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

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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

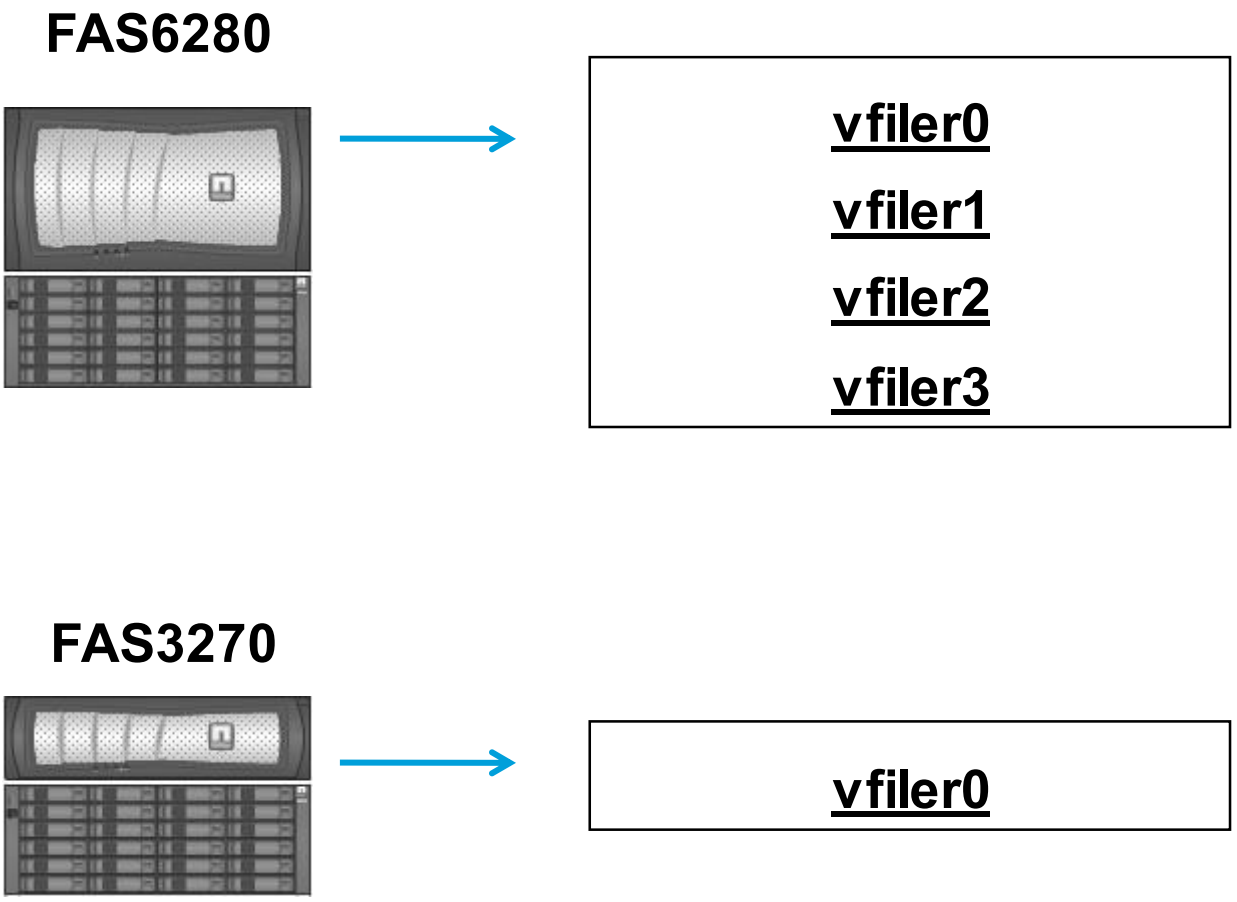
Data ONTAP Simulators (vfiler0)	FAS6280	FAS3270
user	root	root
passwd	netapp123	netapp123
IP	**192.168.150.210 (e0a)**	**192.168.150.211 (e0a)**
Subnet	255.255.255.0	255.255.255.0
GW	192.168.150.2	192.168.150.2
IPSpace	default-ipspace	default-ipspace
dns domainname	lab.local	lab.local
dns server	192.168.150.11	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

vFiler Units	vfiler1	vfiler2	vfiler3
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



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

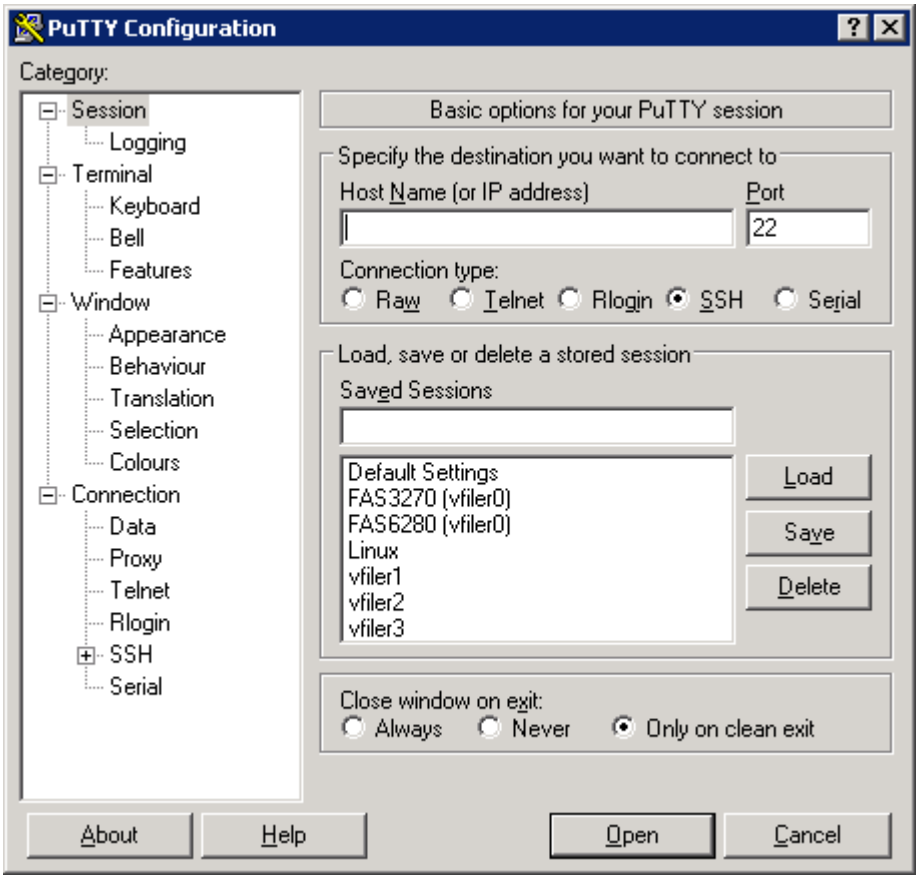
- System Manager 2.0R1
- NetApp Management Console (NMC 3.1)
- OnCommand 5 Console (new DFM)
- Data Fabric Manager Console (legacy DFM)

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 asas root : netapp123



2. Create a test vFiler unit using the CLI. The initial command is show below - you can copy and past 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 vfilers 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
```

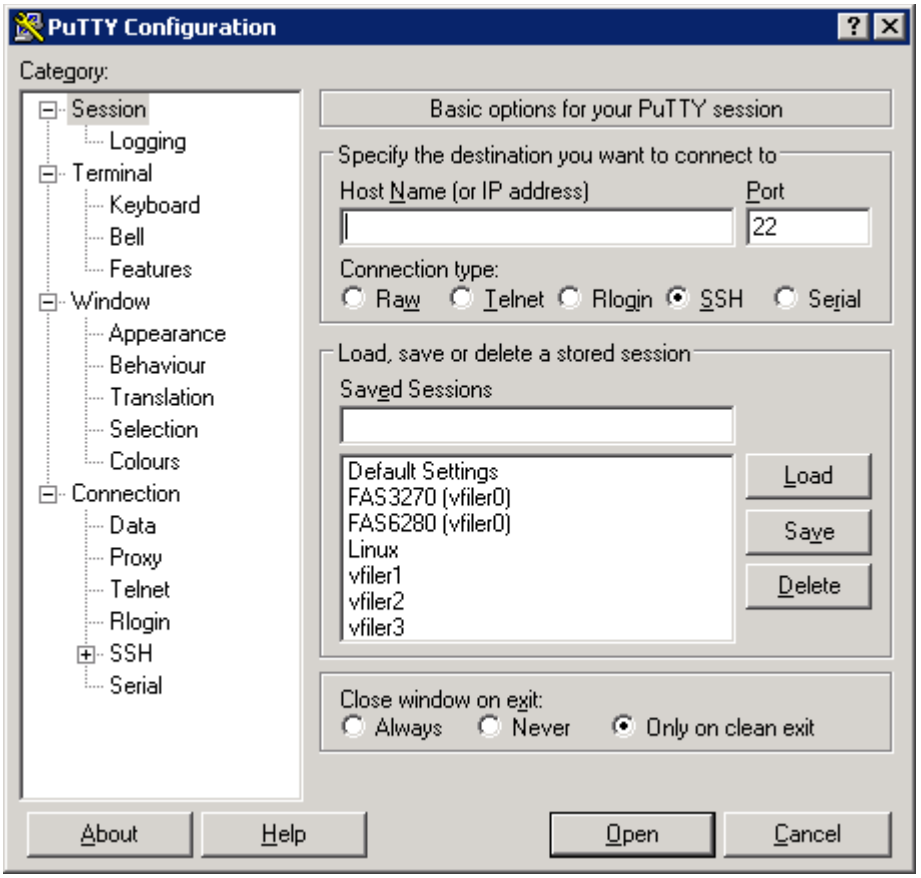
8. Interactive and non-interactive ssh directly to the vFiler unit.

   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 vfilername" 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 cifs shares 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 volumes 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:

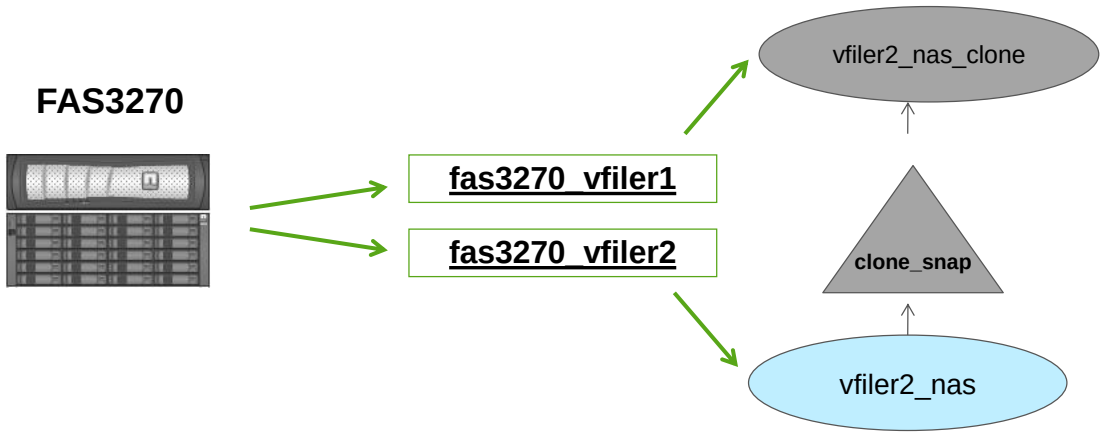
    ```
    priority off
    ```

    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



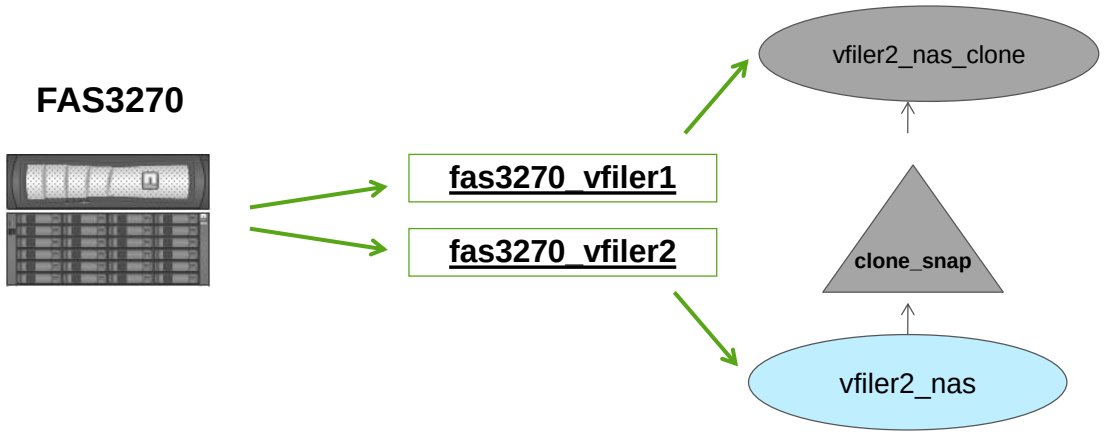
16. Move the source of the cloned volume from one vfiler to another.

```
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
```

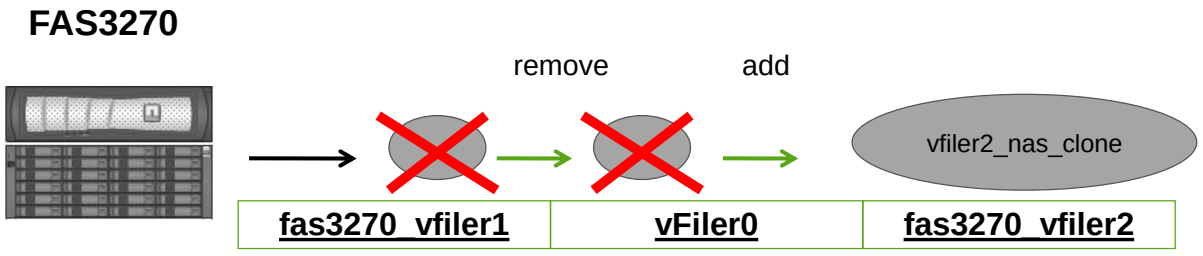
Figure 3) Move A Clone Source Between vFiler Units



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:

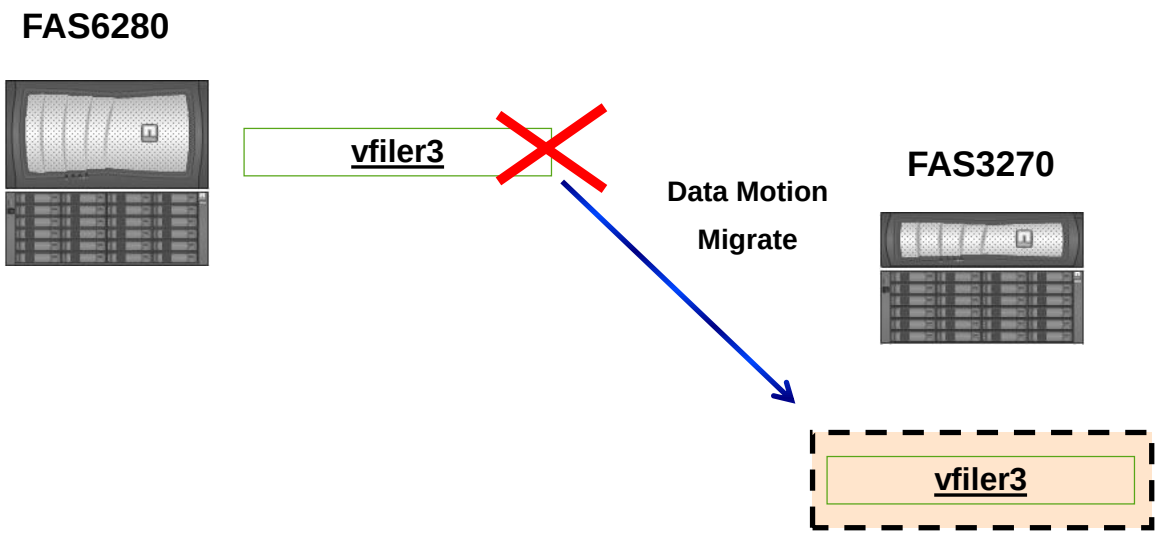
```
vfiler stop fas3270_vfiler2
vfiler destroy fas3270_vfiler2
vfiler status -a
vol offline vfiler2_nas_clone
vol destroy vfiler2_nas_clone
```

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.

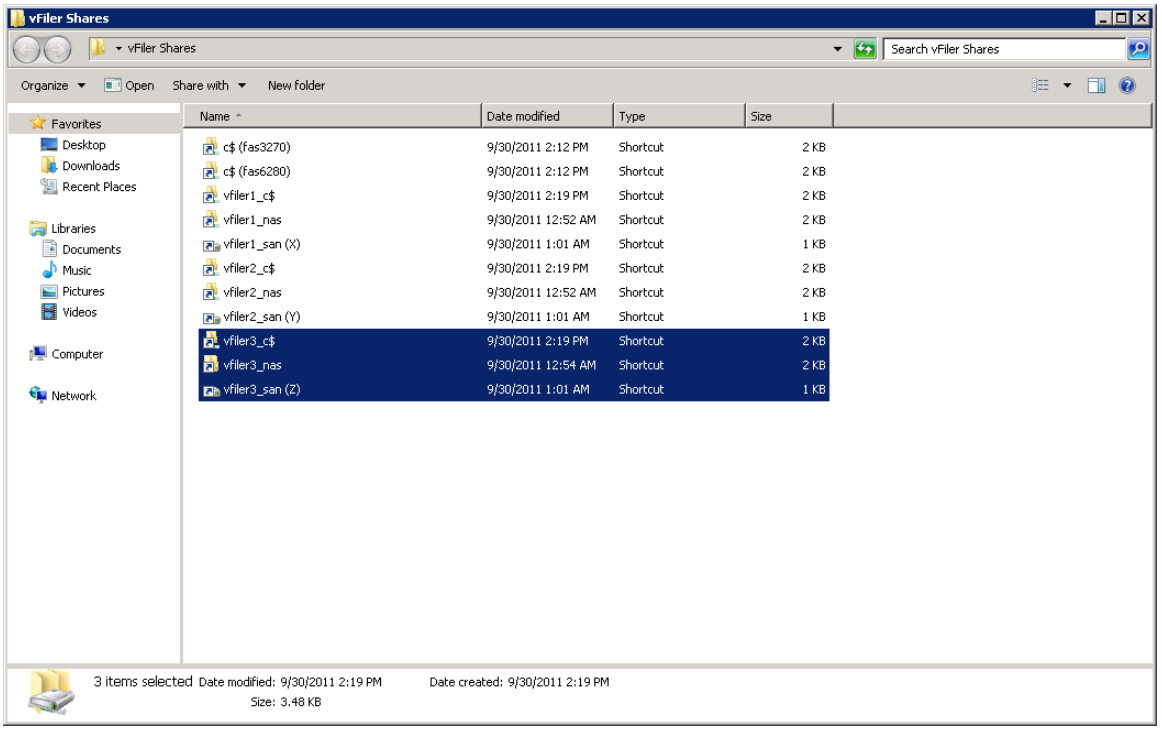
Figure 5) DataMotion for vFiler Diagram

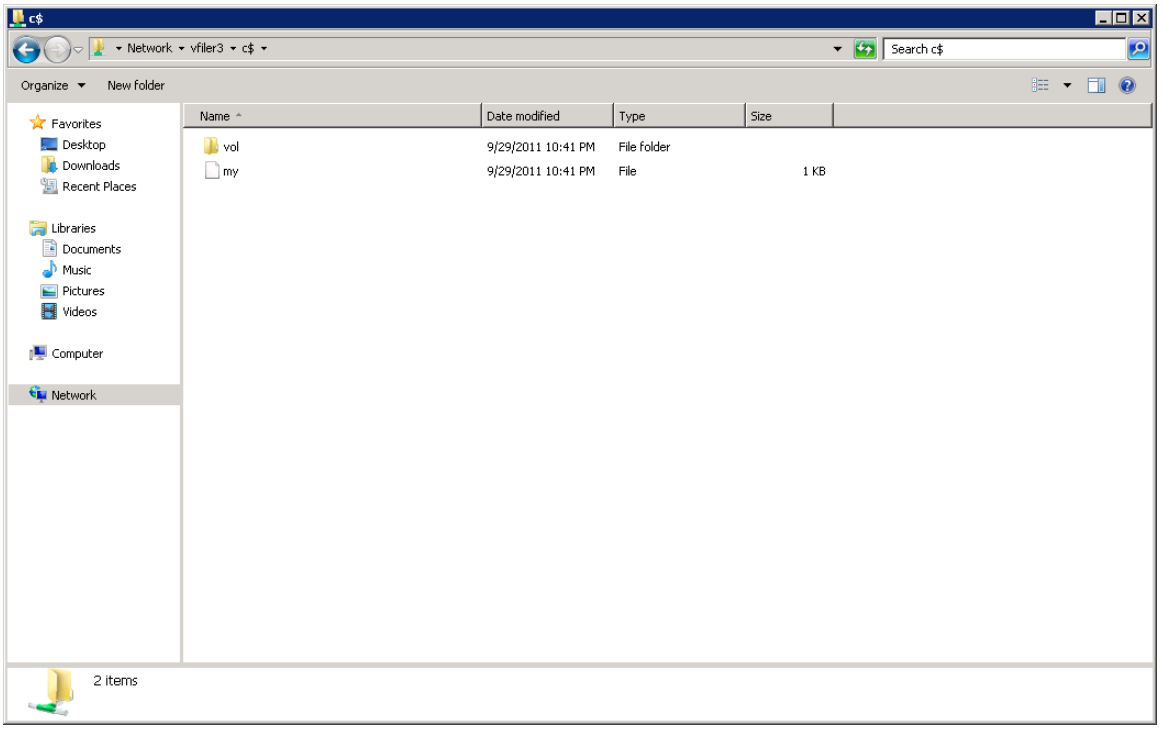


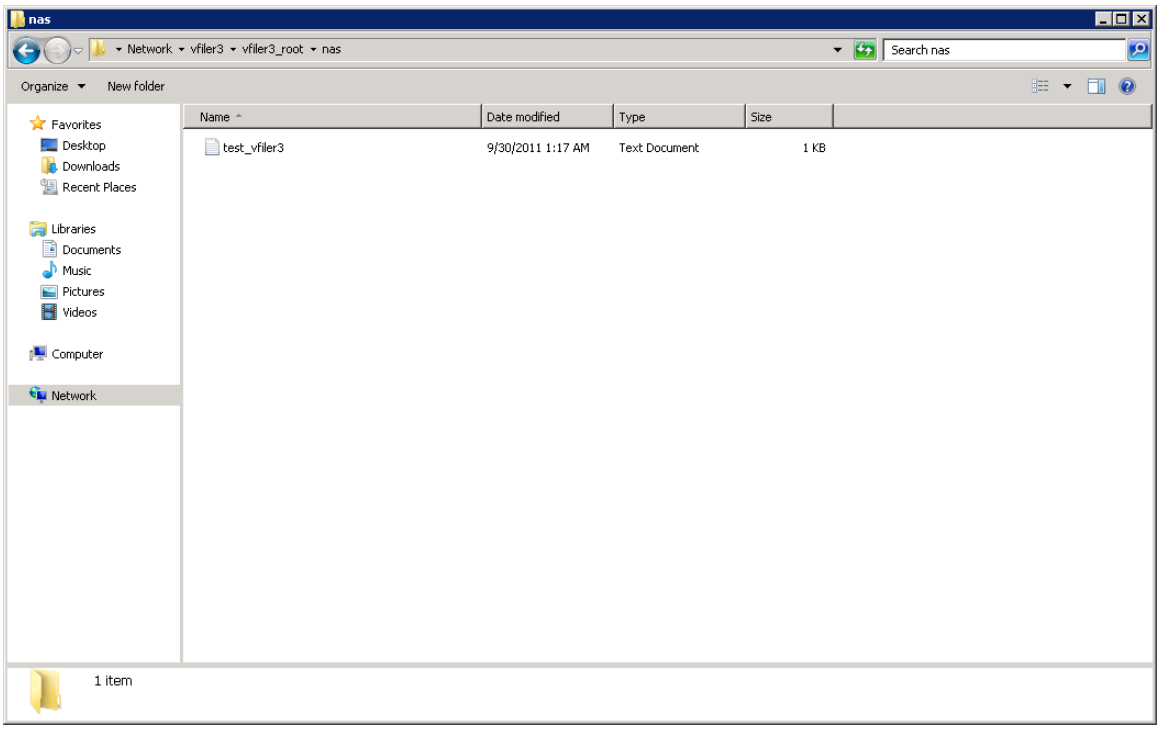
1. To begin this lab, open several SSH sessions. Double-click the PuTTY icon and login to the "FAS6280 (vfiler0)", "FAS3270 (vfiler0)", and "Linux" sessions, authenticating as root : netapp123. You should already have two of these sessions open.
2. Display your access to the NAS (CIFS and NFS) and SAN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

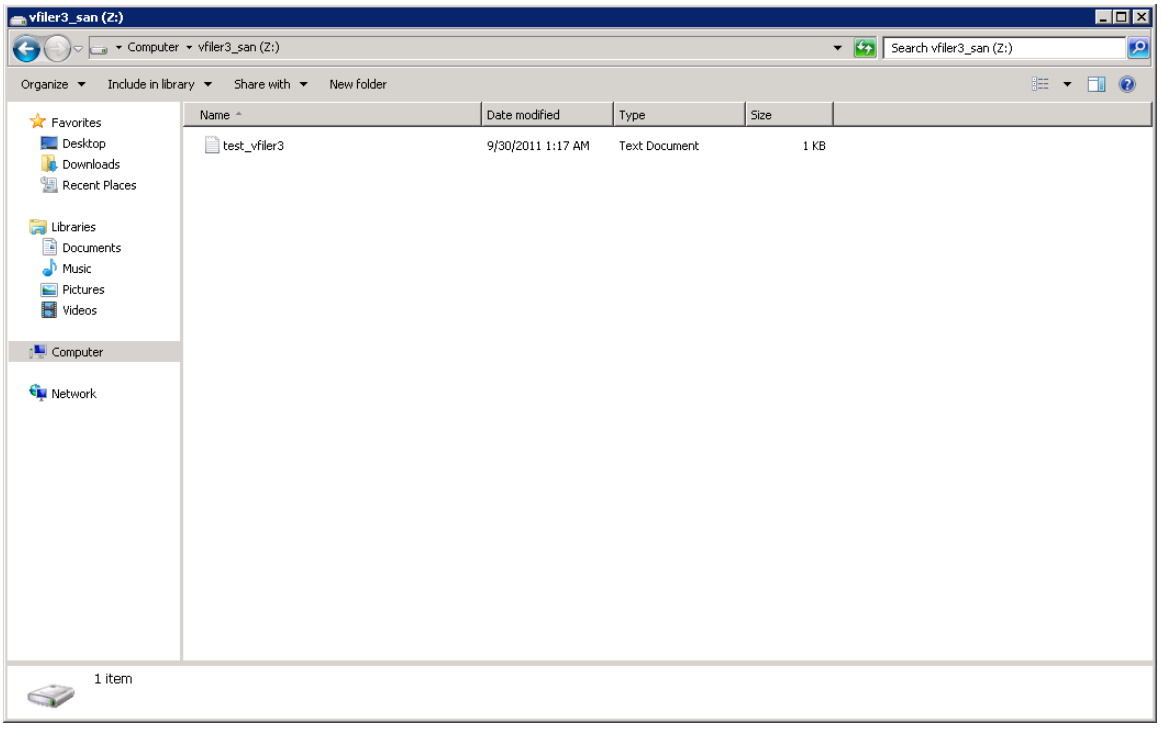
```
[root@ ~]# ls -l /root/vfiler3
total 0
-rw-r--r-- 1 root root 12 Sep 30 01:17 test_vfiler3.txt
```

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.

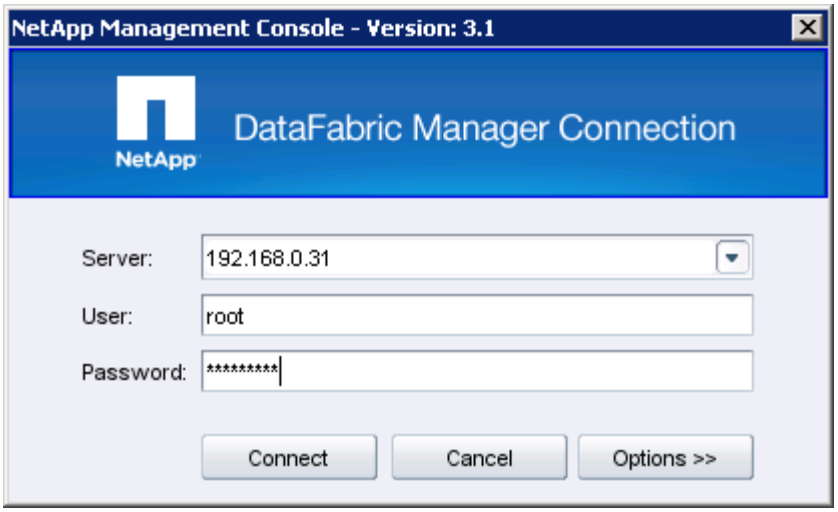




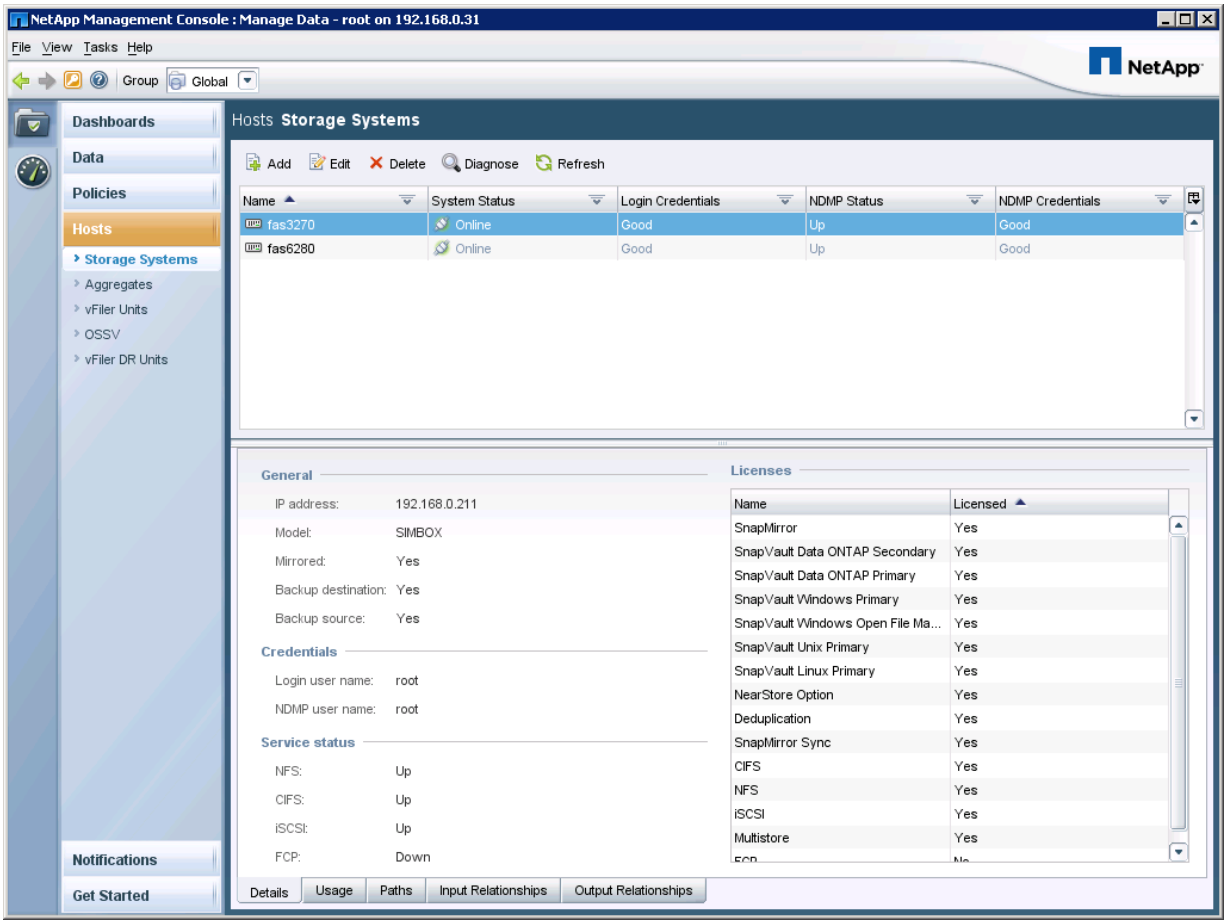

nas
Network ▸ vfiler3 ▸ vfiler3_root ▸ nas
Search nas
Organize
New folder
Favorites
Desktop
Downloads
Recent Places
Libraries
Documents
Music
Pictures
Videos
Computer
Network
Name
Date modified
Type
Size
test_vfiler3
9/30/2011 1:17 AM
Text Document
1 KB
1 item


vfiler3_san (Z:)
Computer ▸ vfiler3_san (Z:)
Search vfiler3_san (Z:)
Organize
Include in library
Share with
New folder
Favorites
Desktop
Downloads
Recent Places
Libraries
Documents
Music
Pictures
Videos
Computer
Network
Name
Date modified
Type
Size
test_vfiler3
9/30/2011 1:17 AM
Text Document
1 KB
1 item

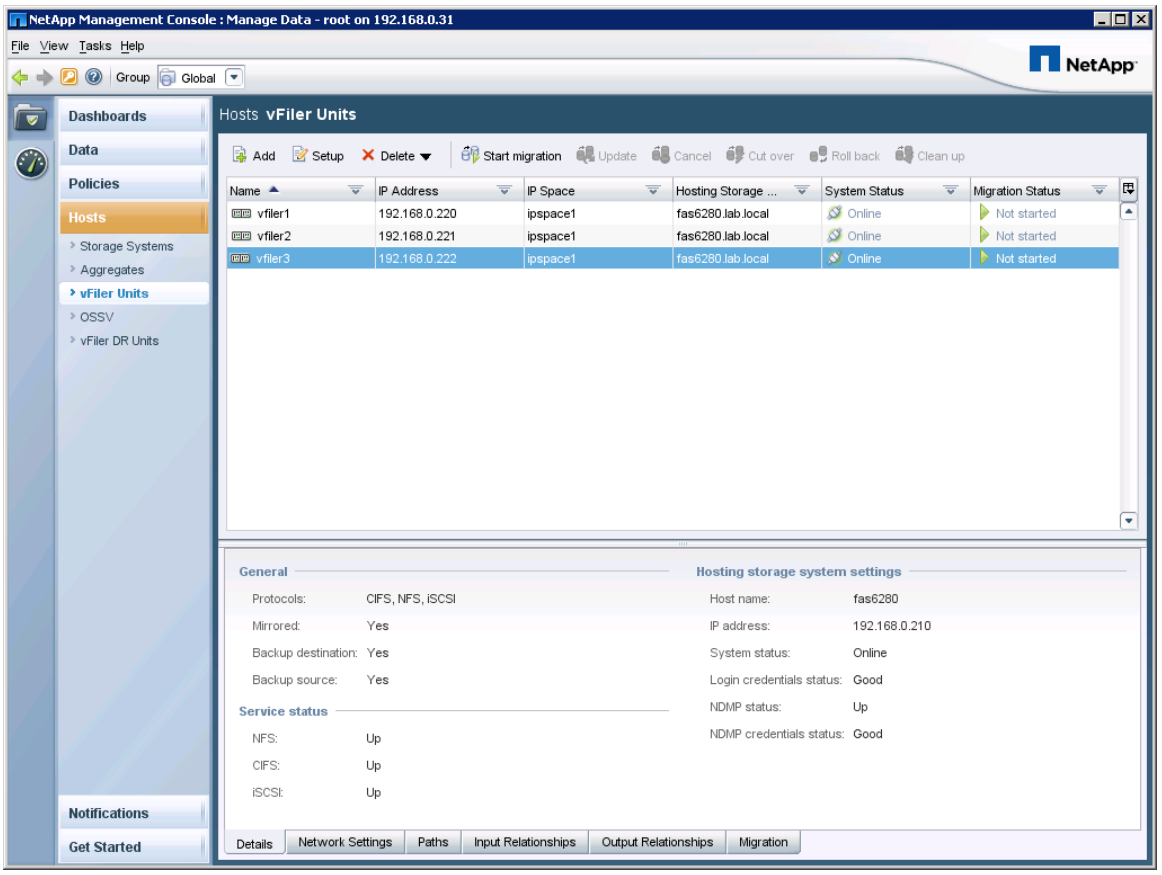
3. To get started with the DataMotion for vFiler process, double-click the NetApp Management Console (NMC) on the Windows 2008 Desktop. Enter the password "netapp123" then click **Connect**.



