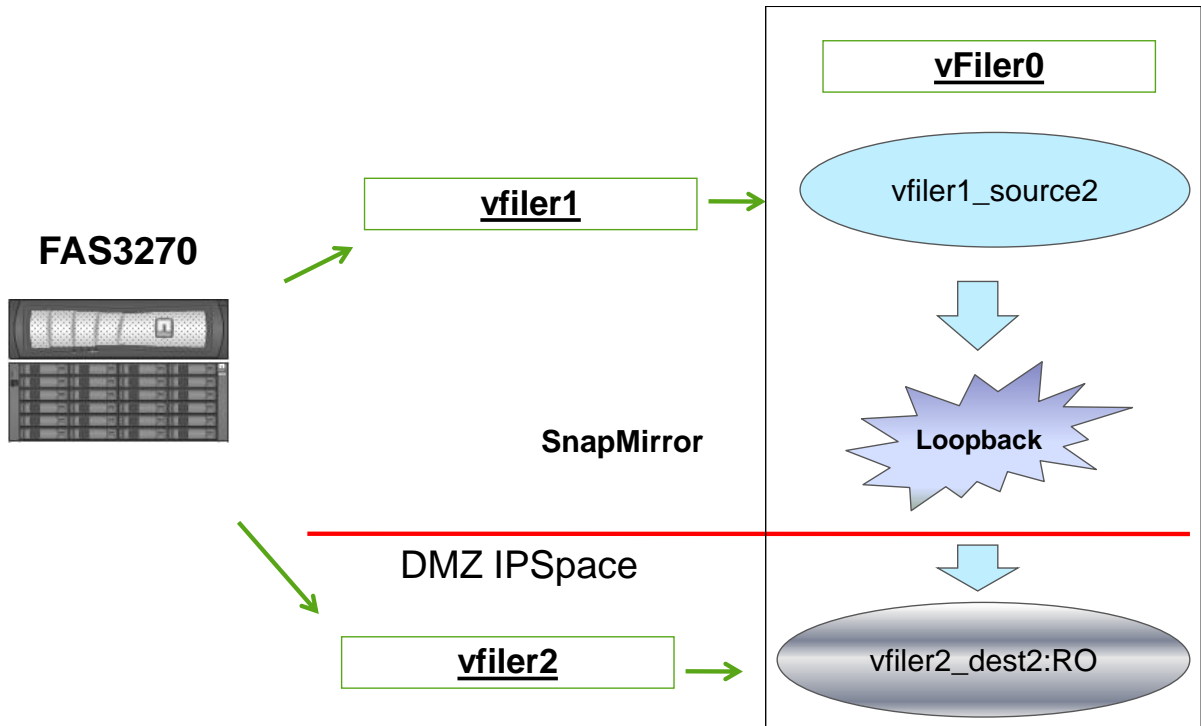
```
fas3270> vfiler run vfiler2 snapmirror initialize -S  
192.168.150.220:vfiler1_source vfiler2_dest
```

```
fas3270> vfiler run vfiler2 snapmirror status
```

SNAPMIRROR USING THE VFILER0 LOOPBACK

In this method, you do not use any externally connected network interfaces to carry the SnapMirror replication traffic. This means that you can mirror traffic between two vFiler units that do not have any network connection. This is a good way to replicate data from production to a DMZ.

Figure 9) SnapMirror Using vFiler0 Loopback



1. As above, create the volumes you want to mirror and add them to both vFiler units.

```
fas3270> vol create vfiler1_source2 -s none aggr0 20m  
fas3270> vfiler add vfiler1 /vol/vfiler1_source2  
  
fas3270> vol create vfiler2_dest2 -s none aggr0 20m  
fas3270> vfiler add vfiler2 /vol/vfiler2_dest2
```
2. This time when you initialize the SnapMirror, note that the command has no IP source or destination address.

```
fas3270> vol restrict vfiler2_dest2  
fas3270> snapmirror initialize -S vfiler1_source2 vfiler2_dest2  
fas3270> snapmirror status
```

8 APPENDIX A – LAB CONFIGURATION FOR REFERENCE

BASIC LAB CONFIGURATION

```
# username          root
# password          netapp123
# e0a               192.168.150.nnn/24
                    fas6280 nnn=210 fas3270 nnn=211 vfiler1 nnn=220 vfiler2 nnn=221 vfiler3 nnn=222
# gateway           192.168.150.2
# dns domainname    lab.local
# dns server        192.168.150.11
# cifs setup         multiprotocol; lab.local domain lab\administrator:netapp123
# cifs administrator administrator
# cifs password      netapp123
# timezone          GMT
# language           C.UTF-8
# admin host        192.168.150.31
```

IPS

192.168.150.2	gateway	
192.168.150.11	Windows 2008 host (RDP landing)	login: administrator : netapp123
192.168.150.31	CentOS 6 host#1	login: root : netapp123
192.168.150.210-229	VSIM and vFilers	login: root : netapp123

CHANGE VM SETTINGS

Change description (VMware) for each VSIM to "vsim_8.1-7mode node1, node2" for each of the 2 nodes 6280, 3270

Change all 4 interfaces e0a/e0b/e0c/e0d to NAT (from custom and bridged)

Change (disconnect) both serial ports under settings | other devices so no serial port conflicts

DO NOT Change from 2 CPU, 2048MB RAM (required for VSIM)

CHANGESERIAL NUMBERS (SO NO DUPLICATION IN ONCOMMAND)

Change serial# of each VSIM for System Manager and Operations Manager - Default SYSID = 123454321

CTRL-C at the boot timer to get to SIMLOADER

There are two boot variables and one (bootarg.nvram.sysid) takes precedent in setting the UID's. If you're looking to avoid UID conflicts, the best thing to do is set bootarg.nvram.sysid and SYS_SERIAL_NUM to the same value, and do this prior to first boot and initializing the disks. That prevents having to go through maintenance mode to reassign the disks. Other UID's may also be fixed and harder to change after the first complete boot.

Also, the system ID format is a 10-digit number. The last two digits of the number need to be unique within the C-Mode cluster for the disk UID's to be unique. So one way to manage the values is to use the first 8 digits to represent the cluster, and the last two digits to represent the node. For example: 1111111101, 1111111102, ..., 2222222201, 2222222202, etc.

To set the values, you'll need to enter:

```
SIMLOADER> set bootarg.nvram.sysid 1111111101    #use 01,02 for each of the 2 nodes 6280, 3270
SIMLOADER> set SYS_SERIAL_NUM 1111111101        #use 01,02 for each of the 2 nodes 6280, 3270
SIMLOADER> boot                                  #"Y" to system override sysid
```

CTRL-C Boot Maintenance Mode - you must run option 4 after changing sysids

Option (4) Clean configuration and initialize all disks.

ADD DISKS (SIM HACK FROM MIROSLAV)

The default simulator comes with 28 simulated disks of 1GB each. It is possible to increase the simulated disk count to 56 simulated disks. Any disk files above the first 56 are ignored. The following procedures will provide step-by-step instructions for doubling the disk count to 56 disks and making the disks available for use. unlock the diag user and assign it a password:

```
priv set advanced
useradmin diaguser unlock
useradmin diaguser password    # netapp123
```

log in to the system shell using the diag user account:

```
systemshell
login: diag
password: netapp123
```

Add the directory with the simulator disk tools to the path:

```
setenv PATH "${PATH}:/sim/bin"
```

```
echo $PATH
```

Go to the simulated devices directory:

```
cd /sim/dev
```

```
ls ,disks/
```

At this point you will see a number of files which represent the simulated disks. Notice that these files start with "v0." and "v1.". That means the disk are attached to adapters 0 and 1, and if you count the disk files you'll see that there are 14 of them on each adapter. This is similar to the DS14 shelf topology with each shelf attached to its own adapter. We will now add two more sets of 14 disks to the currently unused adapters 2 and 3:

```
makedisks.main -h
```

```
sudo makedisks.main -n 14 -t 23 -a 2
```

```
sudo makedisks.main -n 14 -t 23 -a 3
```

```
ls ,disks/
```

***** NOTE: Type 23 for 1GB disks and 8.1 added 2 and 4GB disk types with types 30-33 (30-31 for SAS 520 Blocks per sector, 32-33 for SATA 512 with less usable)**

30	NETAPP__	VD-2000MB-FZ-520	2097,512,000 B	2159,272,960 B	Yes	520
31	NETAPP__	VD-4000MB-FZ-520	4194,304,000 B	4289,192,960 B	Yes	520
32	NETAPP__	VD-2000MB-FZ-ATA	2097,512,000 B	2391,810,048 B	Yes	512
33	NETAPP__	VD-4000MB-FZ-ATA	4194,304,000 B	4751,106,048 B	Yes	512

The first invocation of the command prints usage information. The remaining two commands tell the simulated disk creation tool to create 14 additional disk (" -n 14") of type 23 (" -t 23") on adapters 2 and 3 (e.g., " -a 2"). Data ONTAP 8.0.1 supports simulated disks 1GB or smaller. Even if you see larger disks listed in the usage information, please resist the temptation to add them to the simulator. It will only cause Data ONTAP to panic on boot and force you to recreate the simulator from scratch.

Now we're done with the system shell. We need to reverse some of the earlier steps and reboot the simulator so that it sees the new disks:

```
exit
```

```
useradmin diaguser lock
```

```
priv set admin
```

```
reboot
```

After the reboot complete, log backin and take ownership of all the new disks:

```
disk show -n
disk assign all
disk show -v
```

You should now see 56 disks of 1GB each listed in the simulator. The new disks should be listed as already zeroed and ready to use inside an aggregate.

CONFIGURATION FOR BOTH 6280 AND 3270 NODES

```
disk assign all                # non root disks change to the vsim
aggr create aggr1 -r 25 50     # Configuration for Both 6280 and 3270 nodes
options autosupport.enable off
vol rename vol0 root
license add # add license keys
options security.passwd.rules.history 0
options httpd.enable on
options httpd.admin.enable on
options tls.enable on
options ndmpd.enable on
options snapmirror.enable on
options snapmirror.access *
options timed.servers 192.168.150.11
options timed.enable on
admin host is 192.168.150.31
cifs setup (for all vfiler0 and vfilers) - keep names fas6280, fas3270, vfiler1,
vfiler2, vfiler3
    n                no wins
    1                multiprotocol
    netapp123        root password
    1                domain lab.local
    netapp123        local administrator netapp123
options licensed_feature.flexcache_nfs.enable on
options licensed_feature.iscsi.enable on
options licensed_feature.multistore.enable on
options licensed_feature.nearstore_option.enable on
vfiler limit 4
reboot
vol create vfiler1_root -s none aggr1 20m
vol create vfiler1_nas -s none aggr1 400m
vol create vfiler1_san -s none aggr1 400m
vol create vfiler2_root -s none aggr1 20m
vol create vfiler2_nas -s none aggr1 400m
vol create vfiler2_san -s none aggr1 400m
```

```

vol create vfiler3_dmotion_root aggr1 10g # 6280 only. Not 3270. 3270 will
autocreate from dmotion
options autologout.telnet.enable off
options autologout.console.timeout 180
options autologout.telnet.timeout 180
ipspace create ipspace1
ipspace assign ipspace1 e0b
ipspace list

```

CONFIGURE VFILERS ON FAS6280

vfiler1

```

fas6280> vfiler create vfiler1 -s ipspace1 -i 192.168.150.220 /vol/vfiler1_root
/vol/vfiler1_nas /vol/vfiler1_san
Setting up vfiler vfiler1
Configure vfiler IP address 192.168.150.220? [y]:
Interface to assign this address to: e0b
Admin host 192.168.150.31
Dns lab.local, 192.168.150.11 nameserver

```

```

vfiler run vfiler1 cifs shares -add vfiler1_nas /vol/vfiler1_nas
vfiler run vfiler1 cifs shares
vfiler run vfiler1 options snapmirror.enable on
vfiler run vfiler1 options snapmirror.access *
vfiler run vfiler1 secureadmin setup ssh # enter all all defaults
vfiler run vfiler1 secureadmin enable ssh
vfiler run vfiler1 exportfs -av
vfiler run vfiler1 igroup create -i -t windows vfiler1_iscsi
vfiler run vfiler1 igroup add vfiler1_iscsi iqn.1991-
05.com.microsoft:win2k8r2.lab.local
vfiler run vfiler1 lun create -o noreserve -s 32m -t windows
/vol/vfiler1_san/vfiler1_lun1
vfiler run vfiler1 lun map /vol/vfiler1_san/vfiler1_lun1 vfiler1_iscsi

```

vfiler2

```

fas6280> vfiler create vfiler2 -s ipspace1 -i 192.168.150.221 /vol/vfiler2_root
/vol/vfiler2_nas /vol/vfiler2_san
Setting up vfiler vfiler2
Configure vfiler IP address 192.168.150.221? [y]:
Interface to assign this address to: e0b
Admin host 192.168.150.31
Dns lab.local, 192.168.150.11 nameserver

```

```

vfiler run vfiler2 cifs shares -add vfiler2_nas /vol/vfiler2_nas
vfiler run vfiler2 cifs shares
vfiler run vfiler2 secureadmin setup ssh # enter all all defaults
vfiler run vfiler2 secureadmin enable ssh

```



```
vfiler run vfiler2 exportfs -av
vfiler run vfiler2 igroup create -i -t windows vfiler2_iscsi
vfiler run vfiler2 igroup add vfiler2_iscsi iqn.1991-
05.com.microsoft:win2k8r2.lab.local
vfiler run vfiler2 lun create -o noreserve -s 32m -t windows
/vol/vfiler2_san/vfiler2_lun1
vfiler run vfiler2 lun map /vol/vfiler2_san/vfiler2_lun1 vfiler2_iscsi
```

vfiler3

```
fas6280> vfiler create vfiler3 -s ipspace1 -i 192.168.150.222  
/vol/vfiler3_dmotion_root
```

Setting up vfiler vfiler3

Configure vfiler IP address 192.168.150.222? [y]:

Interface to assign this address to: e0b

Admin host 192.168.150.31

Dns lab.local, 192.168.150.11 nameserver

```
vfiler run vfiler3 cifs shares -add vfiler3_root /vol/vfiler3_dmotion_root  
vfiler run vfiler3 cifs shares  
vfiler run vfiler3 secureadmin setup ssh # enter all all defaults  
vfiler run vfiler3 secureadmin enable ssh  
vfiler run vfiler3 exportfs -av  
vfiler run vfiler3 igroup create -i -t windows vfiler3_iscsi  
vfiler run vfiler3 igroup add vfiler3_iscsi iqn.1991-  
05.com.microsoft:win2k8r2.lab.local  
vfiler run vfiler3 lun create -o noreserve -s 32m -t windows  
/vol/vfiler3_dmotion_root/vfiler3_lun1  
vfiler run vfiler3 lun map /vol/vfiler3_dmotion_root/vfiler3_lun1 vfiler3_iscsi
```

Edit/etc/rc and enter manually the line below to add a default route in the IPSpace:

```
fas6280> vfiler run vfiler1 route add default 192.168.150.2 1
```

SETTINGS TO CHANGE FOR ALL VFILER UNITS

```
vfiler run * options security.passwd.rules.history 0  
vfiler run * options httpd.admin.enable on  
vfiler run * options tls.enable on  
vfiler run * options ndmpd.enable on  
vfiler run * options snapmirror.enable on  
vfiler run * options snapmirror.access *  
vfiler run * options iscsi.ip_based_tpgroup on # data motion requirement
```

OTHER CONFIGURATION

Make Windows 2008 (or other) DNS entries for all 5 systems (2 vfiler0, 3 vfiler)

Setup iSCSI

Create 11 desktop shortcuts (2 physical, 3 per vfiler) C\$, vfiler_nas, vfiler_san (shortcut to x:, y:, z:) drives.

Write a file to each NAS share and iSCSI LUN.

Install Linux, disable firewall, disable screen saver

```
mkdir /root/vfiler1 /root/vfiler2 /root/vfiler3
```

Add NFS mounts in the linux machine's/etc/fstab for /root/vfiler1 /root/vfiler2 /root/vfiler3

```
vfiler1:/vol/vfiler1_nas /root/vfiler1 nfs rsize=32768,wsiz e= 32768,timeo=600,intr
```

```

vfiler2:/vol/vfiler2_nas          /root/vfiler2  nfs rsize=32768,wsiz e= 32768,timeo=600,intr
vfiler3:/vol/vfiler3_dmotion_root/nas  /root/vfiler3  nfs rsize=32768,wsiz e= 32768,timeo=600,intr

```

Install all nfs packages to get around wrong fs type errors ...system administration add/remove software

Do a software update on linux

Disable SE Linux

```

setenforce 0          # realtime disable
vi /etc/selinux/config
    change SELINUX=enforcing to to SELINUX=disabled

```

SOFTWARE INSTALLATION

Install Java, Perl, Adobe Flash, System Manager 2.0R1, NetApp Management Console (NMC), and the vFilerDR plugin for the NMC on the Windows host and add the two simulators (6280, 3270) to System Manager.

