



vSphere 7.0: NFS Deployment Guide with Pavilion Hyperparallel Flash Array

Version 1.0.0

Last Updated: August 2020

Document Version: Version 1.0.0 Rev 0

Legal Notice:

The information contained in this document is proprietary and confidential to Pavilion Data Systems.

This material may not be duplicated, published, or disclosed, in whole or in part, without the prior written permission of Pavilion Data Systems.

Technical Support:

Technical Support maintains support centre's globally. If you have questions regarding an existing support agreement, please email/phone the support agreement administration team as follows:

Phone:

USA & Canada: 1-888-342-0461

United Kingdom: 0800-69-8055

Netherlands: 0800-022-2832

International: 1-408-684-4958

Email:

support@pavilion.io

Documentation:

Make sure that you have the current version of the documentation. Each document displays the date of the last update on page 2.

Documentation Feedback:

Your feedback is important for us.

For documentation feedback send your comments to your Pavilion field support contact.

Contents

1. Summary	4
2. Pavilion Hyperparallel Flash Array (HFA)	5
2.1 Key Recommendations	5
2.2 Introduction To NFS Protocol	5
3. Solution Overview	6
4. Configuring 3 Node ESX Cluster for NFS using VCenter	7
5. Create Distributed Switch for Storage Traffic	14
6. Configure VMKernel Port for NFS traffic	31
7. Configuring Pavilion Controllers as NFS Servers	35
7.1 Configure Individual Controllers to serve NFS volumes	36
7.2 Configure Data Network (IP) interfaces for the controller	38
8. Enabling High Availability with NFS	40
8.1 Creating the NFS HA pair	41
8.2 Creating an NFS volume	43
8.3 Assigning the volume to an NFS export	45

1.Summary

The purpose of this document is to guide through the installation and configuration of vSphere 7.0 using **Pavilion** Hyperparallel Flash Array and to make it easy for users to use NFS with **Pavilion** HFA.

This document also describes the general set of configurations that has been validated. The following assumptions are made: The audience is familiar with VMware, because this paper is not intended to serve as a comprehensive VMware and NFS Guide.

2. Pavilion Hyperparallel Flash Array (HFA)

2.1 Key Recommendations

The key recommendations are as follows:

- Configure **Pavilion** HFA(s) controllers to use NFS
- Create an NFS HA controller pair in the GUI using one primary and one secondary.
- Create volumes and assign to the NFS HA controller pairs per application.
- Ensure physically HA network topology, separate NIC ports, switches per path.
- Create ESXi Cluster through vCenter and mount datastore using NFSv3 or NFS 4.1

2.2 Introduction To NFS Protocol

The Network File System (**NFS**) protocol allows users to mount remote file systems transparently and gives them access to shared files across networks. It uses a client-server model based on Remote Procedure Call (RPC) protocol, so NFS is portable across different machines, operating systems, networks, and transports. NFS eliminates the need to keep copies of files on several machines by letting the clients all share a single copy of a file on the server.

The **Pavilion** HFA, using version 2.3 of **Pavilion** OS, supports NFS protocol versions 3.0 and 4.1. All clients connecting to the array must support NFS v3 or NFS version 4.1.

The **Pavilion** HFA supports up to 10-line cards providing 20 individual controllers. These controllers can individually be dedicated to serving NVMe over RoCE, NVMe over InfiniBand, NVMe over TCP, iSCSI, or NFS. We will use a pair of individual controllers to build a high availability (HA) NFS pair in the following steps.