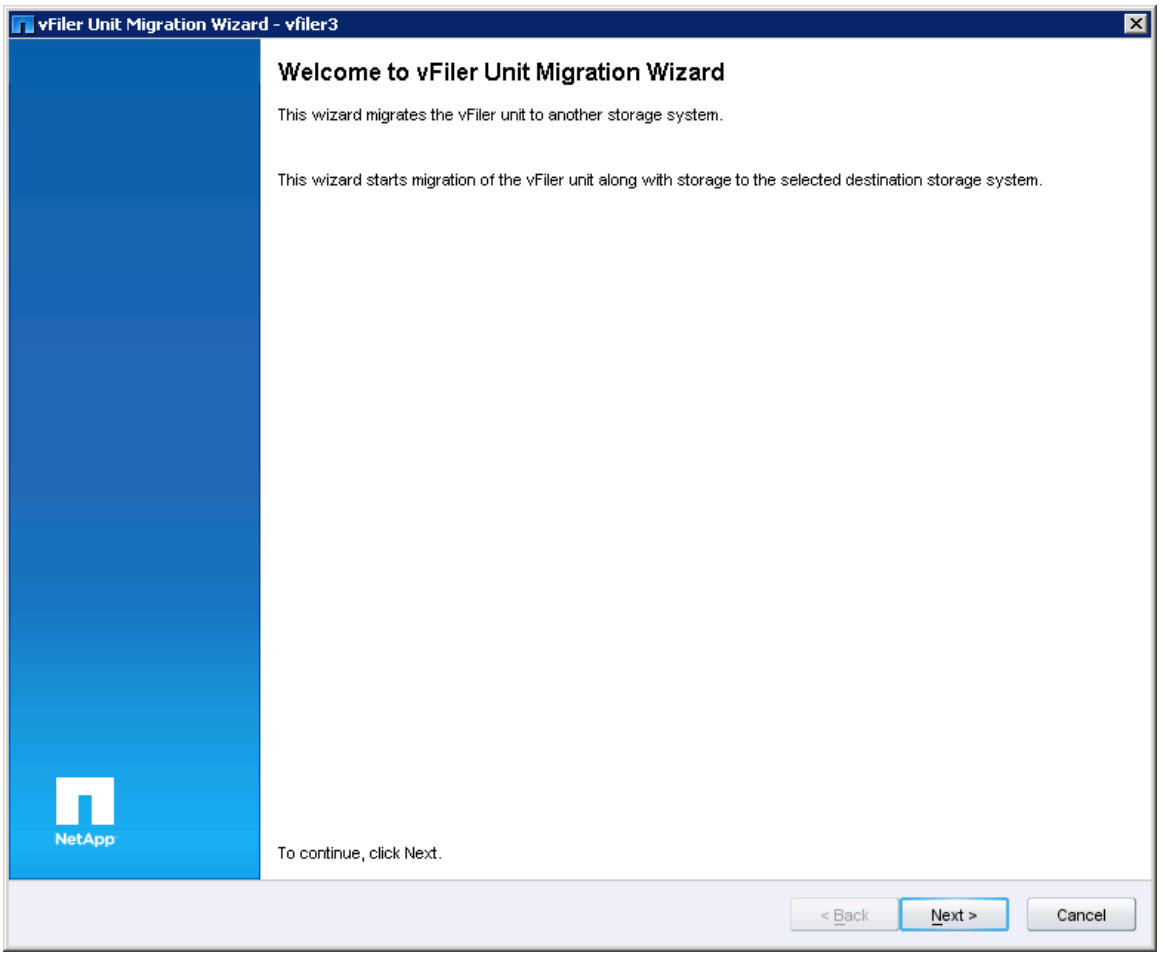
4. Click on the **Hosts** pane on the left.



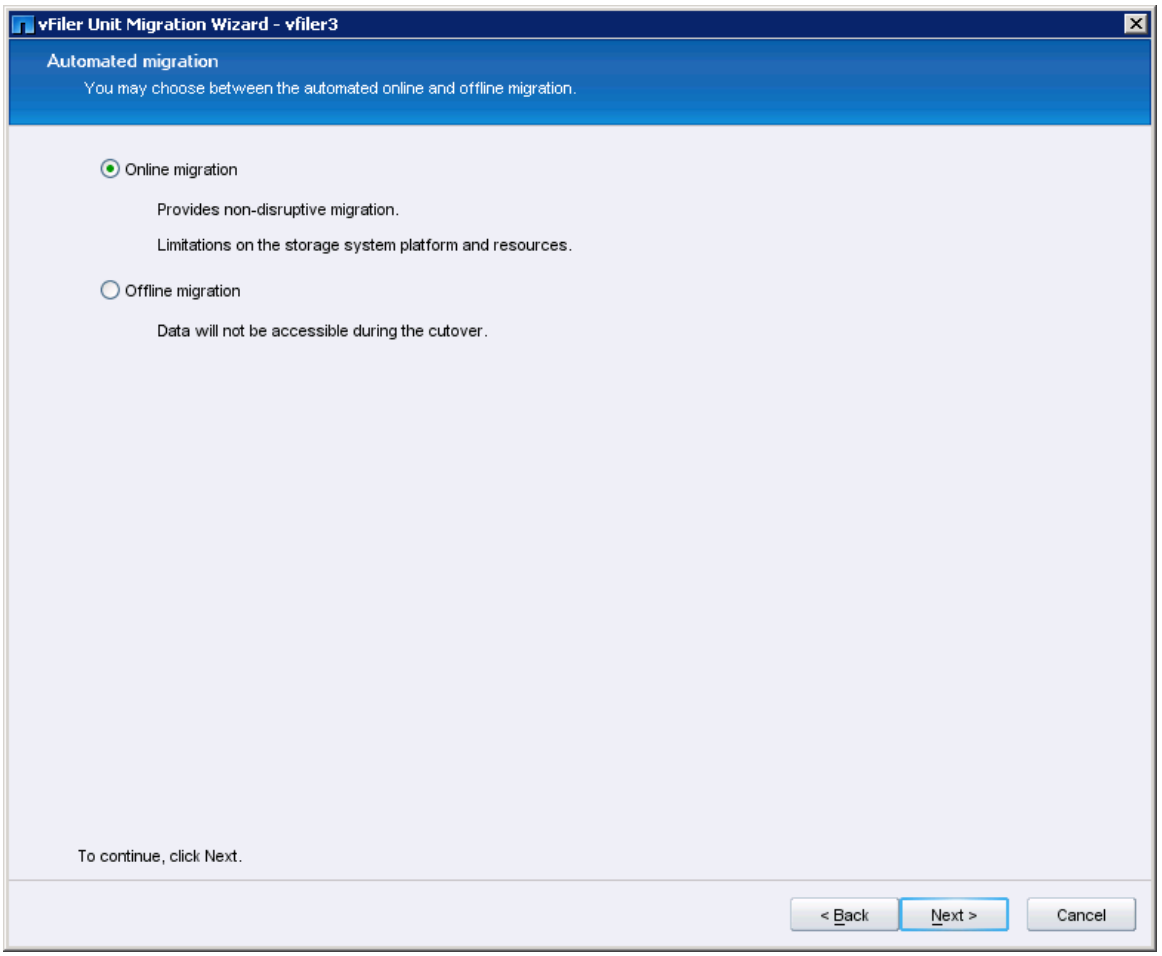
5. Click on **vFiler Units** and select **vfiler3** in the window. Click the **Start migration** button.



6. Click **Next**.


vFiler Unit Migration Wizard - vfiler3
Welcome to vFiler Unit Migration Wizard
This wizard migrates the vFiler unit to another storage system.
This wizard starts migration of the vFiler unit along with storage to the selected destination storage system.
NetApp
To continue, click Next.
< Back
Next >
Cancel

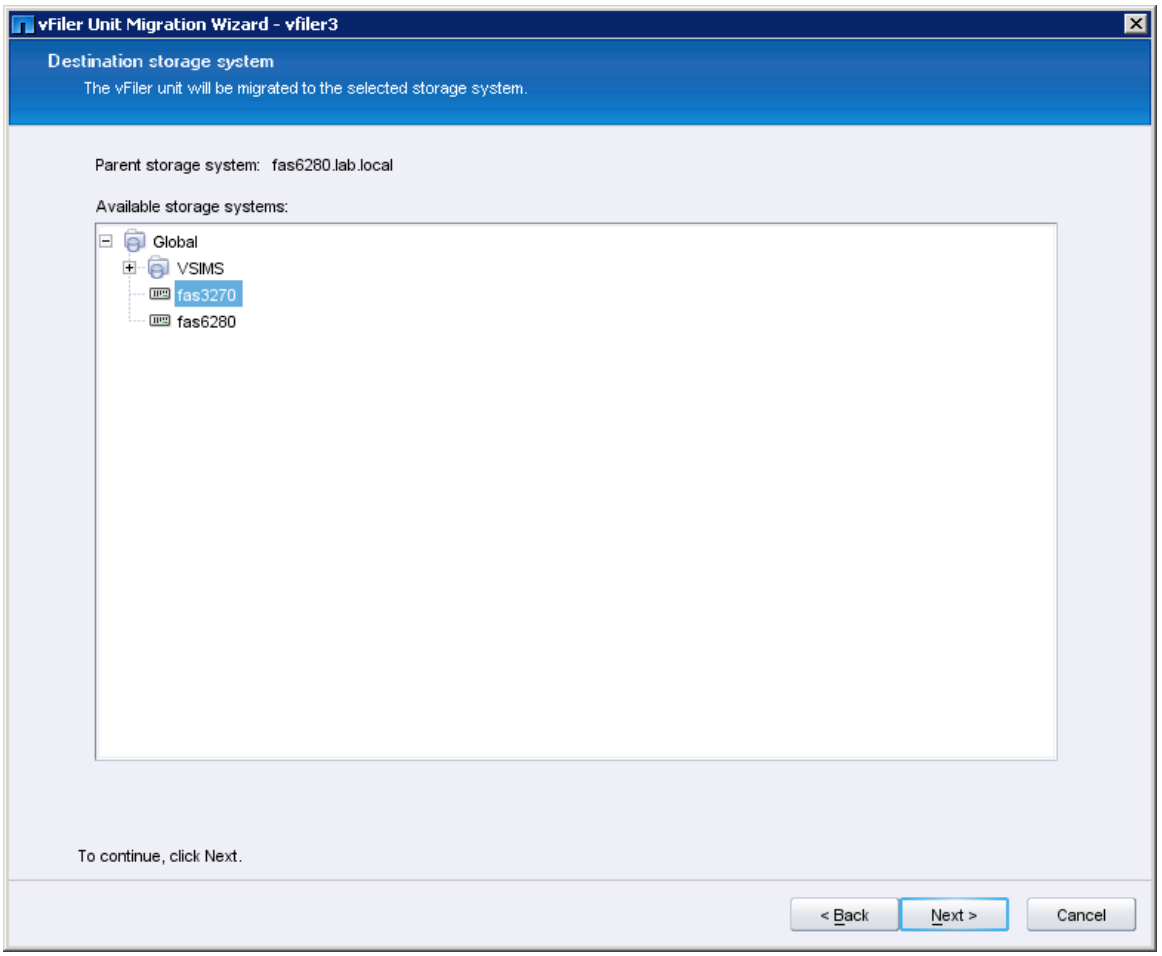
7. Select **Online migration** and click **Next**.



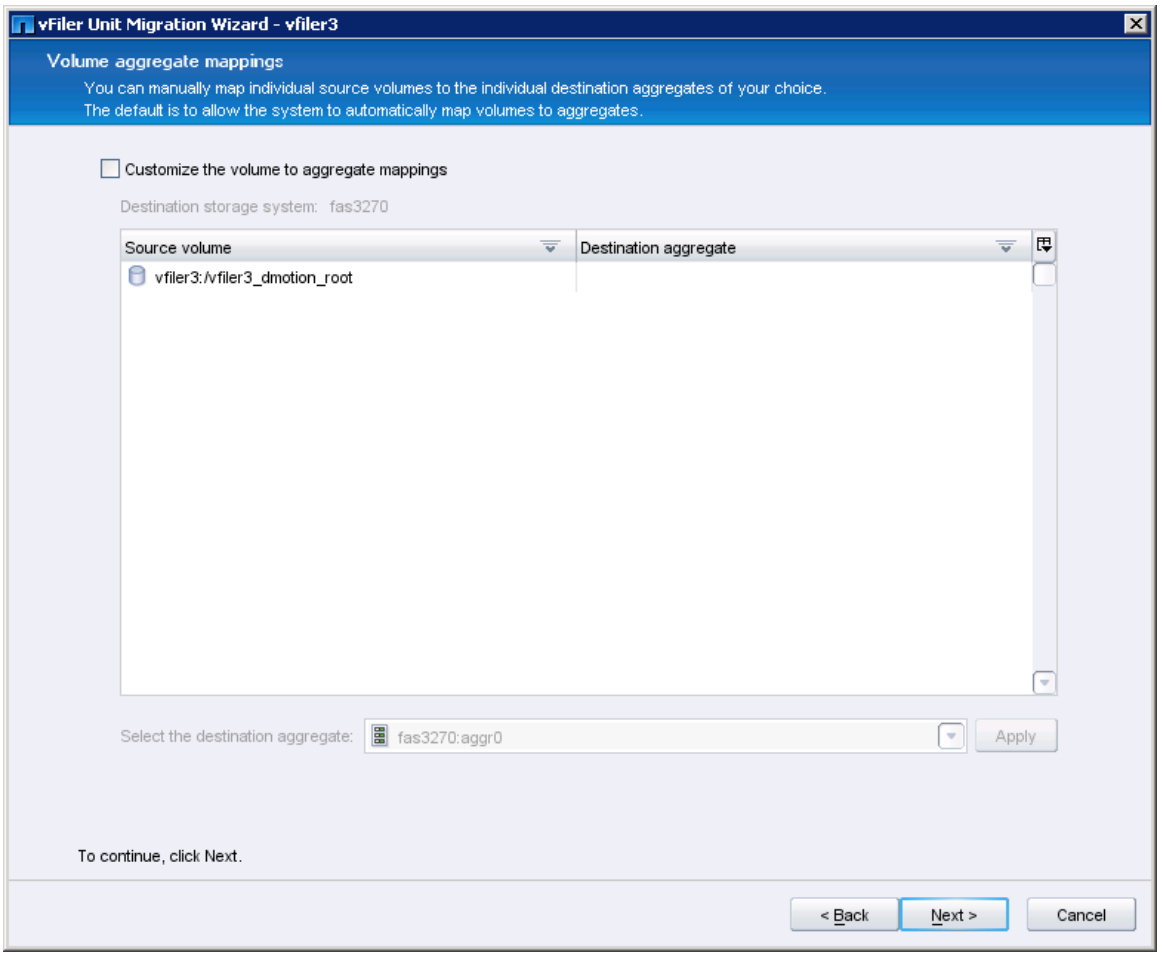
NOTE: Online migration is the key to DataMotion for vFiler. This method of migration allows vFiler units to be moved non-disruptively between NetApp storage systems with a maximum pause in I/O of 120 seconds.

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.

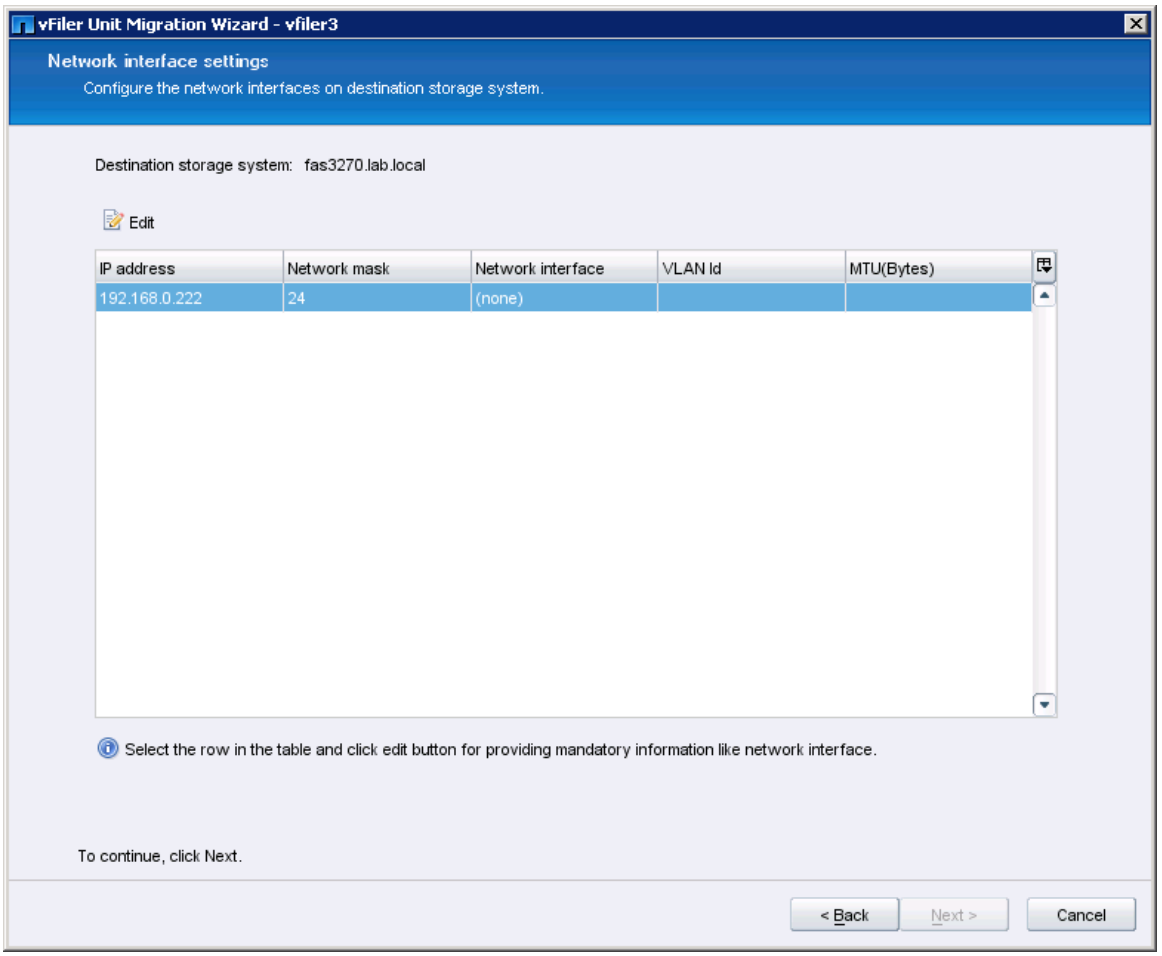
8. Select **fas3270** and click **Next**.



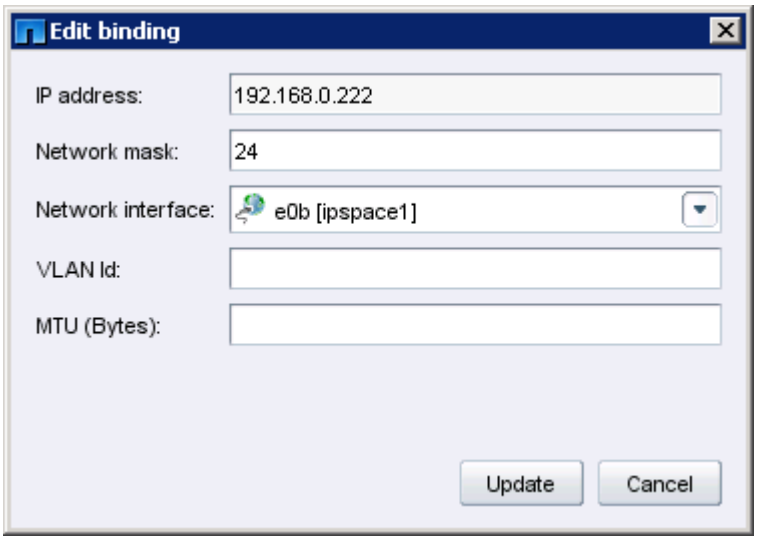
9. Click **Next** (take defaults – we only have one aggregate on each Simulator).

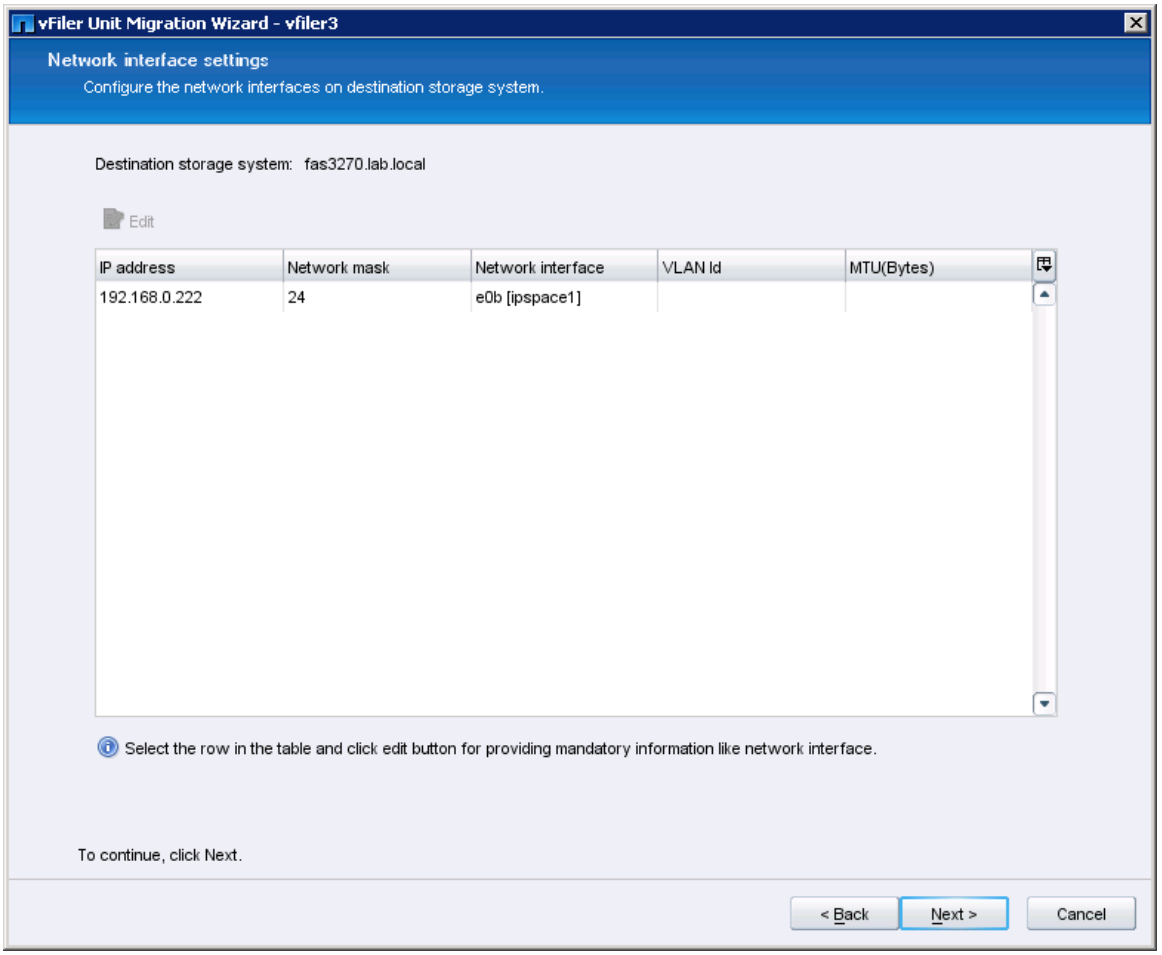


10. Click **Edit**.

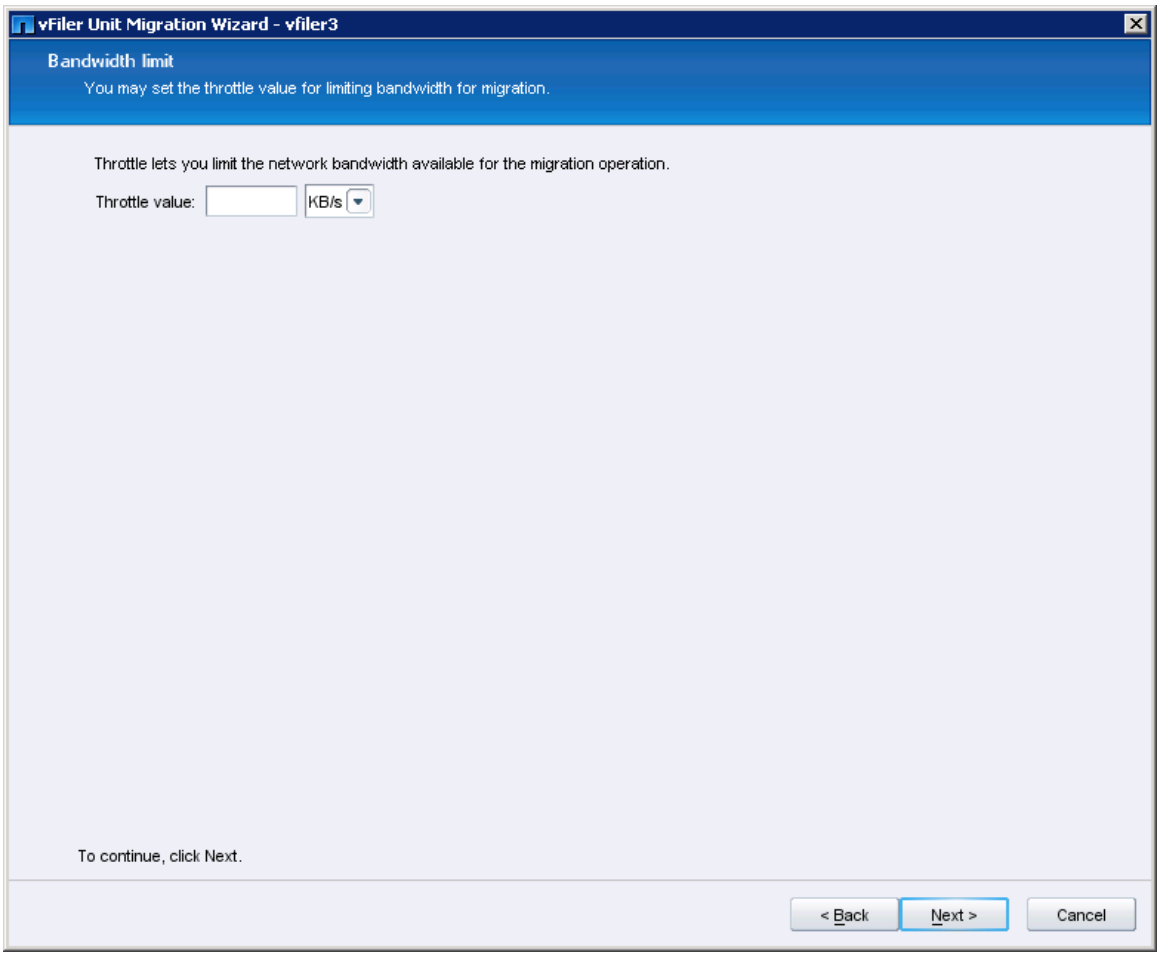


11. Select **e0b** for the network interface and click **Update**, then click **Next**.

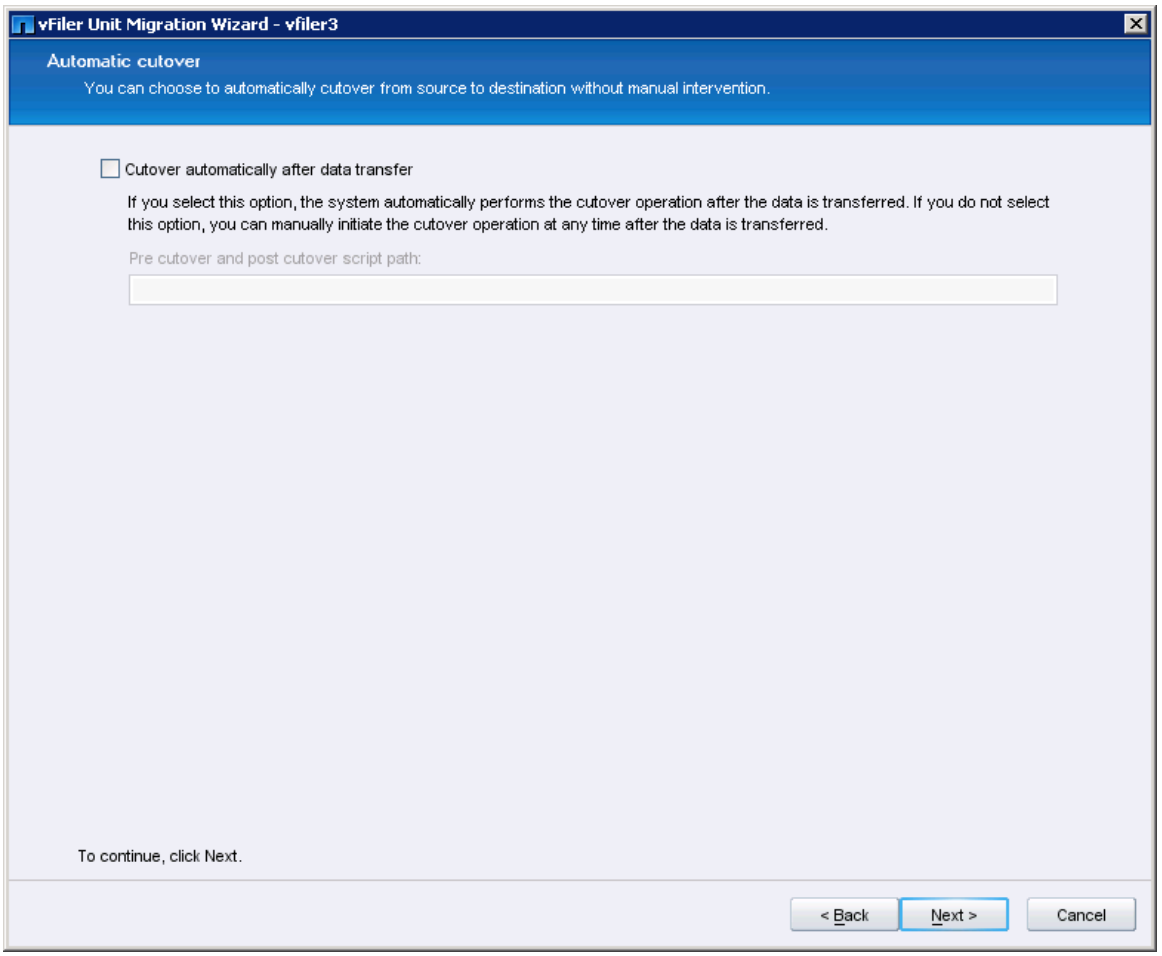