Install OnCommand 5.0 on the Linux host:

./occore-setup-5-0-linux-x64.sh -o

dfm plugin add filerconfig_Linux64.zip

Download the 8.1RC1 64-bit plugin from NOW:

https://now.netapp.com/NOW/download/software/ontap/8.1RC1/dfm_plug-in.shtml

dfm service list # make sure all are started.

dfm option set vFilerMonInterval=1min

dfm vfiler add all

dfm ssl server setup

dfm options set httpsEnabled=on

dfm options list httpsEnabled

dfm service stop http

dfm service start http

dfm option set serverHTTPEntered=Enabled

JAVA Install

```

http://java.com
download
sudo su -
cd /usr/java
chmod a+x jre-6u29-linux-x64-rpm.bin
./ jre-6u29-linux-x64-rpm.bin # install
java -version # test java version

```

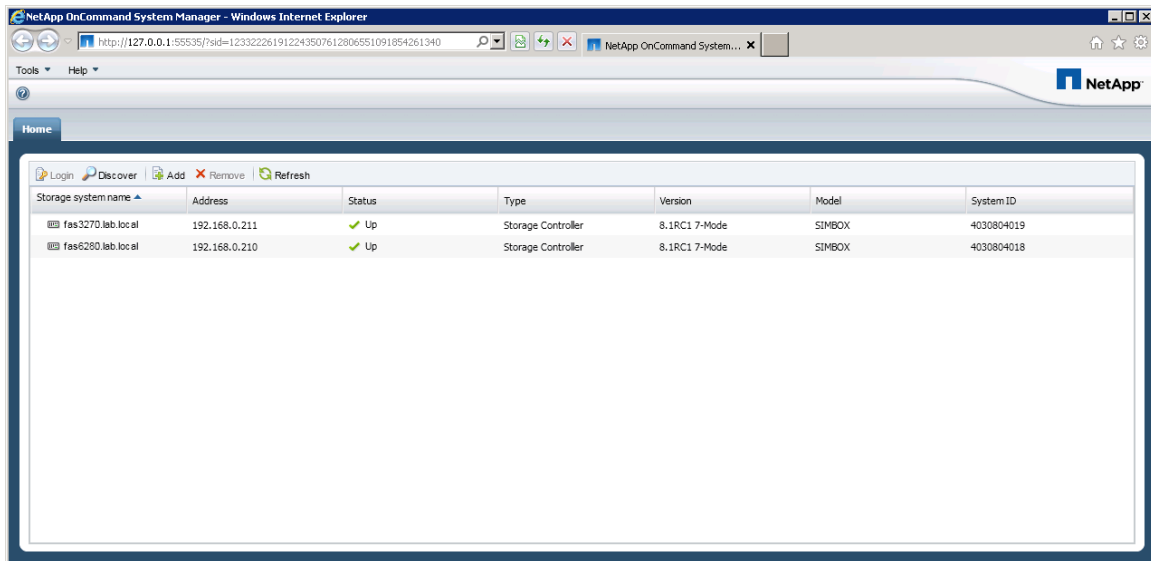
```
cd /usr/lib/mozilla/plugins
ln -s /usr/java/latest/lib/amd64/libnpjp2.so      # required to work in Mozilla
browser
http://www.java.com/en/download/help/testvm.xml  # test java
```

Authenticate NMC to the controllers root and ndmp

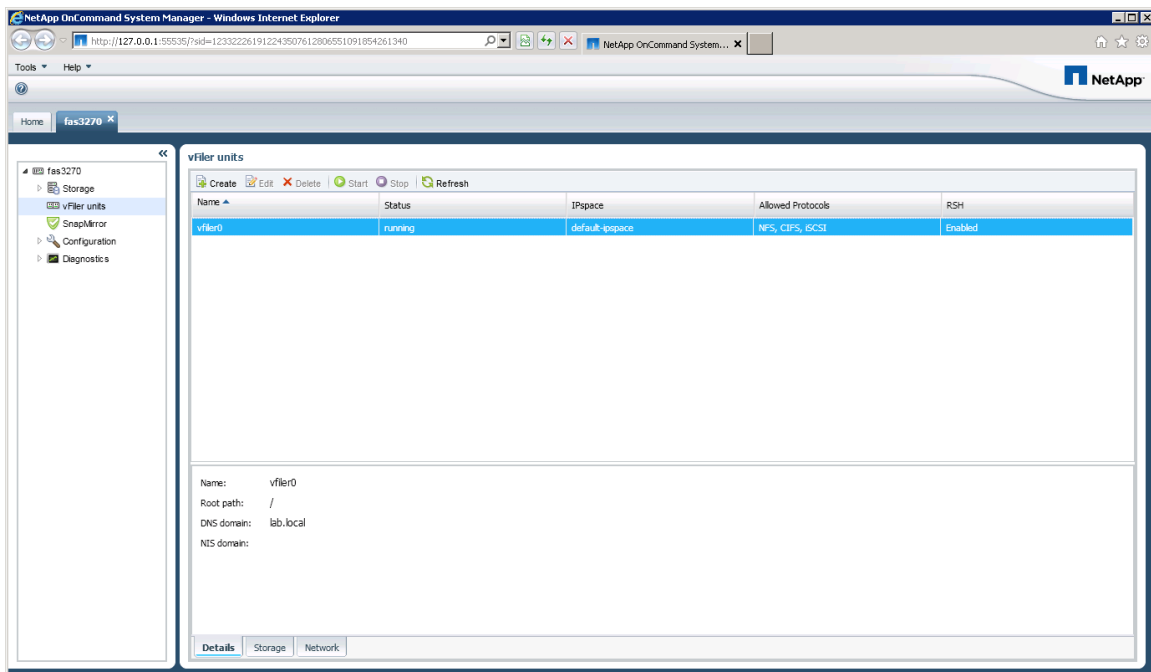
http://localhost:8080/dfm/welcome	# http
http://localhost:8080/start.html	# http to NEW OnCommand5 dashboard
http://localhost:8443/dfm/welcome	# https
http://localhost:8443/start.html	# https to NEW OnCommand5 dashboard

9 APPENDIX B – CREATE A VFILER WITH SYSTEM MANAGER 2.0

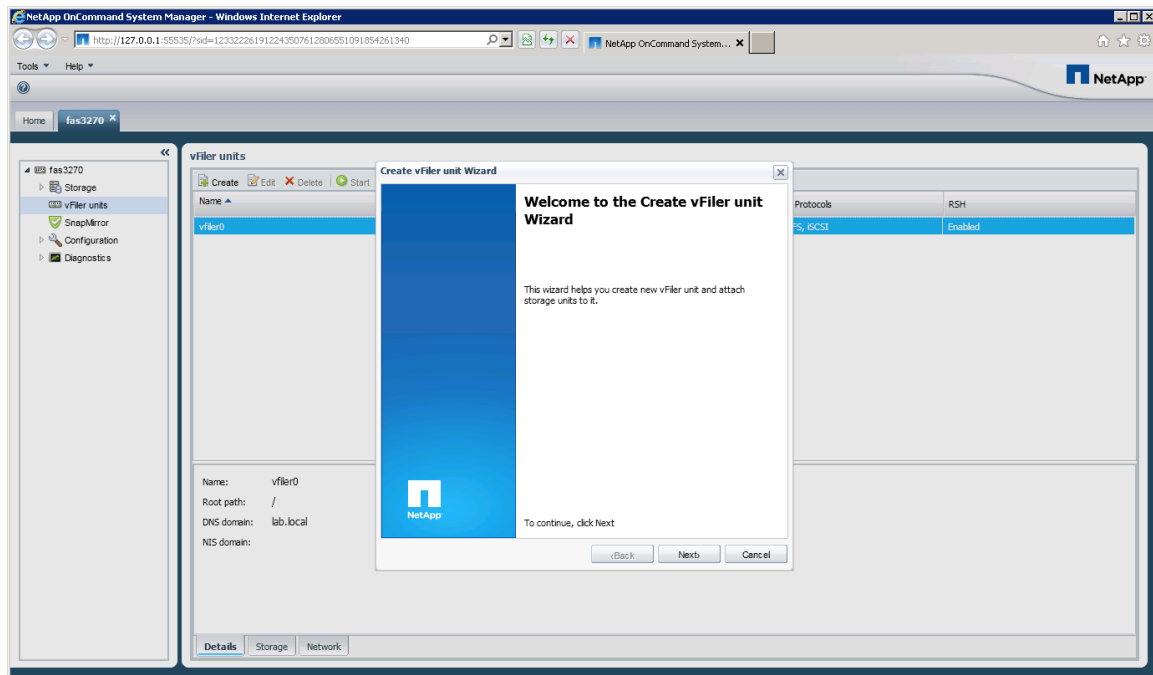
1. Open System Manager 2.0 from the icon on the Windows desktop. Select the **FAS3270** and click the **Login** button.



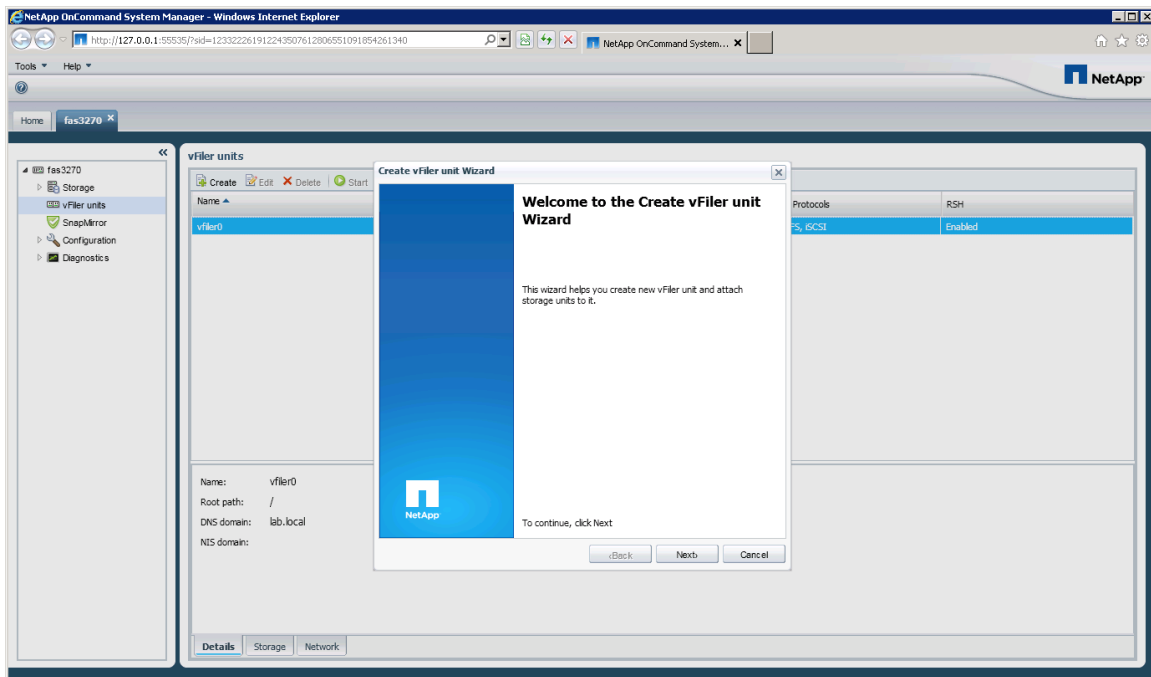
2. Click on **vFiler units**.



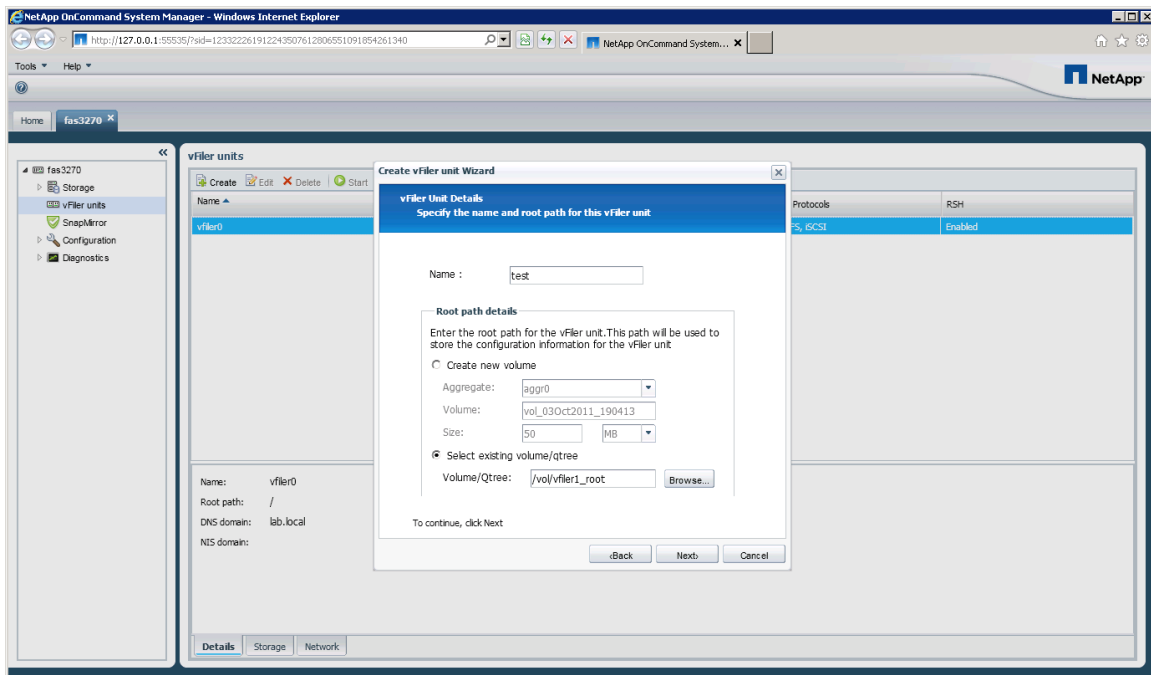
3. Click on **Create**.



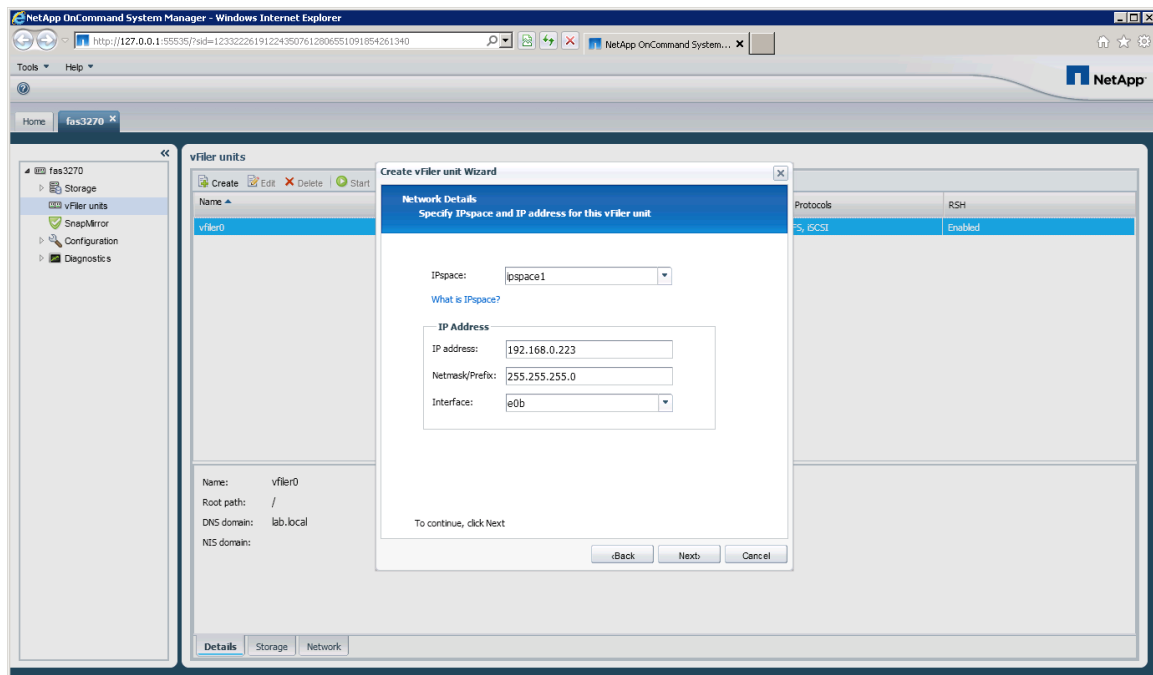
4. Click **Next**.