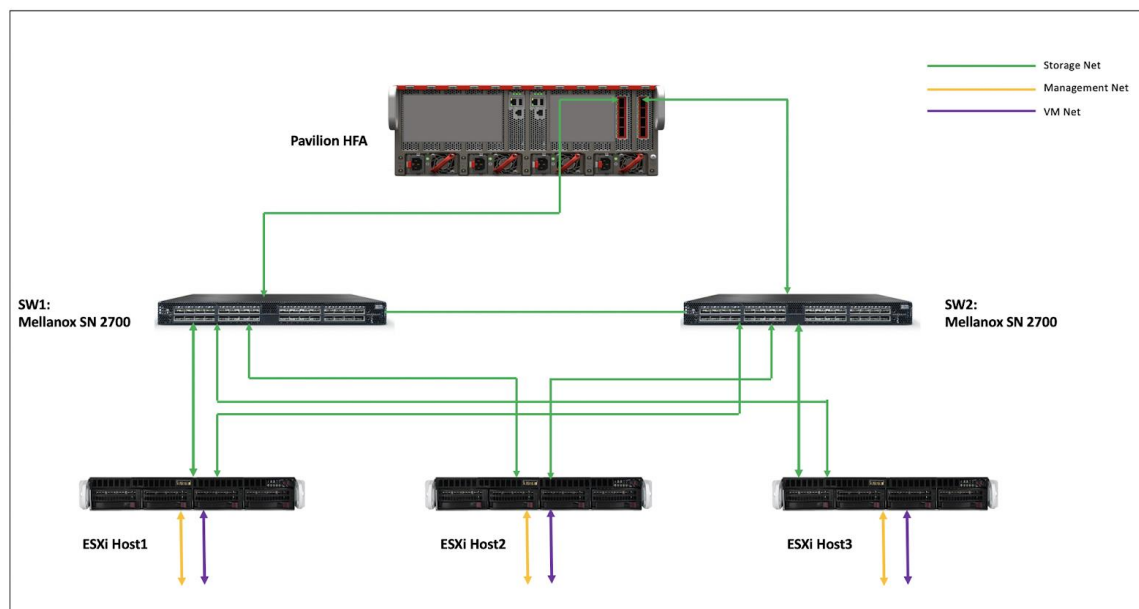
The NFS HA server in the **Pavilion** HFA is configured as a single virtual IP, active/passive service with automatic failover managed by the **Pavilion** HFA's NFS server software. Clients can also optionally be configured using standard HA methods, described below, to remove any single points of failure (**SPOF**) from the entire system.

3. Solution Overview

The solution for this guide consists of following components:

- 3x Supermicro E5-2690 V4 Servers with 1x Mellanox CX-4 Card (dual port)
- **Pavilion HFA**
- 2x Dell Mellanox 2700
- VMware ESXi 7.0 and vCenter 7.0 for hypervisor and management

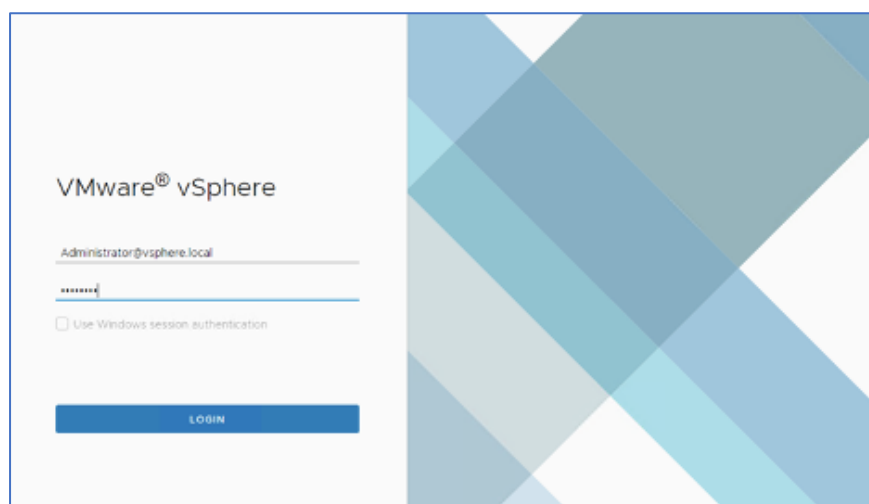
Image below depicts the above solutions overview:



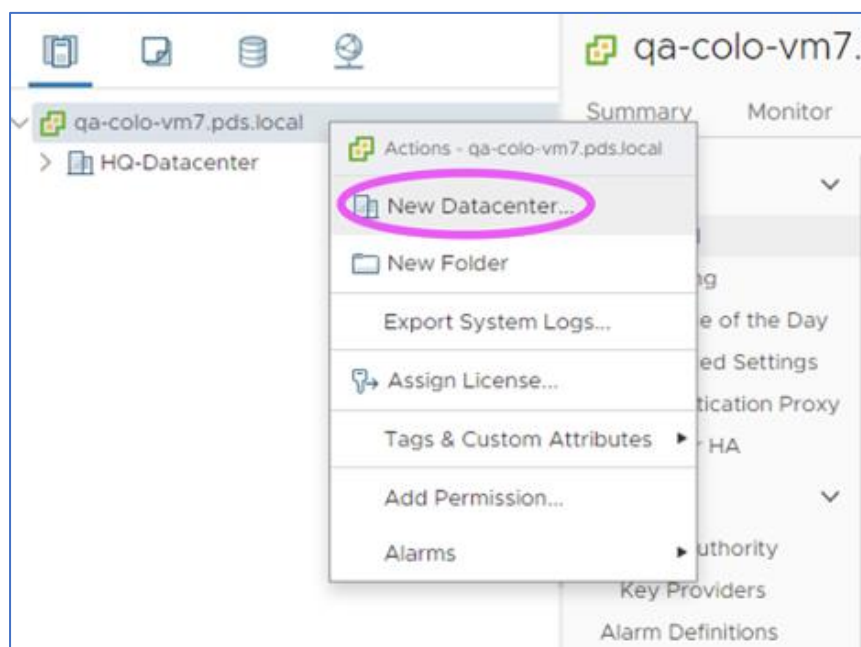
4. Configuring 3 Node ESX Cluster for NFS using VCenter

This section covers setting up 3 Node ESXi Cluster for accessing **Pavilion** volumes using NFS protocol. This section walks the user to create a datacenter, ESXi cluster, and configure networking for NFS traffic.

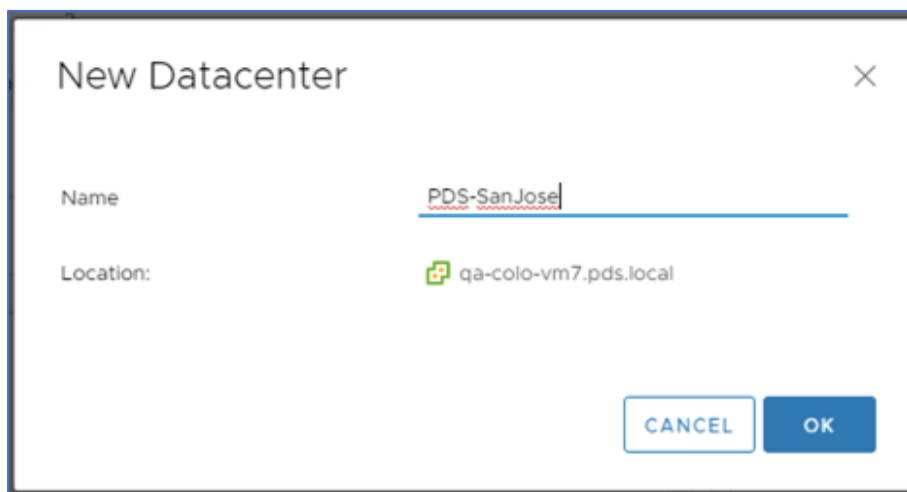
Step 1: Log in to the **VMware® vSphere™** client as seen in the below image:



Step 2: Right click on VCenter Instance and Create New Datacenter:

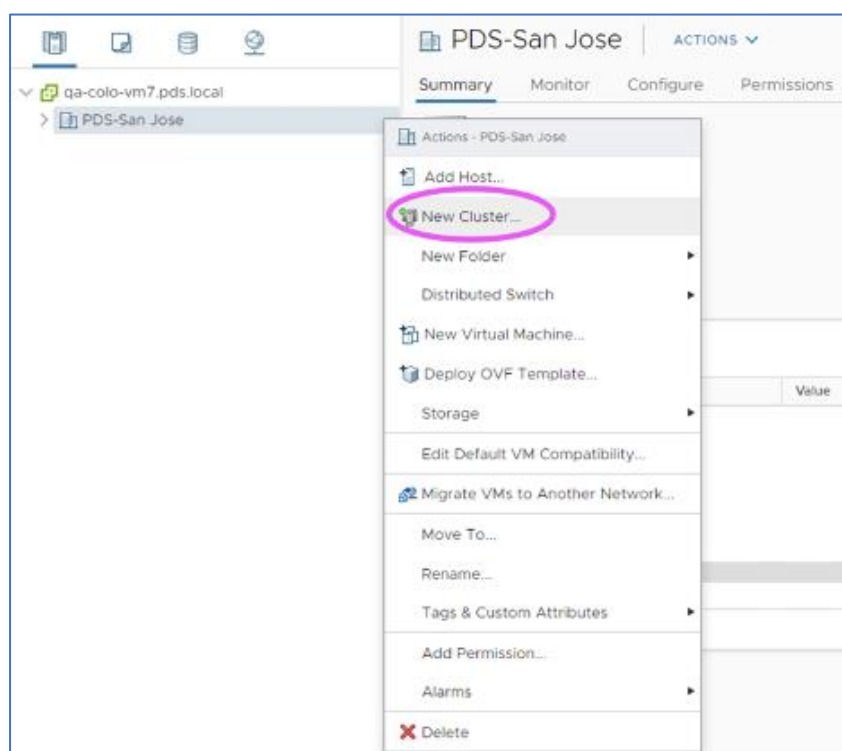


Step 3: Provide Datacenter “Name”:



The image shows a 'New Datacenter' dialog box. It has a title bar with a close button (X). Inside, there are two fields: 'Name' with the text 'PDS-SanJose' and 'Location:' with a dropdown menu showing 'qa-colo-vm7.pds.local'. At the bottom right, there are two buttons: 'CANCEL' and 'OK'.

Step 4: After creating Datacenter, Right click at Datacenter and create new ESXi Cluster:






Step 5: Provide Cluster Name and enable features for HA and DRS:


New Cluster


PDS-SanJose

×

Name	PDS-ESX-Cluster
Location	 PDS-SanJose
 vSphere DRS	<input checked="" type="checkbox"/>
 vSphere HA	<input checked="" type="checkbox"/>
vSAN	<input type="checkbox"/>

These services will have default settings - these can be changed later in the Cluster Quickstart workflow.

☐ Manage all hosts in the cluster with a single image 

 No compatible ESXi versions found. Download updates in Lifecycle Manager

CANCEL

OK

Step 6: The new ESXi cluster gets created:

Summary

Monitor

Configure

Permissions

Hosts

VMs

Datastores

Networks

Updates

Services

vSphere DRS

vSphere Availability

Configuration

Quickstart

General

Security

Licensing

VMware EVC

VM/Host Groups

VM/Host Rules

VM Overrides

IO Filters

Host Options

Host Profile

Trust Authority

Trust Authority Cluster

Alarm Definitions

Scheduled Tasks

vSAN

Services

Cluster quickstart

SKIP QUICKSTART

We have collected some common configuration tasks to make it easier to get your cluster up and running. If you prefer to configure your cluster manually, you can choose not to use this automated workflow.

1. Cluster basics

Selected services:

- vSphere DRS
- vSphere HA

EDIT

2. Add hosts

Not configured hosts: 3

- Time is synchronized across hosts and VC
- All required hosts are in maintenance mode

ADD

RE-VALIDATE

3. Configure cluster

Configure network settings for vMotion traffic, review and customize cluster services.