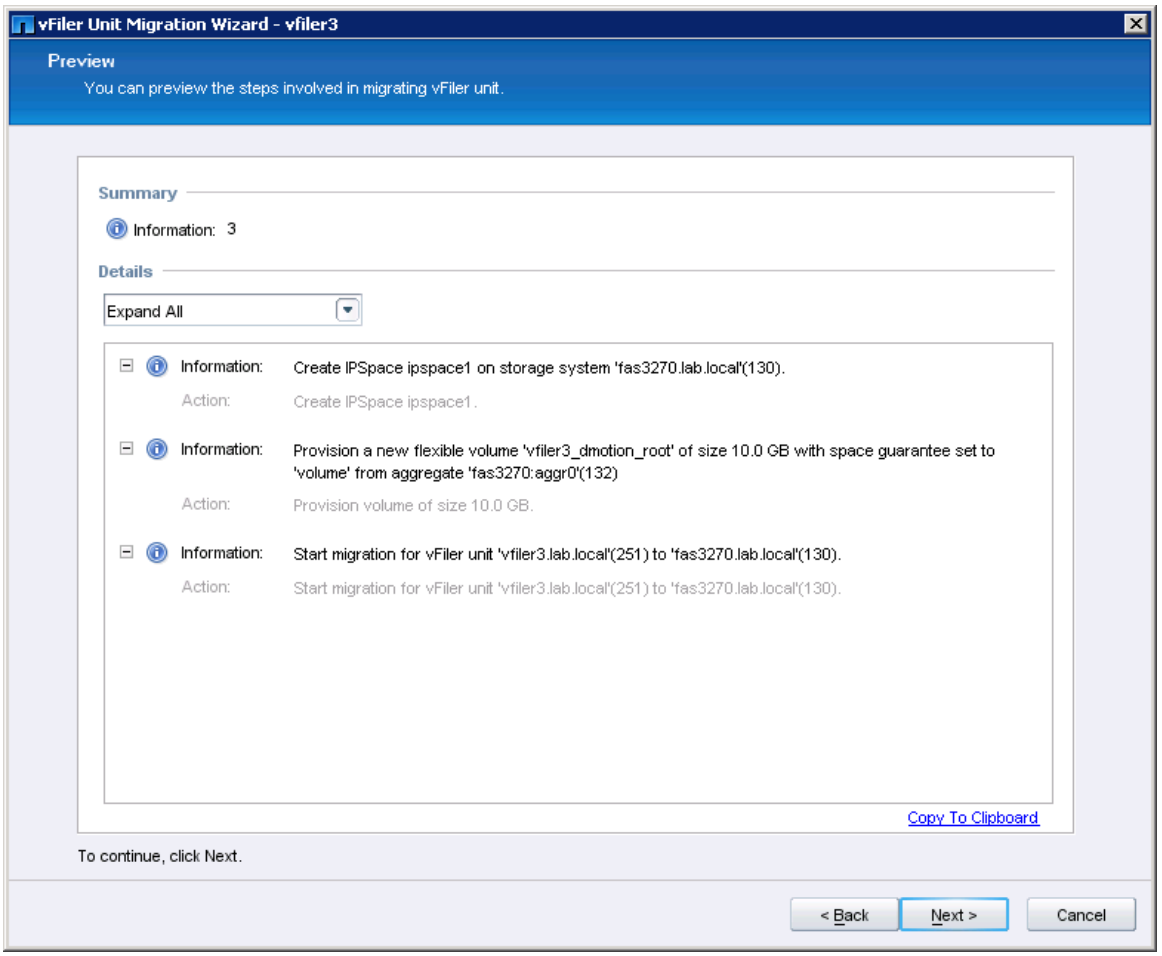
12. Click **Next** (no SnapMirror throttle).



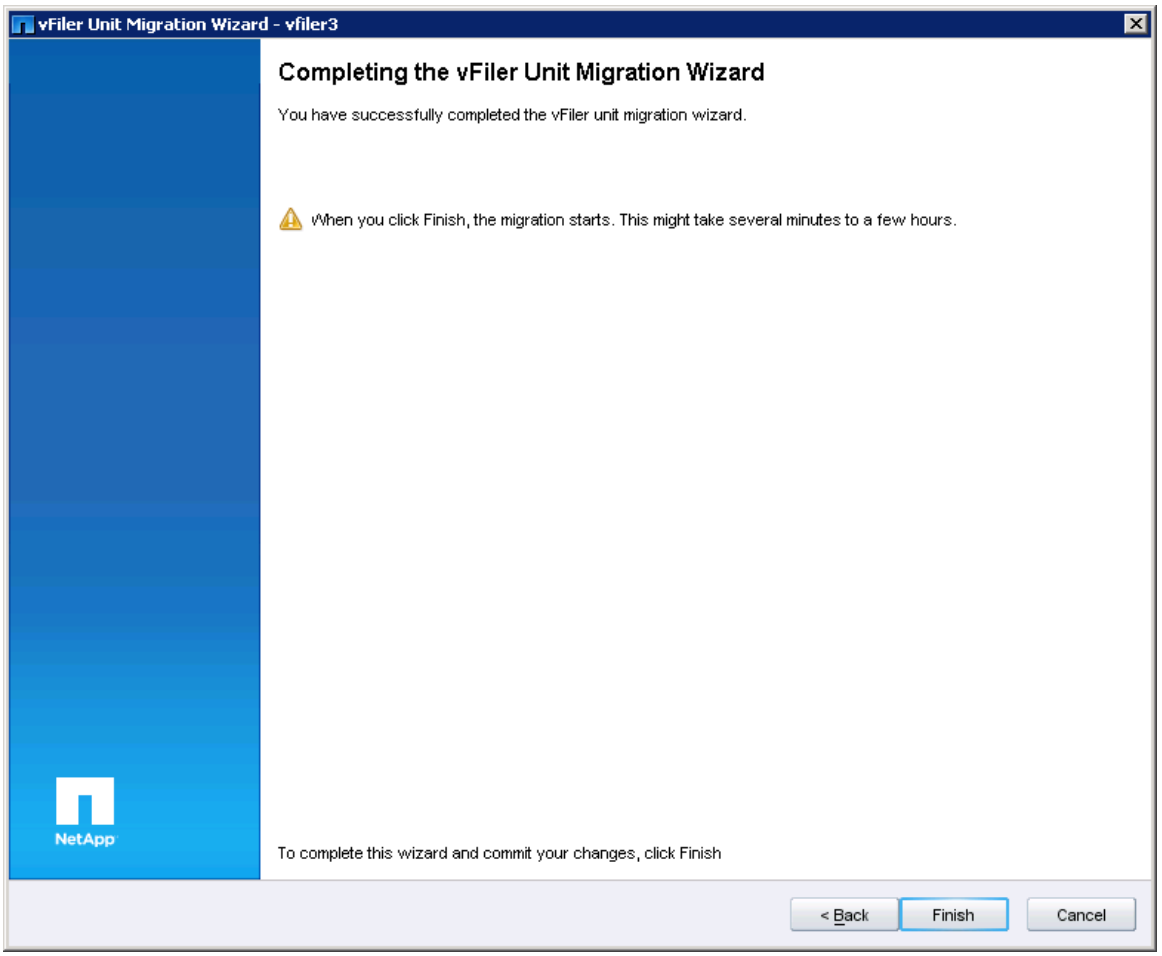
13. Click **Next**. We won't cutover now so you can see how to do this manually.



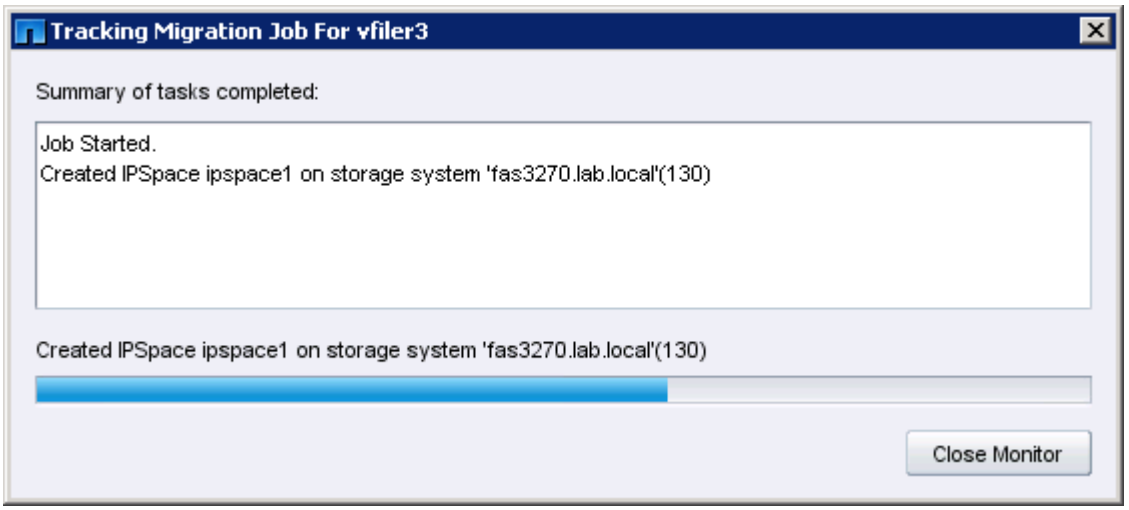
14. Click **Next** on the information screen.



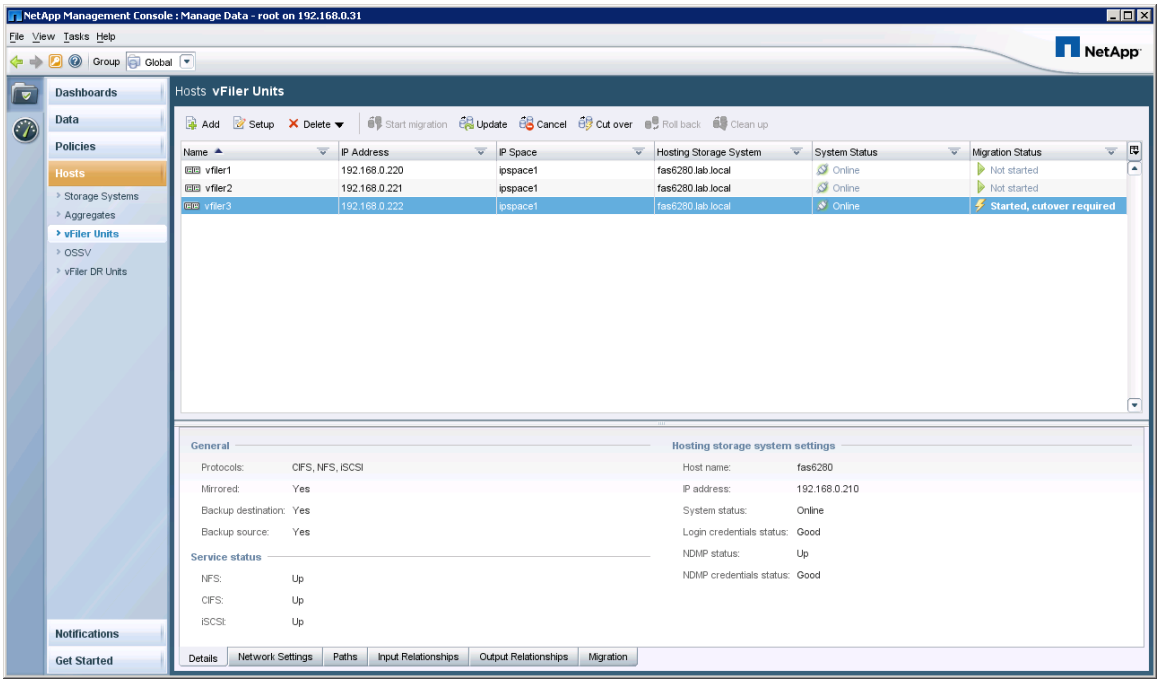
15. Click **Finish**.



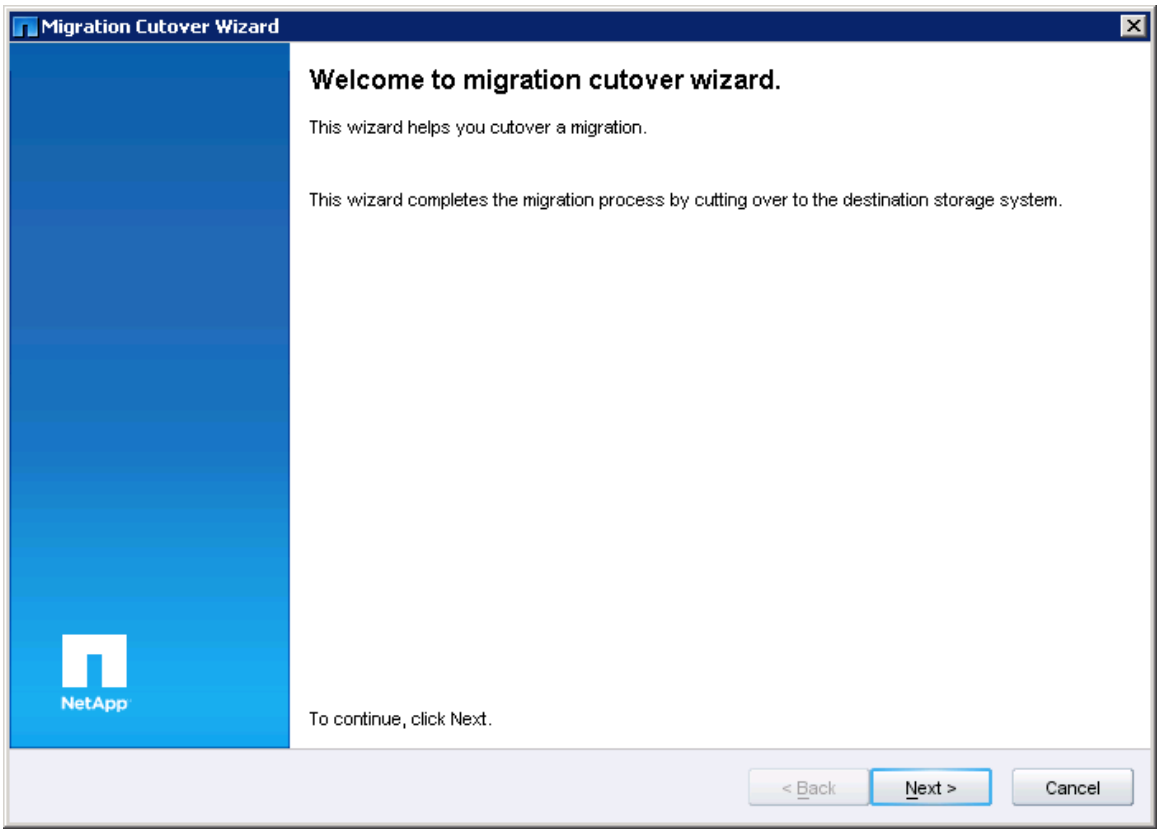
16. You will be able to watch the status of the job as it progresses.



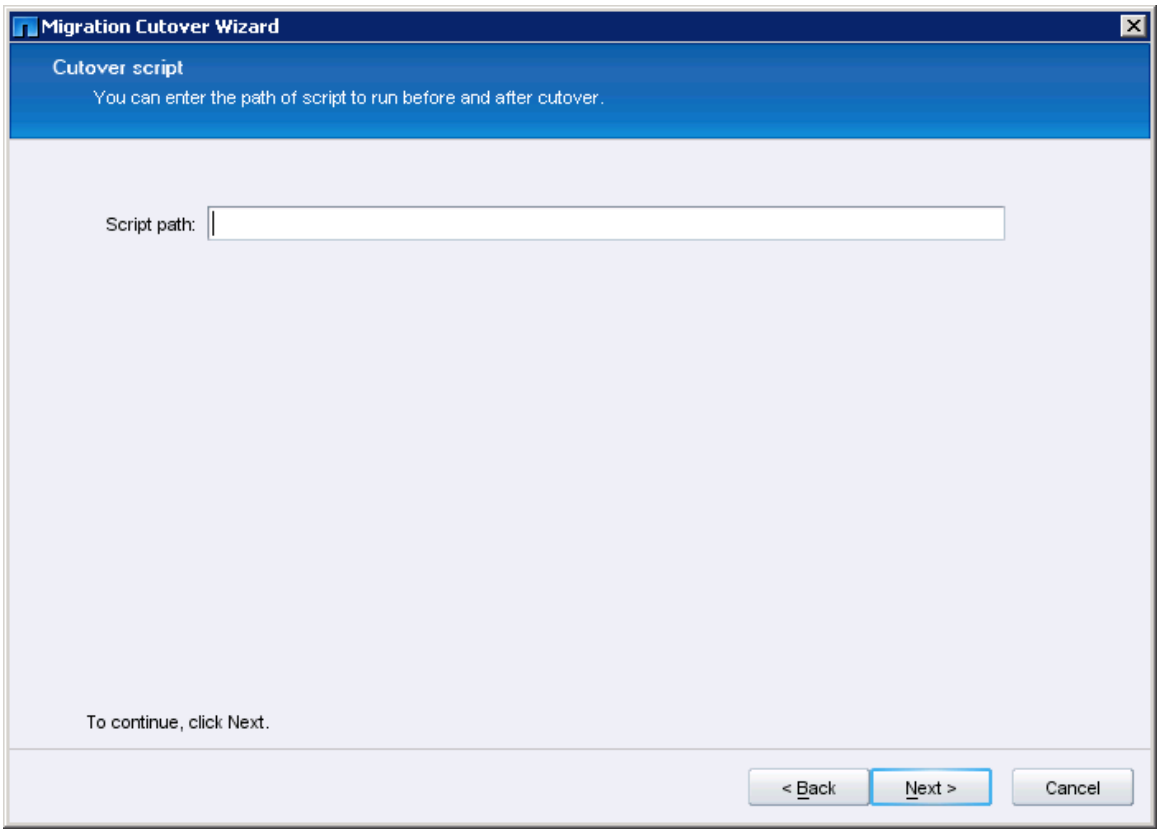
17. When the Status is shown as *Started, cutover required*, click the **Cut over** button. You can also run **Update** to resync the mirrors if a long period has passed. The cutover process will take a while to begin, but once the cutover has begun, the pause in I/O from clients will not exceed 120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



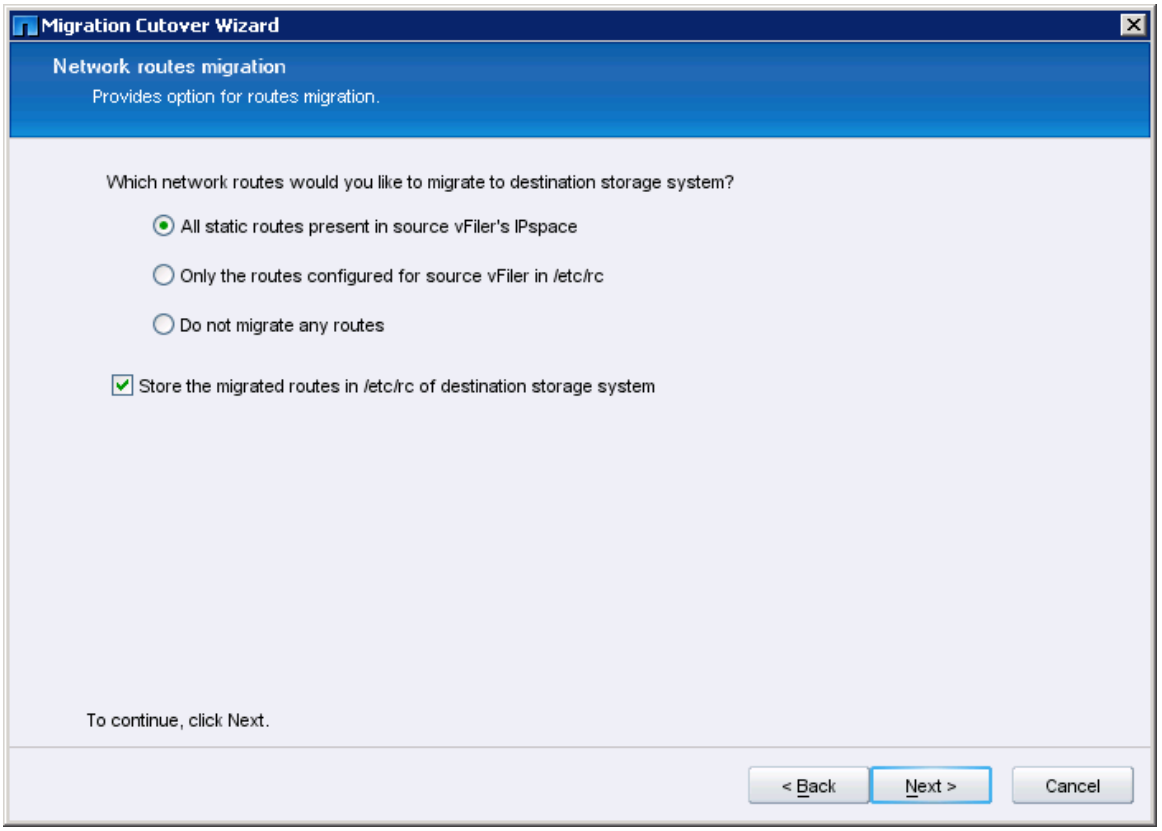
18. The migration cutover wizard starts. Click **Next**.



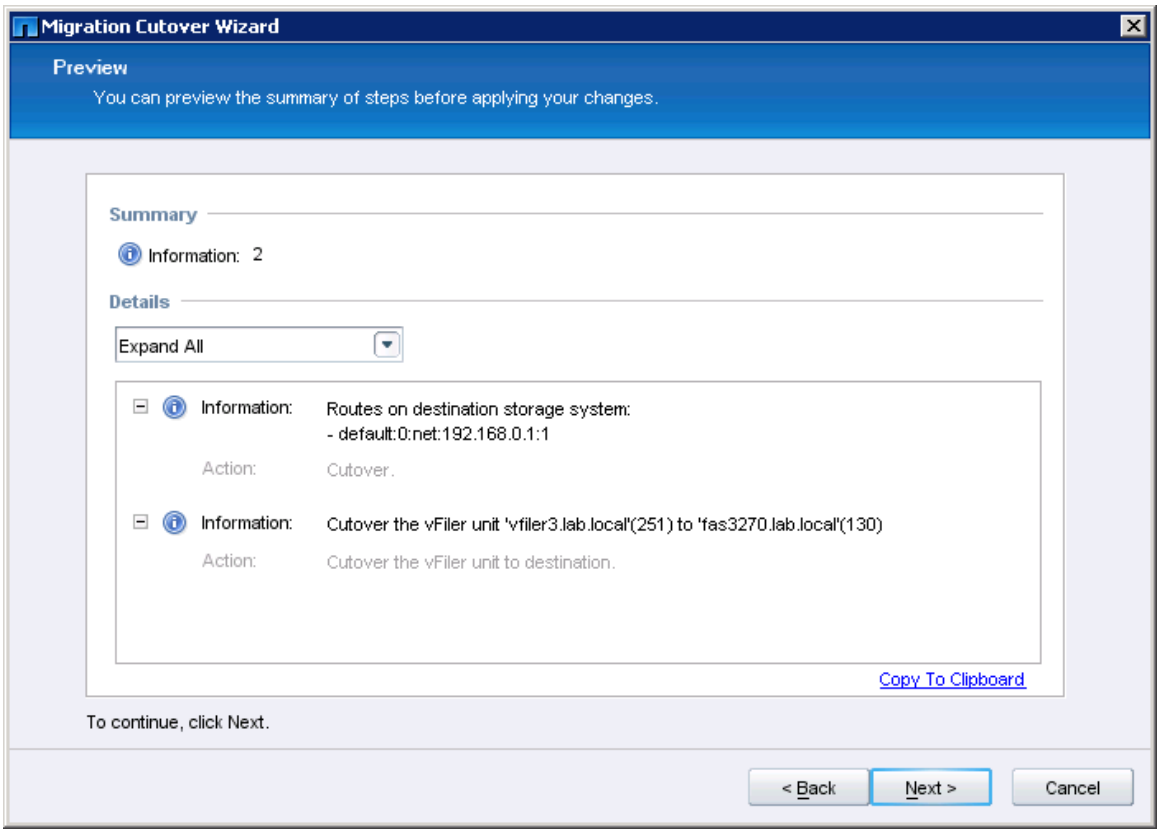
19. Click **Next**.



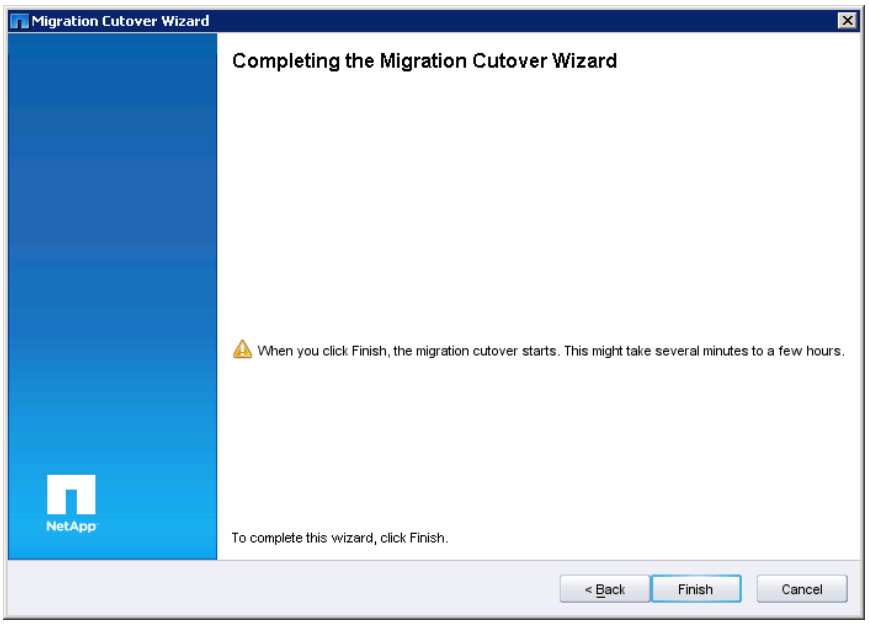
20. Leave the defaults (All static routes radio button and Store the migrated routes checkbox) and click **Next**.



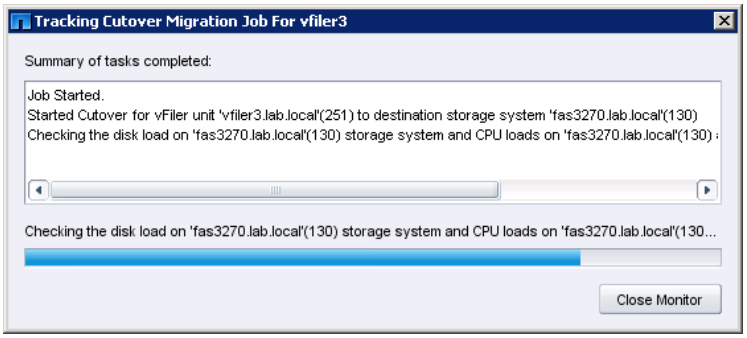
21. Click **Next**.

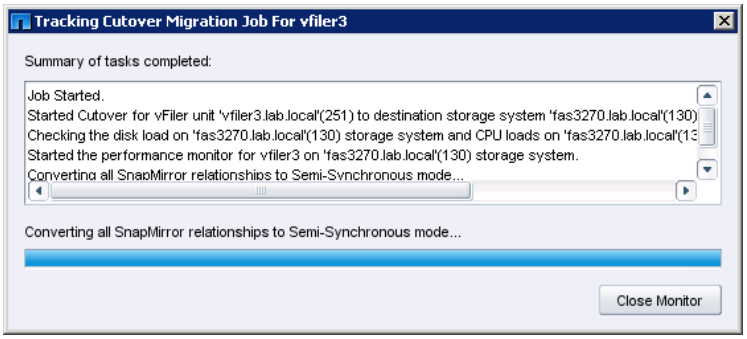


22. Click **Finish**.

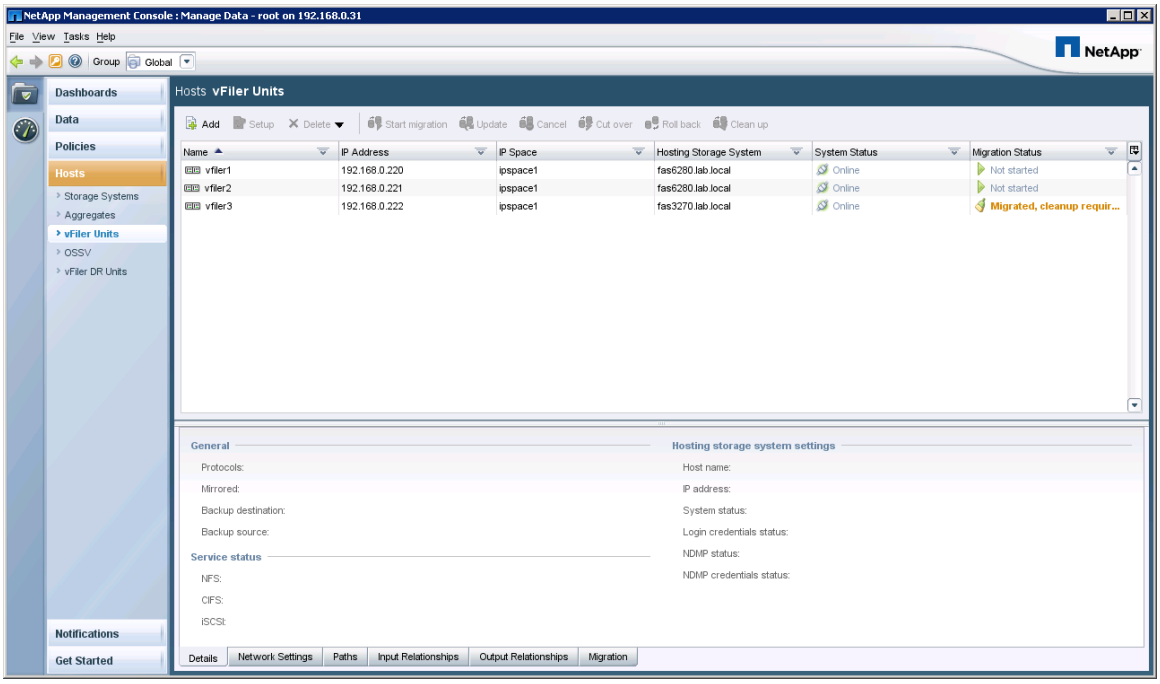


23. You will be able to watch the cutover job as it completes.

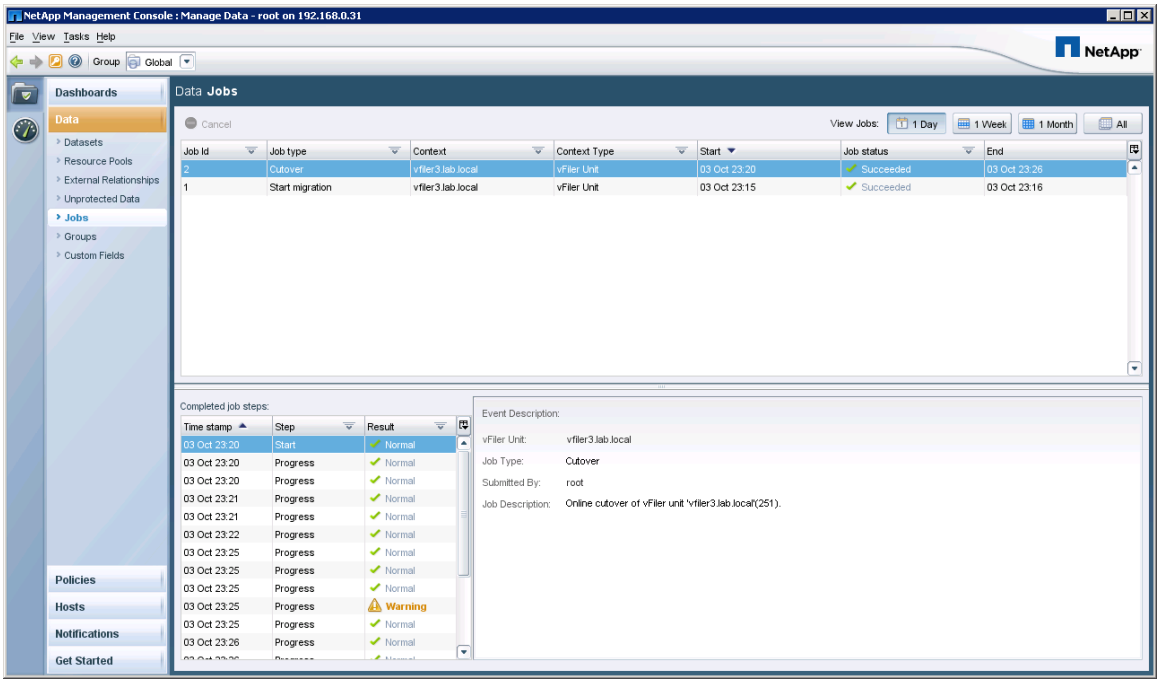




24. When the job window closes, the Migration Status is *Migrated, Cleanup Required*.



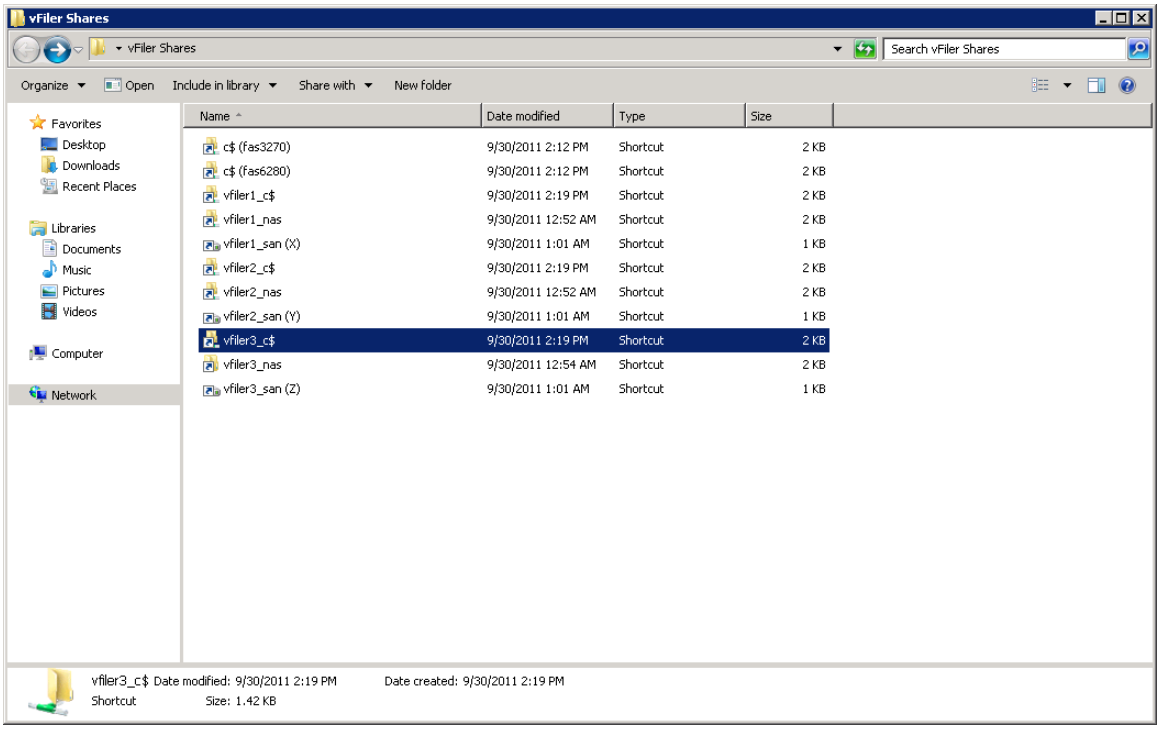
25. To see all jobs, click on the **Data** pane and select **Jobs**.



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** operations 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. IPSpace 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)

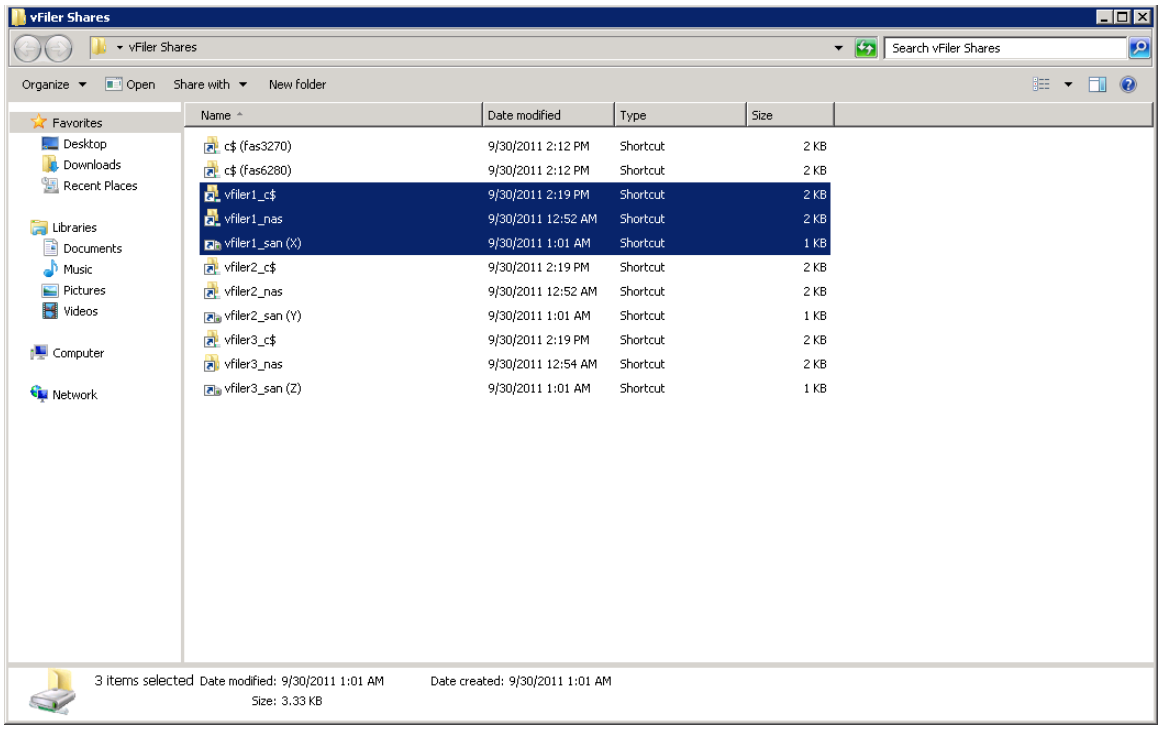
   ```
   [root@ ~]# ls -l /root/vfiler1
   total 0
   -rw-r--r-- 1 root root 12 Sep 30 01:17 test_vfiler1.txt
   ```

   CIFS (access from vFiler Shares on desktop)

   \\192.168.150.220\vfiler1_nas

iSCSI (access from vFiler Shares on desktop)

x:



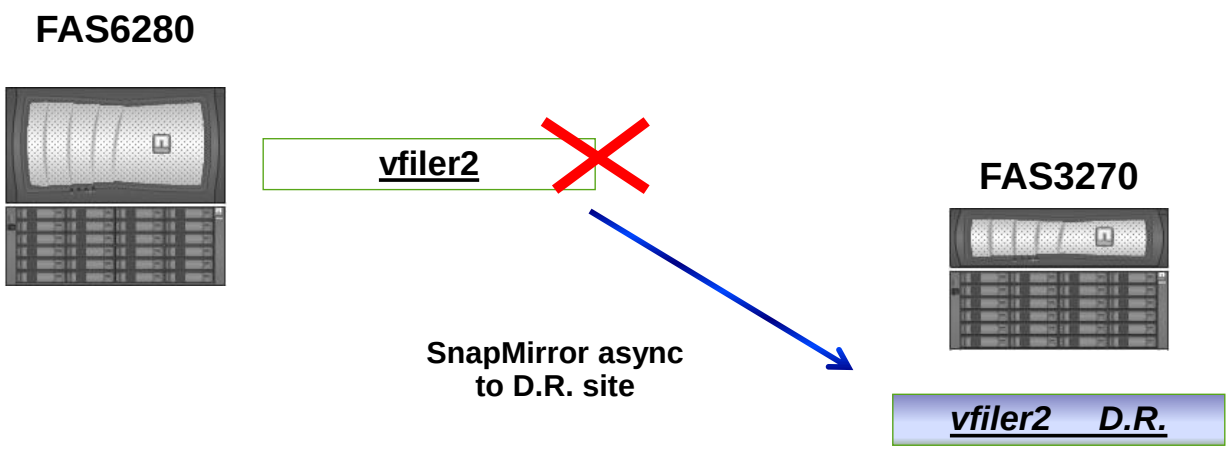
5 VFILER DR

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.