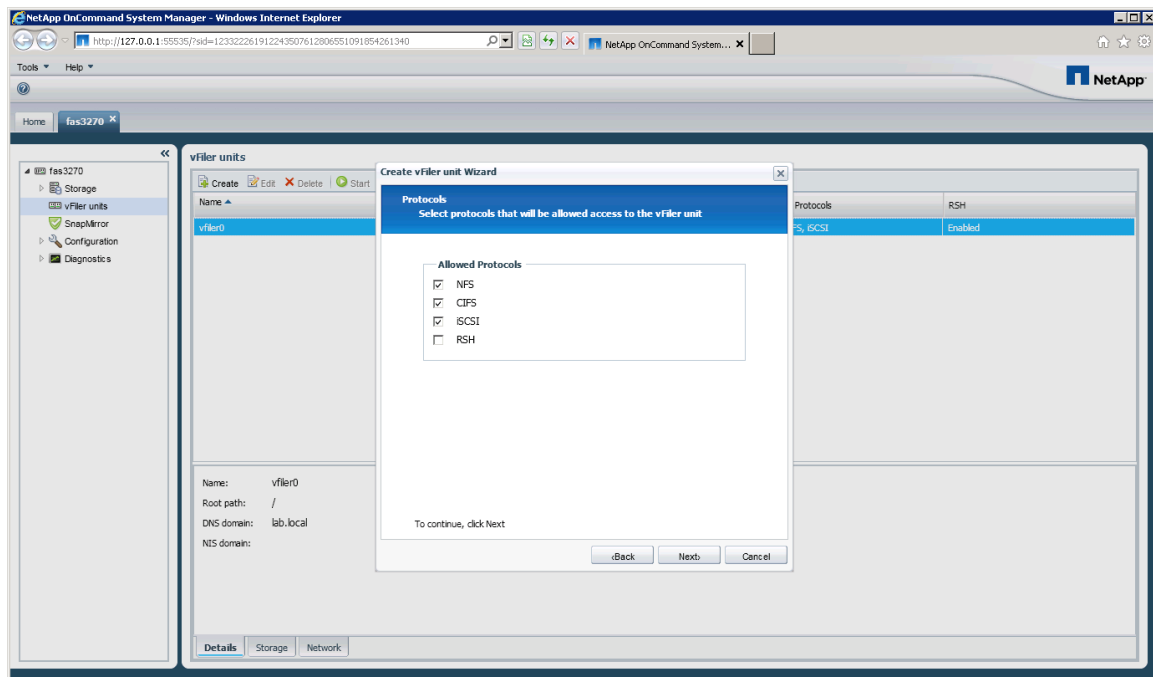
5. Fill in the details below (vfilename: test, browse for existing vfiler1_root volume) and click **Next**.



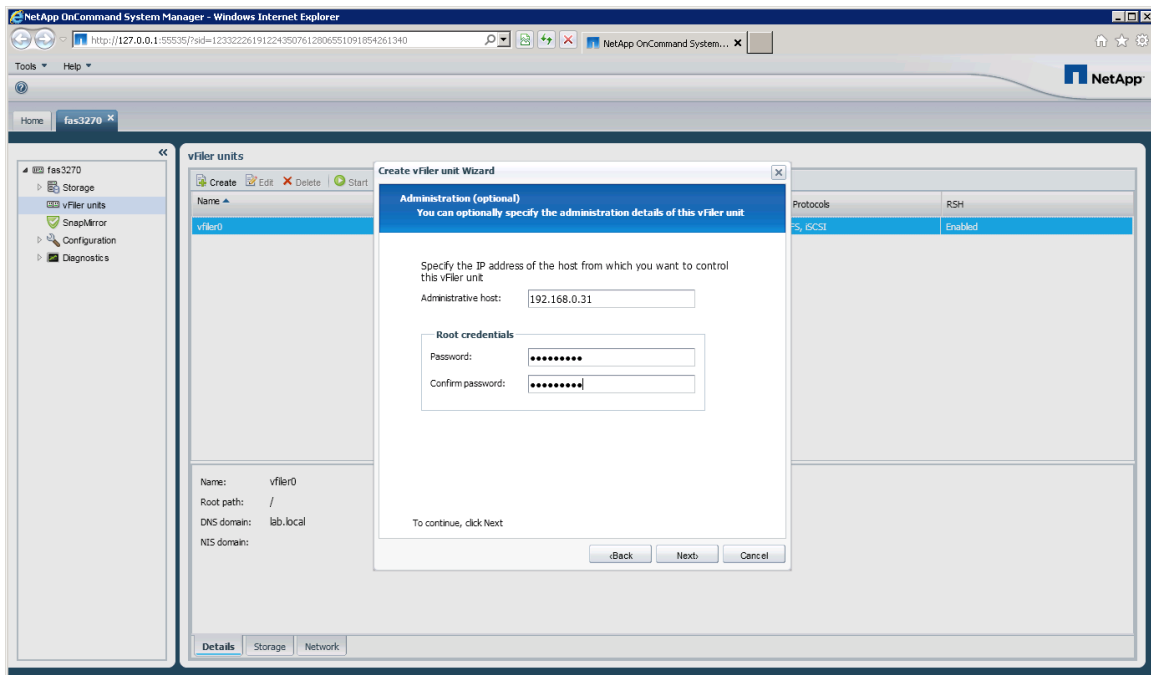
- Fill in the networking details. Enter **ipspace1** for the IPspace, **192.168.150.223** for the IP address, **255.255.255.0** for the netmask, **e0b** for the interface, and click **Next**.



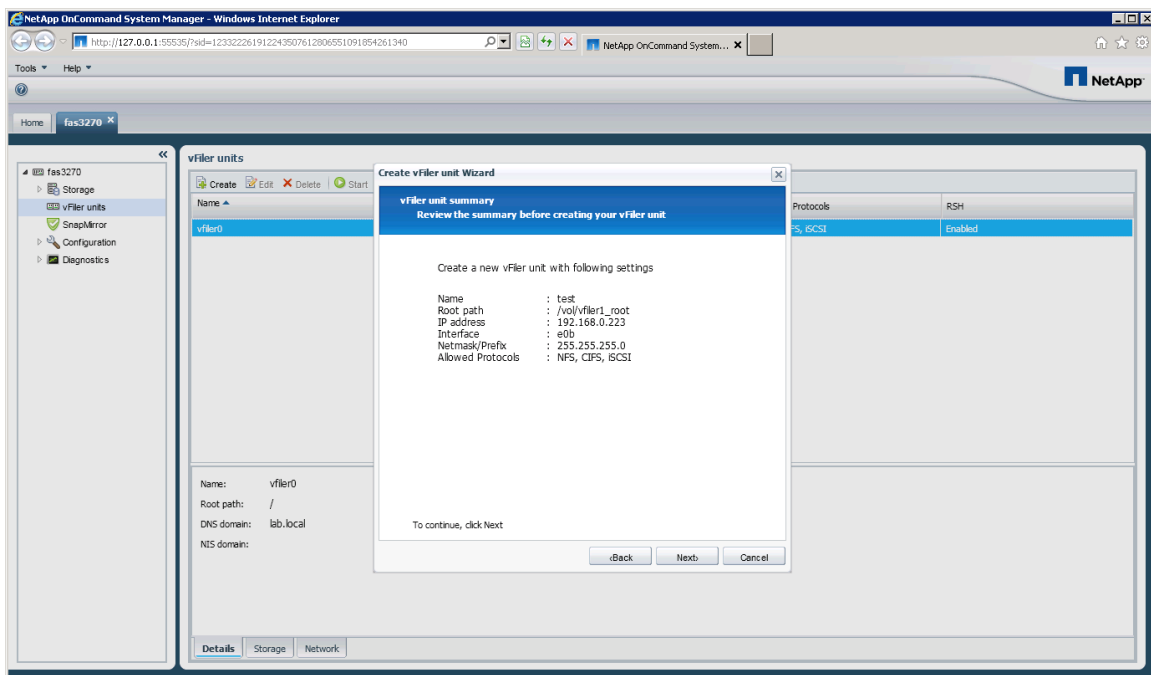
- Click on 3 protocols (all but RSH) and click **Next**.



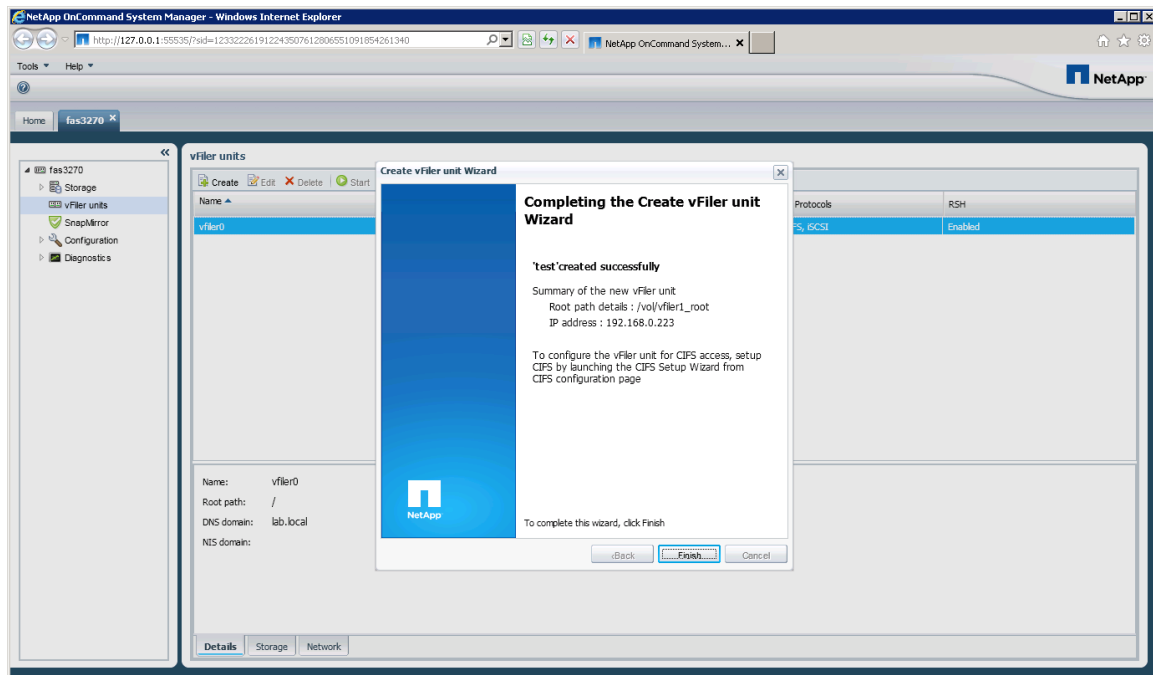
8. Enter the admin host **192.168.150.31** and the password **netapp123** and click **Next**.



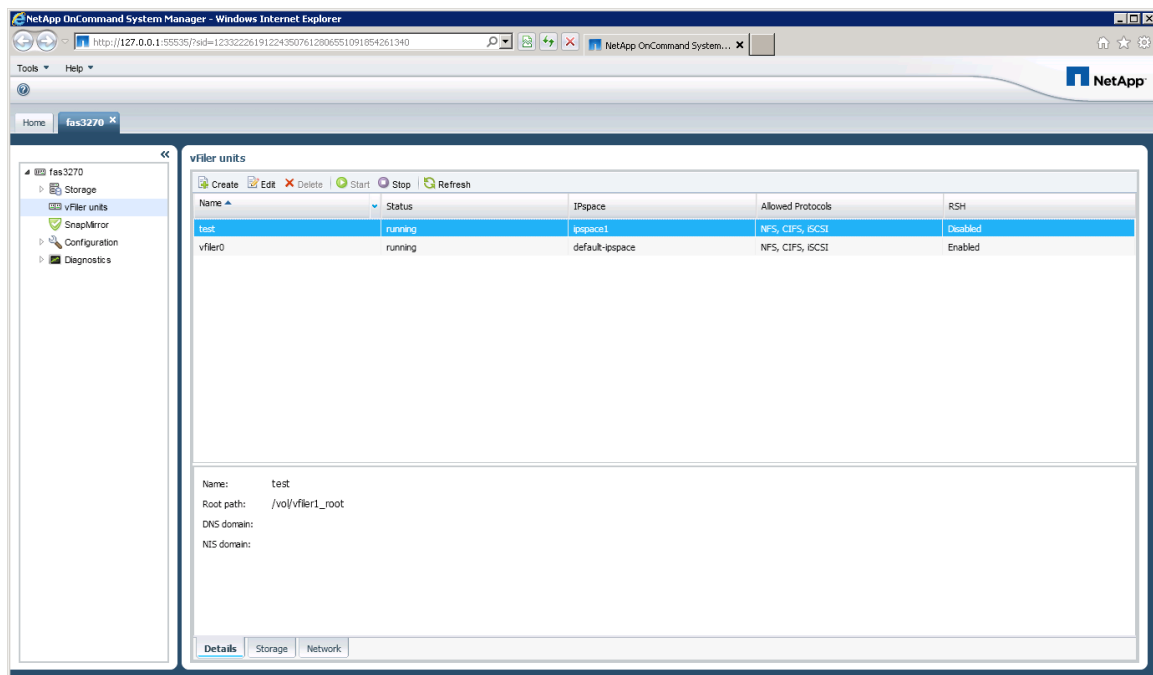
9. Click **Next**.



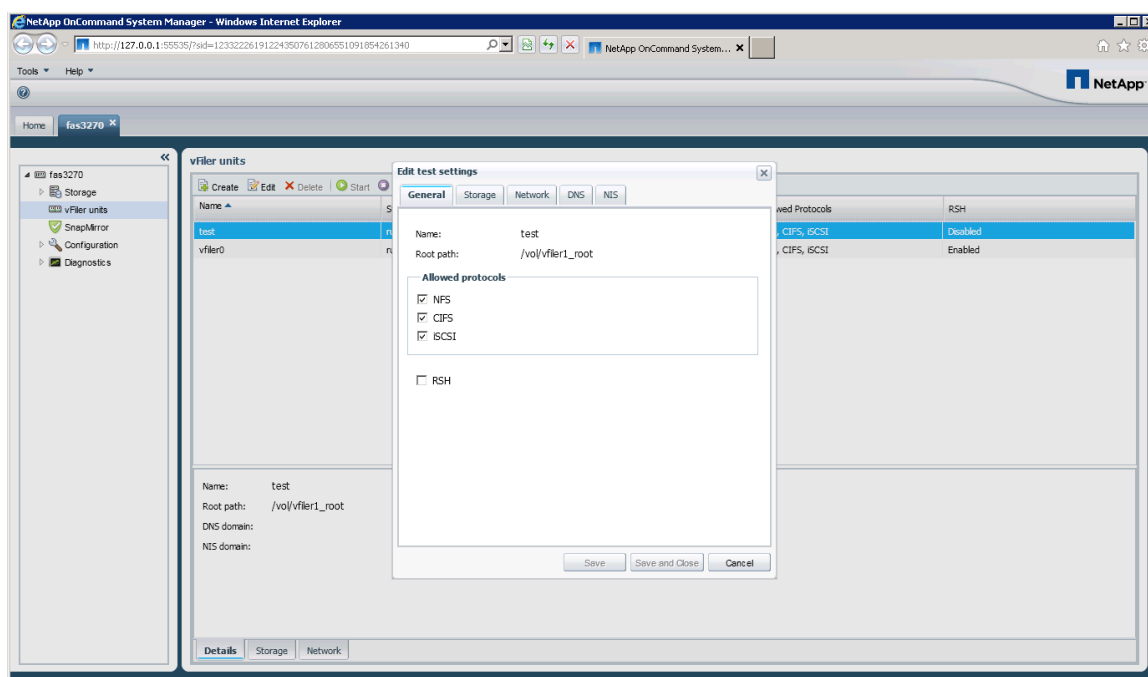
10. Click **Finish**.