CONFIGURE

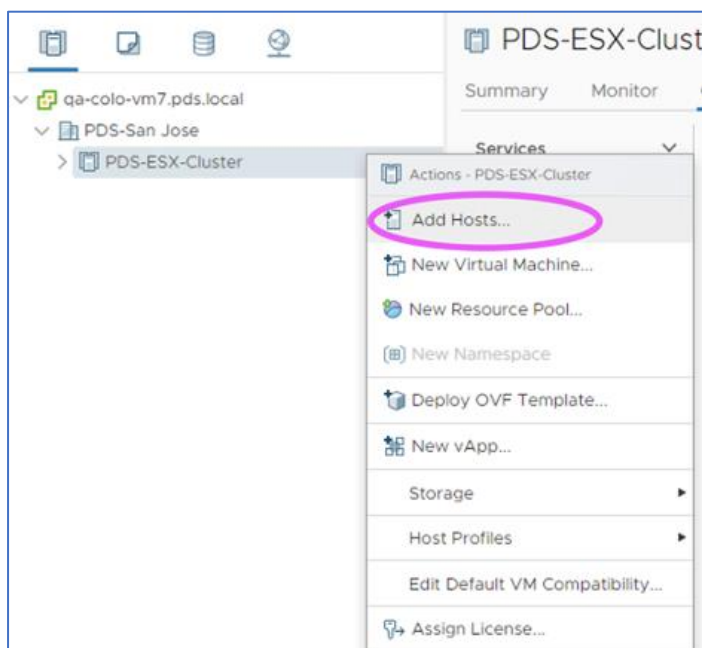
RE-VALIDATE

vSphere 7.0: NFS Deployment Guide with Pavilion Hyperparallel Flash Array

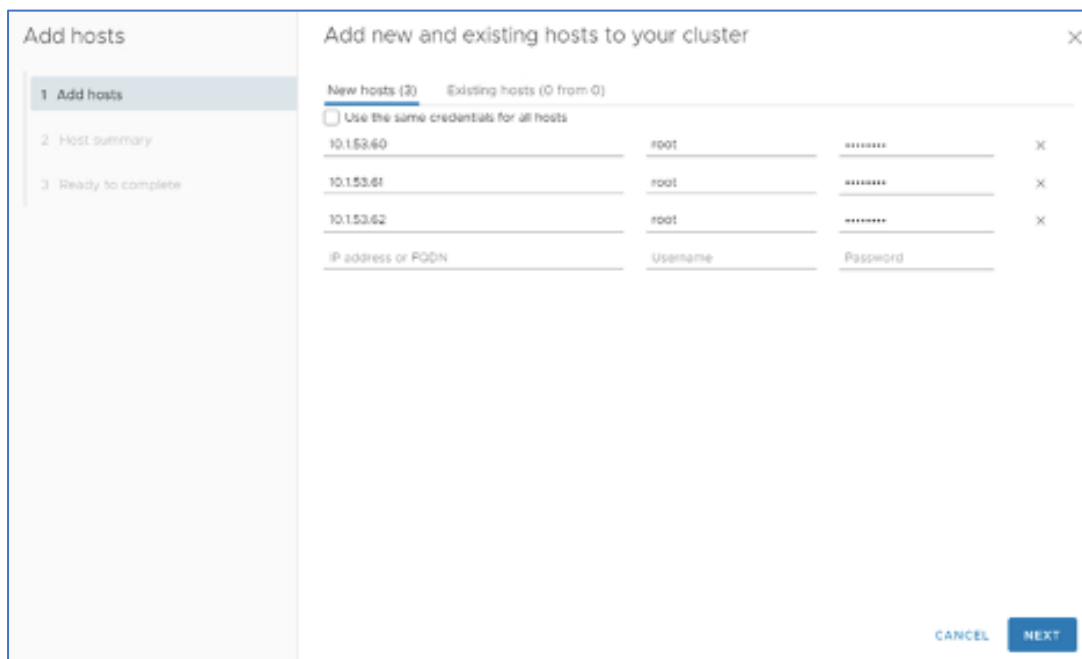
© 2020 Pavilion Data Systems. Proprietary. All rights reserved.