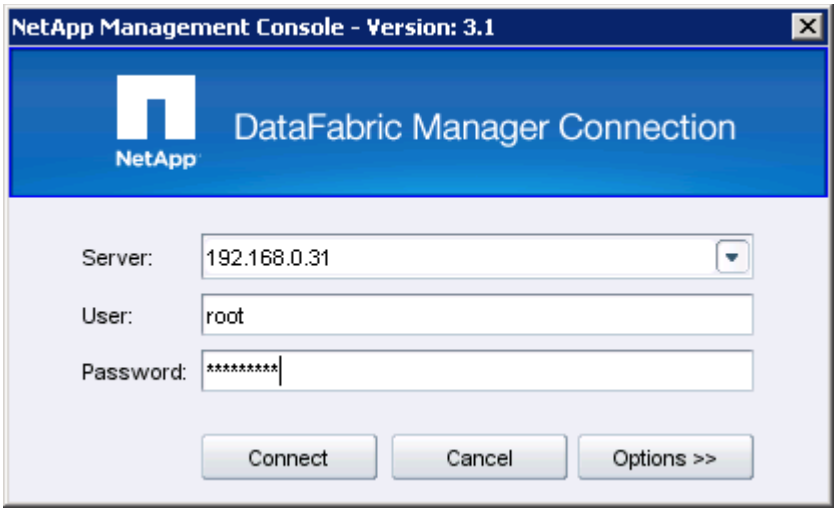
5.1 CONFIGURING VFILER DR WITH THE ONCOMMAND 5 NMC PLUGIN

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

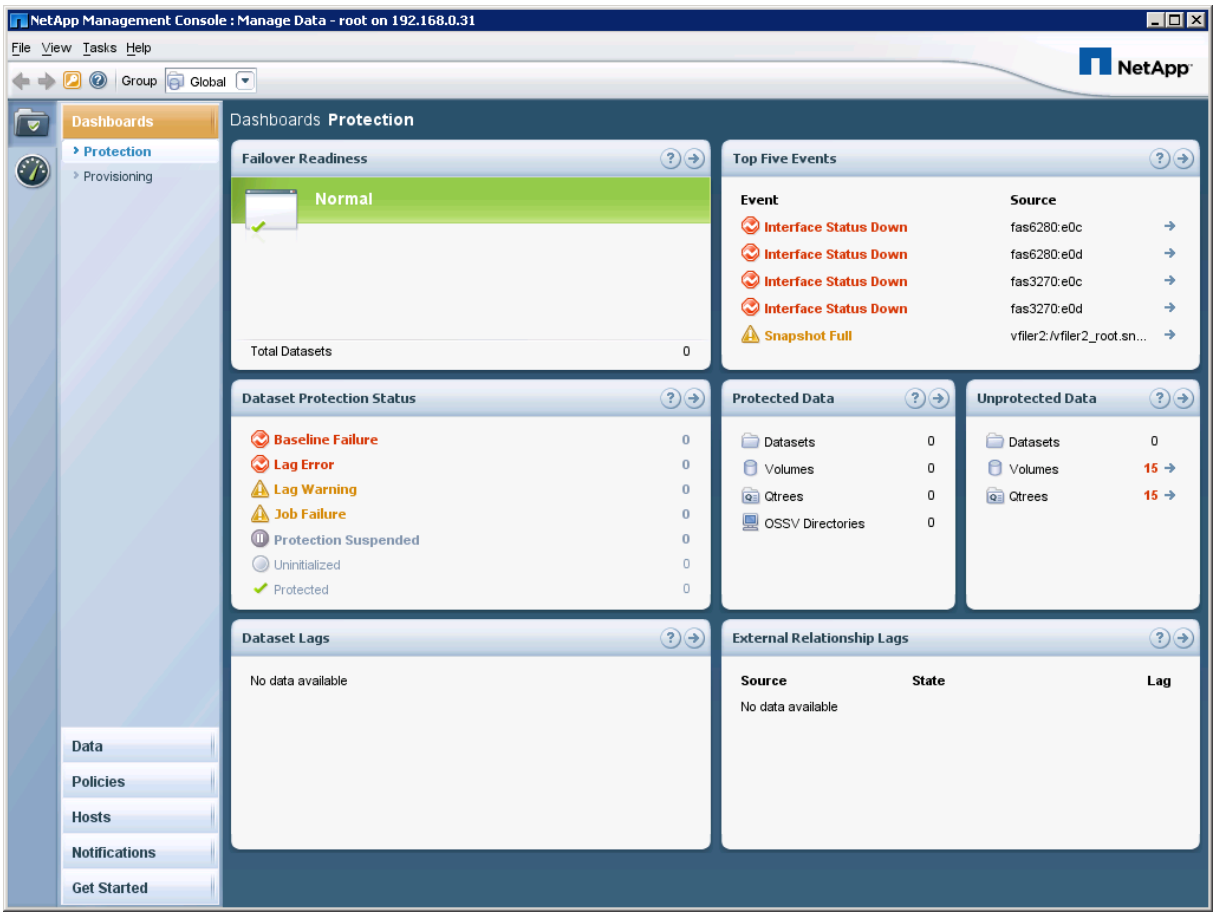
Figure 6) vFiler DR Diagram



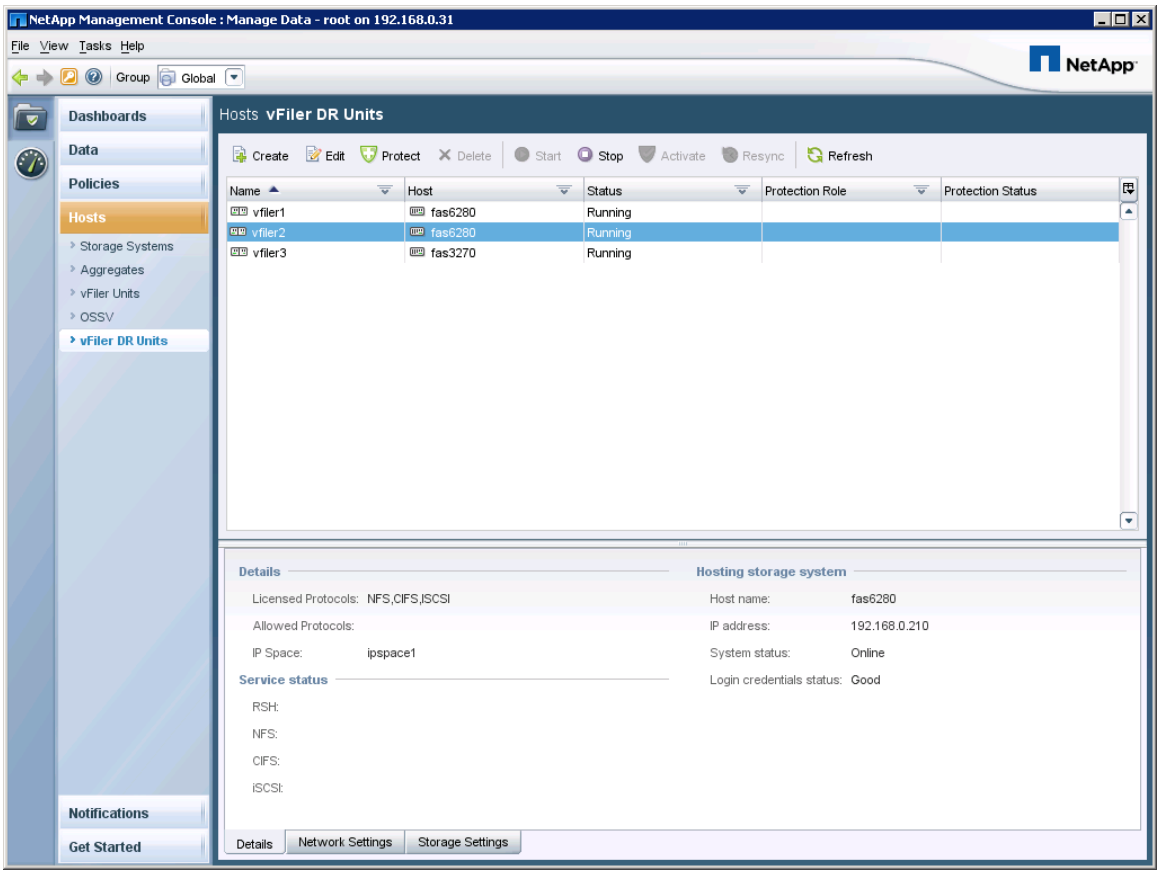
1. Double Click the NetApp Management Console (NMC) on the Windows 2008 Desktop. Enter the password **netapp123** then click **Connect**.



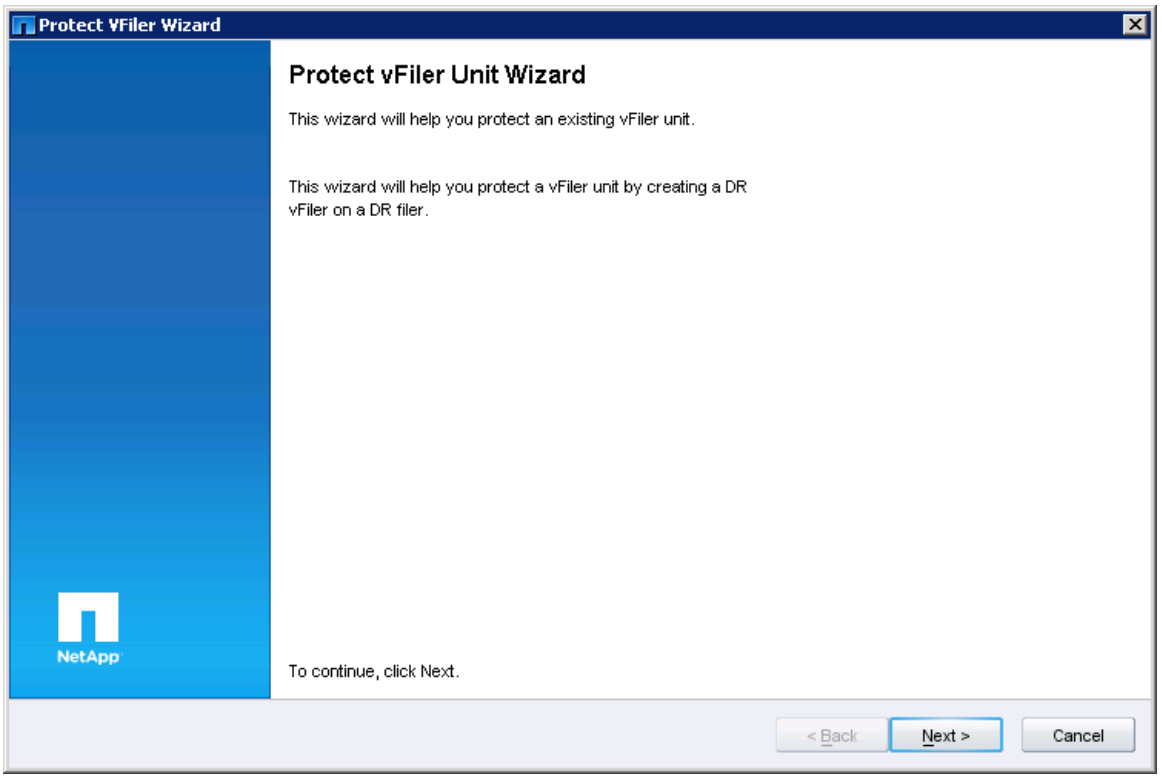
Click on the **Hosts** pane on the left.



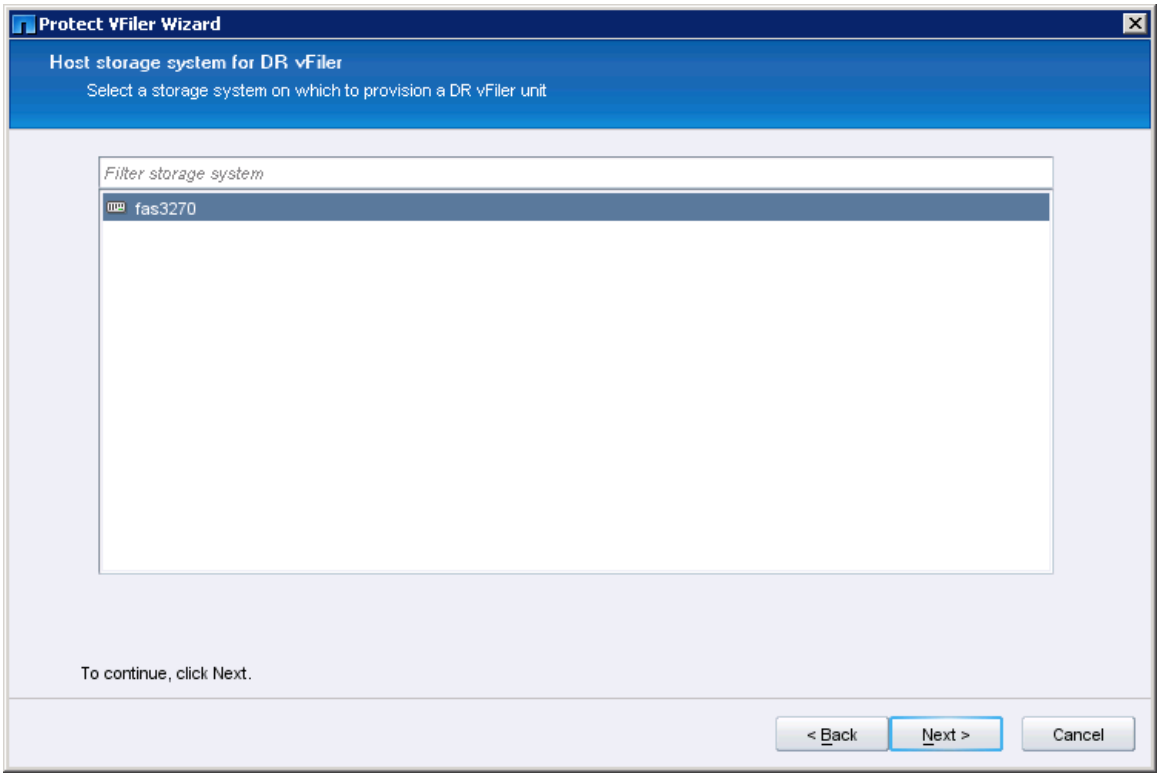
2. Click **vFiler DR Units** and select **vfiler2**. Click the **Protect** button.



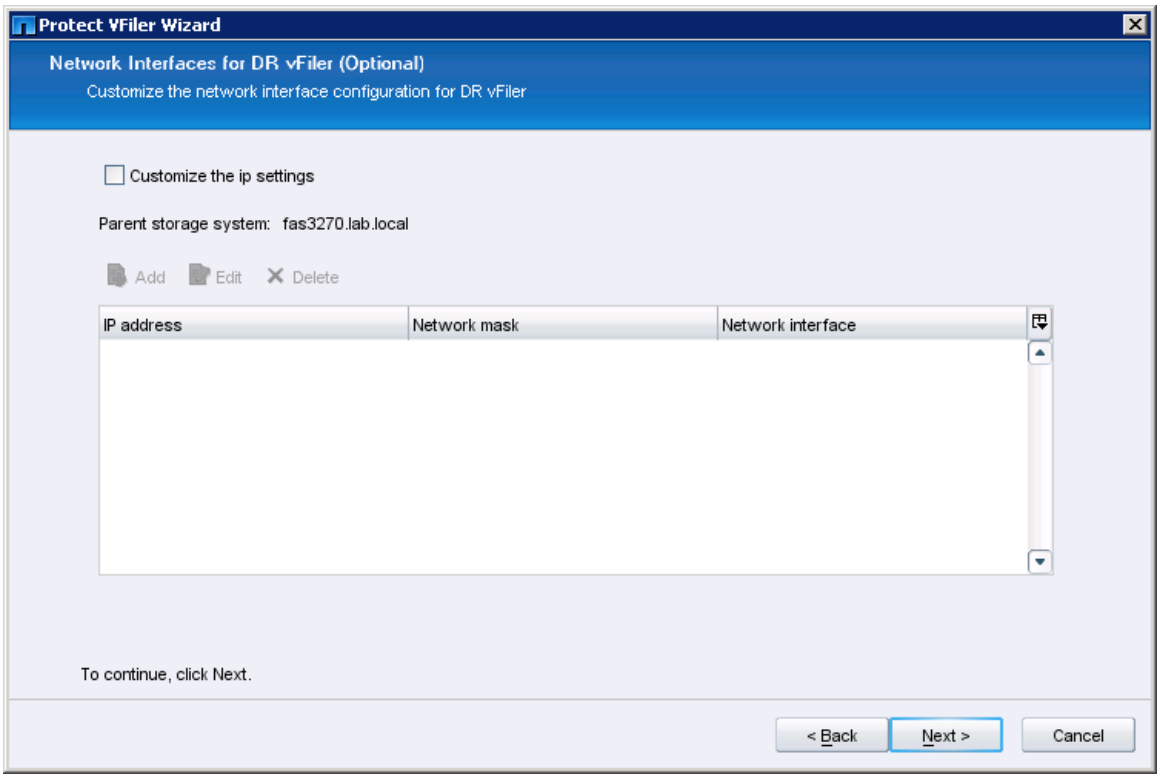
3. Click **Next**.



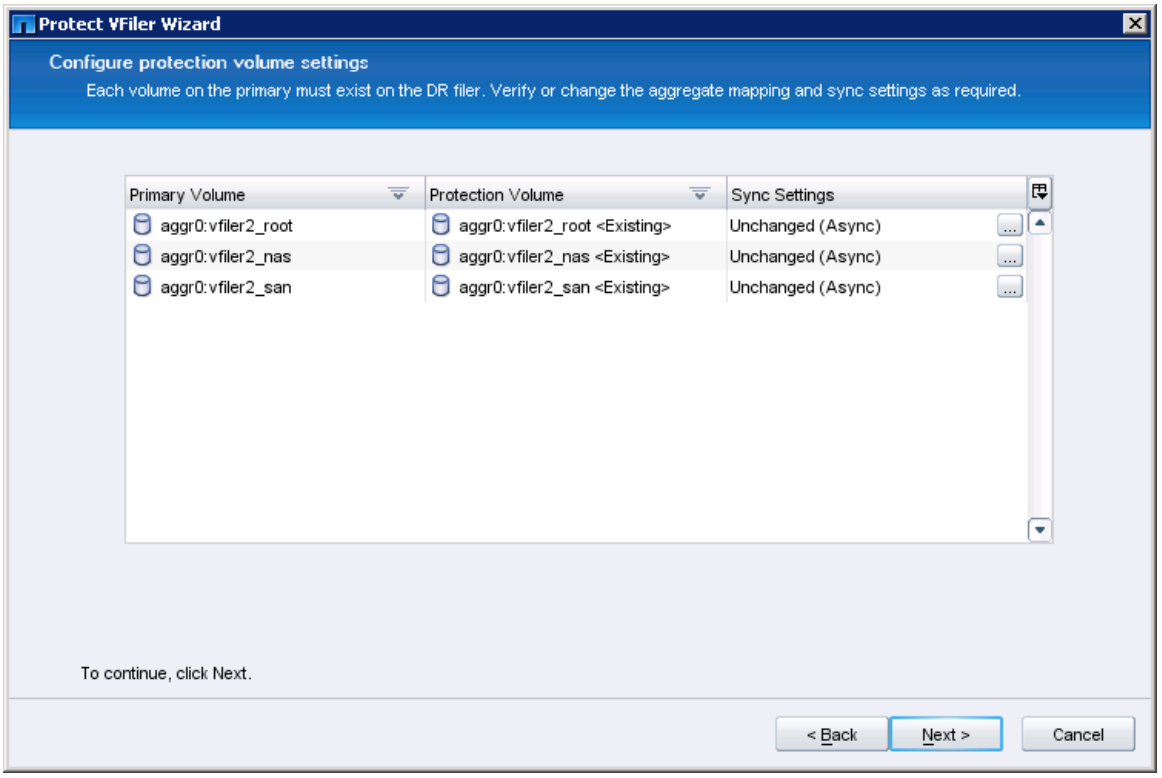
4. Click **Next** as there is only one storage system in the list.



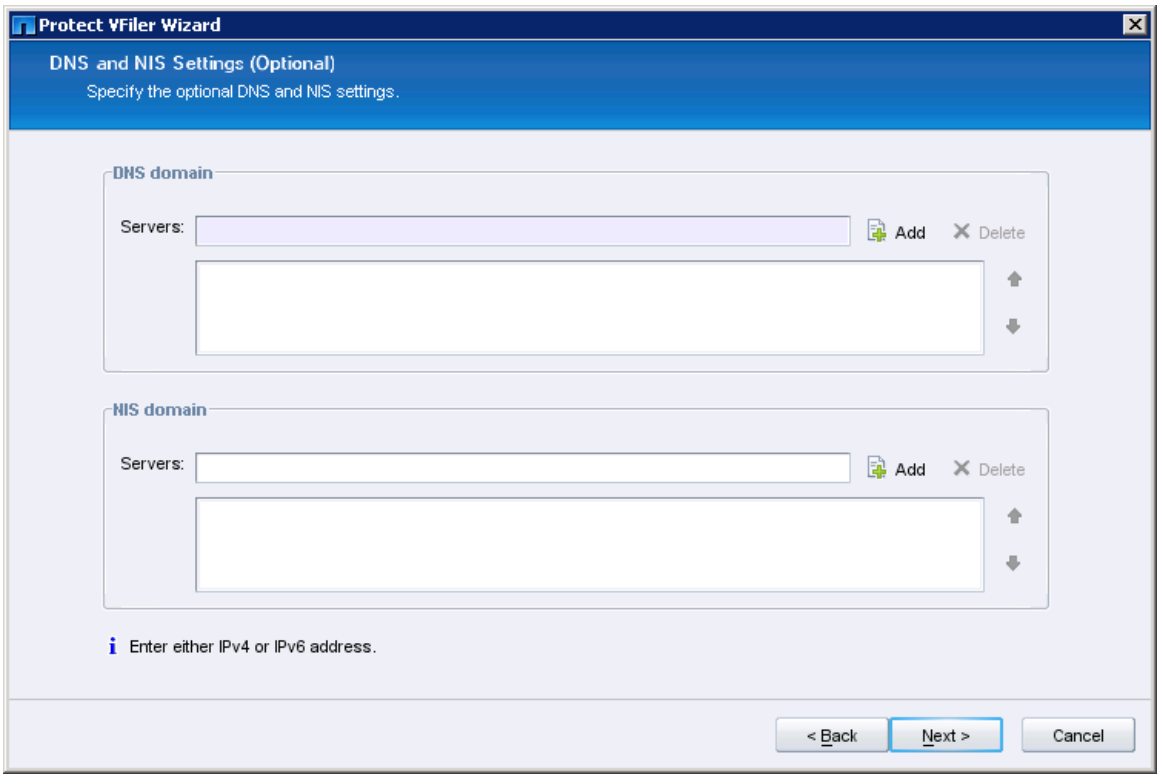
5. Click **Next**, as we are keeping the same IP and interface settings.



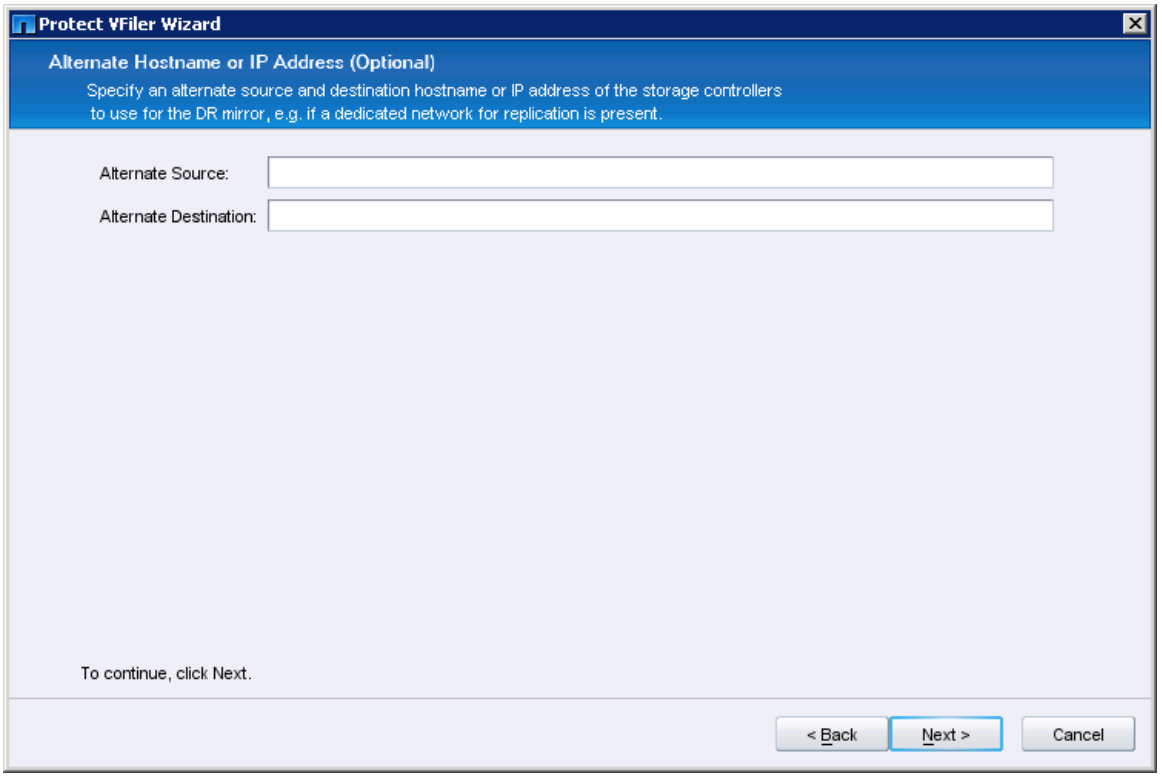
6. Click next to use the default protection values. The destination volumes have been precreated as part of the lab. In a real-world scenario you would need to create these.



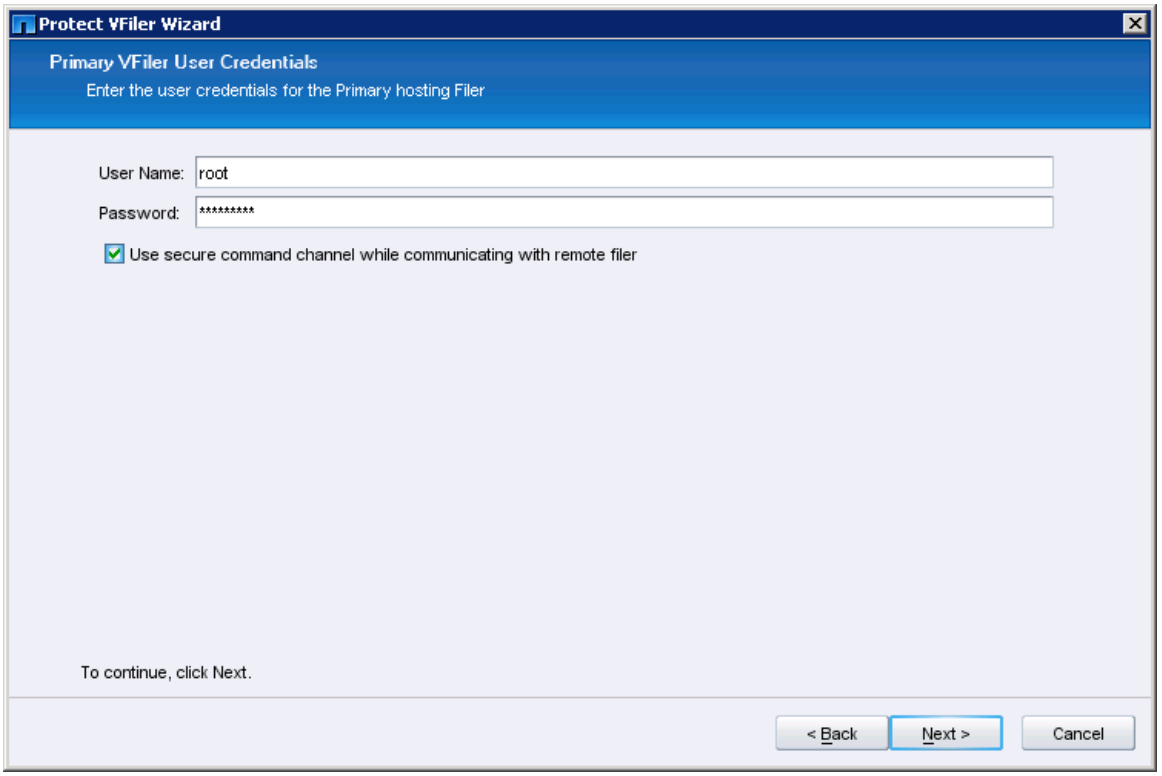
7. Click **Next** to use the same DNS and NIS settings.



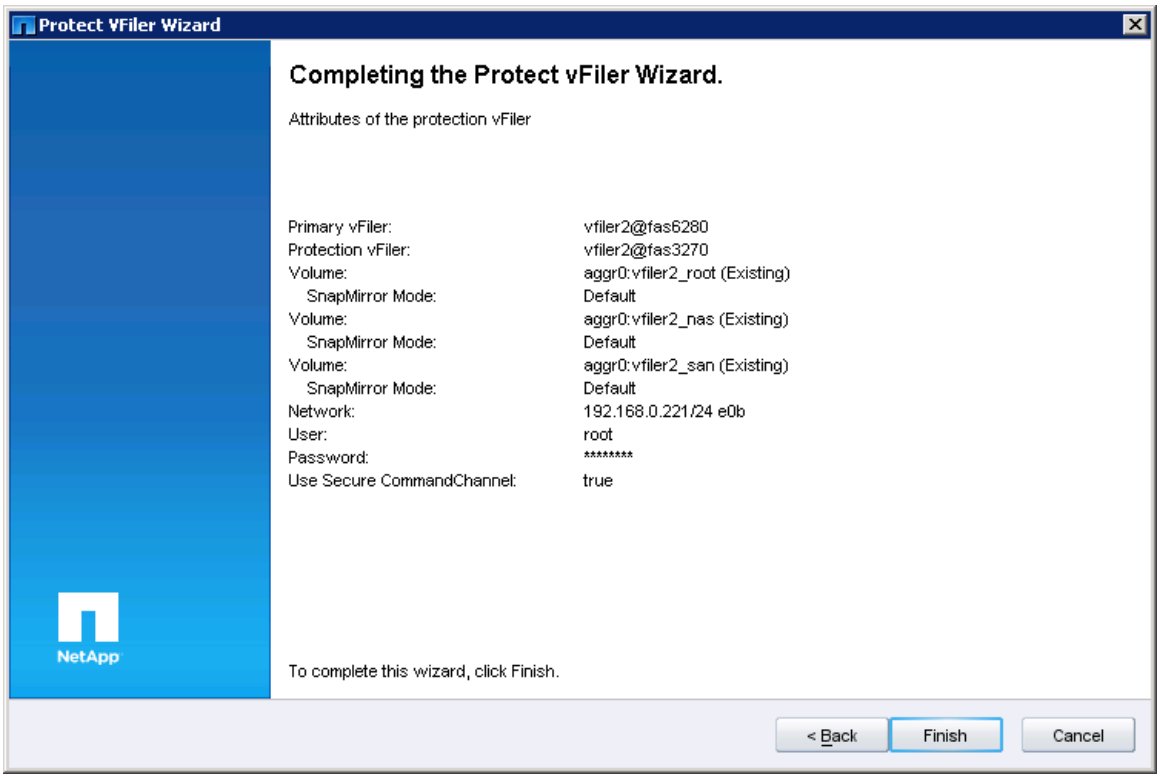
8. Click **Next**. If you needed to specify alternate source or destination IP addresses, you could do that here (for example, if you have a specific network for SnapMirror replication).

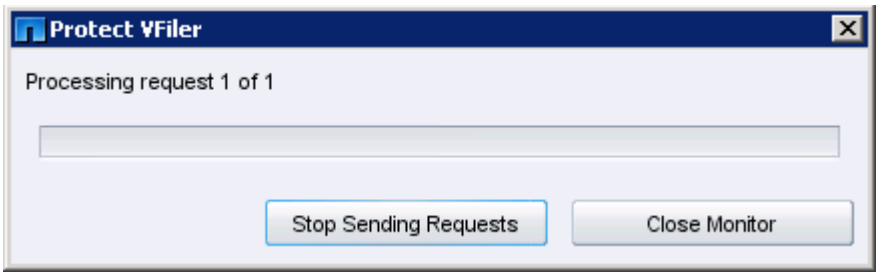


9. Enter the appropriate credentials for the source system (**root : netapp123**), and check the **Use secure command channel**, then click **Next**.