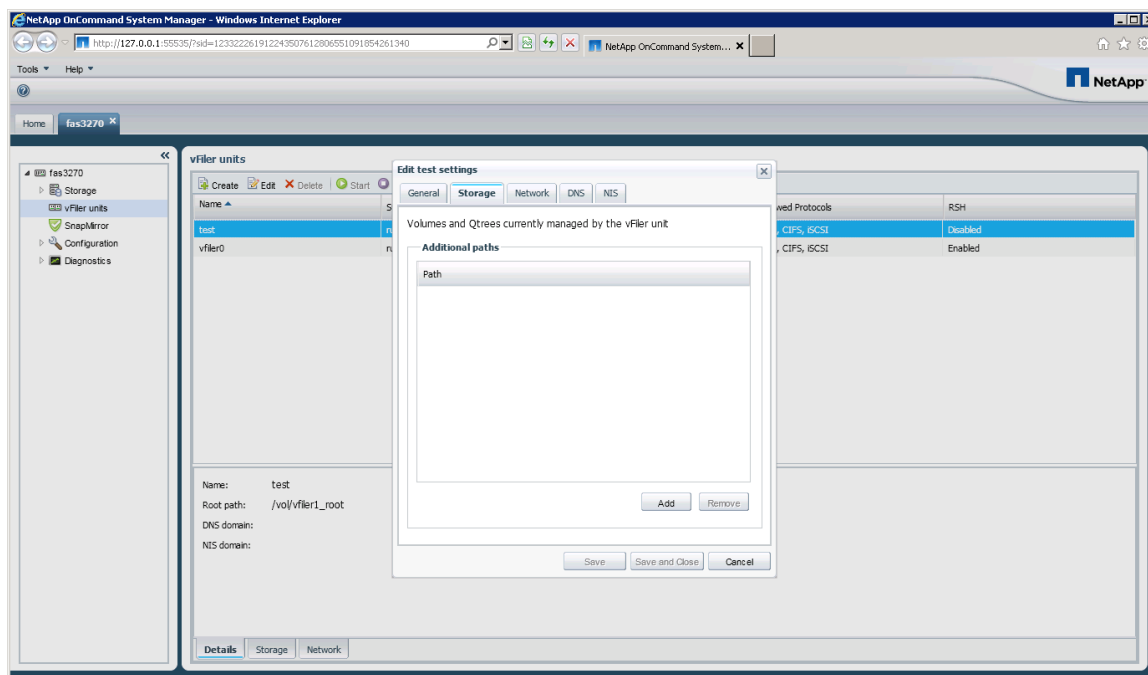
11. Add 2 more volumes. Select the **test** vFiler unit and click **Edit**.



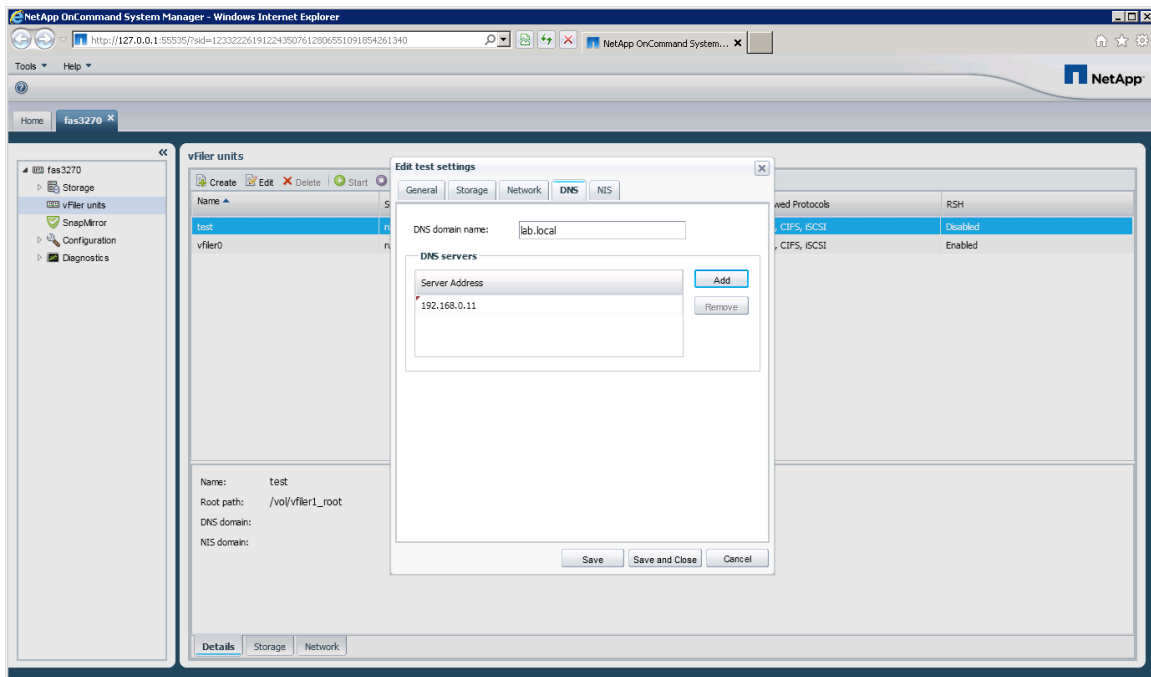
12. Select the **Storage** tab and click the **Add** button.



13. Click the ellipse ... and add the volumes **vfiler1_nas** and **vfiler1_san**, then click **Save**.



14. Select the **DNS** tab, enter **lab.local** and **192.168.150.11**, then click **Save and Close**.



10 APPENDIX C – CREATE A VFILER WITH PROVISIONING MANAGER

NOTE: You will need to add a vfiler default route by adding a **route add default** statement in the vfiler0 /etc/rc file.

Steps required to create a vFiler unit using Provisioning Manager:

- Create a resource pool
- Create a vFiler template
- Create a vFiler unit
- Create a provisioning policy
- Create a dataset and assign storage

CREATE A RESOURCE POOL

1. Open the NetApp Management Console (NMC) and select the **Hosts Pane → Storage Systems**, click the **Details** tab on the bottom, then click on the **FAS3270**. Confirm that all licenses you need are installed.

NetApp Management Console : Manage Data - root on 192.168.0.31

File View Tasks Help

Group Global

Hosts Storage Systems

Add Edit Delete Diagnose Refresh

Name	System Status	Login Credentials	NDMP Status	NDMP Credentials
fas3270	Online	Good	Up	Good
fas6280	Online	Good	Up	Good

General

IP address: 192.168.0.211
Model: SIMBOX
Mirrored: Yes
Backup destination: Yes
Backup source: Yes

Credentials

Login user name: root
NDMP user name: root

Service status

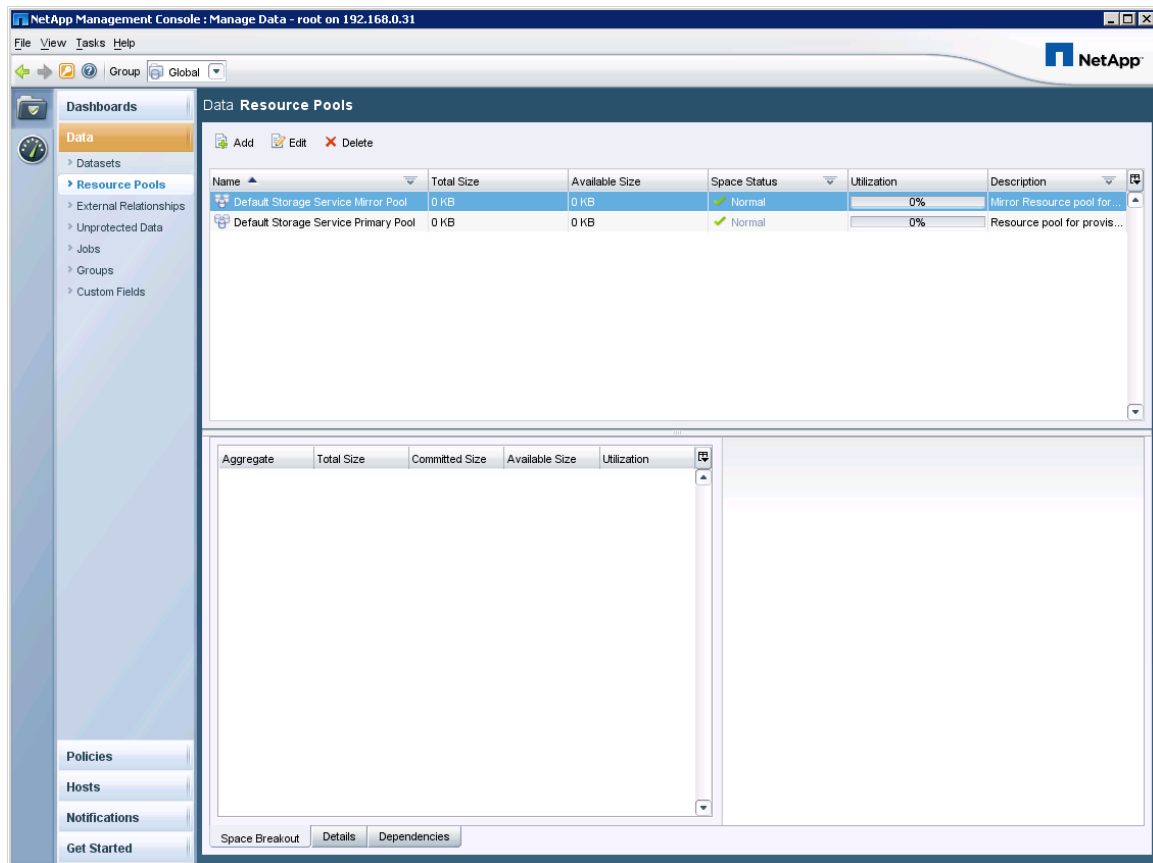
NFS: Up
CIFS: Up
iSCSI: Up
FCP: Down

Licenses

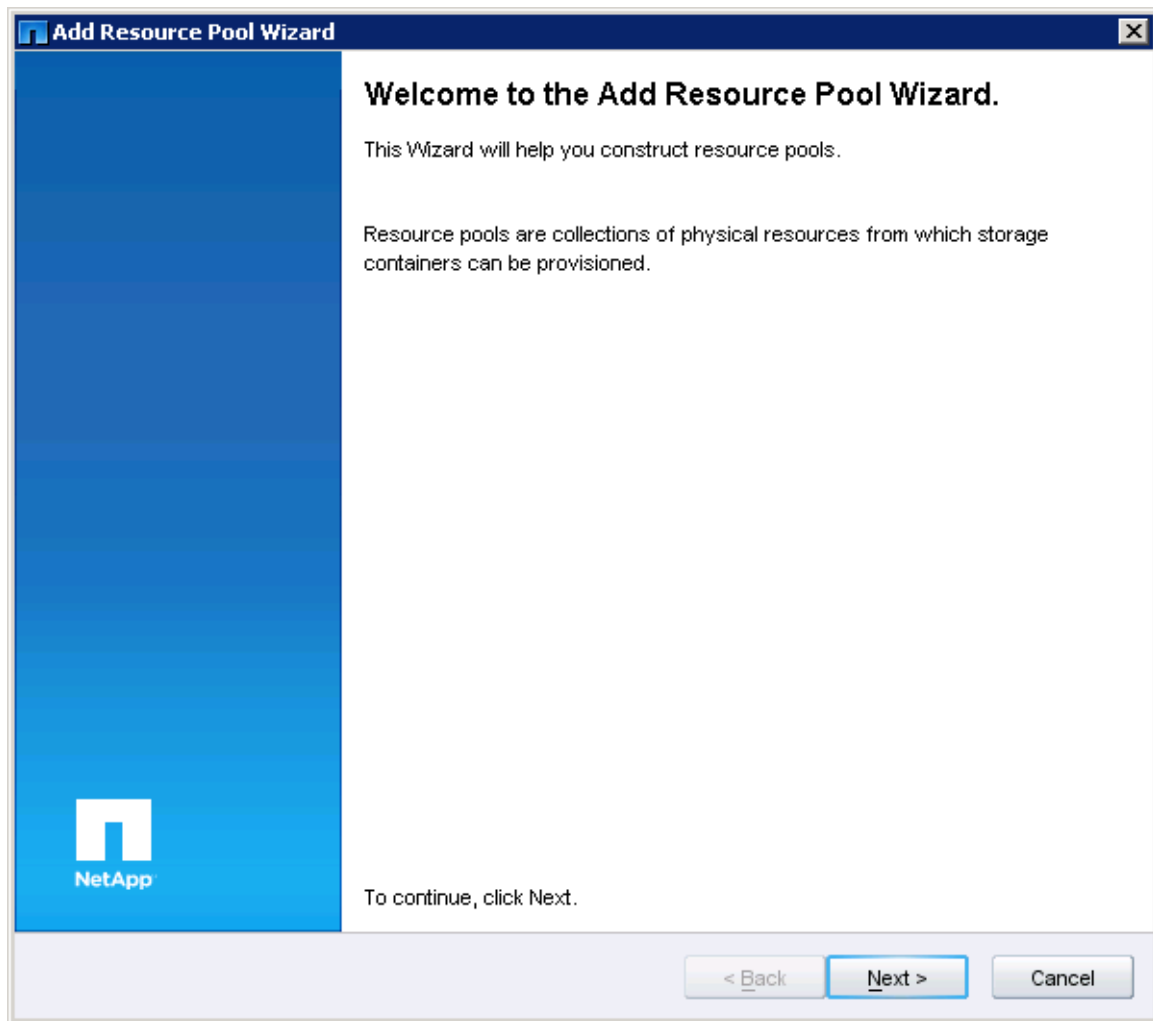
Name	Licensed
SnapMirror	Yes
SnapVault Data ONTAP Secondary	Yes
SnapVault Data ONTAP Primary	Yes
SnapVault Windows Primary	Yes
SnapVault Windows Open File Manager	Yes
SnapVault Unix Primary	Yes
SnapVault Linux Primary	Yes
NearStore Option	Yes
Deduplication	Yes
SnapMirror Sync	Yes
CIFS	Yes
NFS	Yes
iSCSI	Yes
Multistore	Yes
FCP	No

Details Usage Paths Input Relationships Output Relationships

- From the navigation pane, click **Data > Resource Pools**. Click the **Add** button to start the setup wizard.



3. Click Next.



4. Enter **test** in General Properties then click **Next**.

The screenshot shows a Windows-style dialog box titled "Add Resource Pool Wizard" with a close button (X) in the top right corner. The main title bar is dark blue. Below the title bar, the section is titled "General Properties" in white text on a blue background. Underneath, a subtitle in white text reads: "You should name your new resource pool for easier identification." The main area of the dialog is light gray and contains several input fields and a list box. The "Name:" field is a text box containing the word "test". Below it are empty text boxes for "Description:", "Owner:", and "Contact:". Below these is a list box for "Time Zone:". The list box has a search filter at the top that says "Filter Time Zone". The list contains the following items: "Default (currently GMT -4:00)", "Africa/Abidjan", "Africa/Accra", "Africa/Addis_Ababa", "Africa/Algiers", "Africa/Asmara", "Africa/Asmera", "Africa/Bamako", and "Africa/Bangui". The "Default" option is currently selected and highlighted in blue. At the bottom of the dialog, there is a light gray bar containing three buttons: "< Back", "Next >", and "Cancel". The "Next >" button is highlighted with a blue border. Above the buttons, the text "To continue, click Next." is displayed.

Add Resource Pool Wizard

General Properties

You should name your new resource pool for easier identification.