Page | 9

Step 7: Right Click at ESX Cluster and Add Hosts:



Step 8: Enter Hosts information:

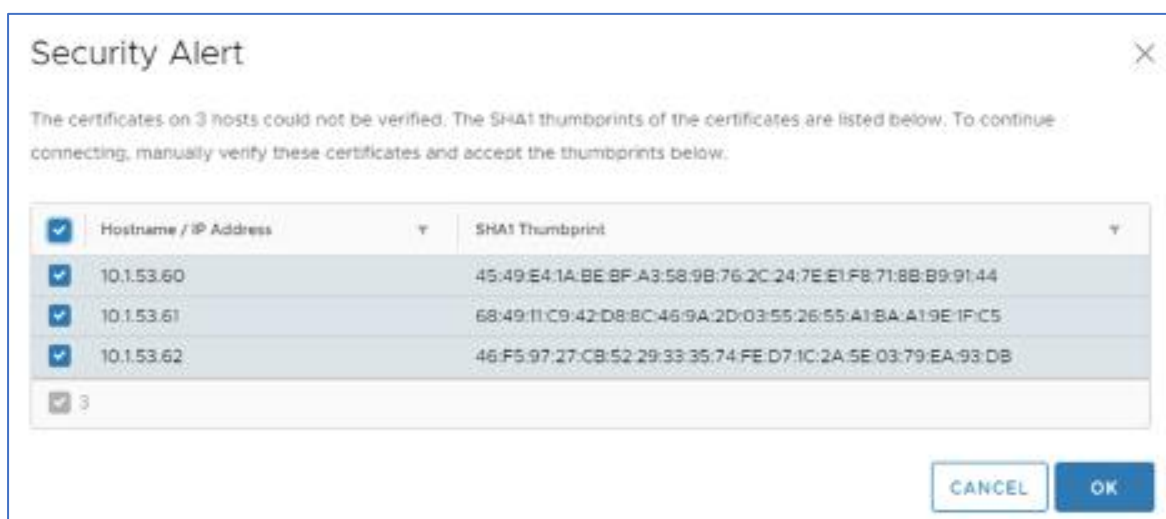


The screenshot shows the 'Add hosts' wizard in the vSphere Web Client. The wizard has a left-hand pane with steps: 1 Add hosts, 2 Host summary, and 3 Ready to complete. The main area is titled 'Add new and existing hosts to your cluster'. It shows 'New hosts (3)' and 'Existing hosts (0 from 0)'. There is a checkbox 'Use the same credentials for all hosts' which is unchecked. Below this is a table with three rows of host information:

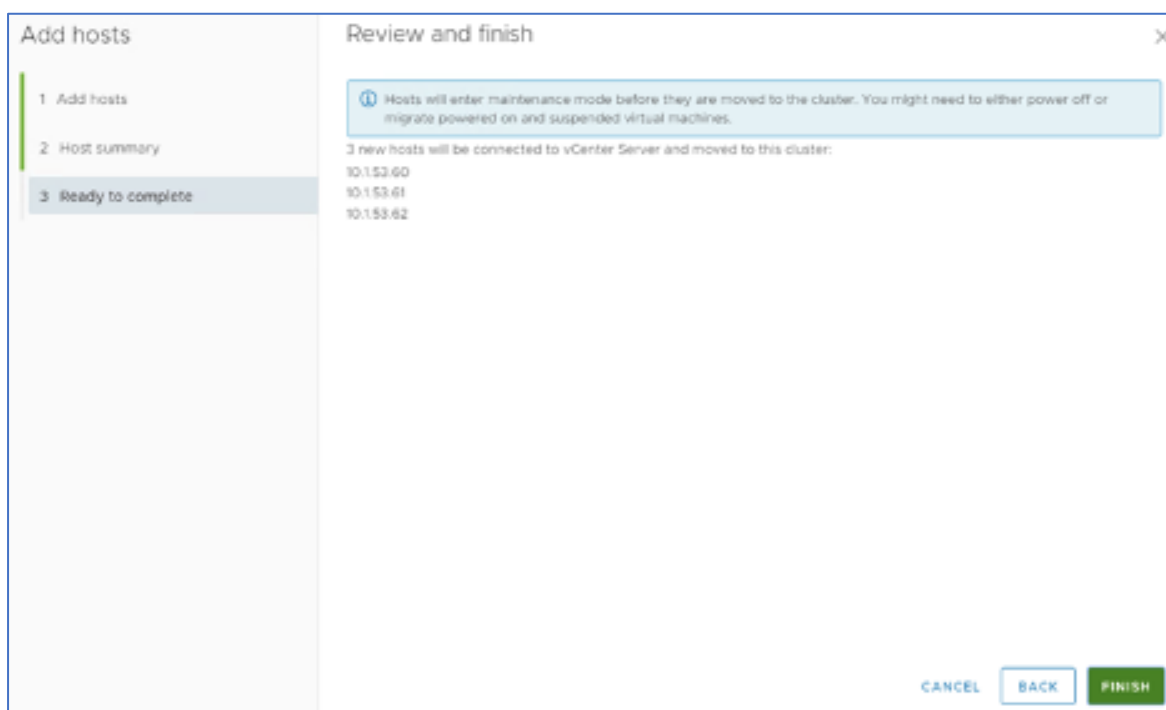
IP address or FQDN	Username	Password	
10.153.60	root	*****	X
10.153.61	root	*****	X
10.153.62	root	*****	X