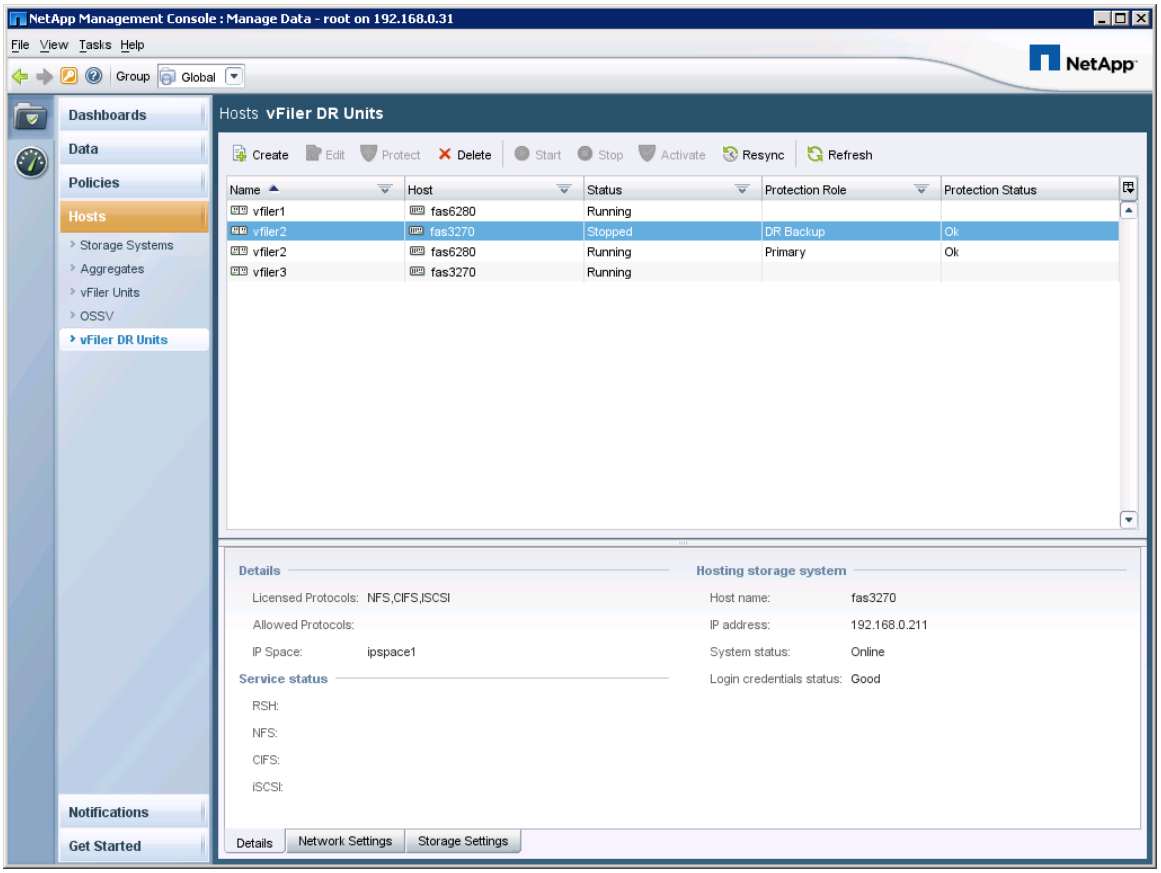


10. Click **Finish**.





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**.



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)

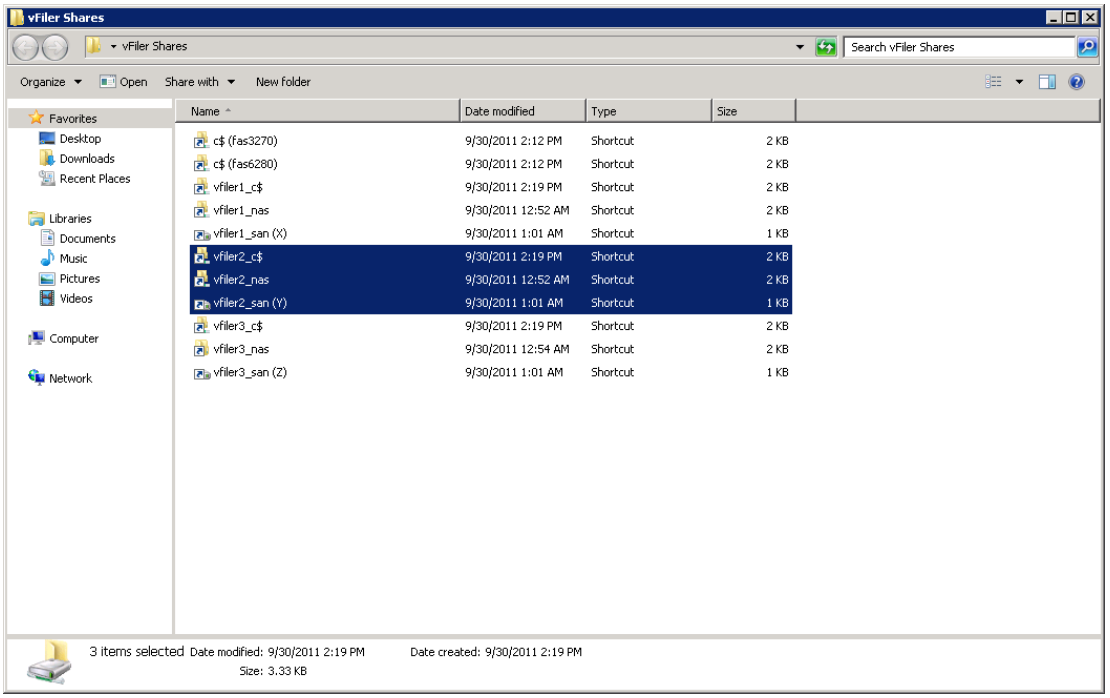
   ```
   [root@ ~]# ls -l /root/vfiler2
   total 0
   -rw-r--r-- 1 root root 12 Sep 30 01:17 test_vfiler2.txt
   ```

   CIFS (access from vFiler Shares on desktop)

   \\192.168.150.221\vfiler2_nas

   iSCSI (access from vFiler Shares on desktop)

   Y:

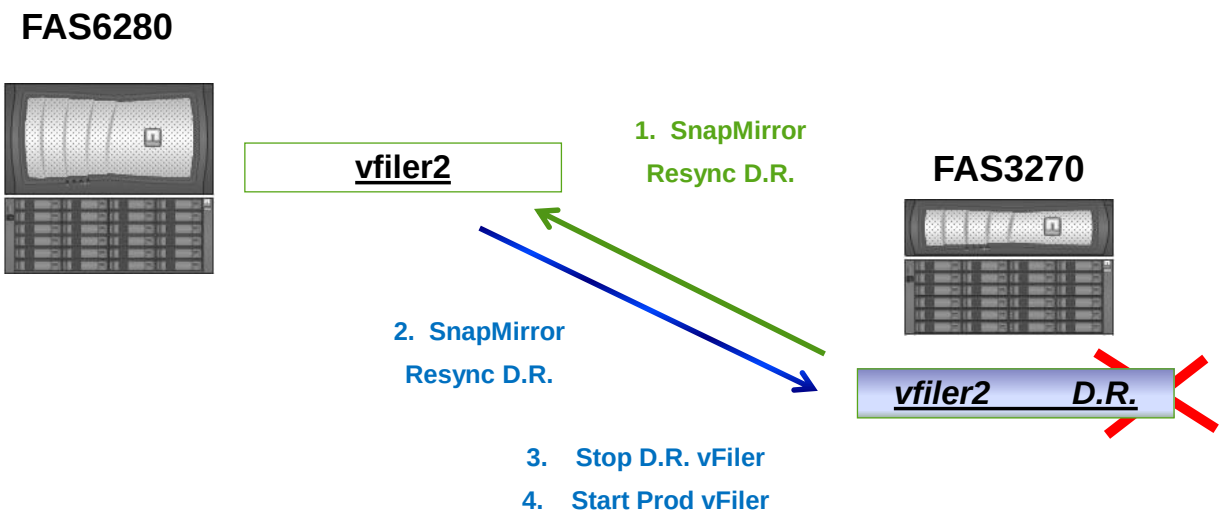

vFiler Shares
vFiler Shares
Search vFiler Shares
Organize
Open
Share with
New folder
Favorites
Desktop
Downloads
Recent Places
Libraries
Documents
Music
Pictures
Videos
Computer
Network
Name
Date modified
Type
Size
c$ (fas3270) 9/30/2011 2:12 PM Shortcut 2 KB
c$ (fas6280) 9/30/2011 2:12 PM Shortcut 2 KB
vfiler1_c$ 9/30/2011 2:19 PM Shortcut 2 KB
vfiler1_nas 9/30/2011 12:52 AM Shortcut 2 KB
vfiler1_san (X) 9/30/2011 1:01 AM Shortcut 1 KB
vfiler2_c$ 9/30/2011 2:19 PM Shortcut 2 KB
vfiler2_nas 9/30/2011 12:52 AM Shortcut 2 KB
vfiler2_san (Y) 9/30/2011 1:01 AM Shortcut 1 KB
vfiler3_c$ 9/30/2011 2:19 PM Shortcut 2 KB
vfiler3_nas 9/30/2011 12:54 AM Shortcut 2 KB
vfiler3_san (Z) 9/30/2011 1:01 AM Shortcut 1 KB
3 items selected Date modified: 9/30/2011 2:19 PM Date created: 9/30/2011 2:19 PM
Size: 3.33 KB

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
```

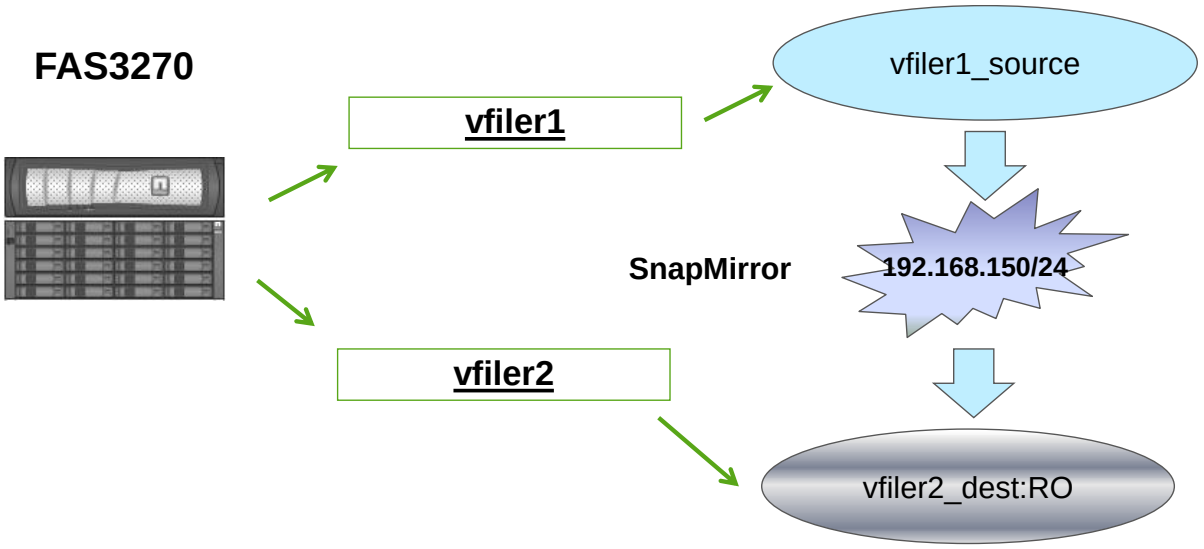
7 SNAPMIRROR BETWEEN VFILER UNITS

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
```

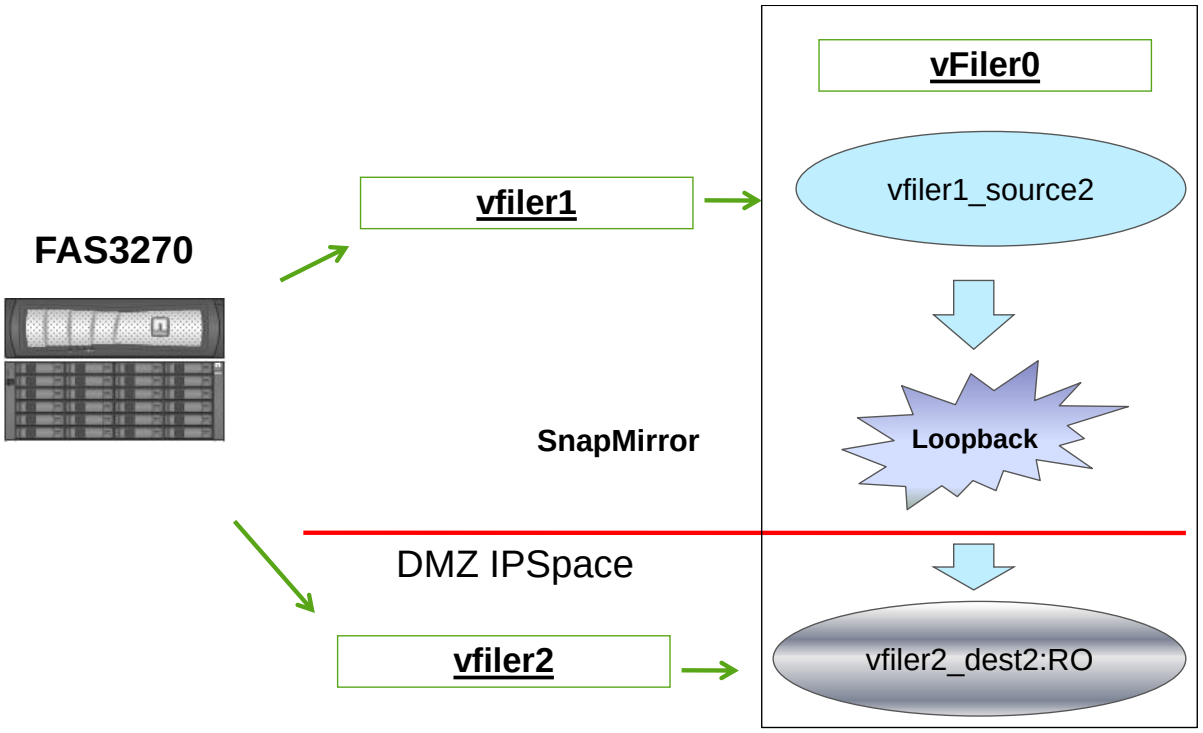
3. Now you can turn on SnapMirror and mirror the volumes.

```
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,wsize=32768,timeo=600,intr
```

```
vfiler2:/vol/vfiler2_nas                    /root/vfiler2  nfs rsize=32768,wsize=32768,timeo=600,intr
vfiler3:/vol/vfiler3_dmotion_root/nas       /root/vfiler3  nfs rsize=32768,wsize=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 vFiler DR 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 serverHTTPEnabled=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
```

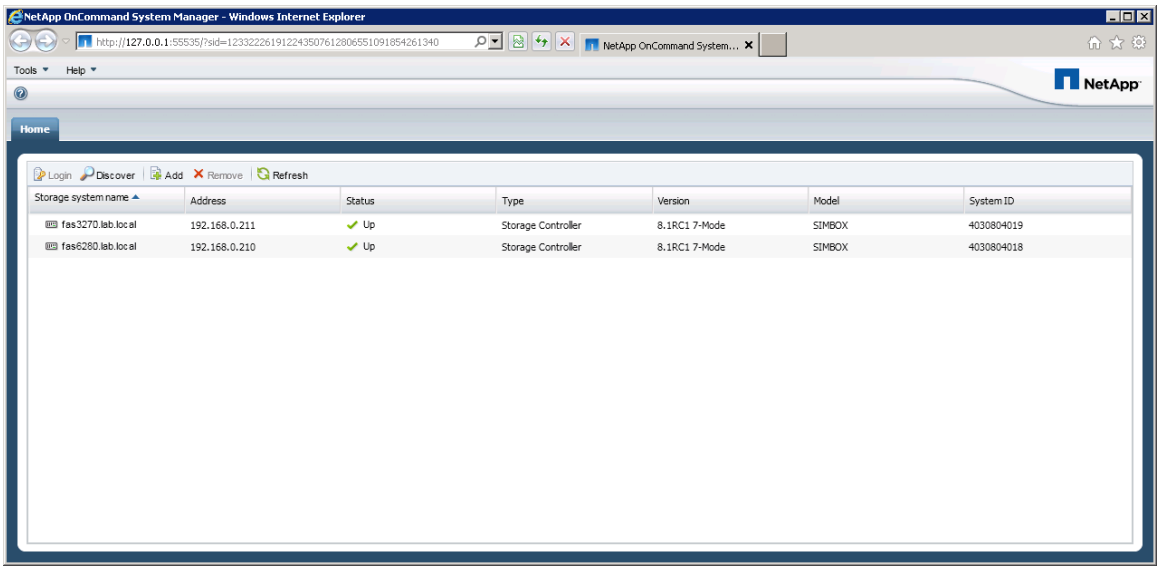
```
cd /usr/lib/mozilla/plugins
ln -s /usr/java/latest/lib/amd64/libnpjp2.so      # required to work in Mozilla
browser
http://www.java.com/en/download/help/testvm.xml   # test java
```

```
Authenticate NMC to the controllers root and ndmp
```

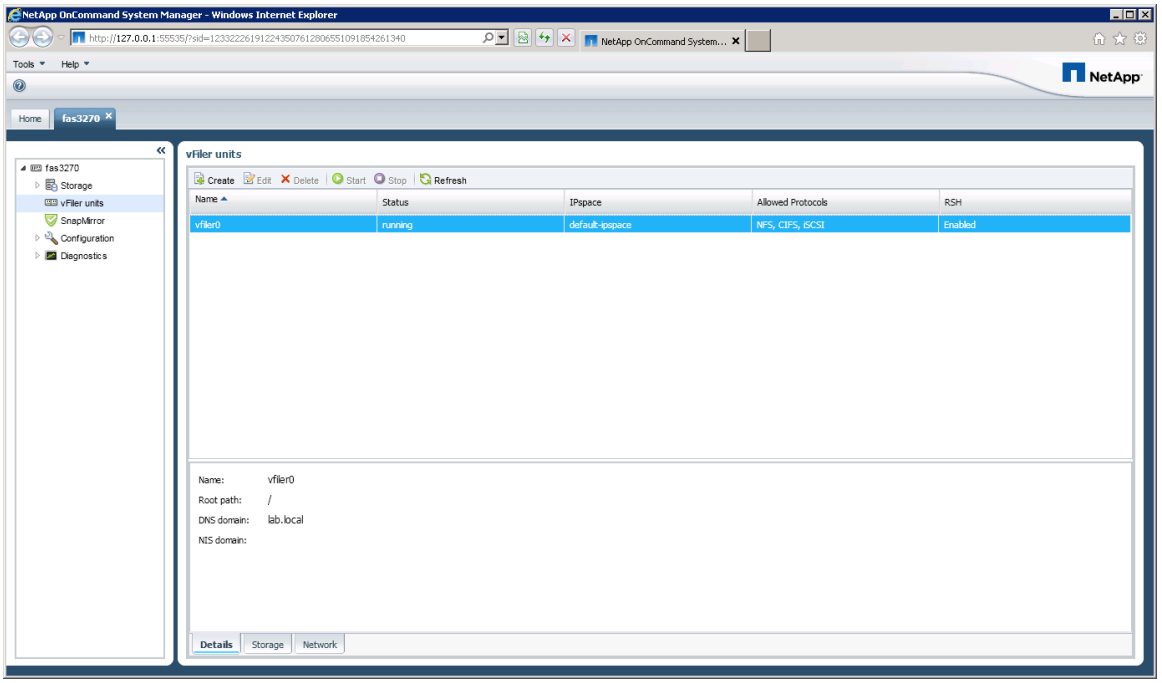
http://localhost:8080/dfm/welcome # http
http://localhost:8080/start.html # http to NEW OnCommand5 dashboard
http://localhost:8443/dfm/welcome # https
http://localhost:8443/start.html # https to NEW OnCommand5 dashboard

9 APPENDIX B – CREATE A VFILER WITH SYSTEM MANAGER 2.0

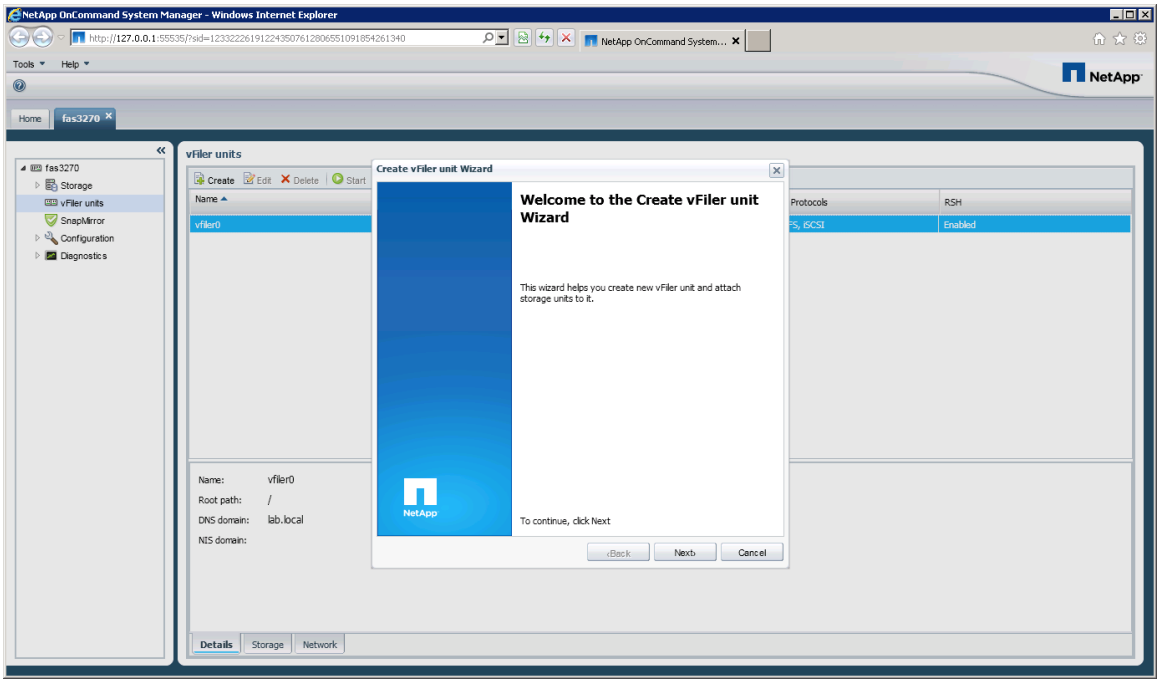
1. Open System Manager 2.0 from the icon on the Windows desktop. Select the **FAS3270** and click the **Login** button.



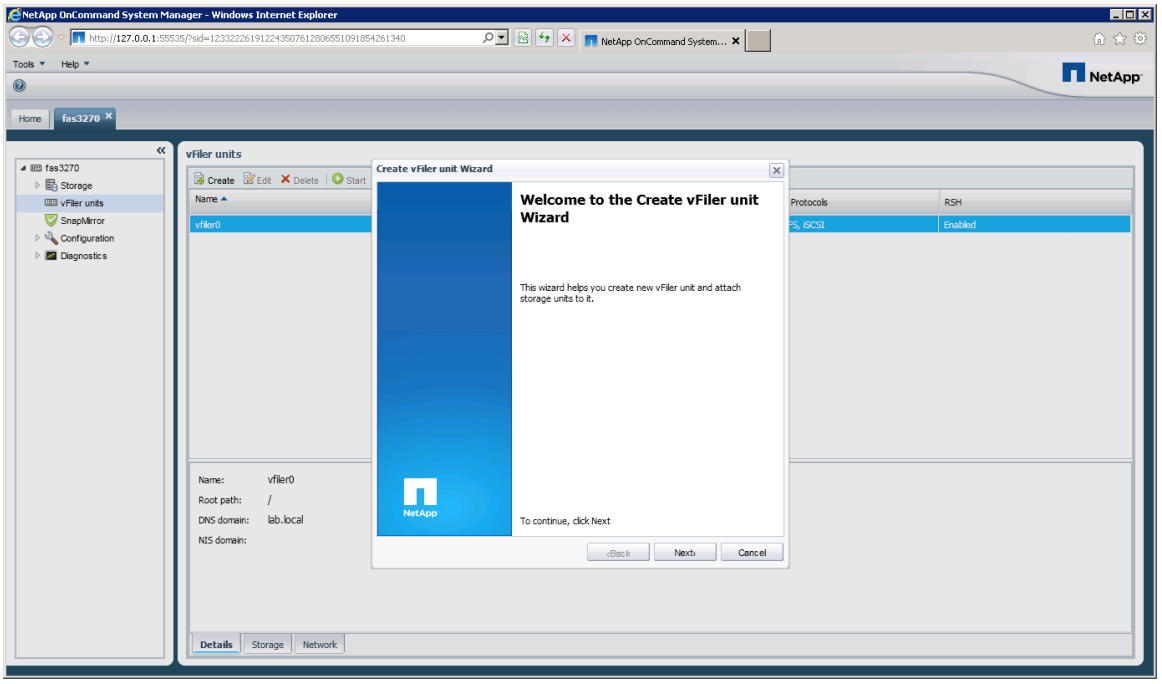
2. Click on **vFiler units**.



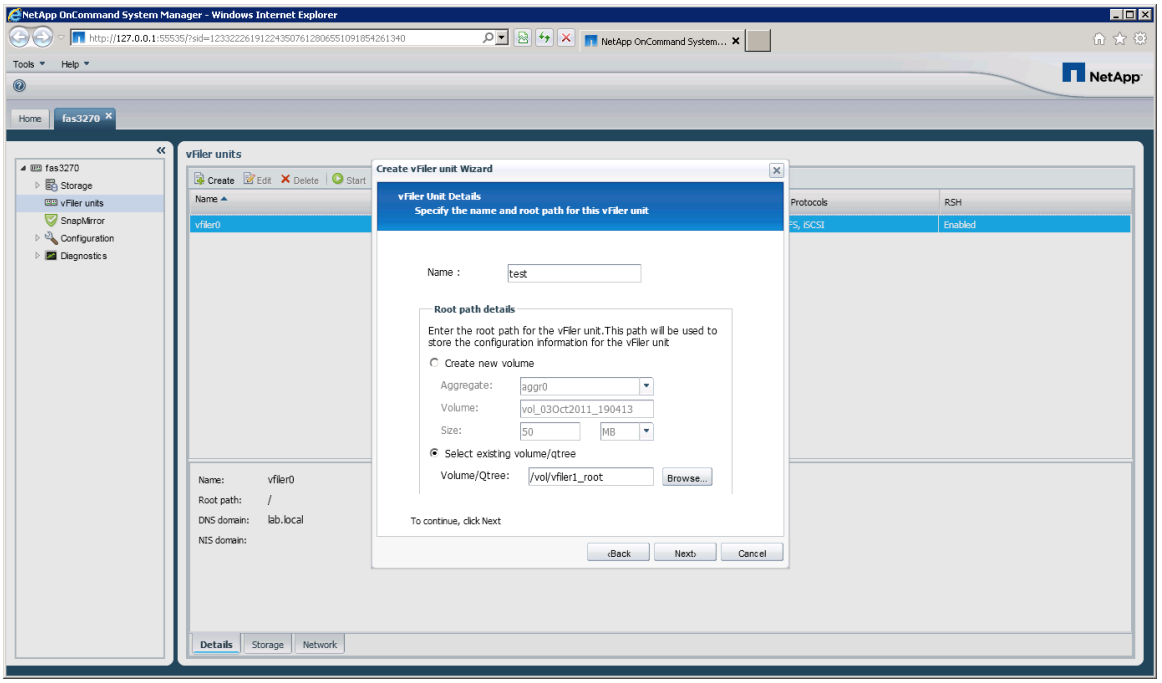
3. Click on **Create**.



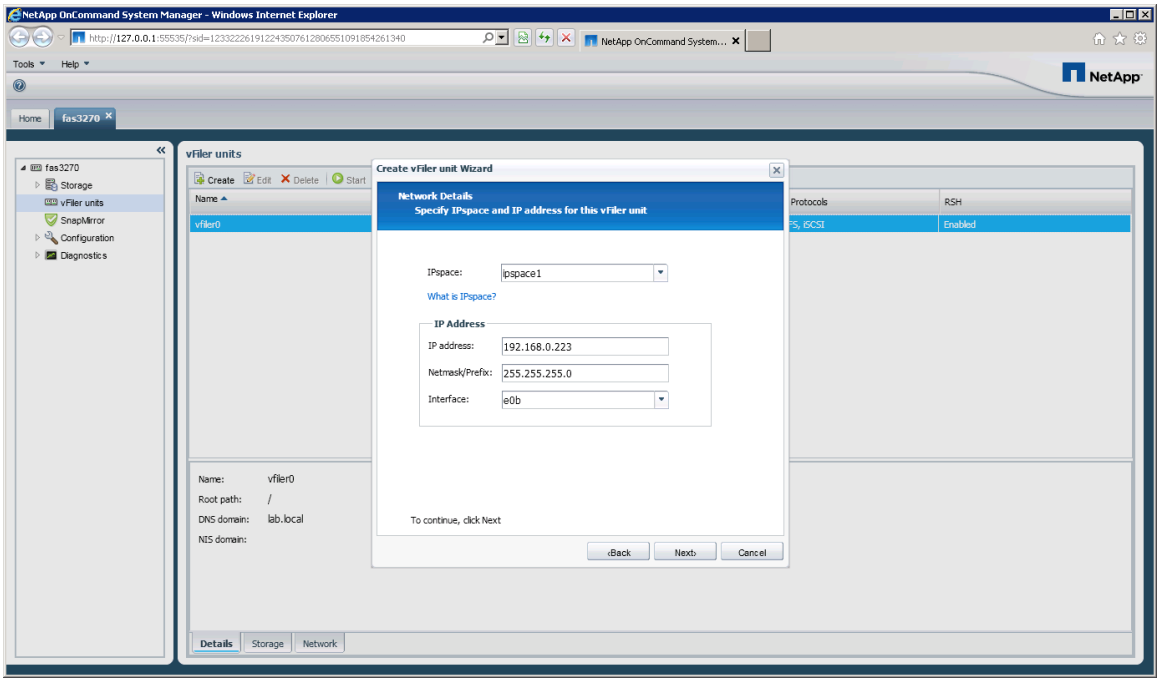
4. Click **Next**.



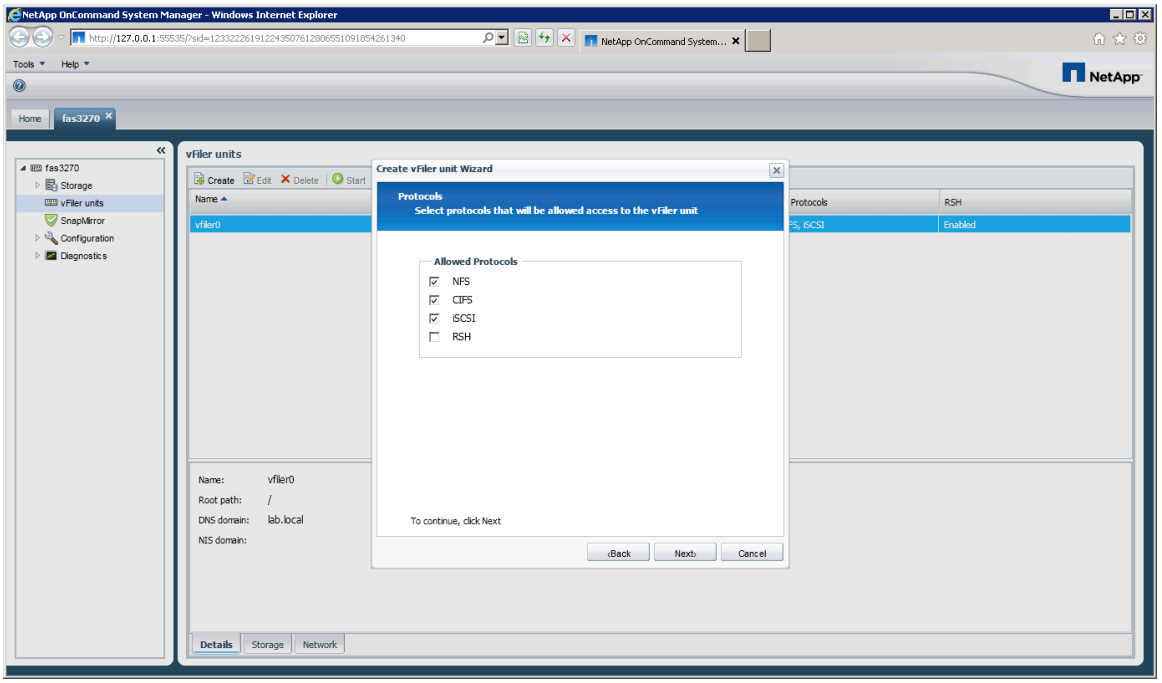
5. Fill in the details below (vfilername: test, browse for existing vfiler1_root volume) and click **Next**.



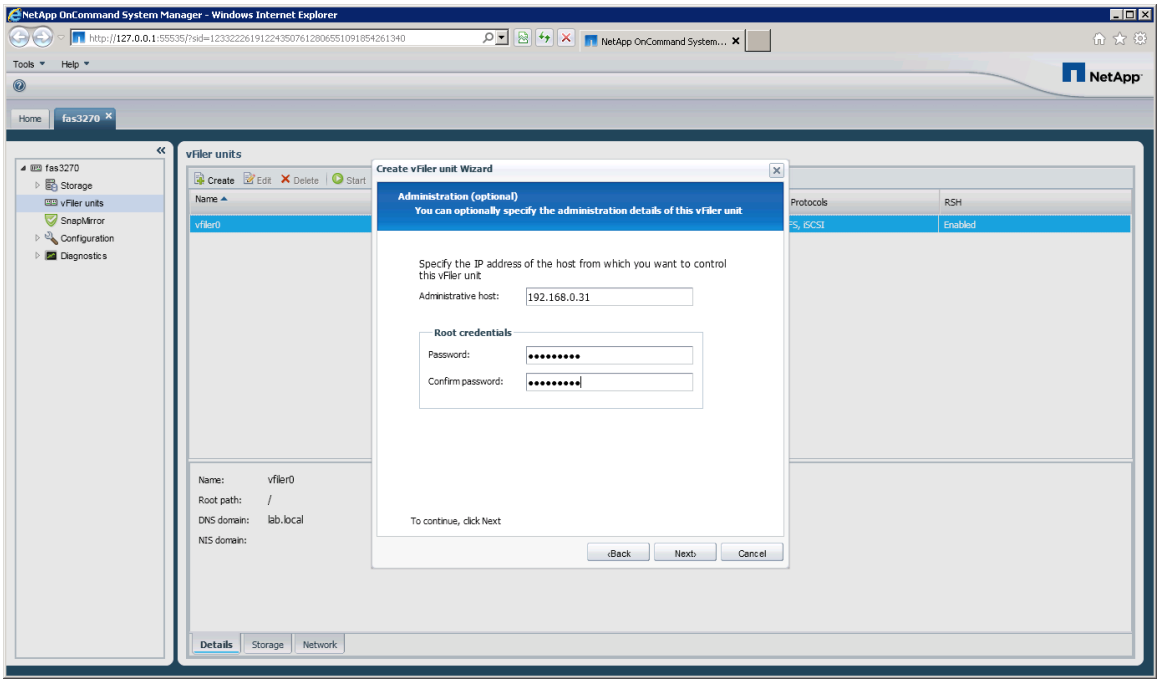
6. Fill in the networking details. Enter **ipspace1** for the IPSpace, **192.168.150.223** for the IP address, **255.255.255.0** for the netmask, **e0b** for the interface, and click **Next**.