Name: test

Description:

Owner:

Contact:

Time Zone:

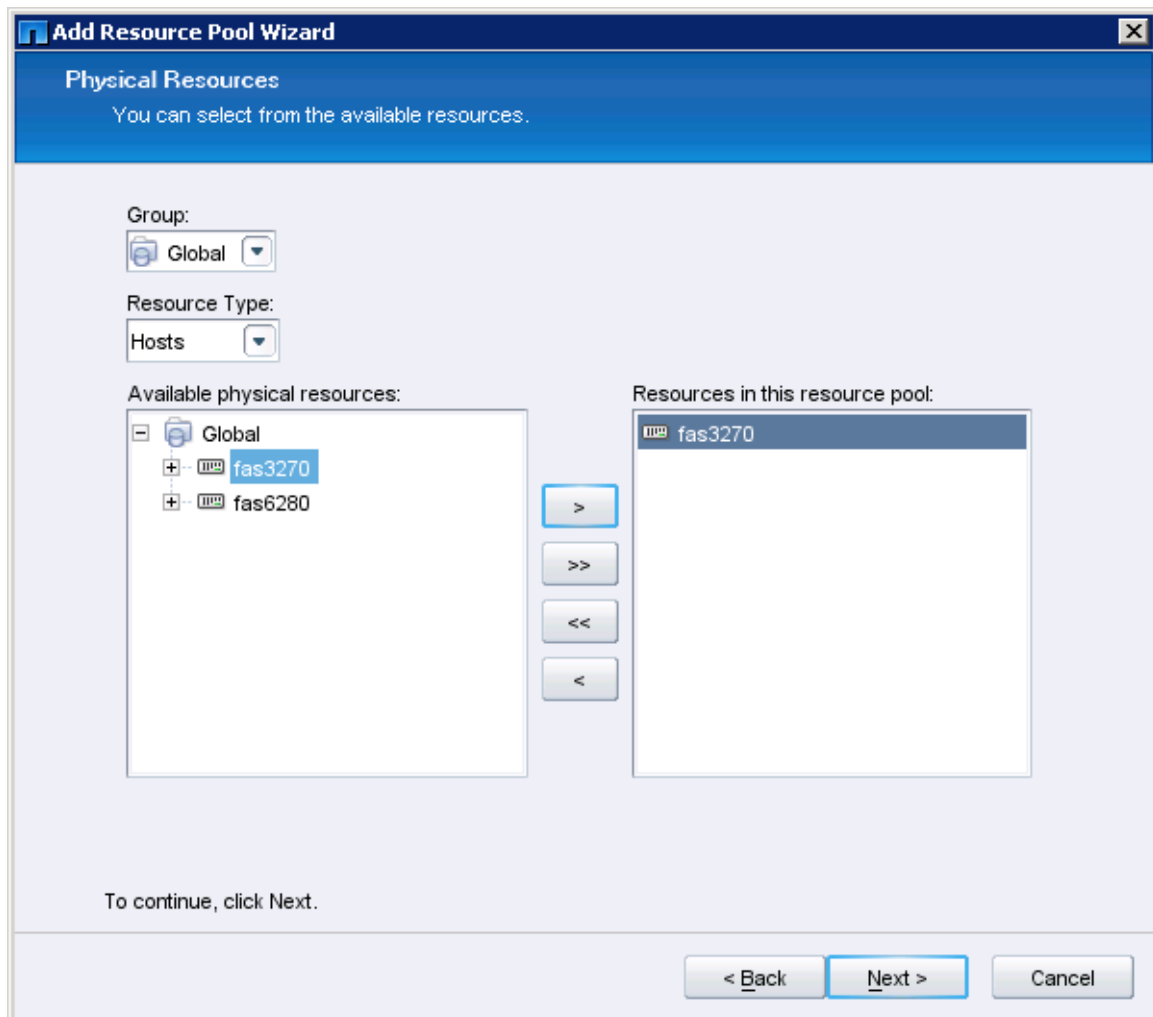
Filter Time Zone

- Default (currently GMT -4:00)
- Africa/Abidjan
- Africa/Accra
- Africa/Addis_Ababa
- Africa/Algiers
- Africa/Asmara
- Africa/Asmera
- Africa/Bamako
- Africa/Bangui

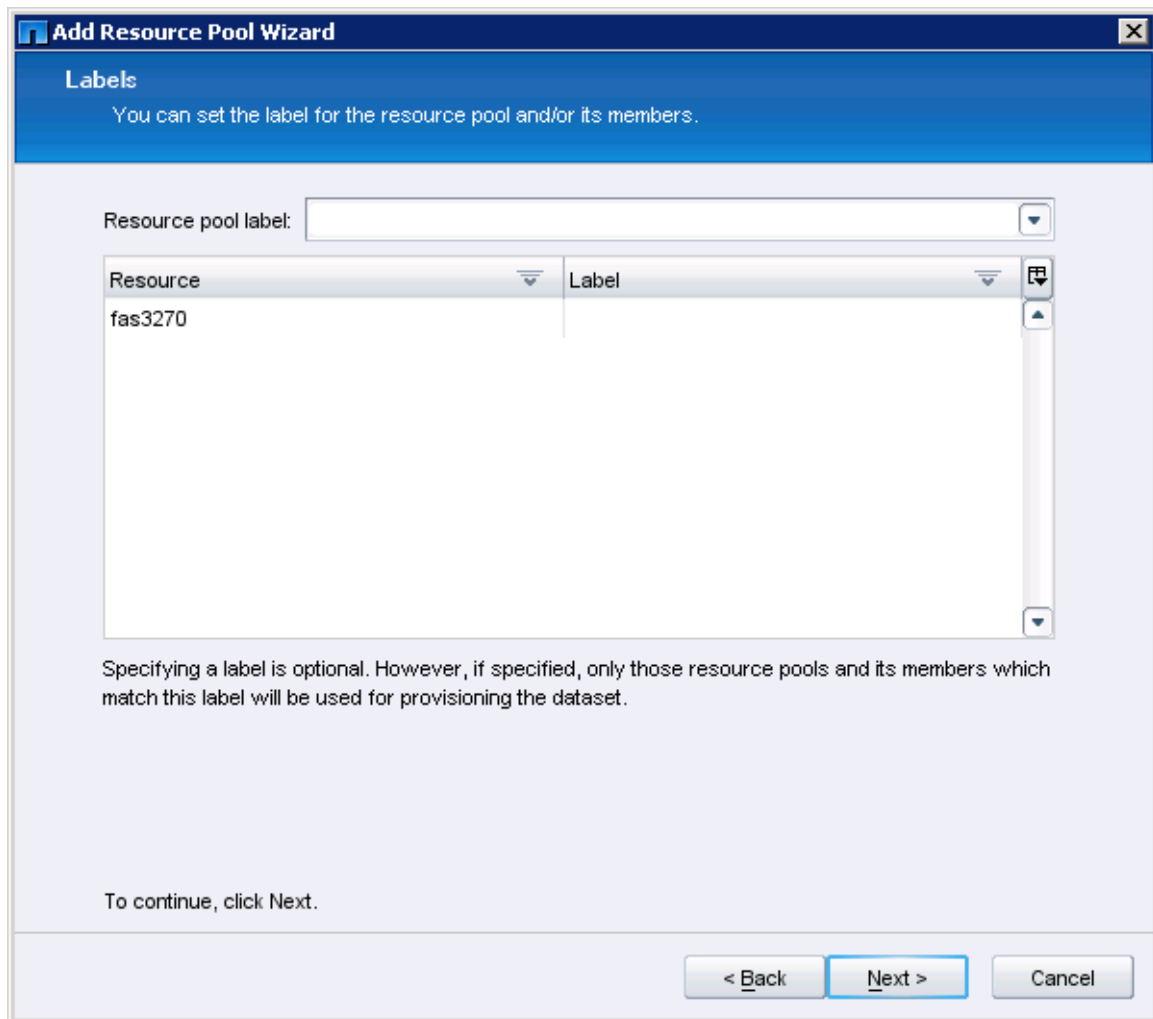
To continue, click Next.

< Back Next > Cancel

5. Click on the **fas3270** and click the > arrow to add to the resource pool, and click **Next**.



6. Leave the Resource pool label blank and click **Next**.



The screenshot shows the 'Add Resource Pool Wizard' window, specifically the 'Labels' step. The window has a blue header bar with the title 'Add Resource Pool Wizard' and a close button. Below the header, the section is titled 'Labels' with a subtitle: 'You can set the label for the resource pool and/or its members.' There is a text input field for 'Resource pool label:' which is currently empty. Below this is a table with two columns: 'Resource' and 'Label'. The 'Resource' column has a dropdown arrow, and the 'Label' column has a dropdown arrow and a search icon. The table contains one row with the value 'fas3270' in the 'Resource' column. Below the table, there is a paragraph of text: 'Specifying a label is optional. However, if specified, only those resource pools and its members which match this label will be used for provisioning the dataset.' At the bottom of the window, there is a message: 'To continue, click Next.' and three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a blue border.

Add Resource Pool Wizard

Labels
You can set the label for the resource pool and/or its members.

Resource pool label:

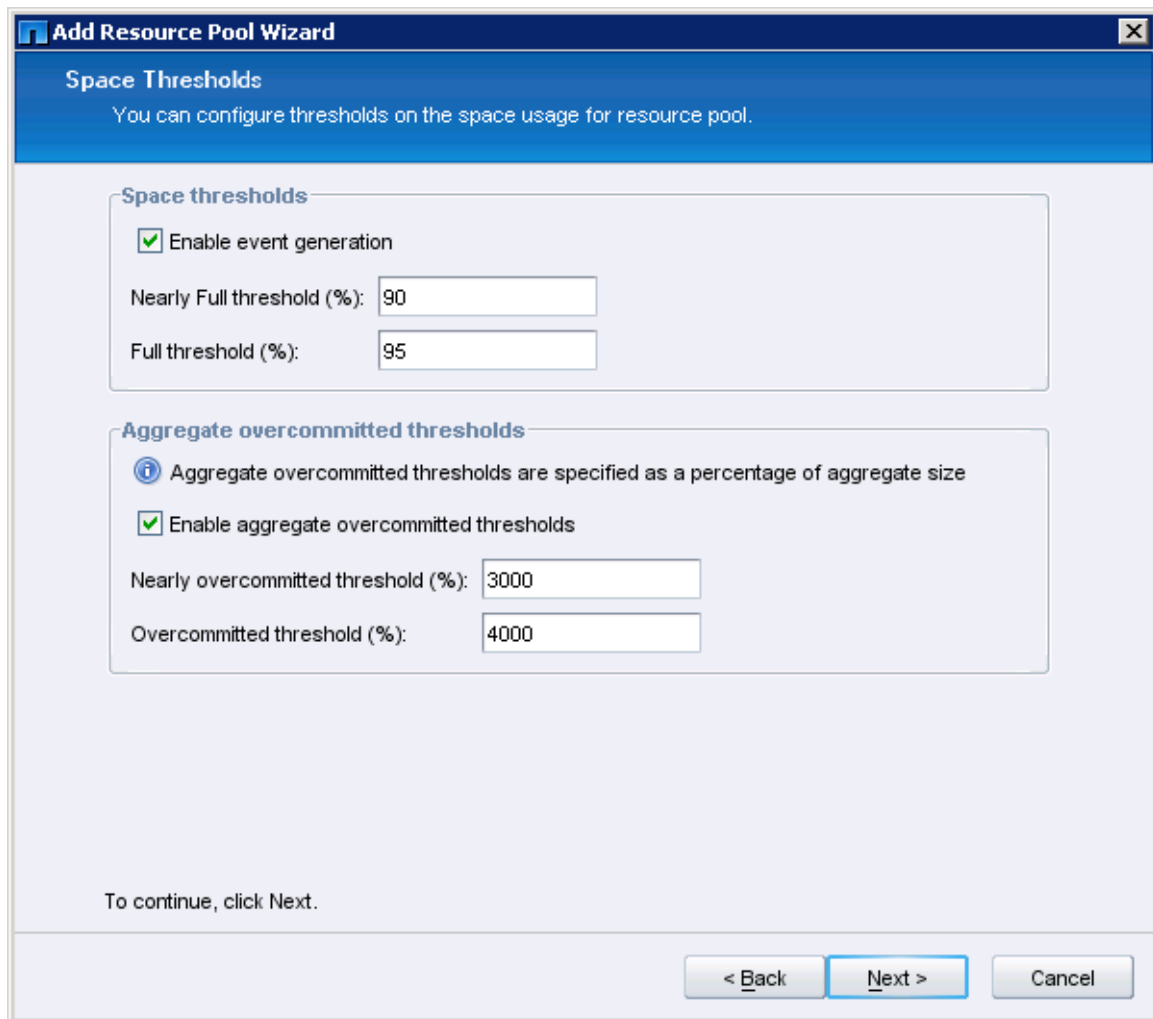
Resource	Label
fas3270	

Specifying a label is optional. However, if specified, only those resource pools and its members which match this label will be used for provisioning the dataset.

To continue, click Next.

< Back **Next >** Cancel

7. Confirm Space Thresholds (increase thresholds per below) and click **Next**.



The image shows a screenshot of the 'Add Resource Pool Wizard' window, specifically the 'Space Thresholds' step. The window has a title bar with the text 'Add Resource Pool Wizard' and a close button. Below the title bar is a blue header area with the text 'Space Thresholds' and a subtitle 'You can configure thresholds on the space usage for resource pool.' The main content area is divided into two sections: 'Space thresholds' and 'Aggregate overcommitted thresholds'. The 'Space thresholds' section contains a checkbox for 'Enable event generation' which is checked, and two input fields: 'Nearly Full threshold (%)' with the value '90' and 'Full threshold (%)' with the value '95'. The 'Aggregate overcommitted thresholds' section contains an information icon and text stating 'Aggregate overcommitted thresholds are specified as a percentage of aggregate size', a checkbox for 'Enable aggregate overcommitted thresholds' which is checked, and two input fields: 'Nearly overcommitted threshold (%)' with the value '3000' and 'Overcommitted threshold (%)' with the value '4000'. At the bottom of the window, there is a text prompt 'To continue, click Next.' and three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a blue border.

Add Resource Pool Wizard

Space Thresholds
You can configure thresholds on the space usage for resource pool.


Space thresholds

☒ Enable event generation

Nearly Full threshold (%):

Full threshold (%):

Aggregate overcommitted thresholds

 Aggregate overcommitted thresholds are specified as a percentage of aggregate size

☒ Enable aggregate overcommitted thresholds

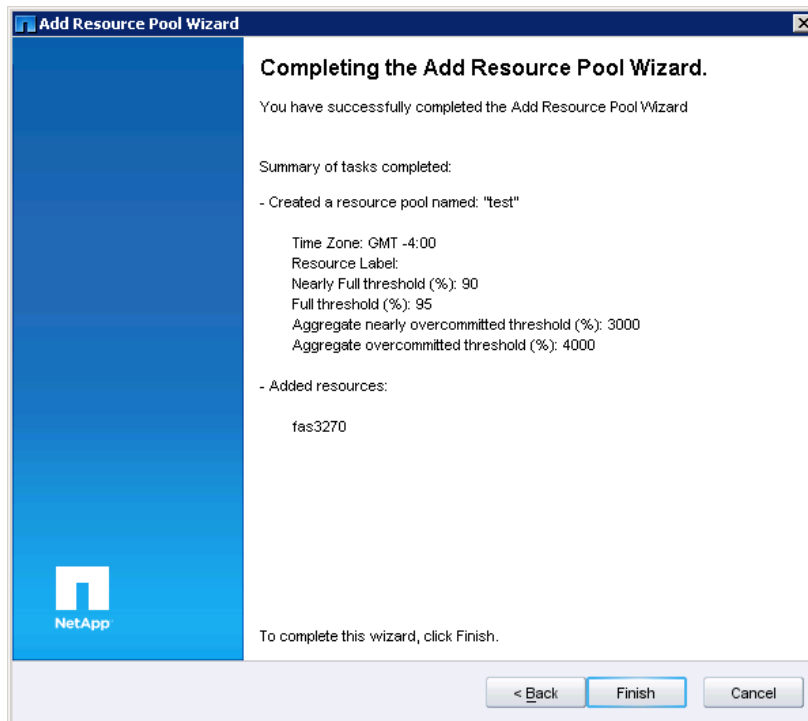
Nearly overcommitted threshold (%):

Overcommitted threshold (%):

To continue, click Next.

< Back **Next >** Cancel

8. Click **Finish**.



9. You can now see your created Resource Pool.

The screenshot shows the NetApp Management Console interface. The main window is titled "Data Resource Pools". On the left, a sidebar contains navigation links: Dashboards, Data (selected), Datasets, Resource Pools (selected), External Relationships, Unprotected Data, Jobs, Groups, and Custom Fields. Below these are links for Policies, Hosts, Notifications, and Get Started. The main content area displays a table of resource pools with columns: Name, Total Size, Available Size, Space Status, Utilization, and Description. The table lists three pools: "Default Storage Service Mirror Pool", "Default Storage Service Primary Pool", and a custom pool named "test". The "test" pool has a total size of 21.97 GB, an available size of 21.11 GB, a status of "Normal", and 4% utilization. Below the table, there are tabs for "Space Breakout", "Details", and "Dependencies". The "Details" tab is active, showing aggregate properties for "fas3270:aggr0" and a table for aggregate datasets.

Name	Total Size	Available Size	Space Status	Utilization	Description
Default Storage Service Mirror Pool	0 KB	0 KB	Normal	0%	Mirror Resource pool for...
Default Storage Service Primary Pool	0 KB	0 KB	Normal	0%	Resource pool for provis...
test	21.97 GB	21.11 GB	Normal	4%	

Aggregate	Total Size	Committed Size	Available Size	Utilization
fas3270:aggr0	21.97 GB	2.46 GB	21.11 GB	4%

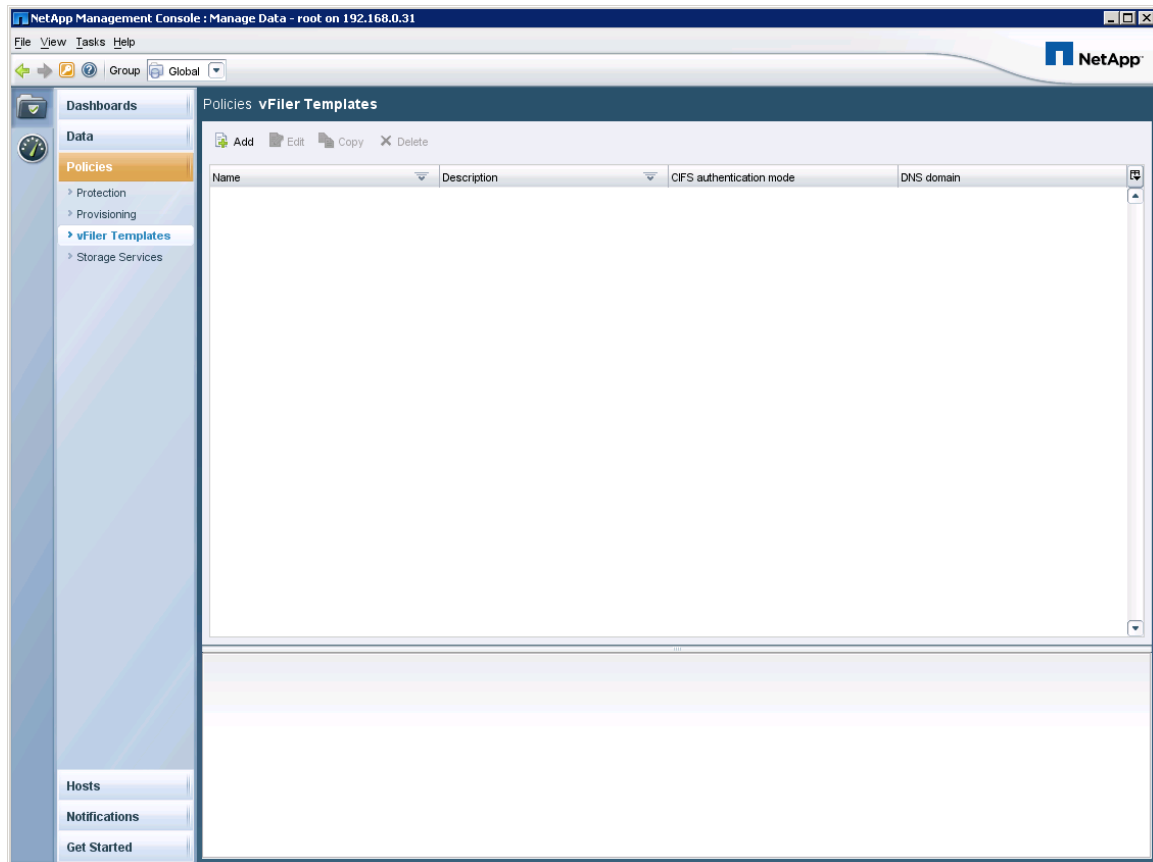
Aggregate properties:
Name: fas3270:aggr0
Space status: Normal

Aggregate datasets:

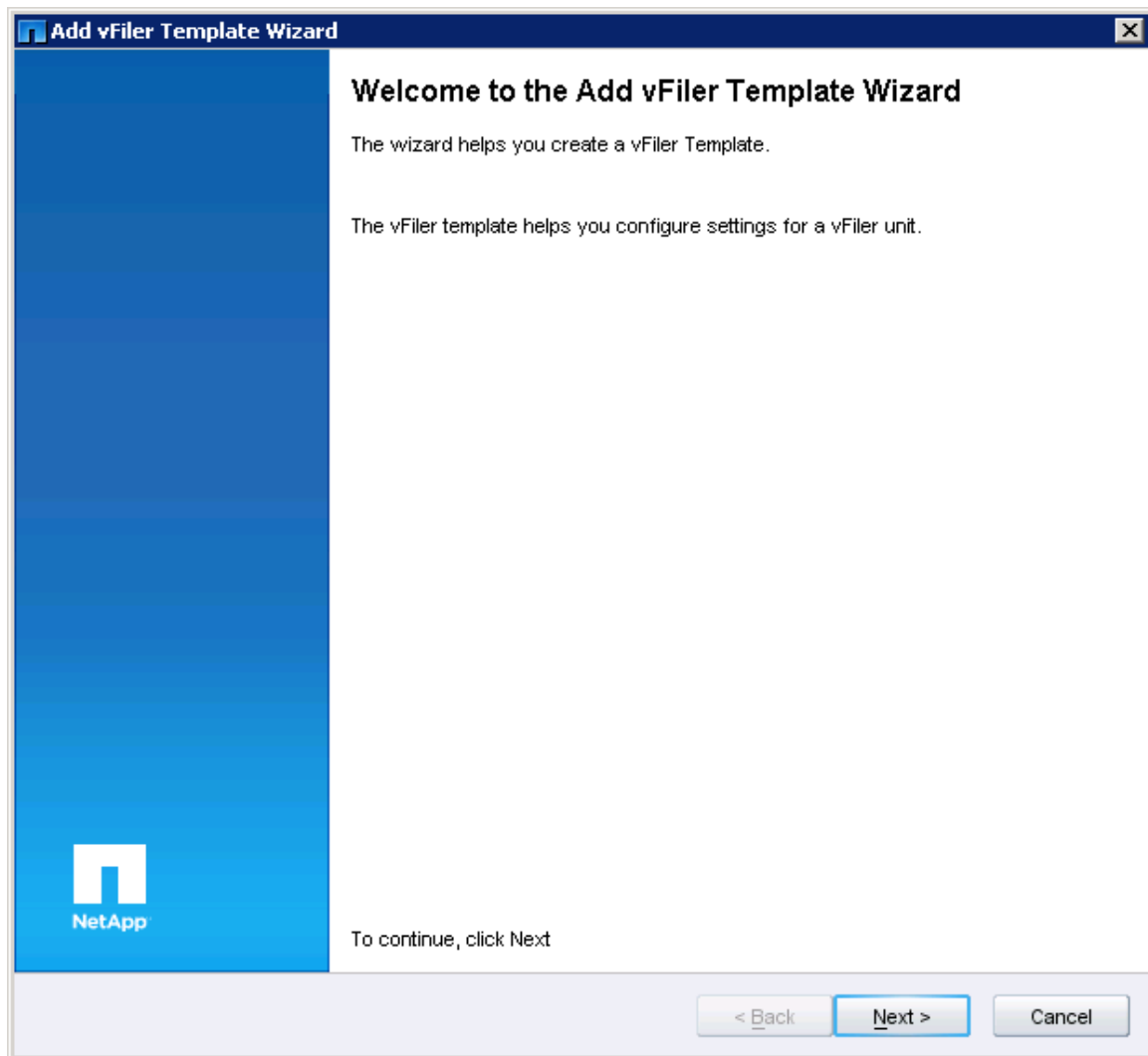
Dataset	Aggregate Space Used
---------	----------------------

CREATE A VFILER TEMPLATE

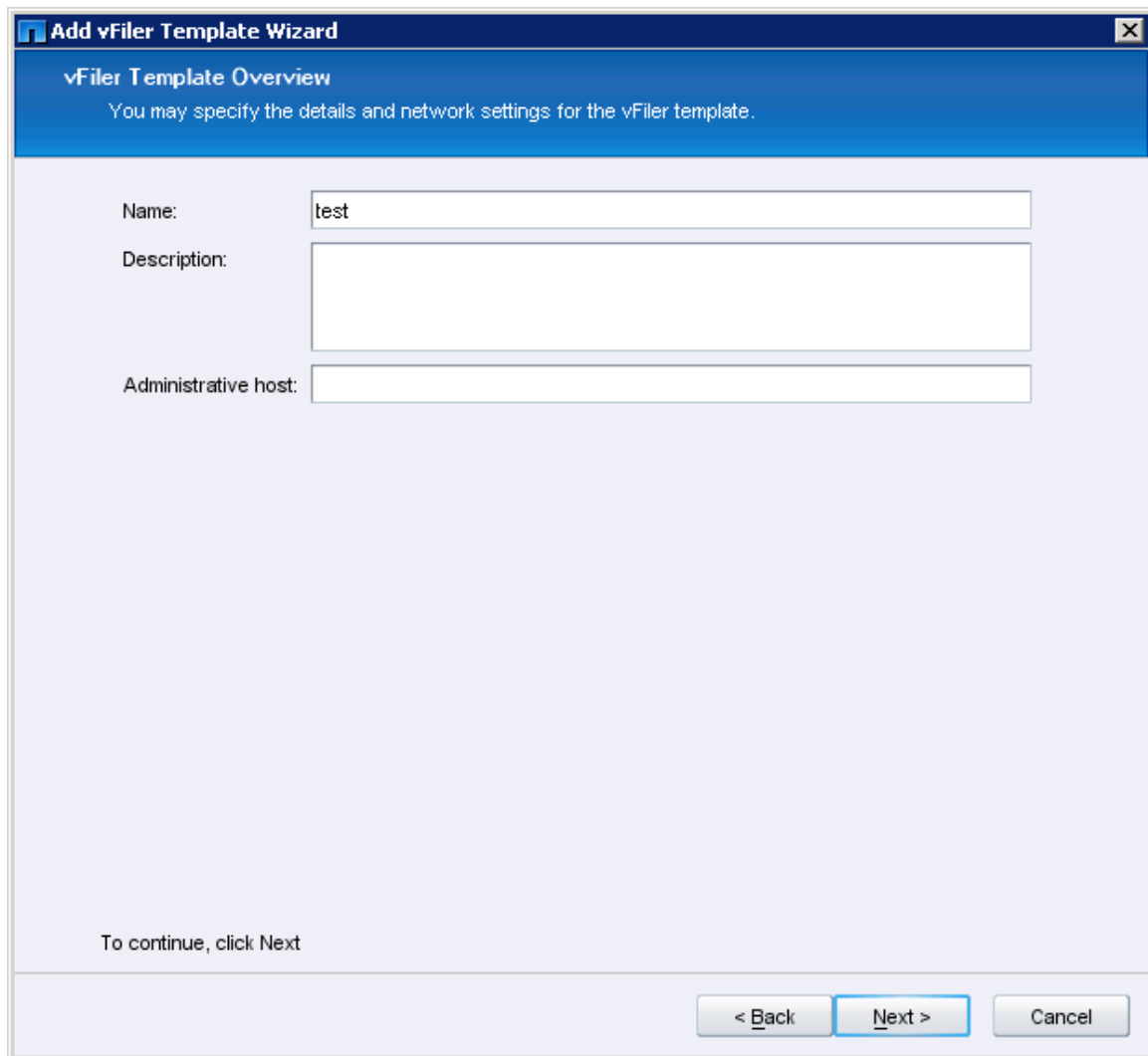
1. From the navigation pane, select **Policies > vFiler Templates**. Click the **Add** button to start the setup wizard.



2. Click **Next**.



3. Enter **test** and click **Next**.



The image shows a Windows-style dialog box titled "Add vFiler Template Wizard". The title bar is dark blue with a small icon on the left and a close button (X) on the right. Below the title bar is a blue header area with the text "vFiler Template Overview" and a subtitle "You may specify the details and network settings for the vFiler template." The main area of the dialog is light blue and contains three input fields: "Name:" with the text "test" entered, "Description:" with an empty text area, and "Administrative host:" with an empty text field. At the bottom left, there is a text prompt "To continue, click Next". At the bottom right, there are three buttons: "< Back", "Next >" (which is highlighted with a blue border), and "Cancel".

Add vFiler Template Wizard

vFiler Template Overview
You may specify the details and network settings for the vFiler template.

Name: test

Description:

Administrative host:

To continue, click Next

< Back Next > Cancel

4. Add DNS settings. Enter **lab.local** for the domain name and **192.168.150.11** for a name server. Click on **Add** then click **Next**.

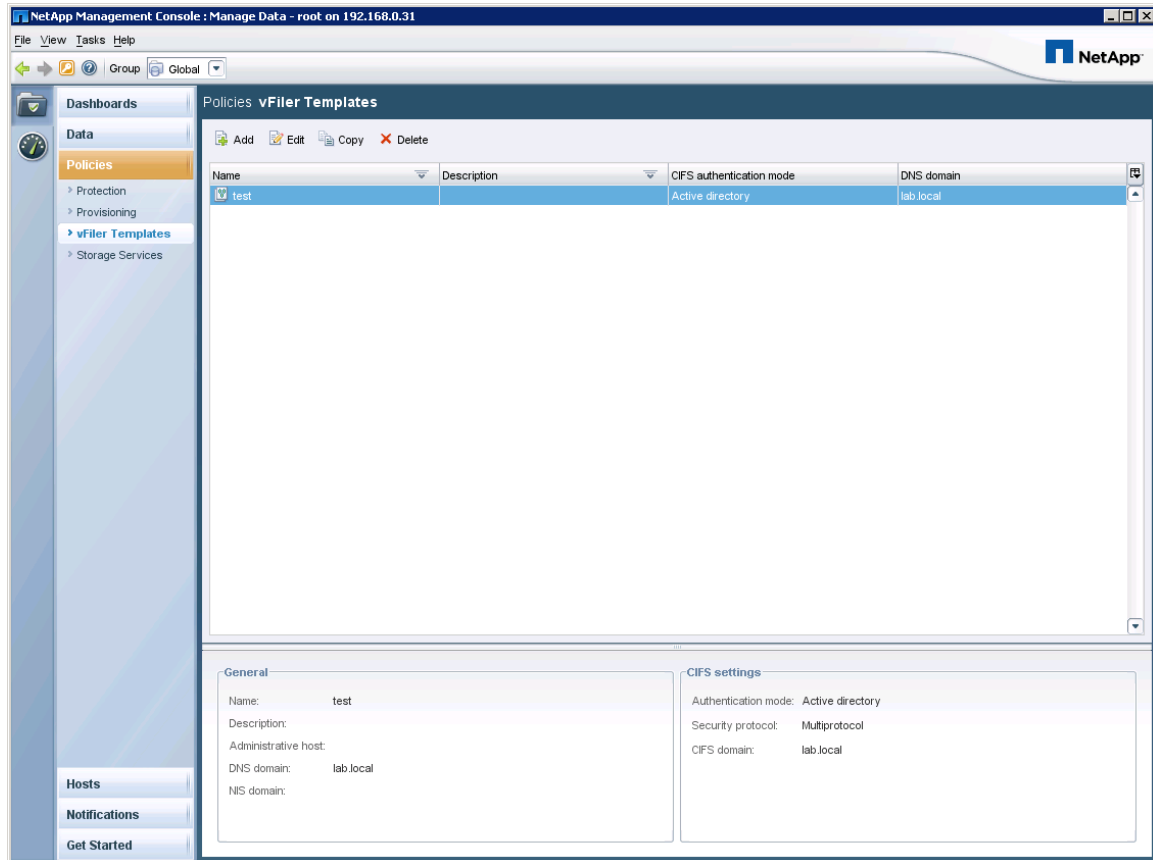
The screenshot shows a window titled "Add vFiler Template Wizard" with a close button in the top right corner. The window has a blue header bar with the title "DNS and NIS Settings" and a subtitle "You may specify the DNS and NIS settings." Below the header, there are two main sections: "DNS domain" and "NIS domain".

The "DNS domain" section contains a "Name:" field with the text "lab.local" and a "Servers:" field with the text "192.168.0.11". To the right of the "Servers:" field are "Add" and "Delete" buttons. Below the "Servers:" field is a list box containing "192.168.0.11" with up and down arrow buttons to its right.

The "NIS domain" section contains a "Name:" field and a "Servers:" field, both of which are empty. To the right of the "Servers:" field are "Add" and "Delete" buttons. Below the "Servers:" field is an empty list box with up and down arrow buttons to its right.

Below the "NIS domain" section, there is an information icon (i) followed by the text "Enter either IPv4 or IPv6 address." At the bottom of the window, there is a message "To continue, click Next" and three buttons: "< Back", "Next >" (which is highlighted with a blue border), and "Cancel".

5. For CIFS Settings, select **MultiProtocol**, **Active Directory** and click **Next**.
6. Click **Finish**. You can now see your created vFiler Template.



CREATE A VFILER UNIT

1. From the navigation pane, select **Hosts > vFiler Units**. Click the **Add** button to start the setup wizard.

The screenshot displays the NetApp Management Console interface. The left-hand navigation pane is expanded to show the 'Hosts' section, with 'vFiler Units' selected. The main content area is titled 'Hosts vFiler Units' and features a table listing existing vFiler units. Above the table is a toolbar with buttons for 'Add', 'Setup', 'Delete', 'Start migration', 'Update', 'Cancel', 'Cut over', 'Roll back', and 'Clean up'. The table has columns for Name, IP Address, IP Space, Hosting Storage Sys..., System Status, and Migration Status. Below the table, there are two sections: 'General' and 'Service status'. The 'General' section includes fields for Protocols, Mirrored, Backup destination, and Backup source. The 'Service status' section shows the status for NFS, CIFS, and iSCSI. To the right of these sections is a 'Hosting storage system settings' panel with fields for Host name, IP address, System status, Login credentials status, NDMP status, and NDMP credentials status. At the bottom of the console, there is a 'Get Started' button and a row of tabs: 'Details', 'Network Settings', 'Paths', 'Input Relationships', 'Output Relationships', and 'Migration'.