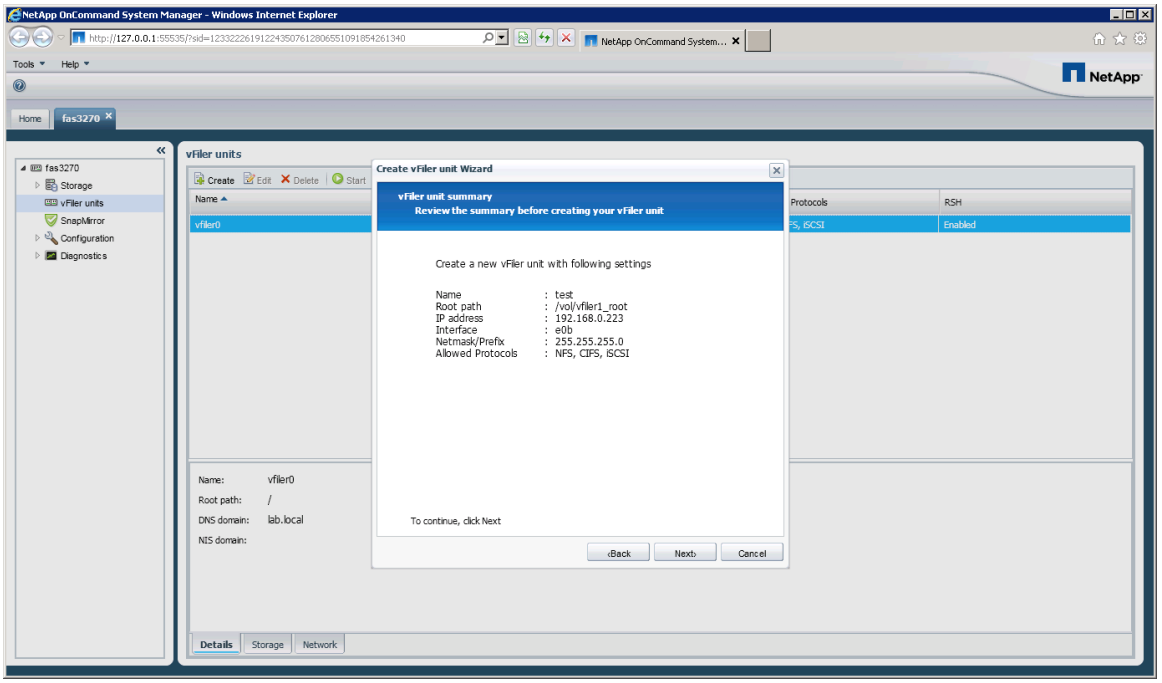
7. Click on 3 protocols (all but RSH) and click **Next**.



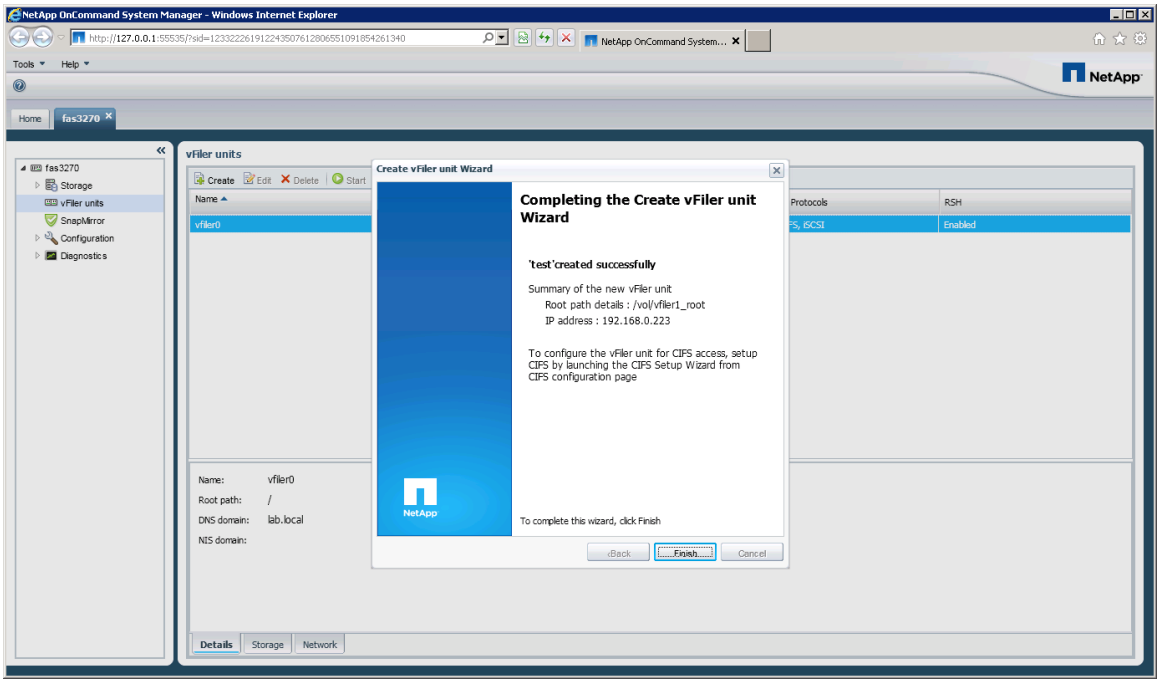
8. Enter the admin host **192.168.150.31** and the password **netapp123** and click **Next**.



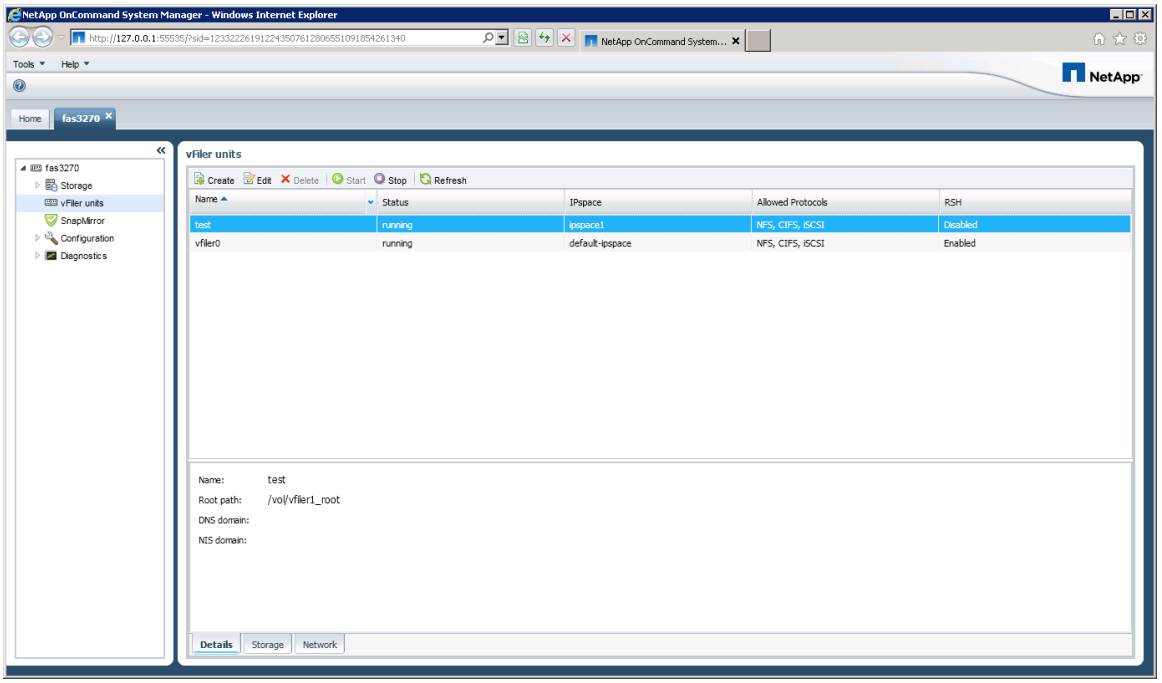
9. Click **Next**.



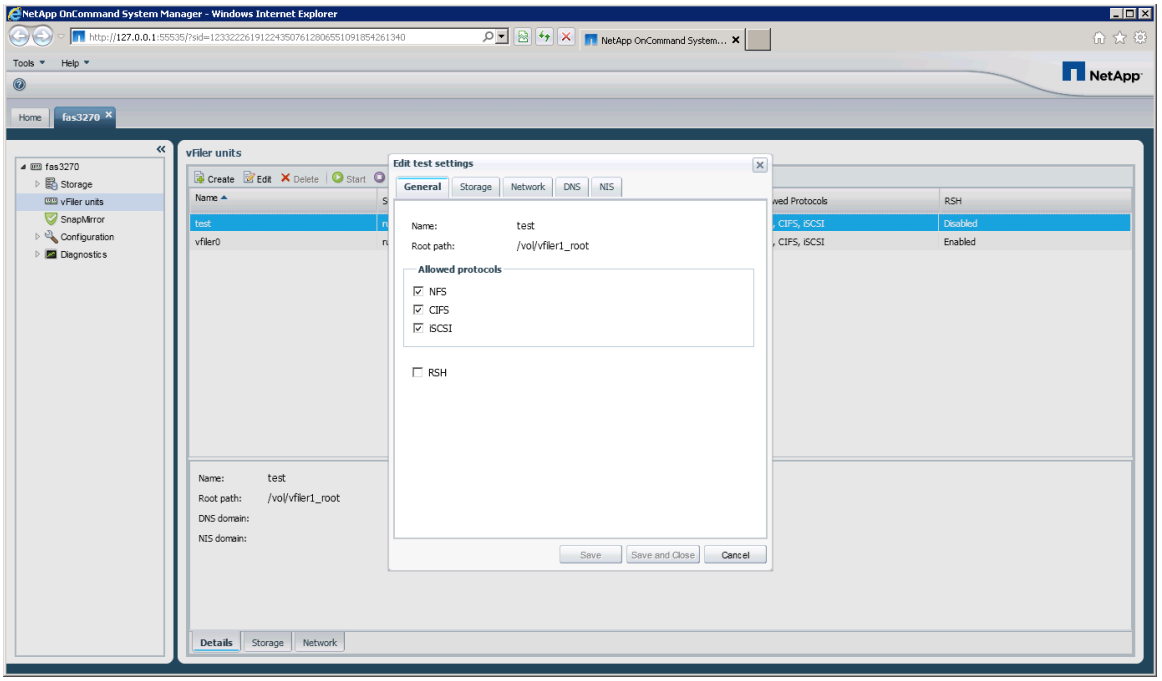
10. Click **Finish**.



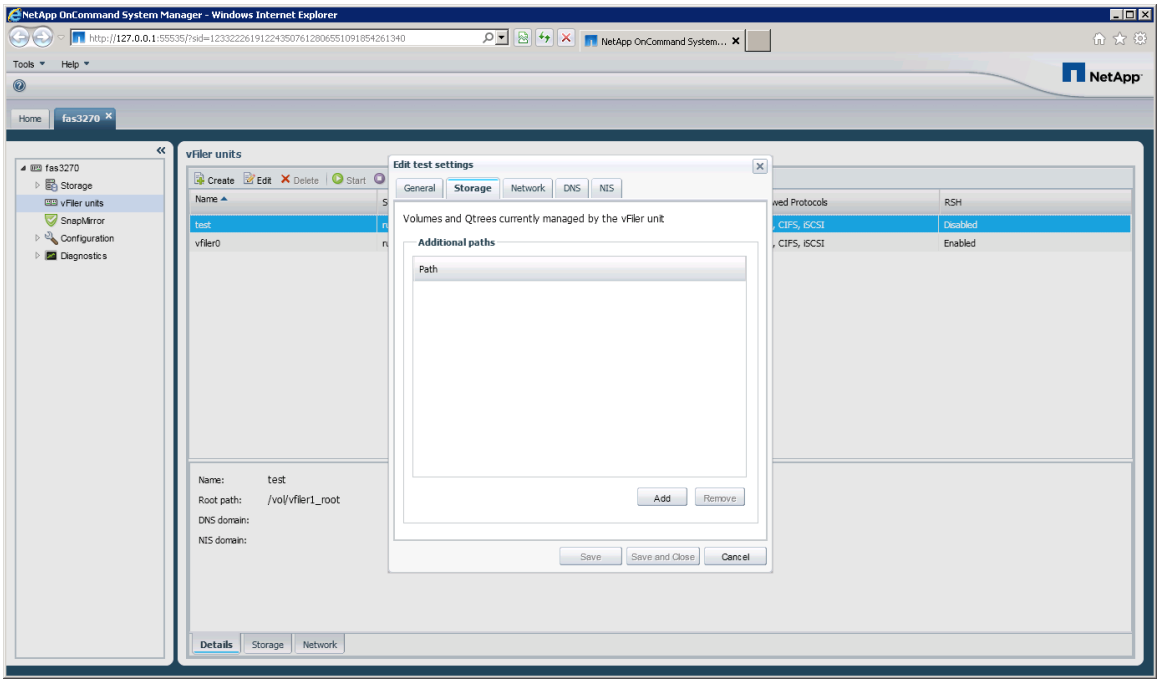
11. Add 2 more volumes. Select the **test** vFiler unit and click **Edit**.



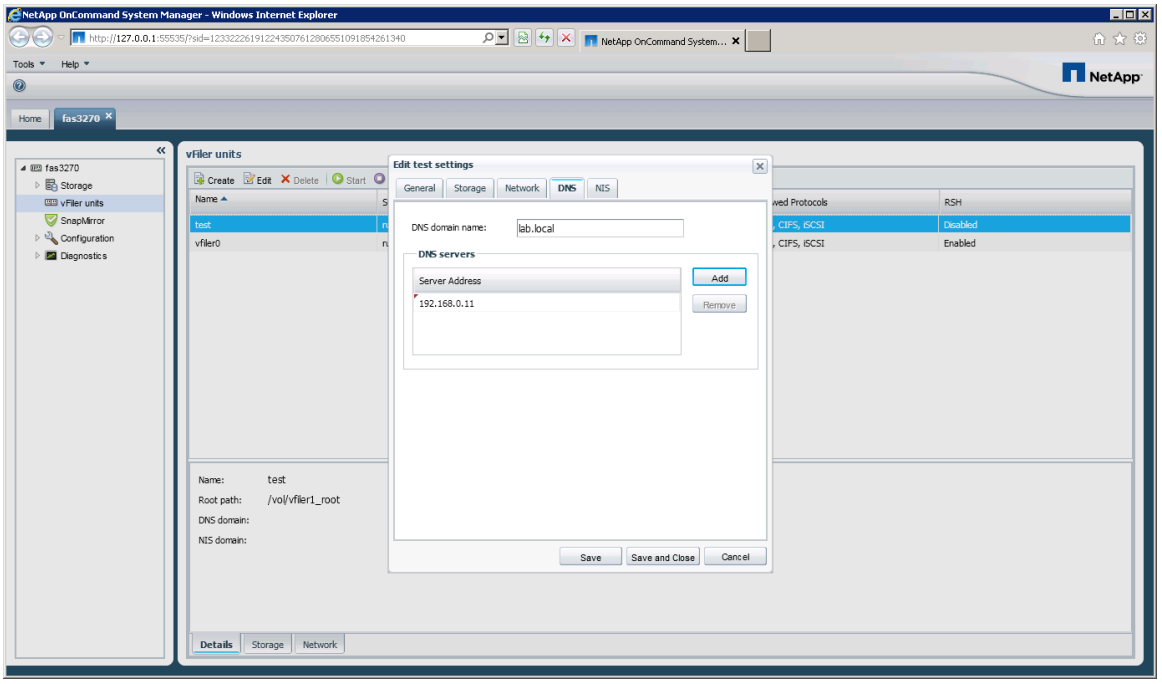
12. Select the **Storage** tab and click the **Add** button.



13. Click the elipse **...** 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

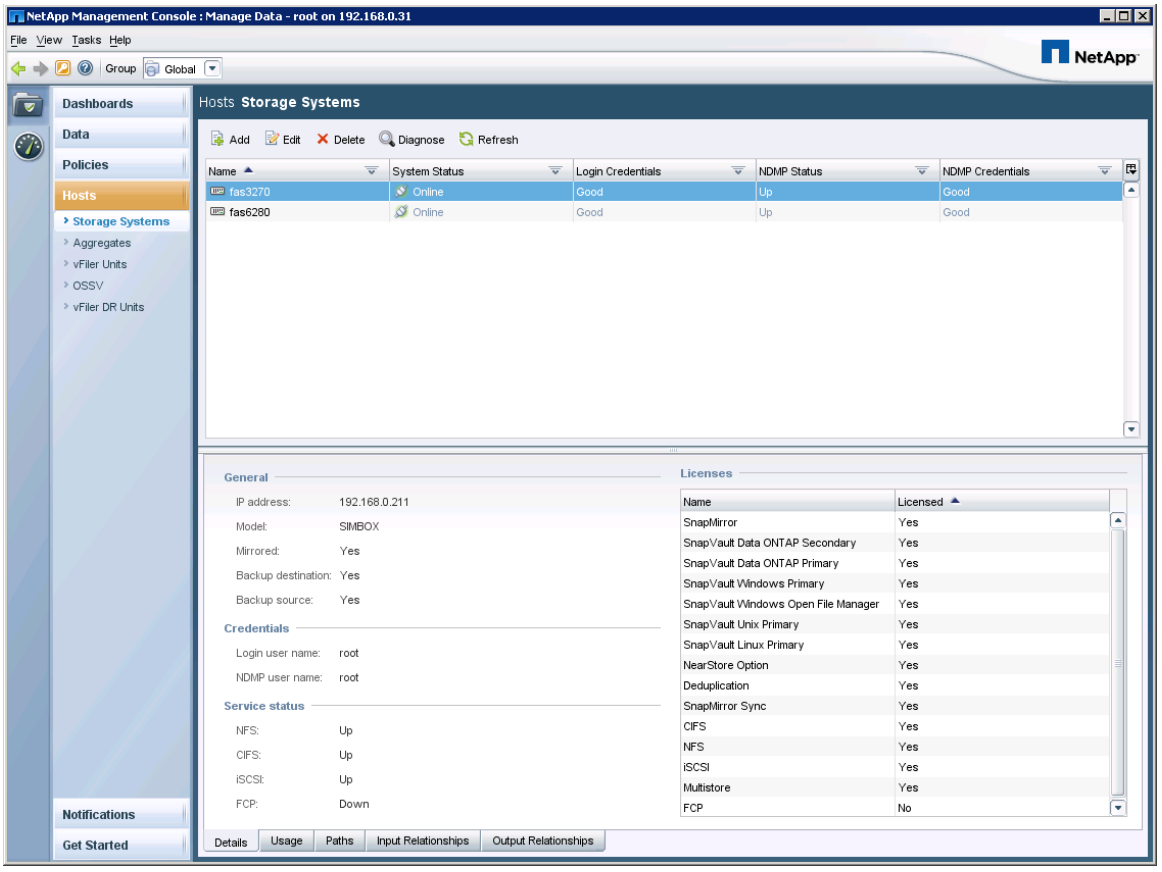
NOTE: You will need to add a vfiler default route by adding a **route add default** statement in the vfiler0 /etc/rc file.

Steps required to create a vFiler unit using Provisioning Manager:

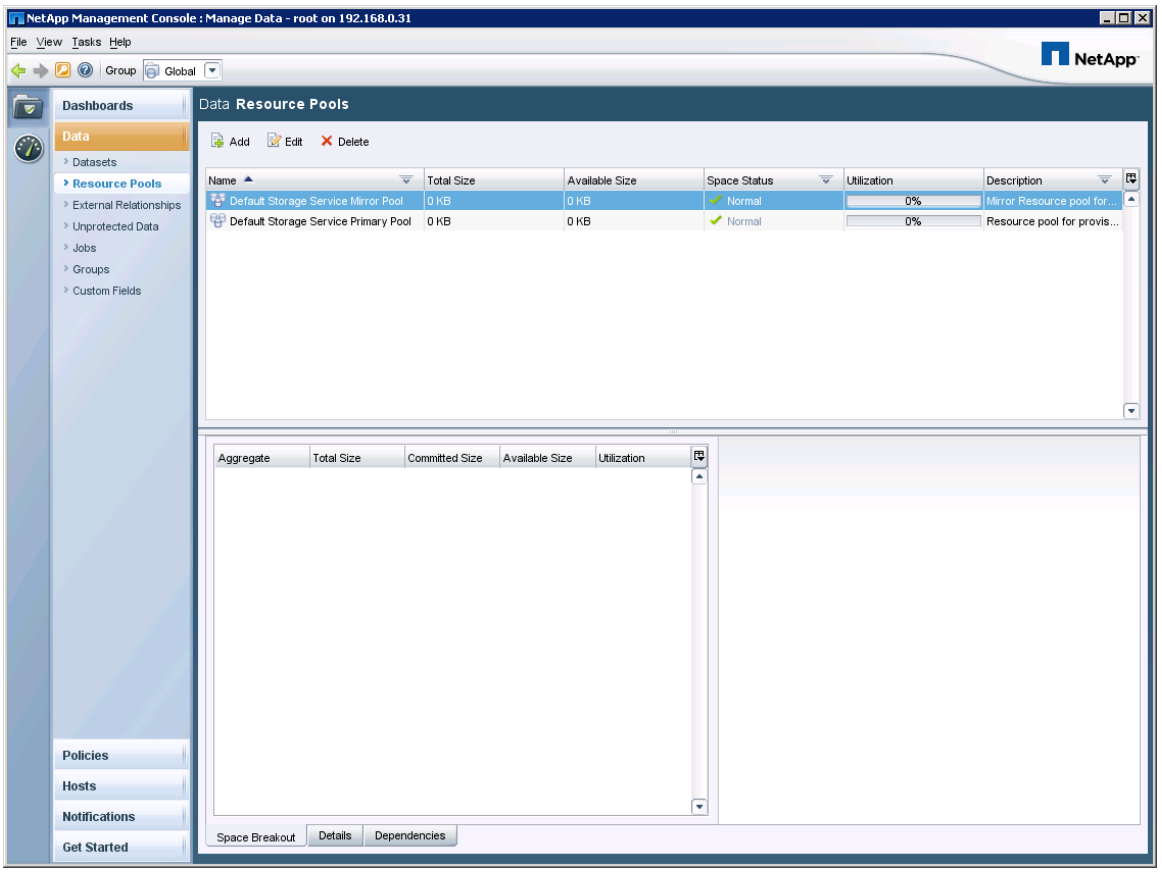
- Create a resource pool
- Create a vFiler template
- Create a vFiler unit
- Create a provisioning policy
- Create a dataset and assign storage

CREATE A RESOURCE POOL

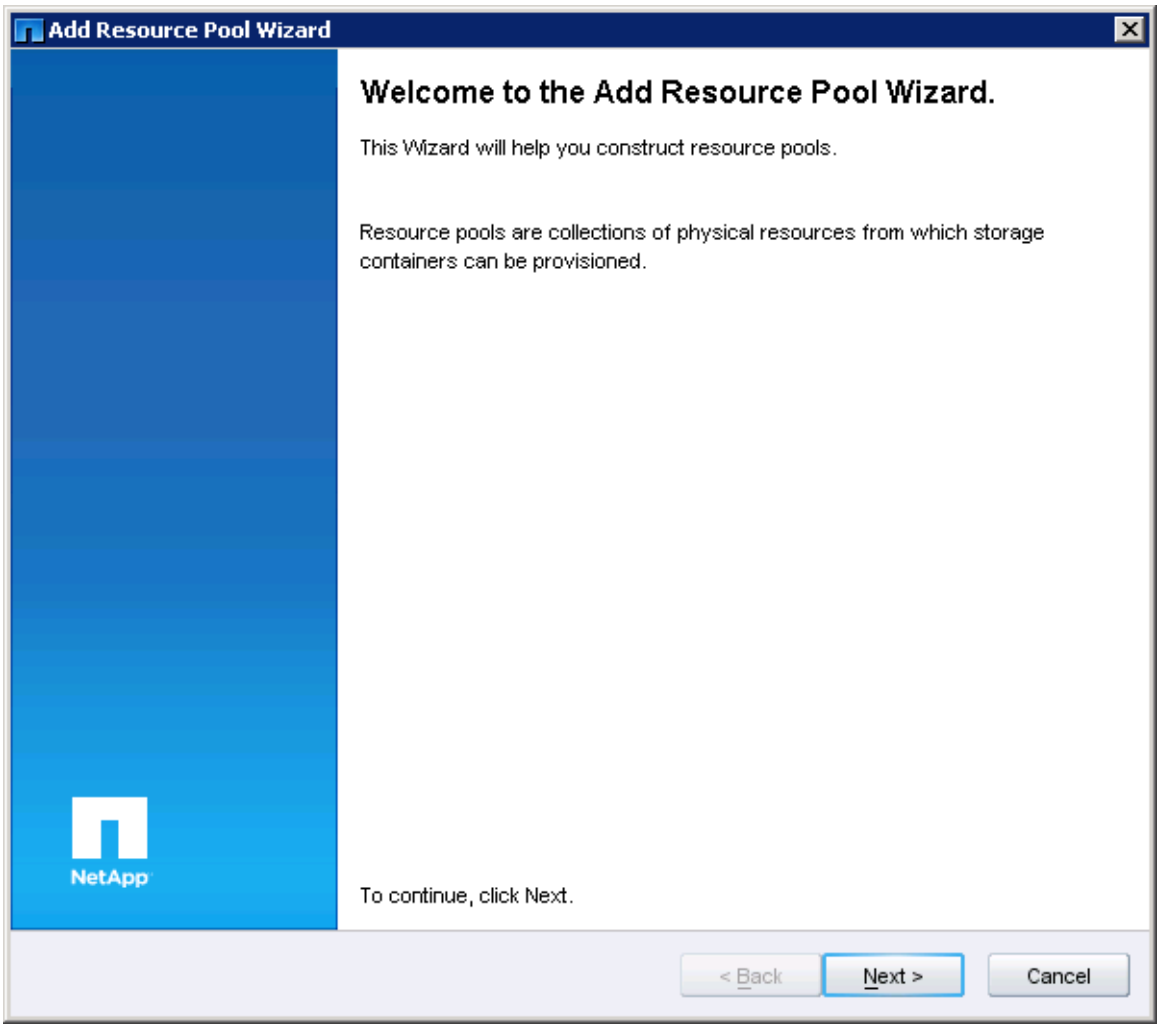
1. Open the NetApp Management Console (NMC) and select the **Hosts Pane → Storage Systems**, click the **Details** tab on the bottom, then click on the **FAS3270**. Confirm that all licenses you need are installed.



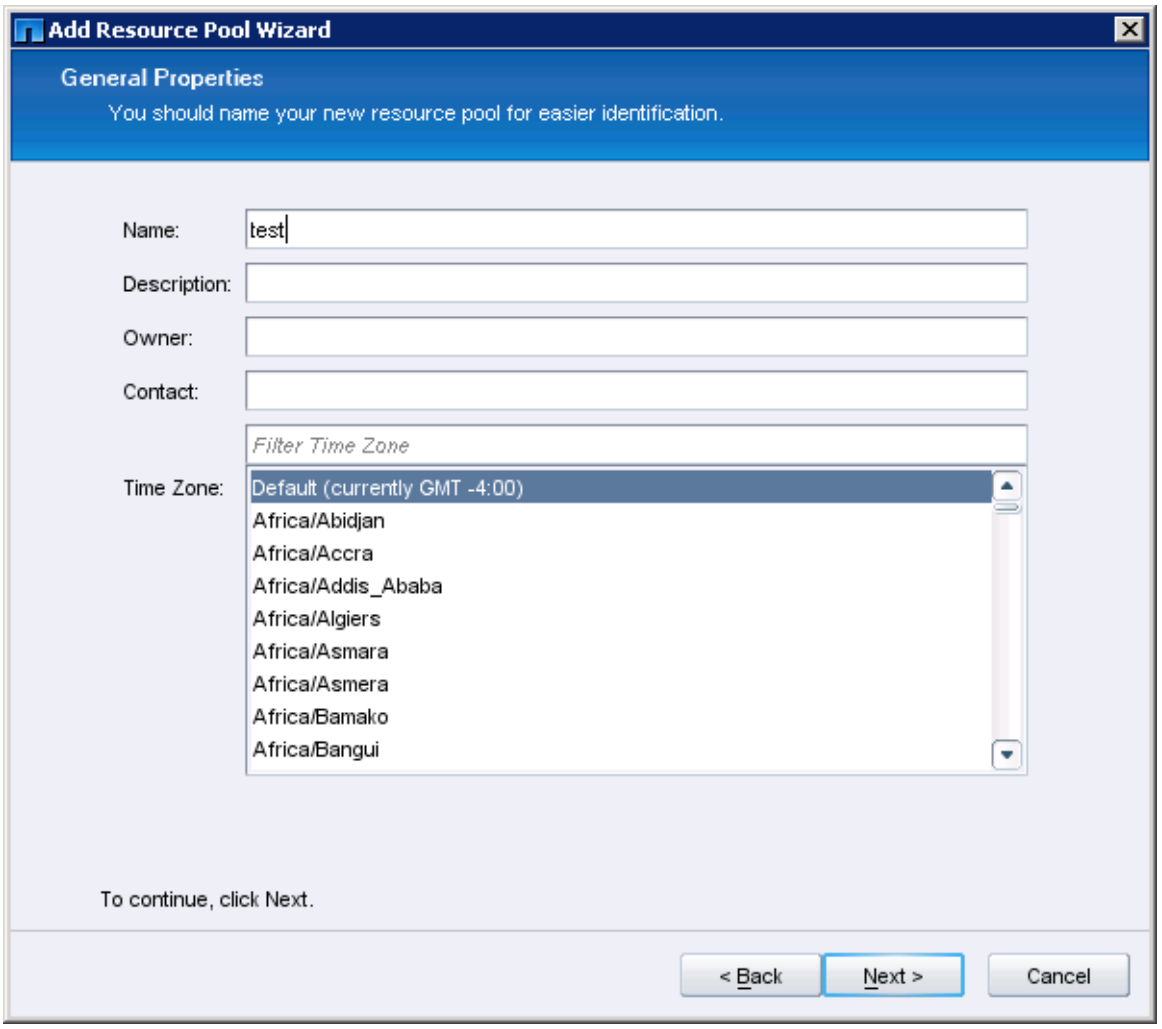
2. From the navigation pane, click **Data > Resource Pools**. Click the **Add** button to start the setup wizard.



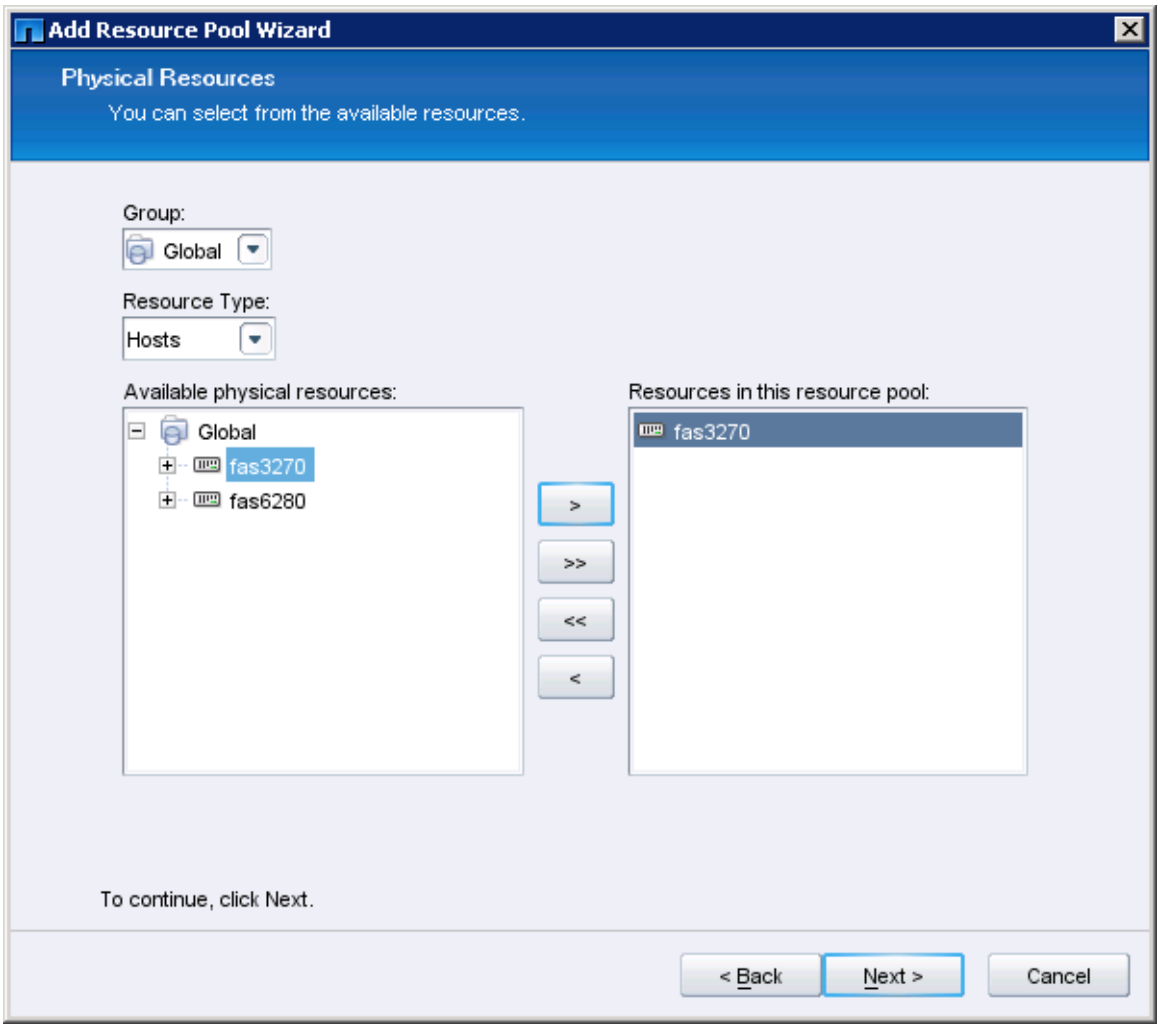
3. Click Next.


Add Resource Pool Wizard
Welcome to the Add Resource Pool Wizard.
This Wizard will help you construct resource pools.
Resource pools are collections of physical resources from which storage containers can be provisioned.
NetApp
To continue, click Next.
< Back
Next >
Cancel

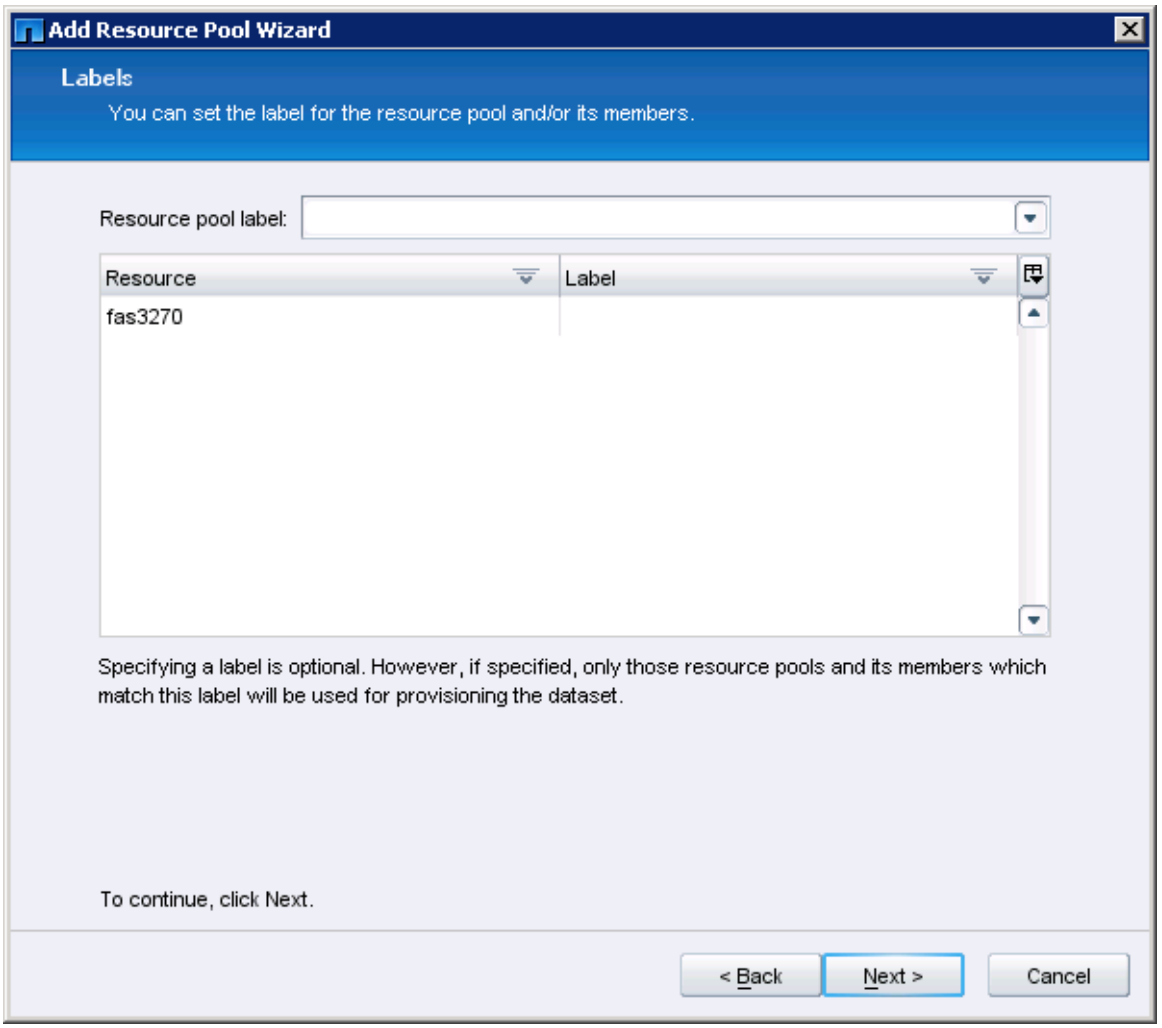
4. Enter **test** in General Properties then click **Next**.



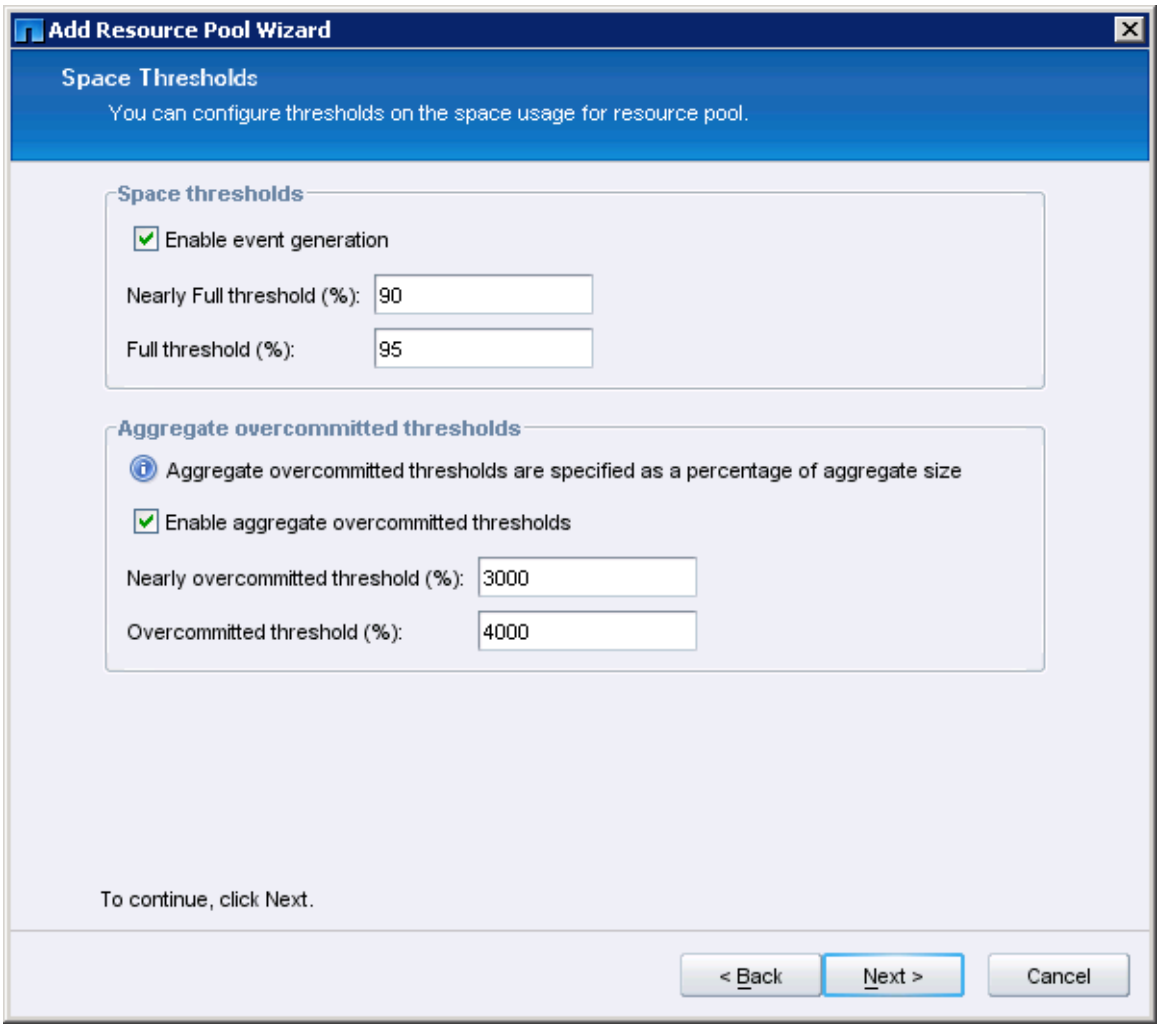
5. Click on the **fas3270** and click the **>** arrow to add to the resource pool, and click **Next**.



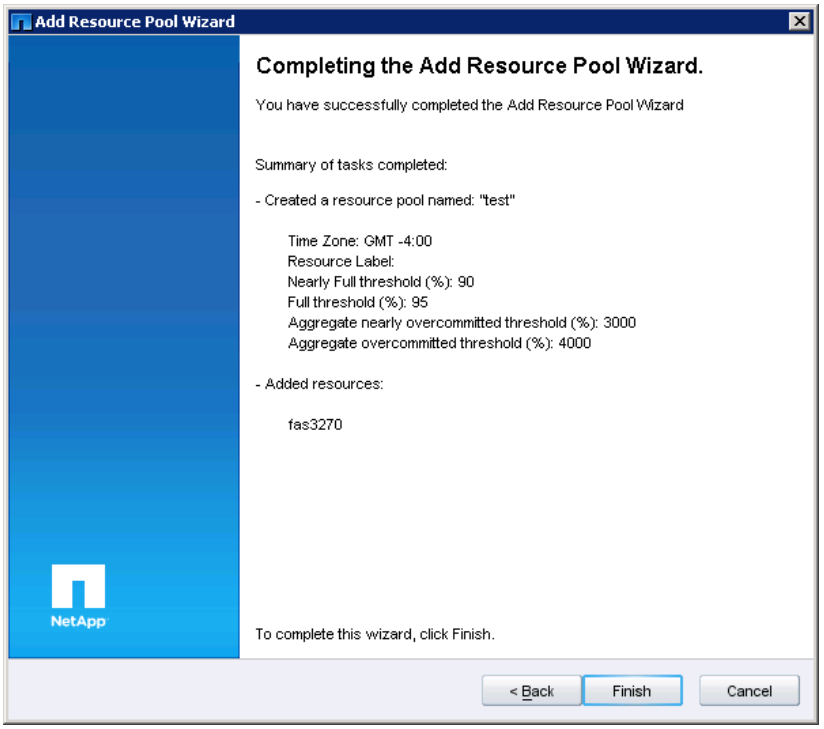
6. Leave the Resource pool label blank and click **Next**.



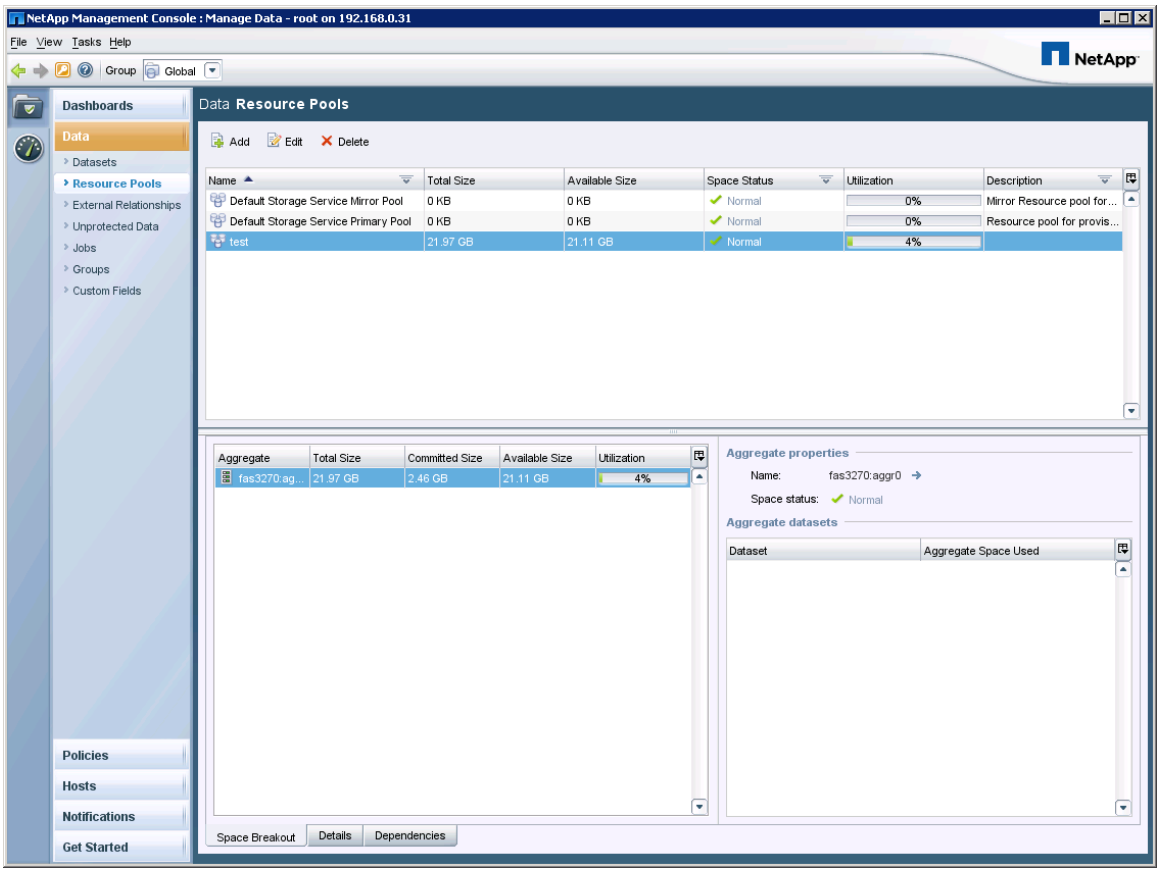
7. Confirm Space Thresholds (increate thresholds per below) and click **Next**.



8. Click **Finish**.

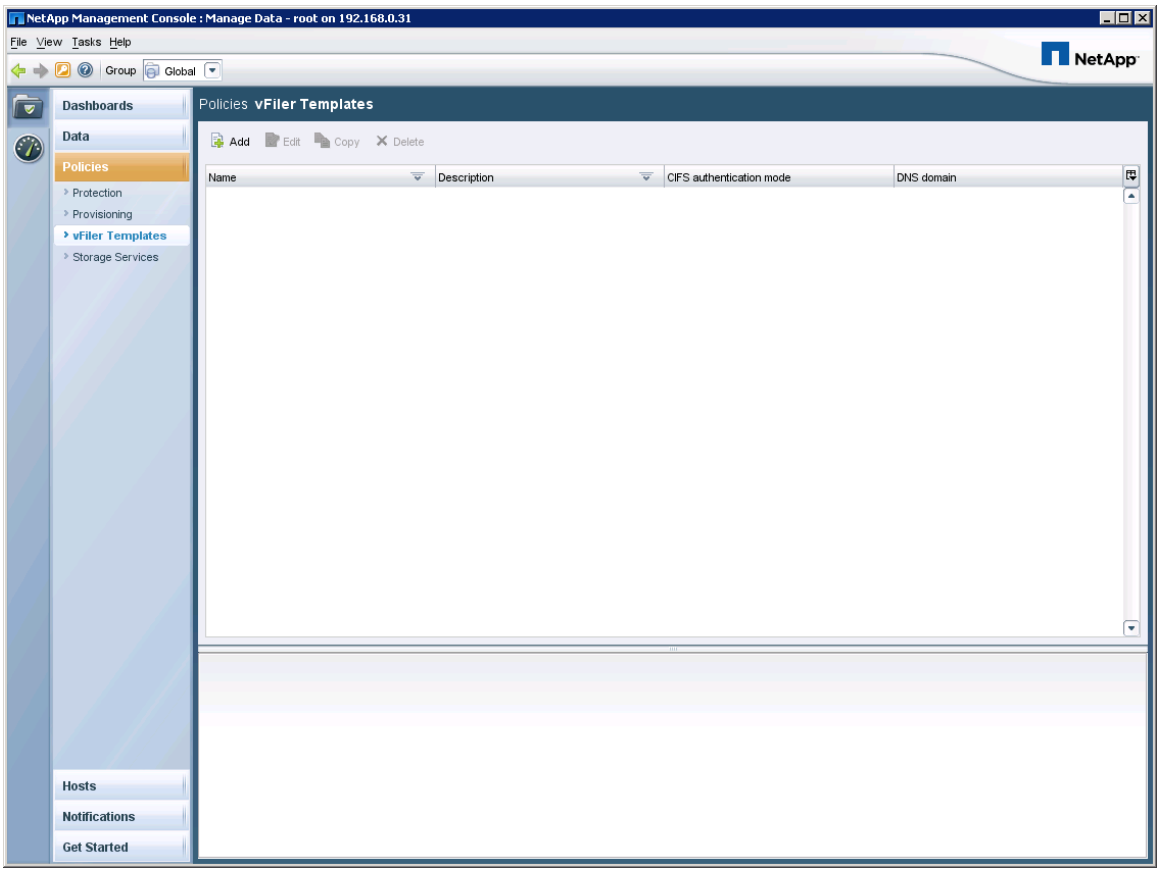


9. You can now see your created Resource Pool.

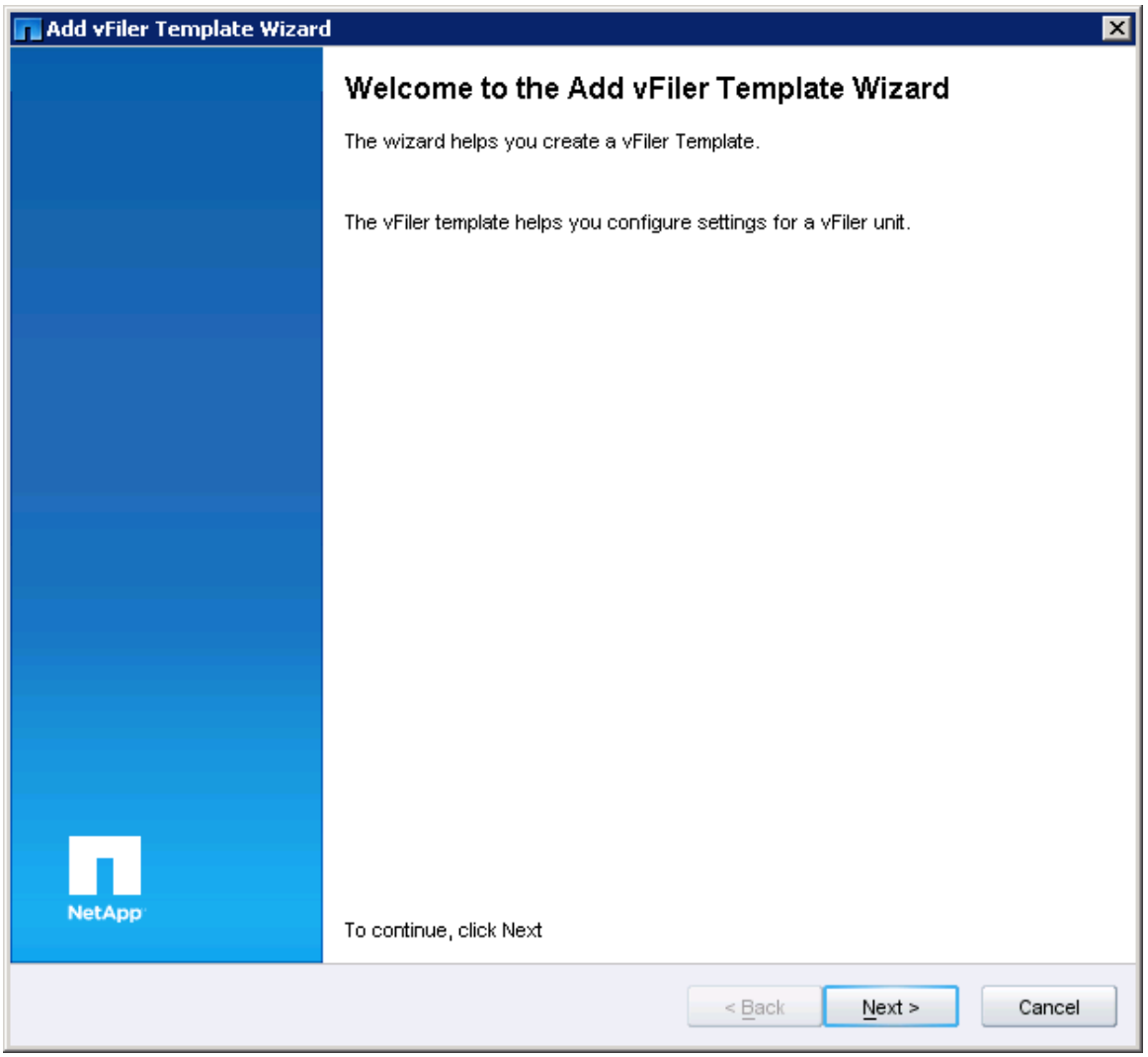


CREATE A VFILER TEMPLATE

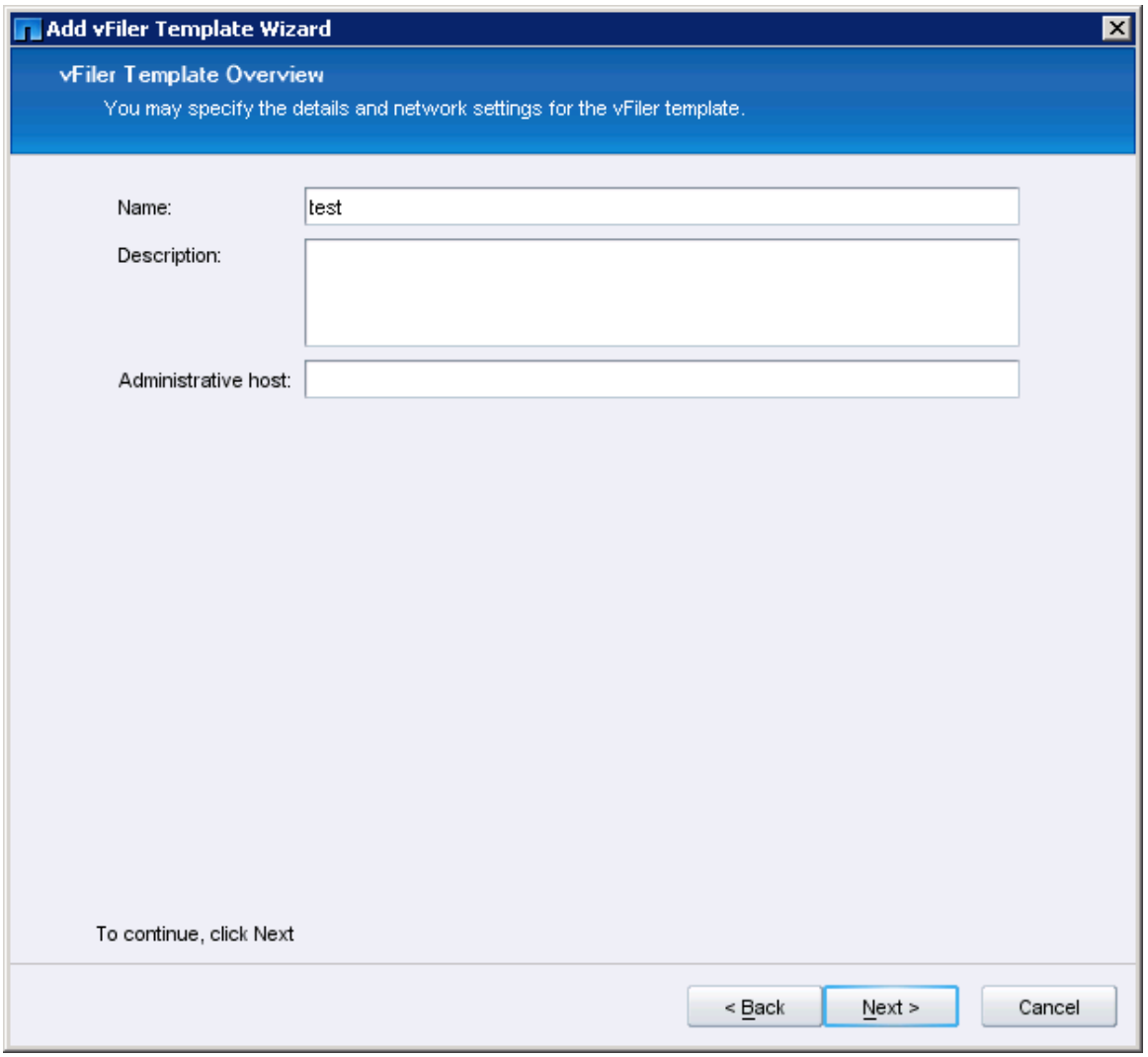
1. From the navigation pane, select **Policies > vFiler Templates**. Click the **Add** button to start the setup wizard.



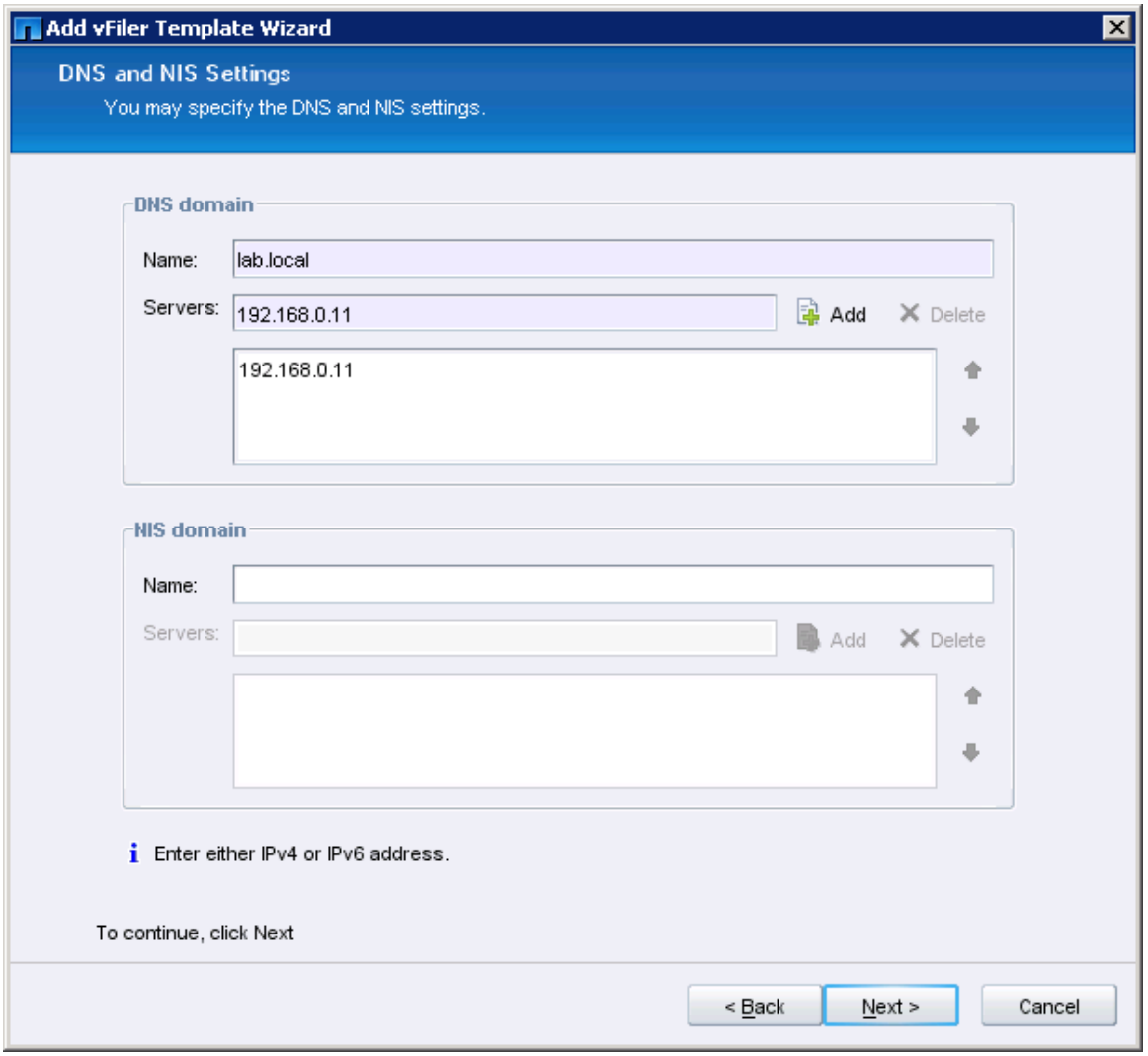
2. Click **Next**.


Add vFiler Template Wizard
Welcome to the Add vFiler Template Wizard
The wizard helps you create a vFiler Template.
The vFiler template helps you configure settings for a vFiler unit.
NetApp
To continue, click Next
< Back
Next >
Cancel

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

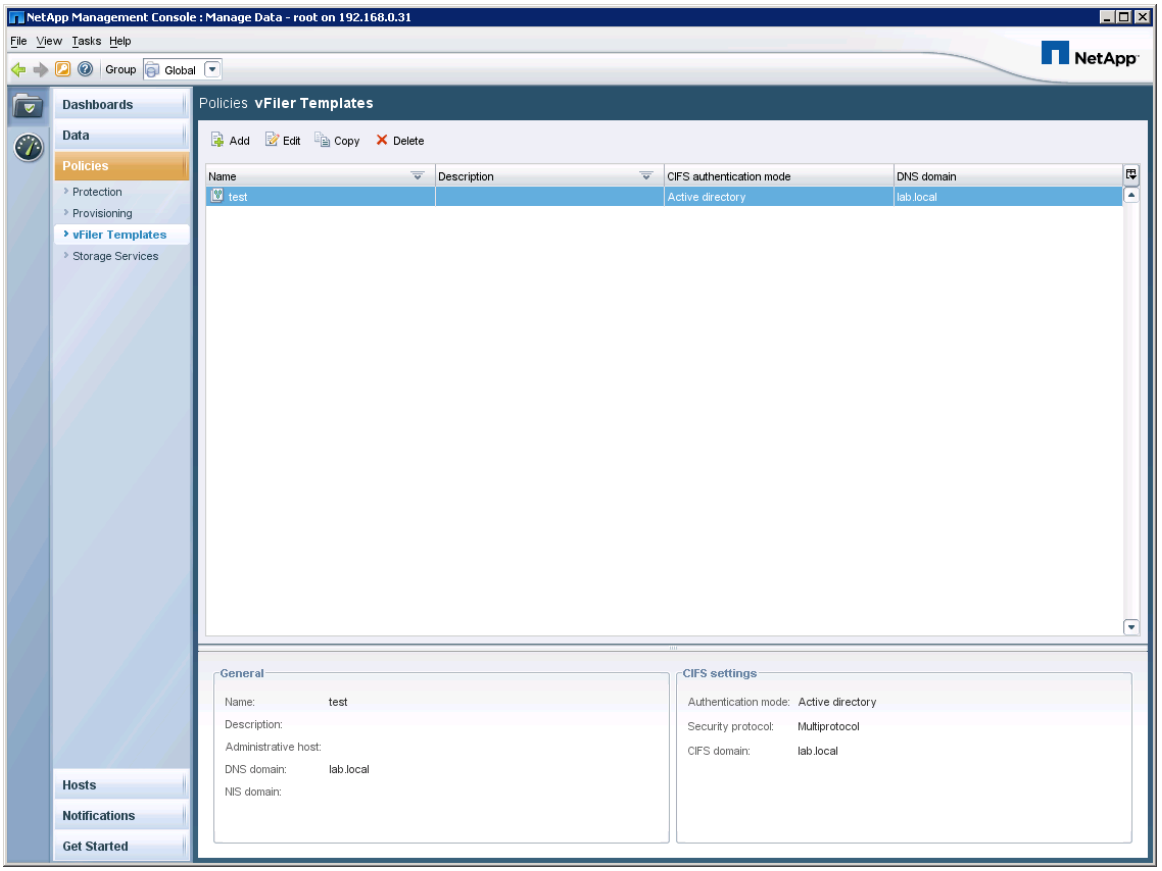


4. Add DNS settings. Enter **lab.local** for the domtain name and **192.168.150.11** for a name server. Click on **Add** then click **Next**.