Name	IP Address	IP Space	Hosting Storage Sys...	System Status	Migration Status
vfiler1	192.168.0.220	ipspace1	fas6280.lab.local	Online	Not started
vfiler2	192.168.0.221	ipspace1	fas6280.lab.local	Online	Not started
vfiler3	192.168.0.222	ipspace1	fas6280.lab.local	Online	Not started

General

Protocols: CIFS, NFS, iSCSI
Mirrored: Yes
Backup destination: Yes
Backup source: Yes

Service status

NFS: Up
CIFS: Up
iSCSI: Up

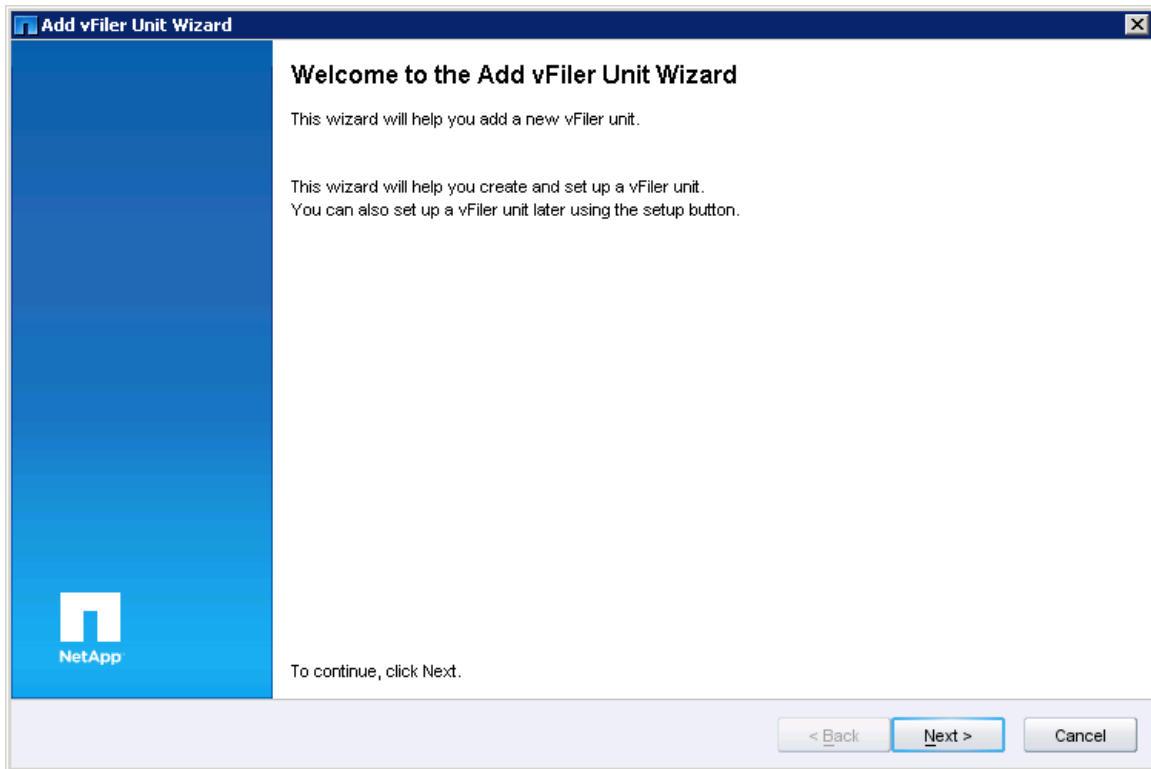
Hosting storage system settings

Host name: fas6280
IP address: 192.168.0.210
System status: Online
Login credentials status: Good
NDMP status: Up
NDMP credentials status: Good

Get Started

Details | Network Settings | Paths | Input Relationships | Output Relationships | Migration

2. Click **Next**.



3. Enter **test** for the name, ipspace1 as the IP Space. Select **NFS**, **CIFS** and **iSCSI**, then click **Next**.

Add vFiler Unit Wizard

vFiler Unit information
Enter the details of a vFiler unit

Name:

IP space:

Allowed protocols

☒ NFS ☒ CIFS ☒ iSCSI

To continue, click Next.

< Back **Next >** Cancel

4. Select **fas3270** and click **Next**.

Add vFiler Unit Wizard

vFiler unit hosting storage system
Select a storage system or a resource pool to provision a vFiler unit

☒ Select a storage system

Filter storage system

- fas3270
- fas6280

☐ Select a resource pool

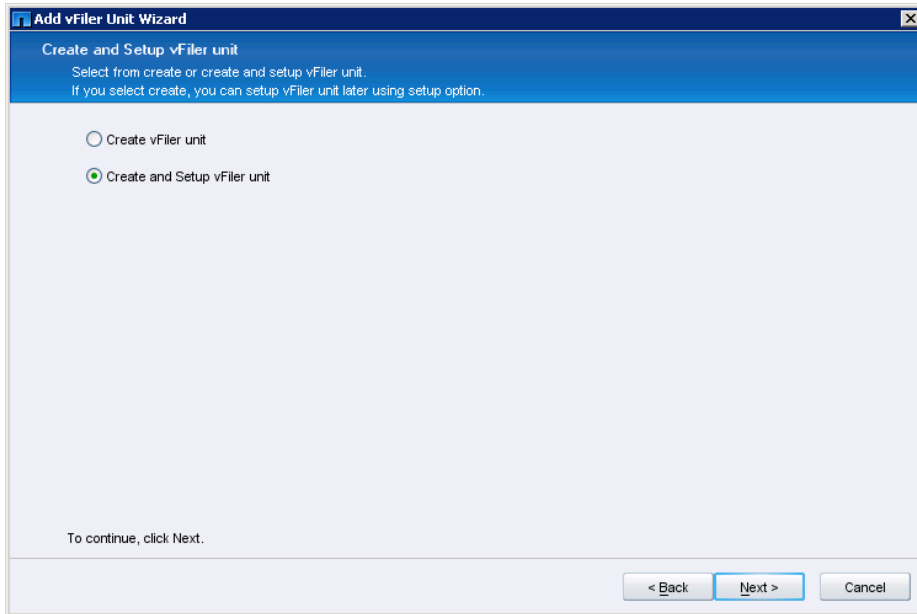
Filter resource pool

- test

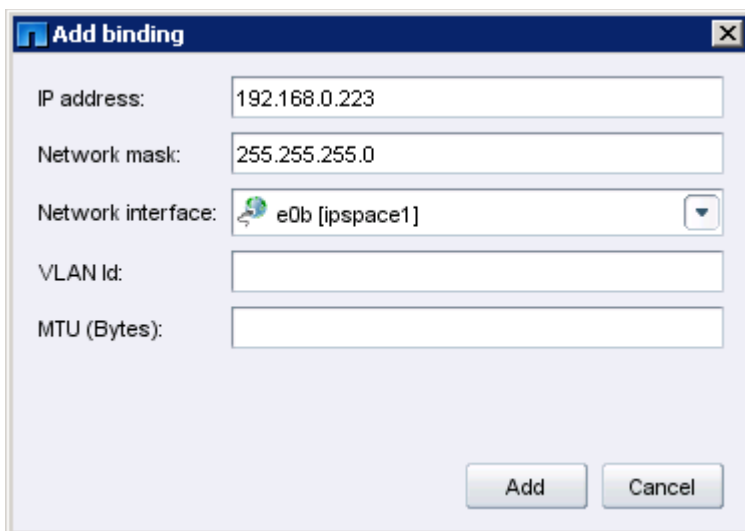
To continue, click Next.

< Back **Next >** Cancel

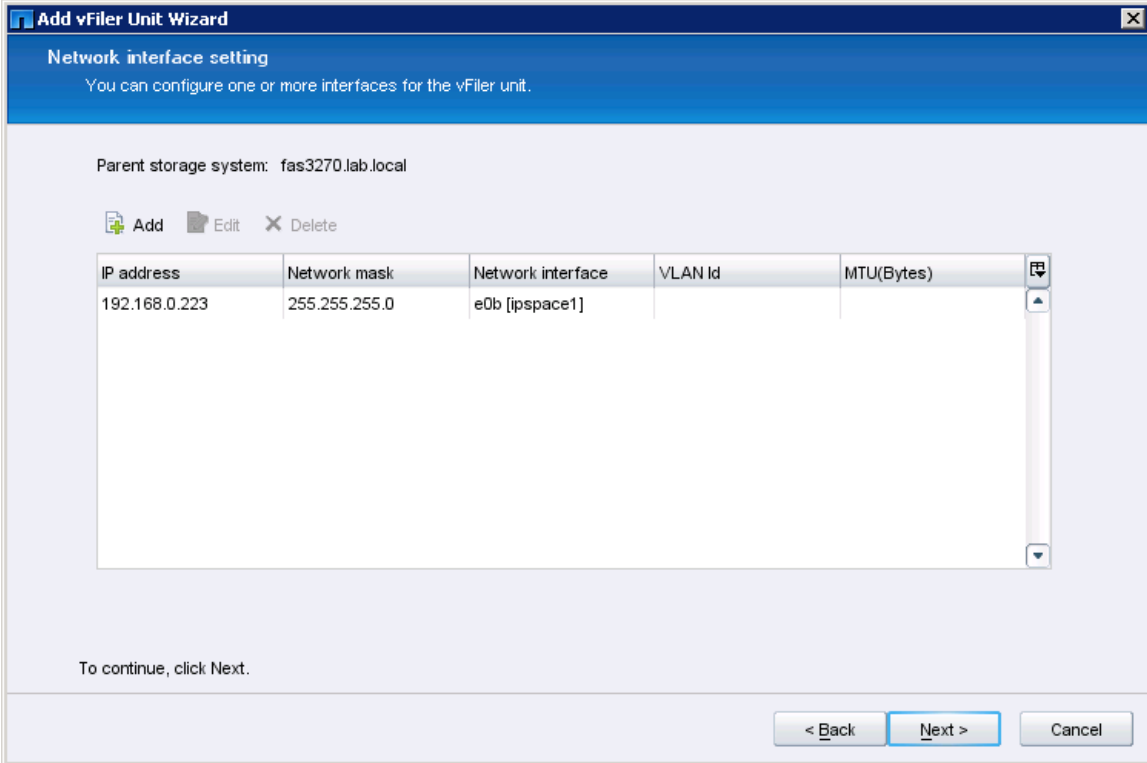
5. Click **Next**.



6. Click **Add** to enter IP bindings. Enter the IP, netmask, e0b (which will be part ipspace1 from prior setting) and click **Add**.



7. Click **Next**.



The screenshot shows the 'Add vFiler Unit Wizard' window, specifically the 'Network interface setting' step. The window has a blue header bar with the title and a close button. Below the header, a subtitle reads 'You can configure one or more interfaces for the vFiler unit.' The main area displays the 'Parent storage system: fas3270.lab.local' and three icons: 'Add' (green plus), 'Edit' (grey pencil), and 'Delete' (red X). A table with five columns is shown: 'IP address', 'Network mask', 'Network interface', 'VLAN Id', and 'MTU(Bytes)'. The first row contains the values '192.168.0.223', '255.255.255.0', 'e0b [ipspace1]', and empty cells for 'VLAN Id' and 'MTU(Bytes)'. A vertical scrollbar is on the right side of the table. At the bottom, a message says 'To continue, click Next.' and there are three buttons: '< Back', 'Next >' (highlighted with a blue border), and 'Cancel'.

Parent storage system: fas3270.lab.local

Add Edit Delete

IP address	Network mask	Network interface	VLAN Id	MTU(Bytes)
192.168.0.223	255.255.255.0	e0b [ipspace1]		

To continue, click Next.

< Back Next > Cancel

8. Select the vfiler template **test**, enter the domain password (**netapp123**), and click **Next**.

The screenshot shows a Windows-style dialog box titled "Add vFiler Unit Wizard". The main heading is "vFiler network configuration" with a subtitle "Select vFiler unit template and optionally configure CIFS settings." Below this, there is a "vFiler template:" label followed by a dropdown menu showing "test". A checkbox labeled "Perform CIFS setup" is checked. Underneath, there are two text input fields: "Domain user:" containing "administrator@lab.local" and "Domain password:" containing "*****". At the bottom left, it says "To continue, click Next." At the bottom right, there are three buttons: "< Back", "Next >" (which is highlighted with a blue border), and "Cancel".

9. Enter the password **netapp123** and click **Next**.

Add vFiler Unit Wizard

vFiler unit root password
You may optionally set root password. If already set password won't be modified.

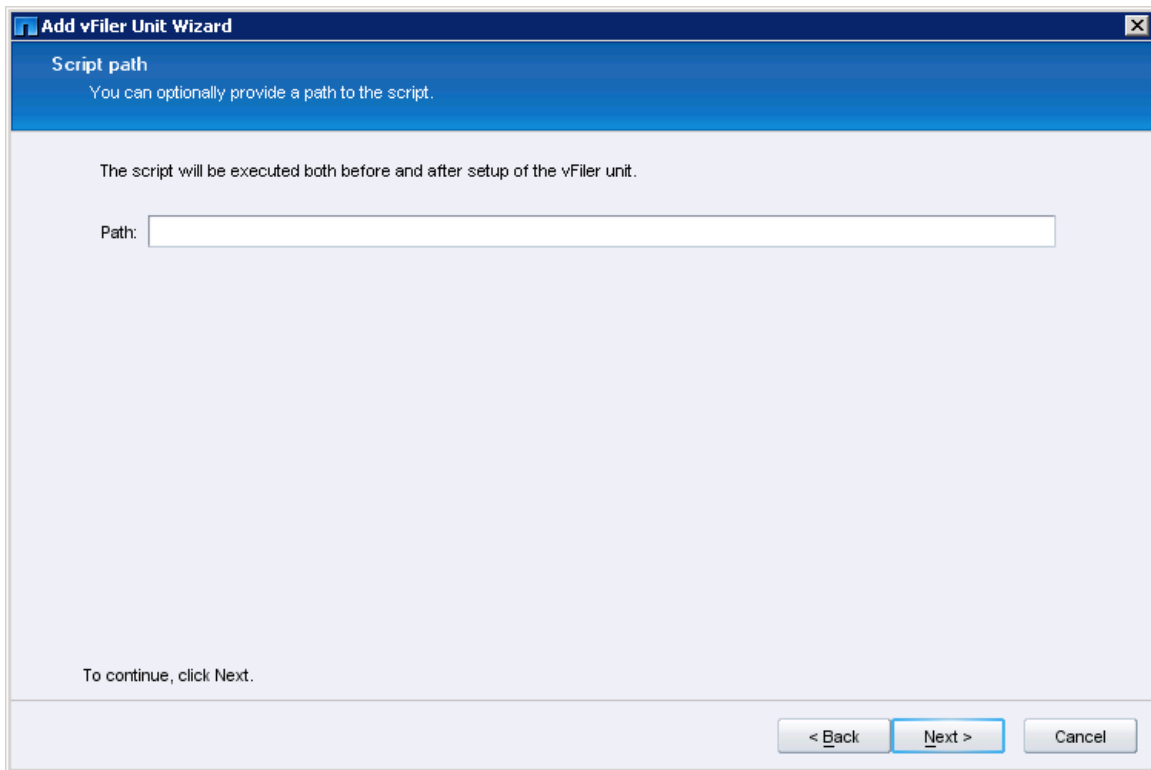
Root password: *****

Confirm root password: *****

To continue, click Next.

< Back **Next >** Cancel

10. Click **Next**.



The image shows a screenshot of the 'Add vFiler Unit Wizard' window. The title bar is dark blue with the text 'Add vFiler Unit Wizard' and a close button. The main content area has a light blue header with the text 'Script path' and 'You can optionally provide a path to the script.' Below this, a message states 'The script will be executed both before and after setup of the vFiler unit.' There is a text input field labeled 'Path:'. At the bottom, there is a message 'To continue, click Next.' and three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a blue border.

Add vFiler Unit Wizard

Script path
You can optionally provide a path to the script.