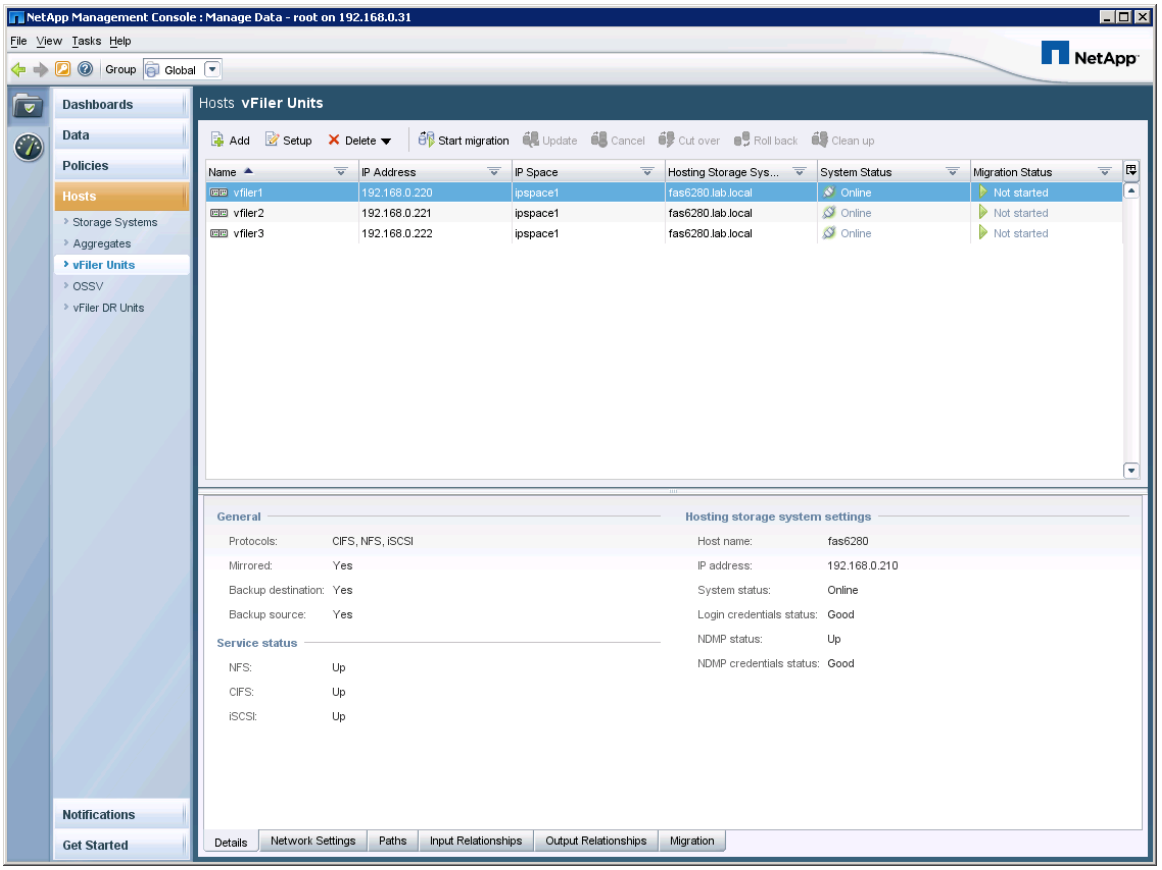
5. For CIFS Settings, select **MultiProtocol**, **Active Directory** and click **Next**.

6. Click **Finish**. You can now see your created vFiler Template.

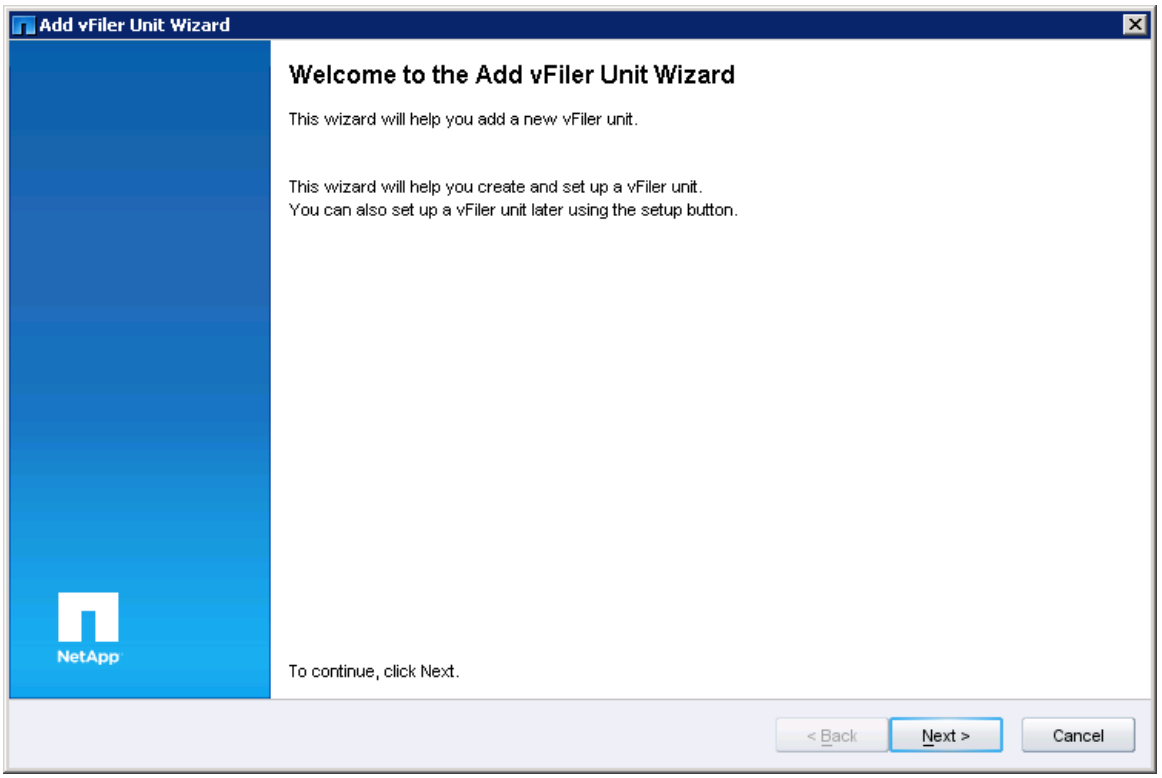


CREATE A VFILER UNIT

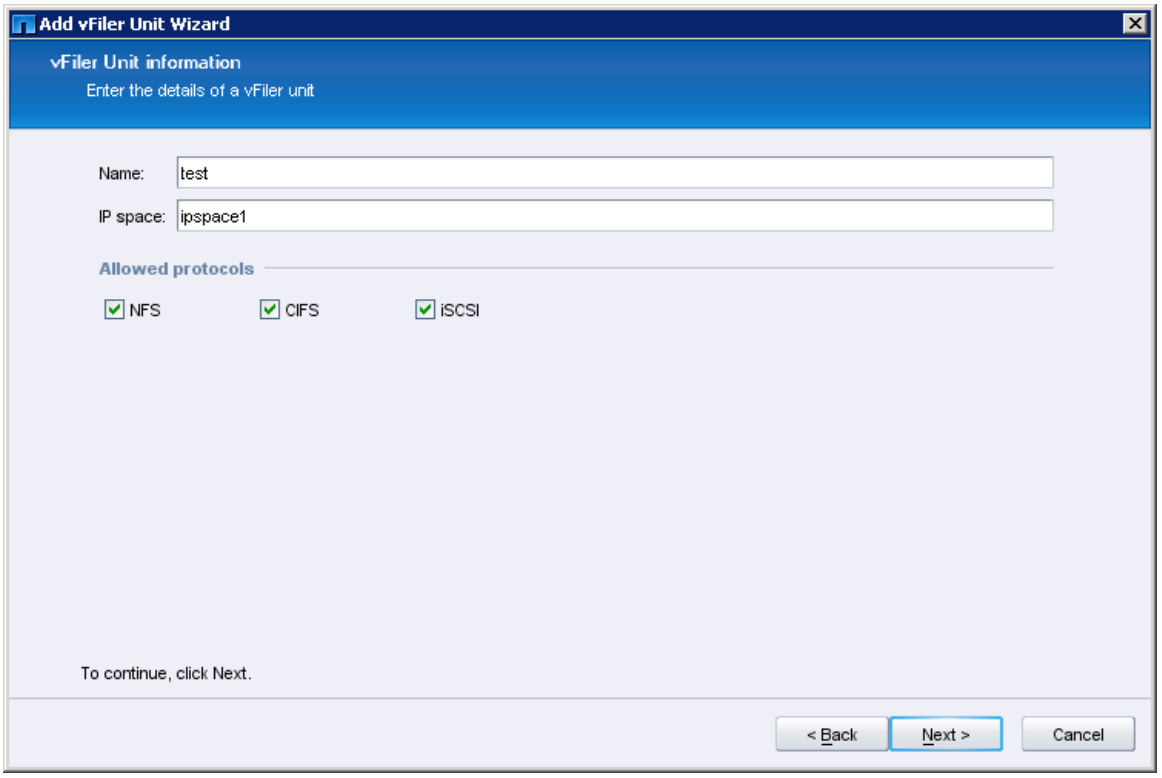
1. From the navigation pane, select **Hosts > vFiler Units**. Click the **Add** button to start the setup wizard.



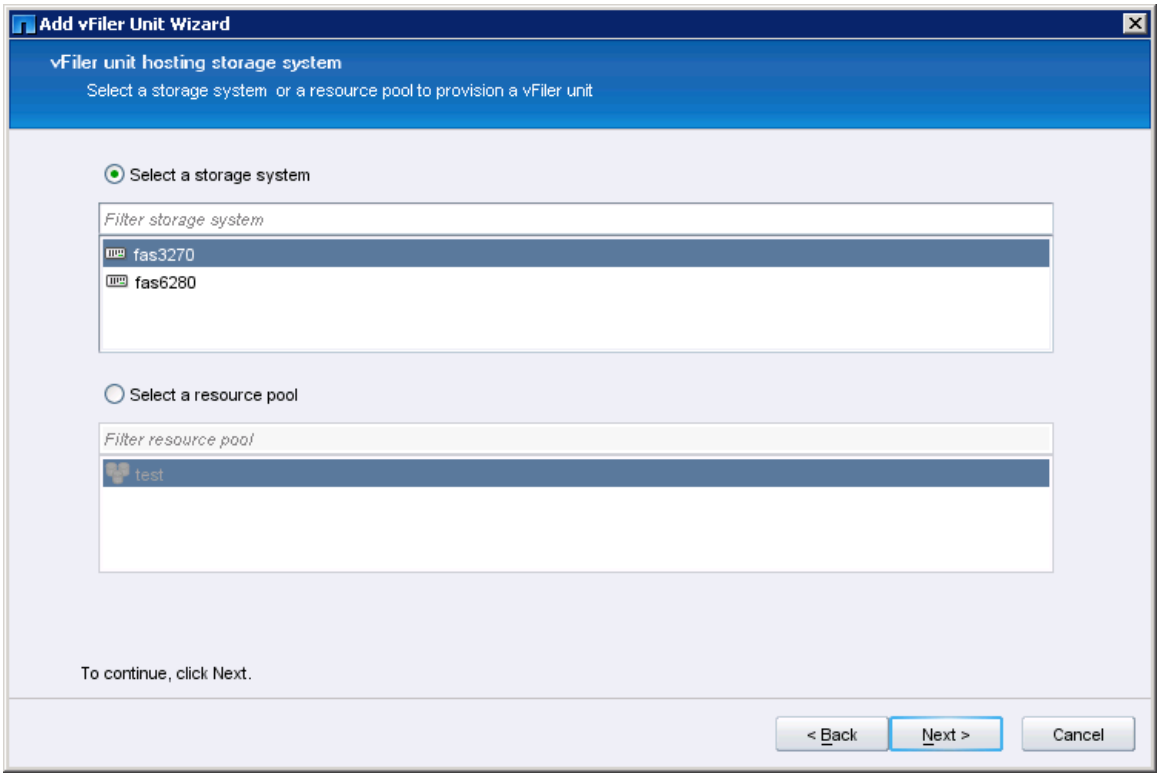
2. Click **Next**.


Add vFiler Unit Wizard
Welcome to the Add vFiler Unit Wizard
This wizard will help you add a new vFiler unit.
This wizard will help you create and set up a vFiler unit.
You can also set up a vFiler unit later using the setup button.
NetApp
To continue, click Next.
< Back
Next >
Cancel

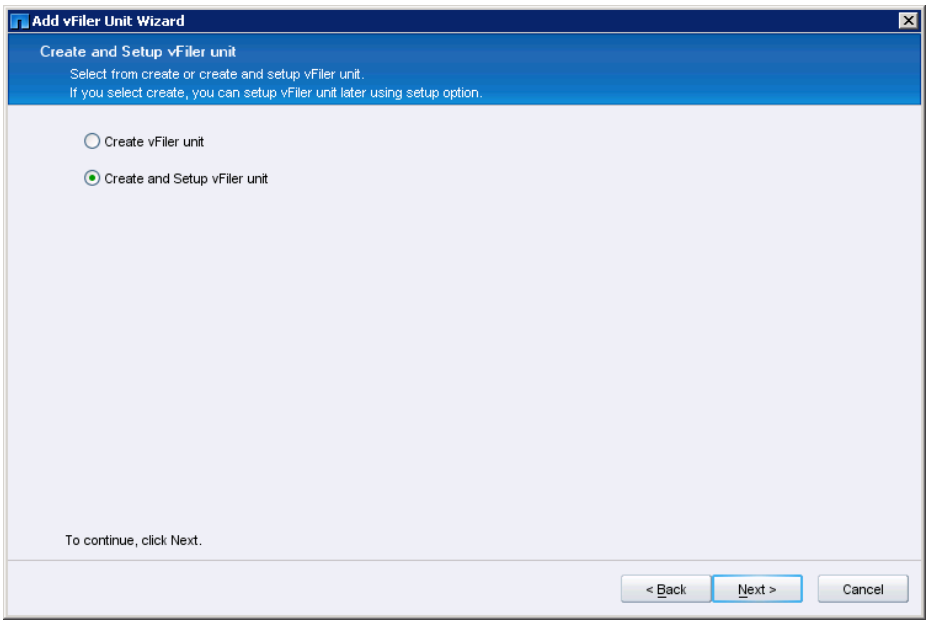
3. Enter **test** for the name, ipspace1 as the IPSpace. Select **NFS**, **CIFS** and **iSCSI**, then click **Next**.



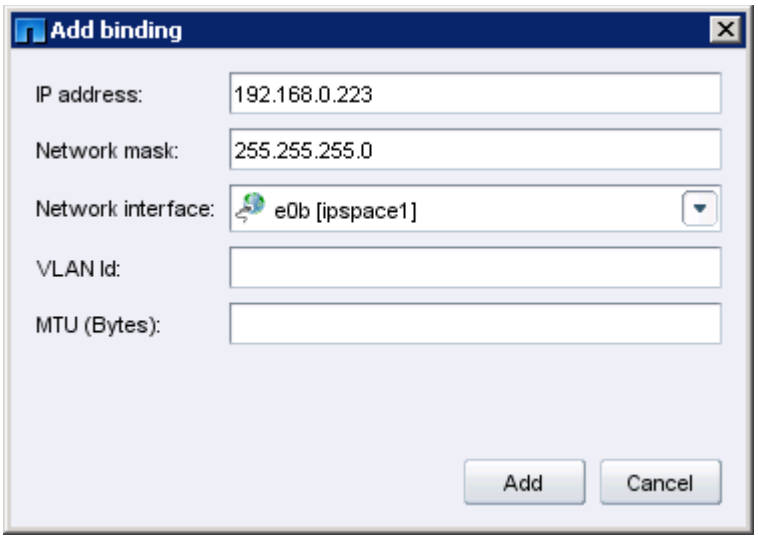
4. Select **fas3270** and click **Next**.



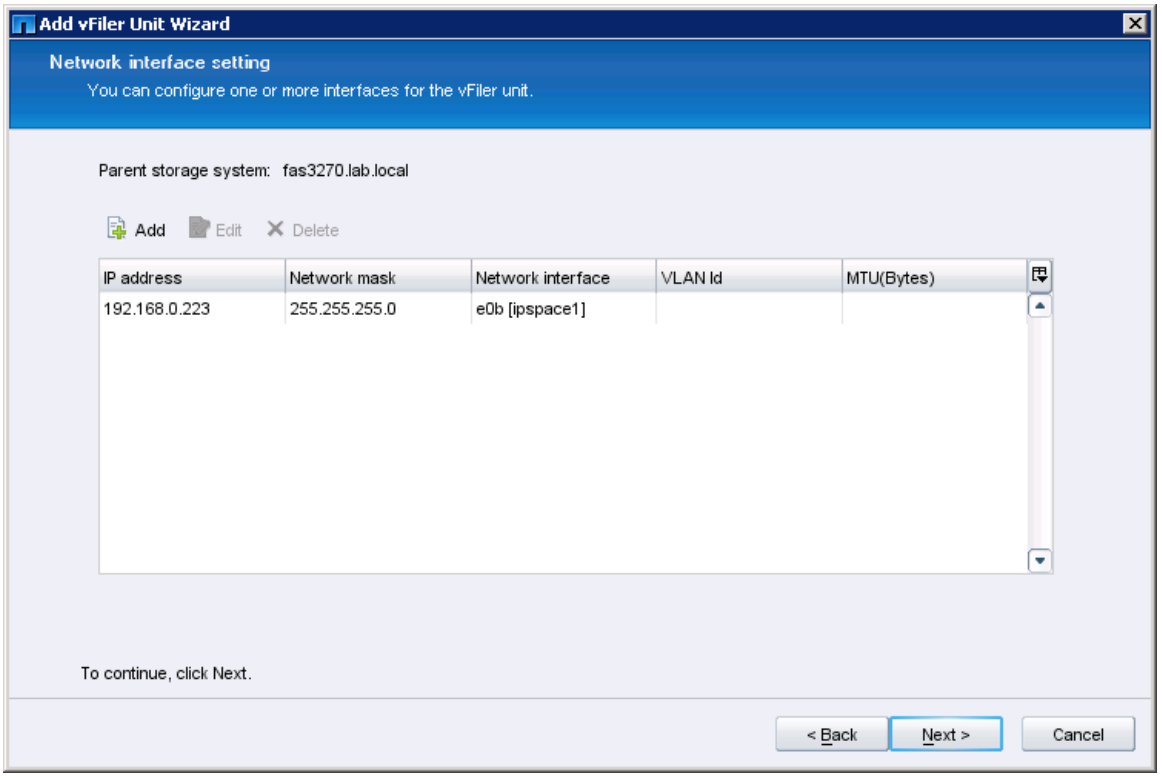
5. Click **Next**.



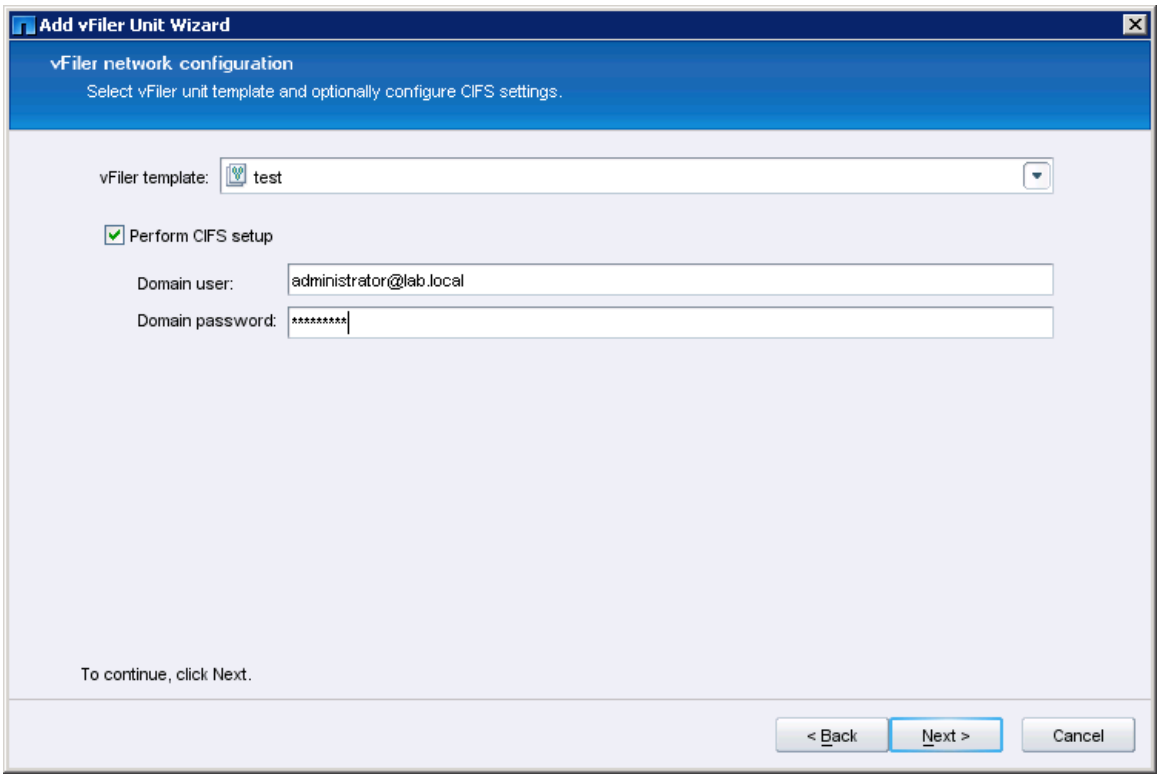
6. Click **Add** to enter IP bindings. Enter the IP, netmask, e0b (which will be part ipspace1 from prior setting) and click **Add**.



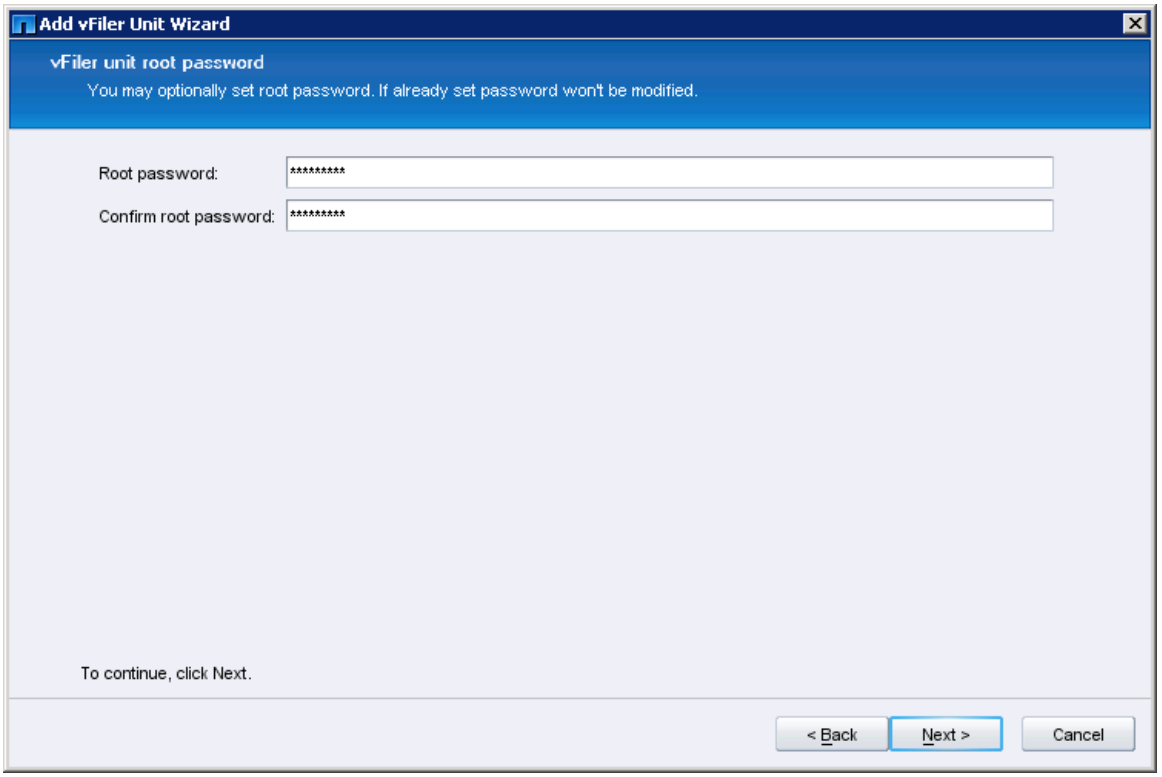
7. Click **Next**.


Add vFiler Unit Wizard
Network interface setting
You can configure one or more interfaces for the vFiler unit.
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

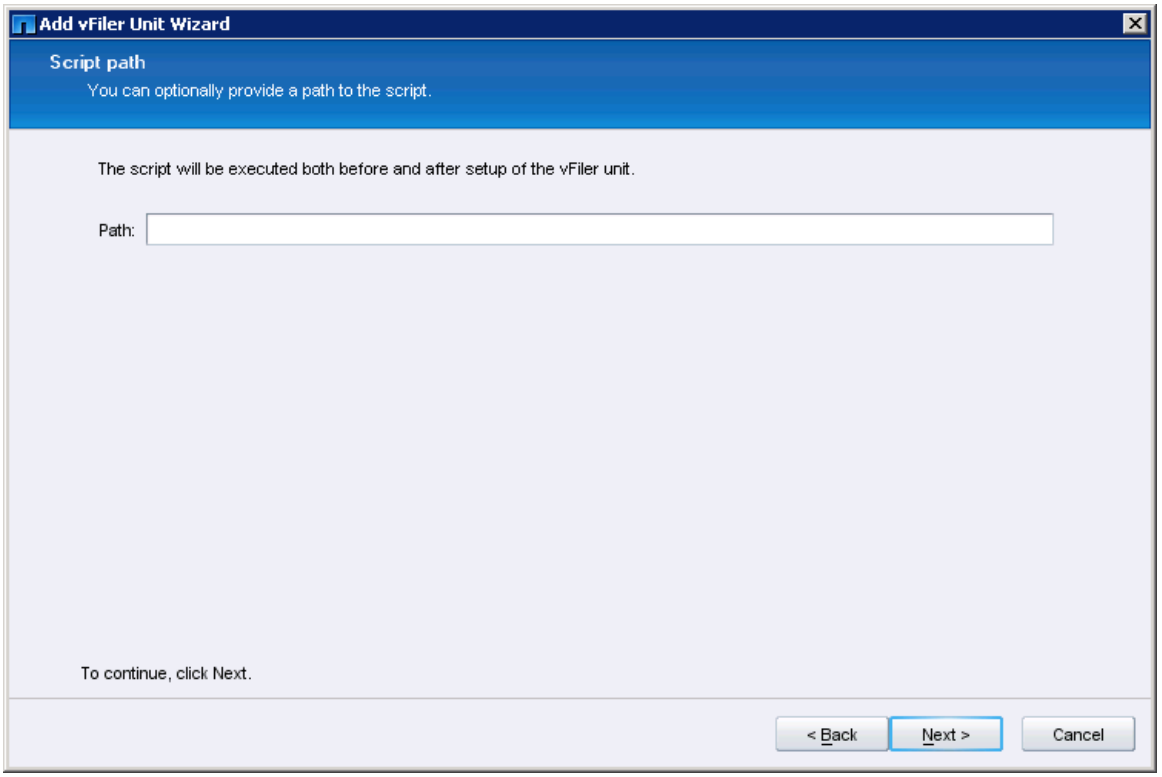
8. Select the vfiler template **test**, enter the domain password (**netapp123**), and click **Next**.



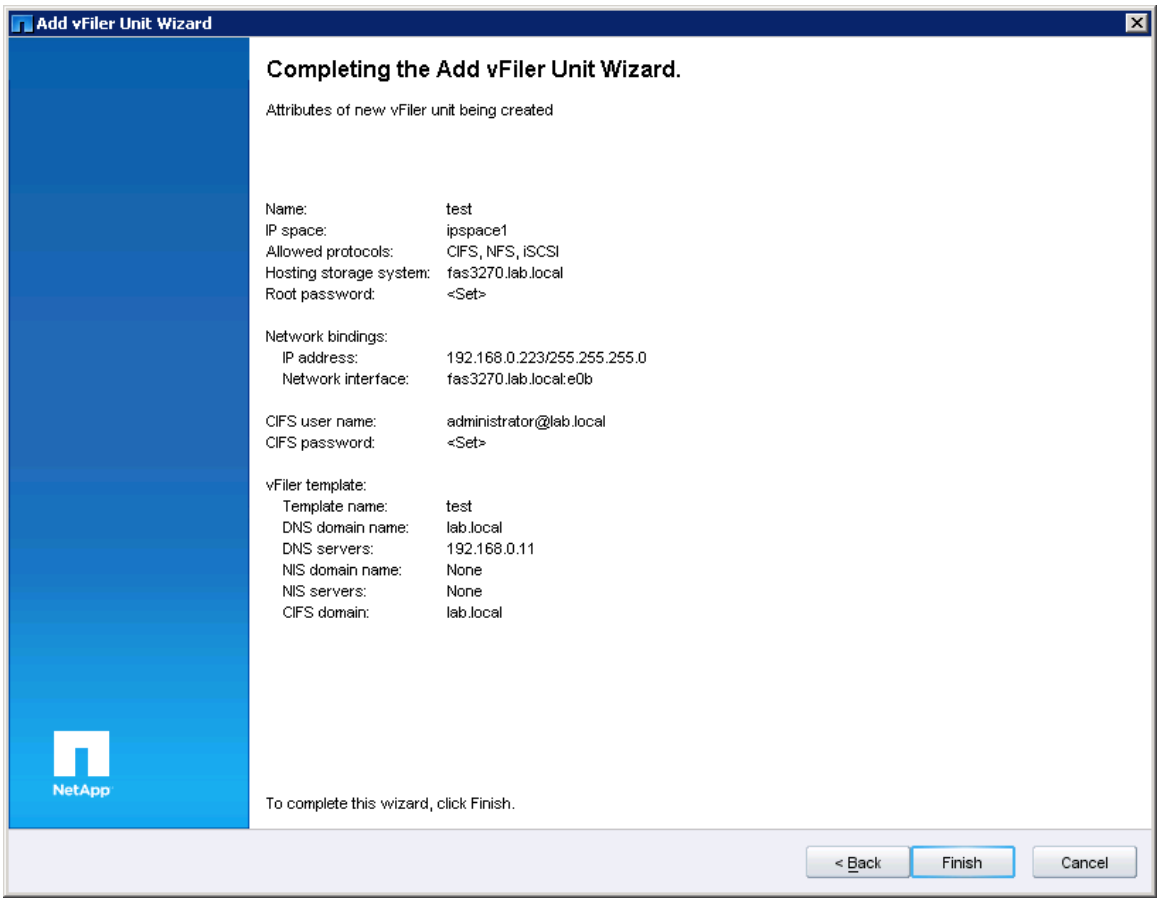
9. Enter the password **netapp123** and click **Next**.

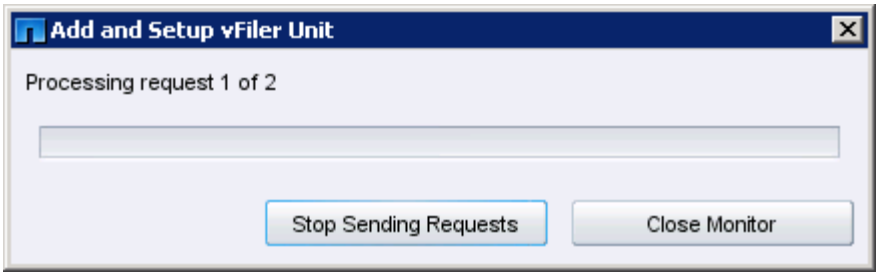


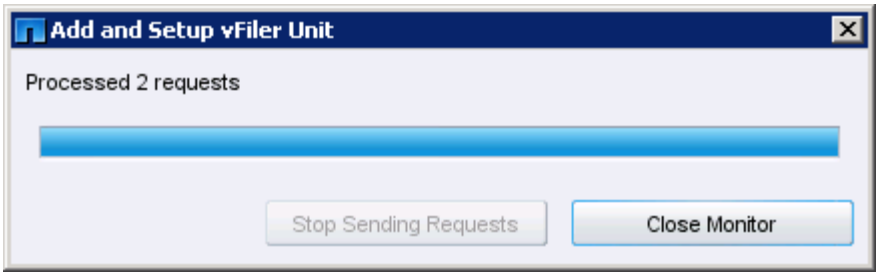
10. Click **Next**.

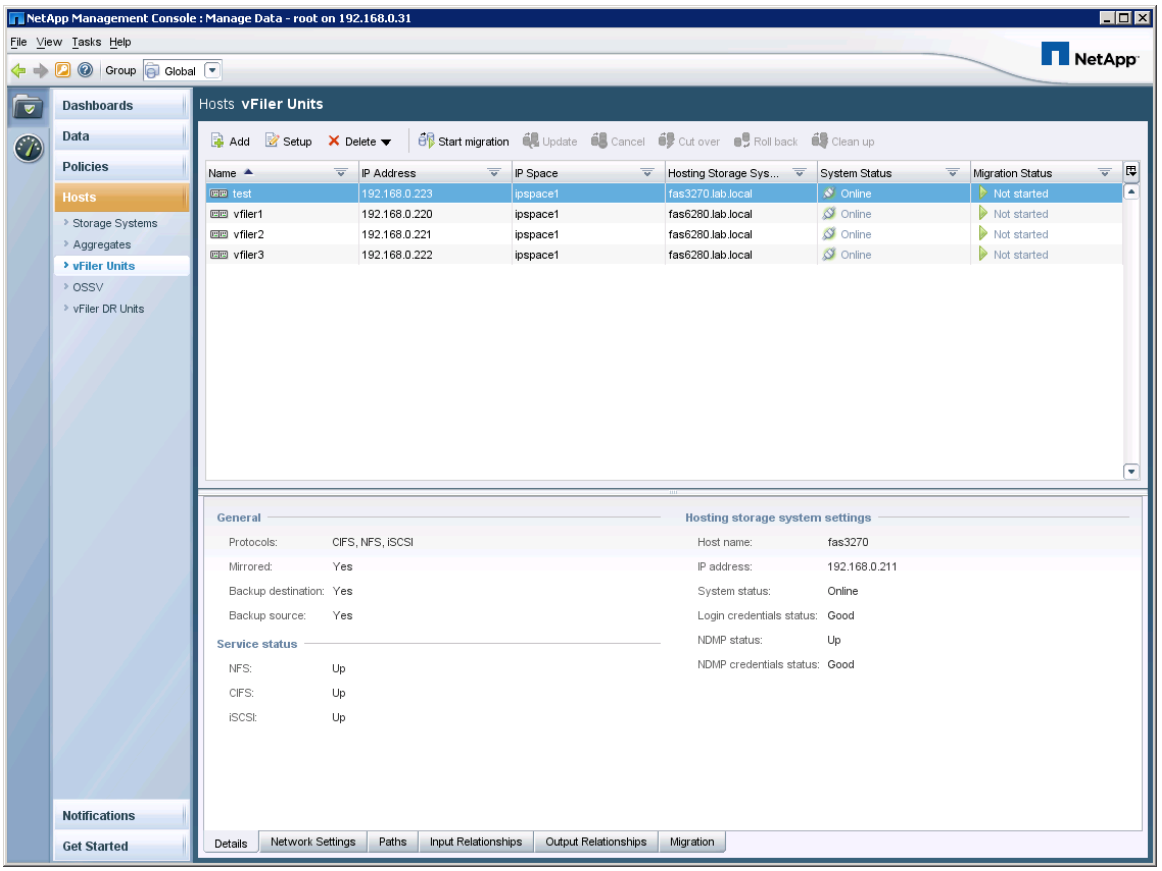


11. Click **Finish**.









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.

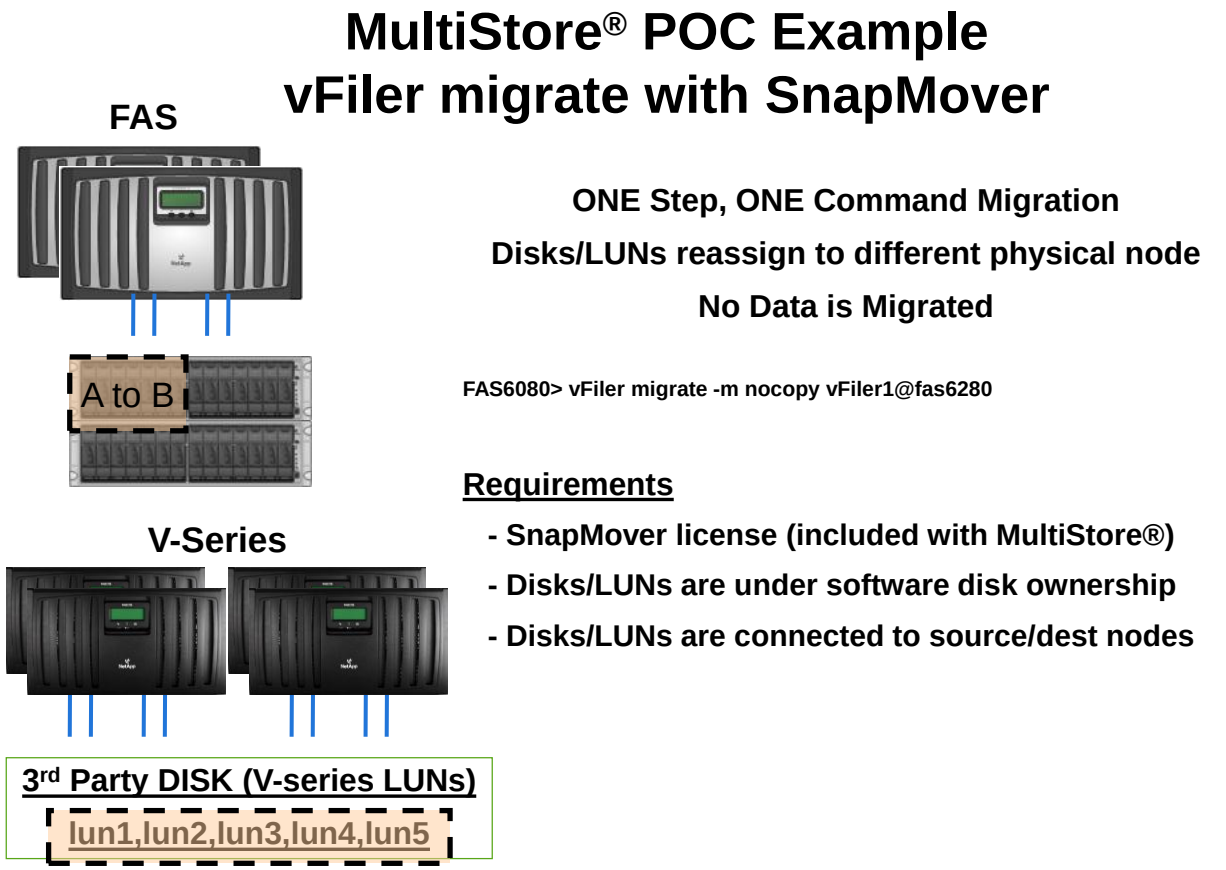
SnapMover was previously a separate license and product name. In Data ONTAP 7.3.2 and Data ONTAP 8.0 and later, the SnapMover license and product name have been discontinued. The functionality has been included with the MultiStore license. This functionality can not be demonstrated in a simulator since 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 it's 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/symlink.translations (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.