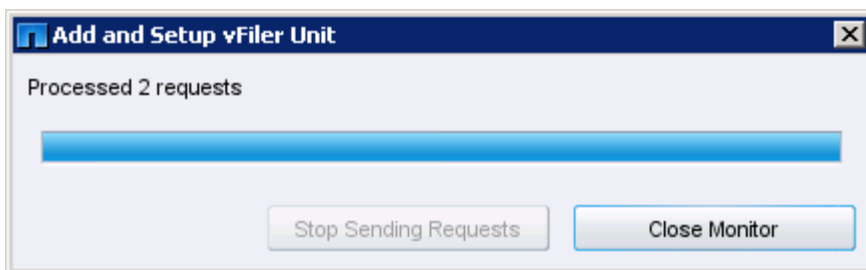
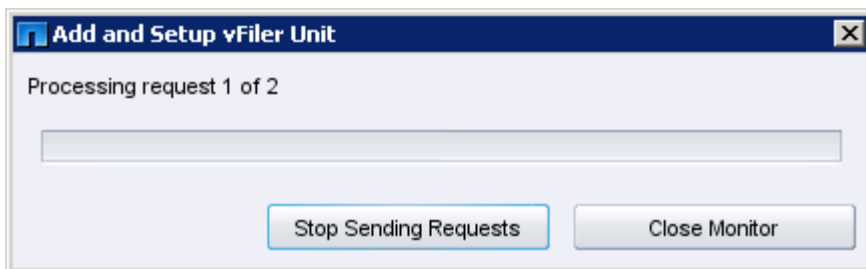
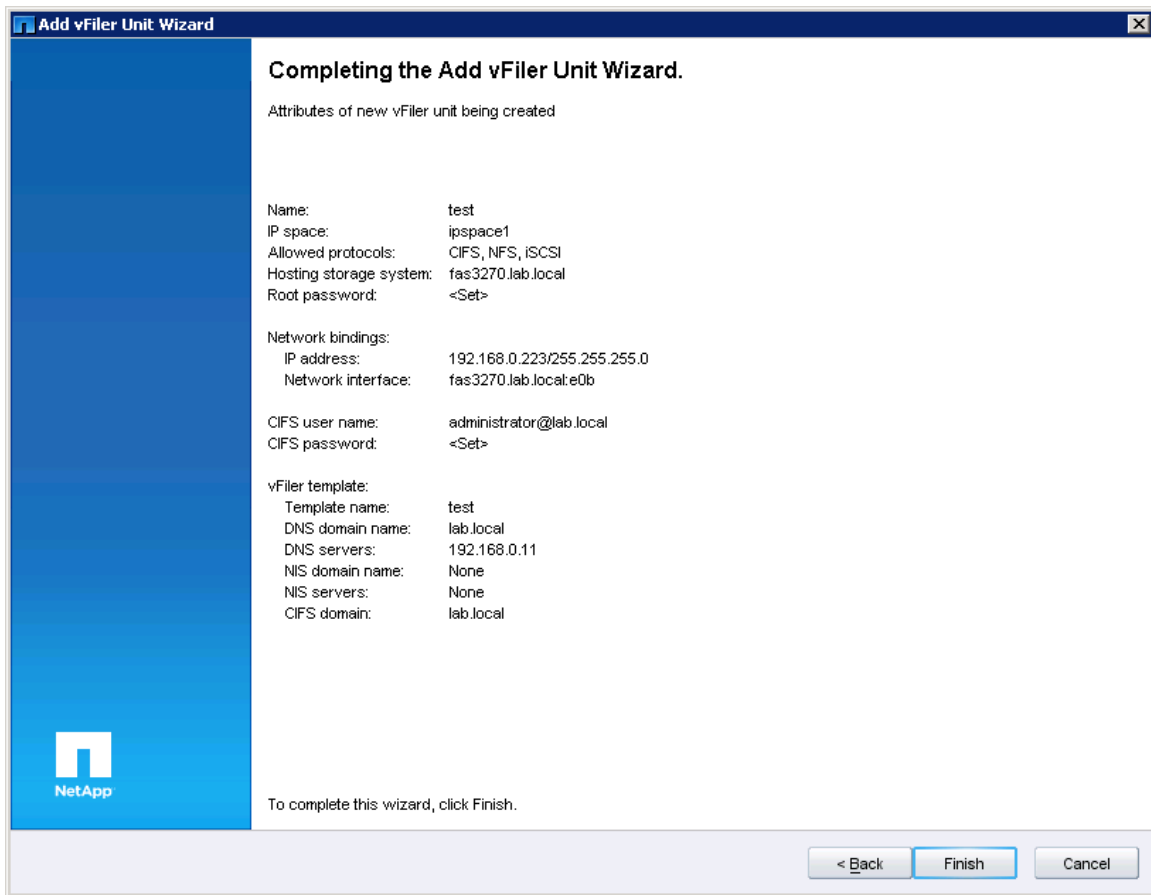
The script will be executed both before and after setup of the vFiler unit.

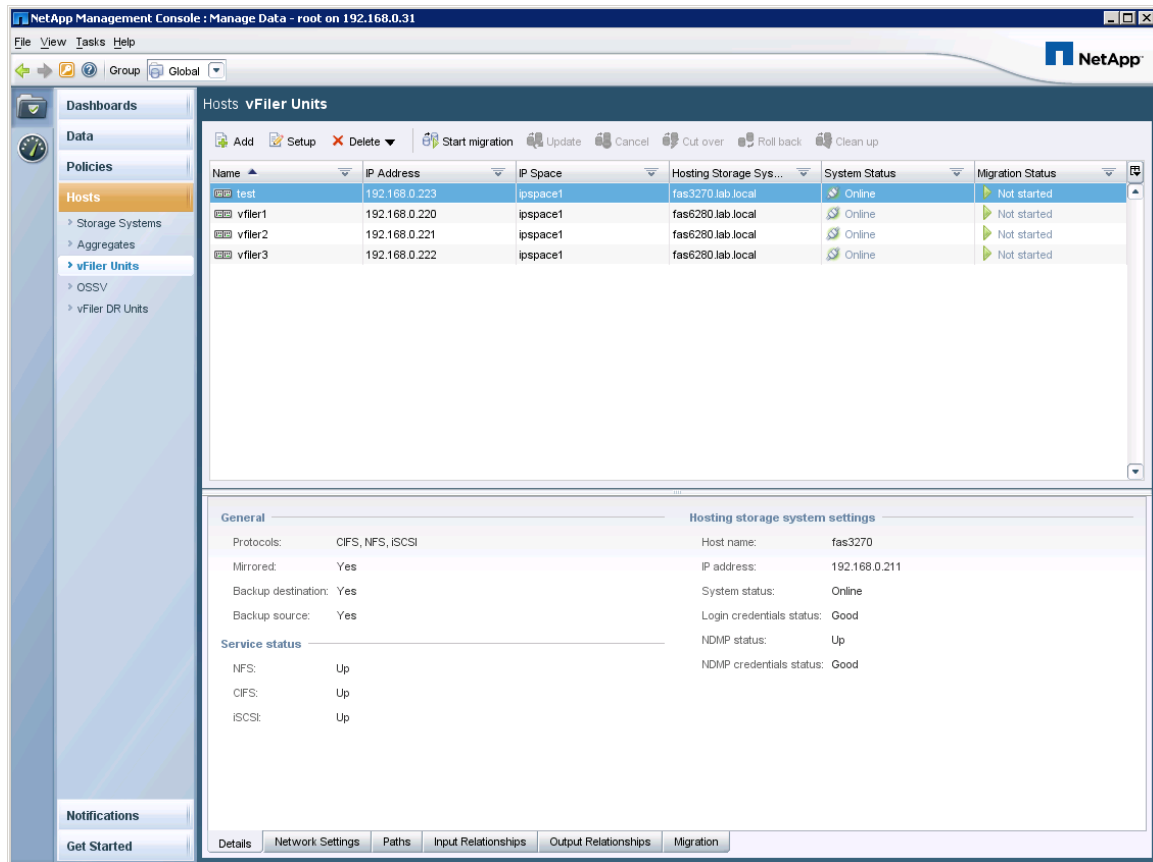
Path:

To continue, click Next.

< Back **Next >** Cancel

11. Click **Finish**.





ADDITIONAL TASKS OUT OF SCOPE OF THIS EXAMPLE

Create a provisioning policy: **Policies → Provisioning**

Create a dataset and assign storage: **Data → Datasets**

11 APPENDIX D - VFILER MIGRATE WITH NO DATA COPY

For Reference Only – this is not possible in the simulator hands-on lab.

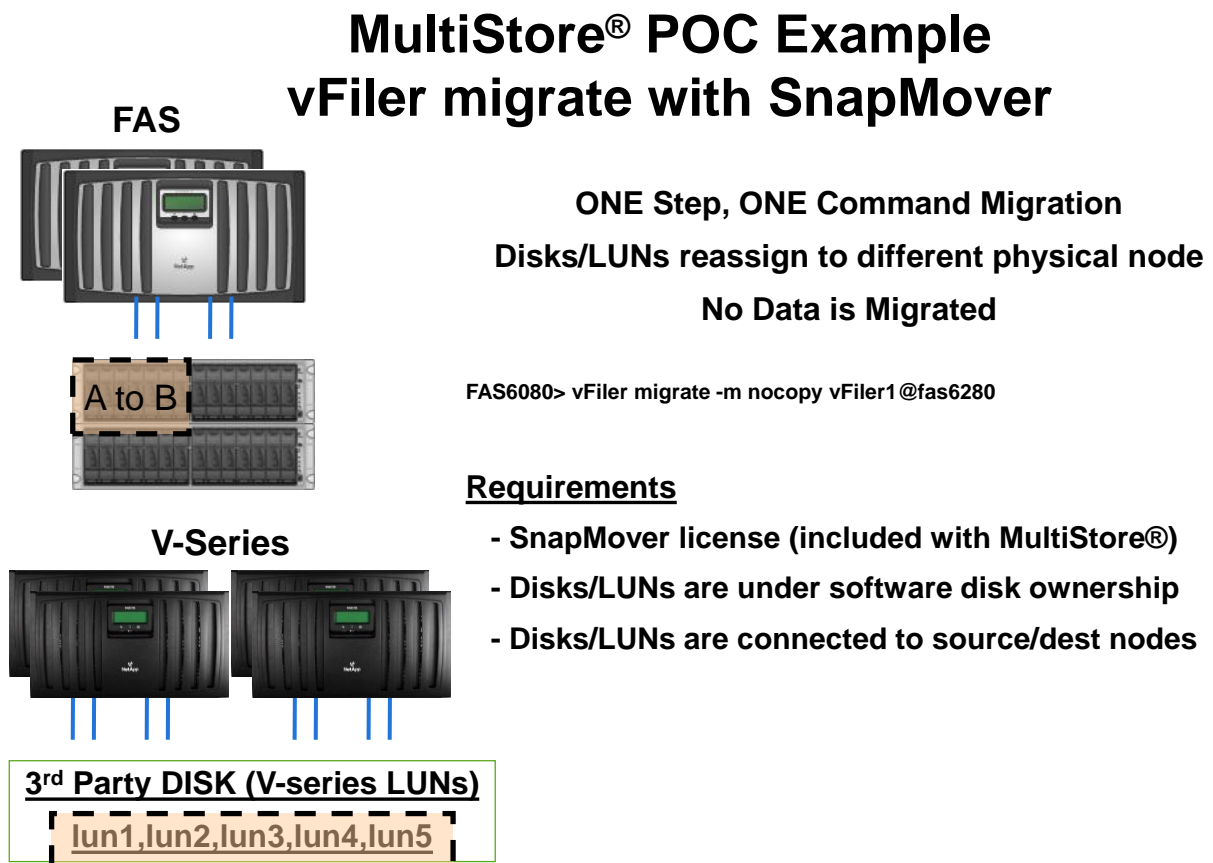
SnapMover was previously a separate license and product name. In Data ONTAP 7.3.2 and Data ONTAP 8.0 and later, the SnapMover license and product name have been discontinued. The functionality has been included with the MultiStore license. This functionality can not be demonstrated in a simulator since we don't have software disk ownership, but see below for more information.

The major requirement is that the vFiler owns ALL volumes in ALL aggregates used by that vFiler. For FAS controllers, it only works between 2 cluster nodes since both can see the disks at the same time.

The vfiler migrate command is issued only once to do the migration since no data mirroring is done, just vfiler stop, disk reassign, and vfiler start. The command to use is:

```
vfiler migrate -m nocopy
```

Figure 10) vFiler Migrate No Copy Diagram



12 APPENDIX E - HOW TO MOVE EXISTING VFILER0 TO A VFILER

It is possible to migrate an existing physical controller to a vFiler unit. There are many considerations to plan for moving a physical controller into a vFiler. There will be downtime to migrate to a vFiler, but if you plan (and pre-write commands or scripts) for all the considerations below, the downtime can be short. In many cases you may take vfiler0 and create more than one vFiler, and that can be extrapolated from the list below.

There are a lot of small things to migrate from vfiler0 into the vFiler and these considerations also apply when migrating from one physical controller to another physical controller. Below is a checklist of topics without ONTAP commands (anyone doing this work should know the commands or where to find them). A pre-written plan to execute on-site is the key to success when migrating to a vFiler from a physical controller.

- A vFiler needs its own small root volume
 - Create a root volume for the vFiler
- iSCSI Nodename and LUN Mappings
 - Rename the vfiler0 iscsi nodename and reassign the iscsi nodename on the vFiler to match former vfiler0 for no client change (you can leave it different but need to make changes on the clients if you do).
 - Create iGroups in the vFiler
 - Map LUNs to iGroups
- Hostname
 - Need a new hostname (either for vfiler0 or vFiler depending on which keeps the original hostname). For no host change, often vfiler0 is renamed and the vFiler assumes the name of vfiler0.
- IPSpaces
 - Do you need to create a separate network from the default-ipspace?
- IP and Interface, DNS, NIS, LDAP
 - You need a new IP (often put a new management IP on vfiler0 and move existing interfaces on vfiler0 to the vFiler).
- Domain Membership, FilerSID, Recreate shares and exports
 - We need to rejoin the domain from vFiler using the same netbios name we had in vfiler0, then rejoin with vfiler0 with a new netbios name. Typically vfiler0 rejoins the domain with a new name to free the computer account first.
- SnapMirror Relationships
 - Need to manually setup additional volumes and then create the dr vFiler manually, then resync it. Use vfiler0 for the relationship, so this typically involves a new IP address since the new vFiler typically assumes the physical filer address and you have a new hostname and IP for vfiler0 which will be the source of the mirror for vFiler dr. You could use the vFiler IP for snapmirror, but not if using vFiler dr.
 - If Operations Manager use vfiler0 for relationships and update snapmirror.access.
- NDMP Backups
 - If any backups are set to run against vfiler0 and its IP changes, change the backup software to authenticate to vfiler0's new IP/name. NDMP works for copying but does not work for backup to tape from a vFiler. NDMP backups for the data will need to re-authenticate to vfiler0.
- SnapVault Relationships
 - Operations Manager uses vfiler0 (hosting filer) for SnapVault relationships. Modify / restart vaults from vFiler0 between source and target instead of direct vFiler to vFiler.
 - Set snapvault.access and ndmpd.preferred_interfaces on vfiler0.

- VSCAN
 - If any vscanners are set to run against vfiler0 and its ip changes, change the vscan software to authenticate to vfiler0's new IP/name. Unless you want to vscan from the vFiler (most often vscan is centralized for all vFilers at vfiler0).
- Netbios Aliasing
 - If any netbios aliases are used by vfiler0, they need to be moved to the vFiler. NOTE: this might be an issue if you leave resources on vfiler0 that also need the alias. The same alias can't be in more than one filer (virtual or physical). If all resources move to the vFiler, we can move it from vfiler0, but if not, users may be impacted.
- AutoHome directories
 - If any autohome directories are setup for any volumes moving from vfiler0 to the vFiler, they must be removed from vfiler0 and setup again in the vFiler.
- Local User Accounts
 - Create local user accounts in vfiler0 in the vFiler. There is a method to export and import registry entries for users.
- Local Groups
 - Check for local groups from the **windows mmc** and/or **/etc/lclgroups.cfg**. Make entries in the new vfiler for any groups needed in the vfiler.
- Domain User Accounts
 - Always check to see if domain user accounts are used in vfiler0 so they can be added to the vFiler.
- SNMP
 - Match SNMP settings if any snmp monitors are used (OpsManager, etc.)
- Quotas
 - If any quotas are set on volumes moving from vfiler0 to the vFiler, the /etc/quotas entries need to be removed from /etc/quotas on vfiler0 and created in /etc/quotas on the vFiler, then "quota on volname" in the vFiler for the volume.
- User Mappings
 - Copy usermap.cfg entries needed in vfiler1 from vfiler0 (modify / copy / delete as needed for each vfiler)
- CIFS, NFS, iSCSI Options
 - List all options from vfiler0 and match on the vFiler
- Fpolicy settings
 - Need to run fpolicy setup in the vFiler
- Widelinks
 - /etc/symlinktranslations (move from the physical controller to the vFiler).
- SSH, RSH setup
 - Both of these need to be enabled and configured in the vFiler.
- Volume Names
 - Volume names must be the same on the source and destination for migrate, dr and data motion.