At the bottom right, there are 'CANCEL' and 'NEXT' buttons.

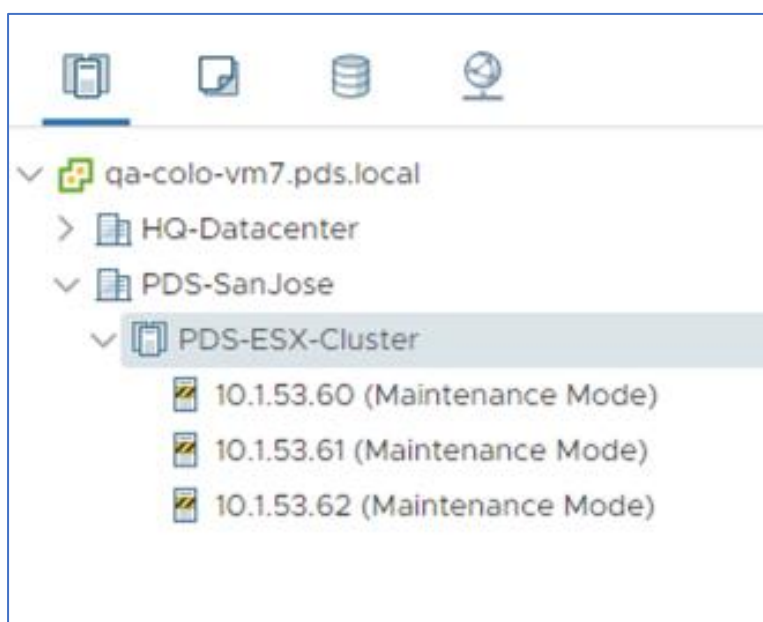
Step 9: Hosts are discovered and ready to be added to the cluster:



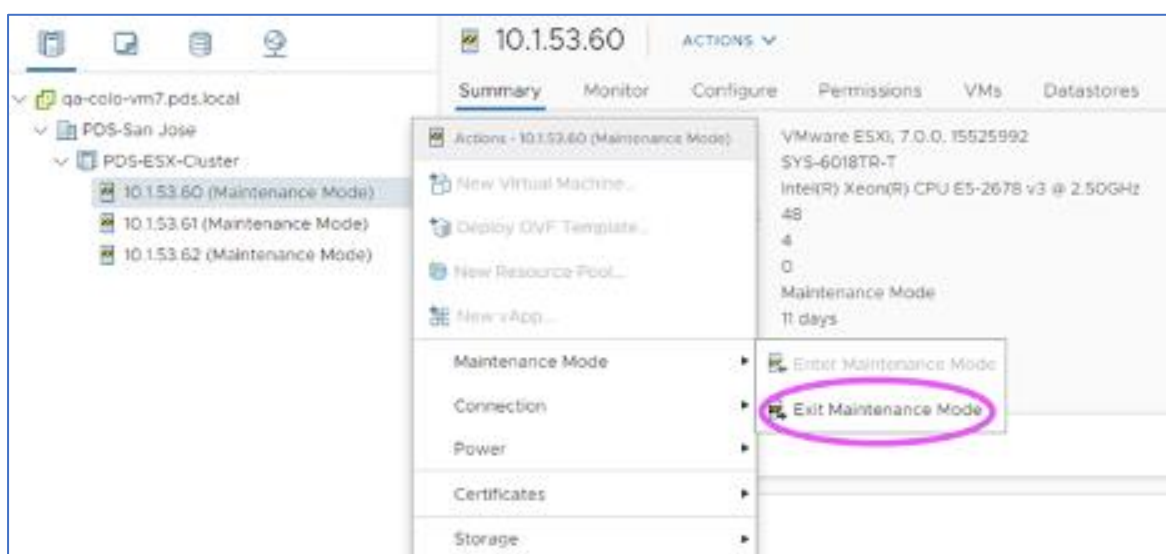
Step 10: Review Hosts Information and click “Finish”:



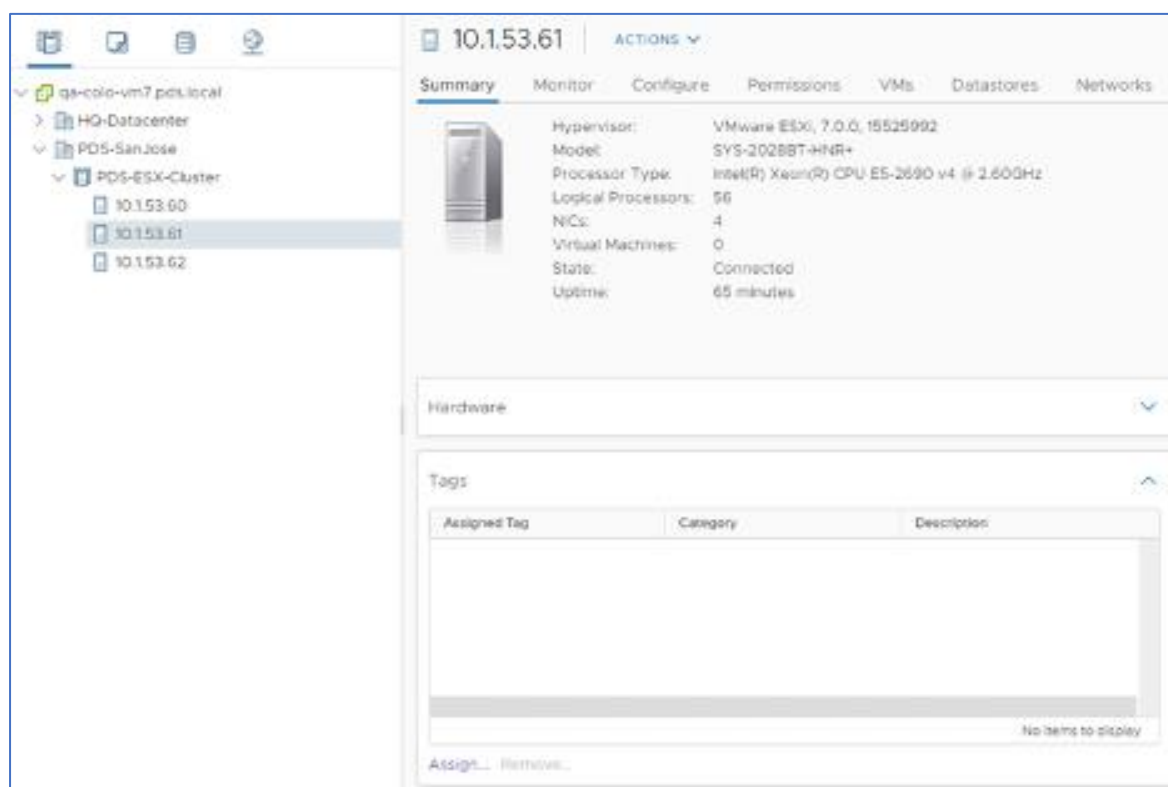
Step 11: New added hosts will be in Maintenance Mode:



Step 12: Exit Maintenance mode for each host in the cluster:



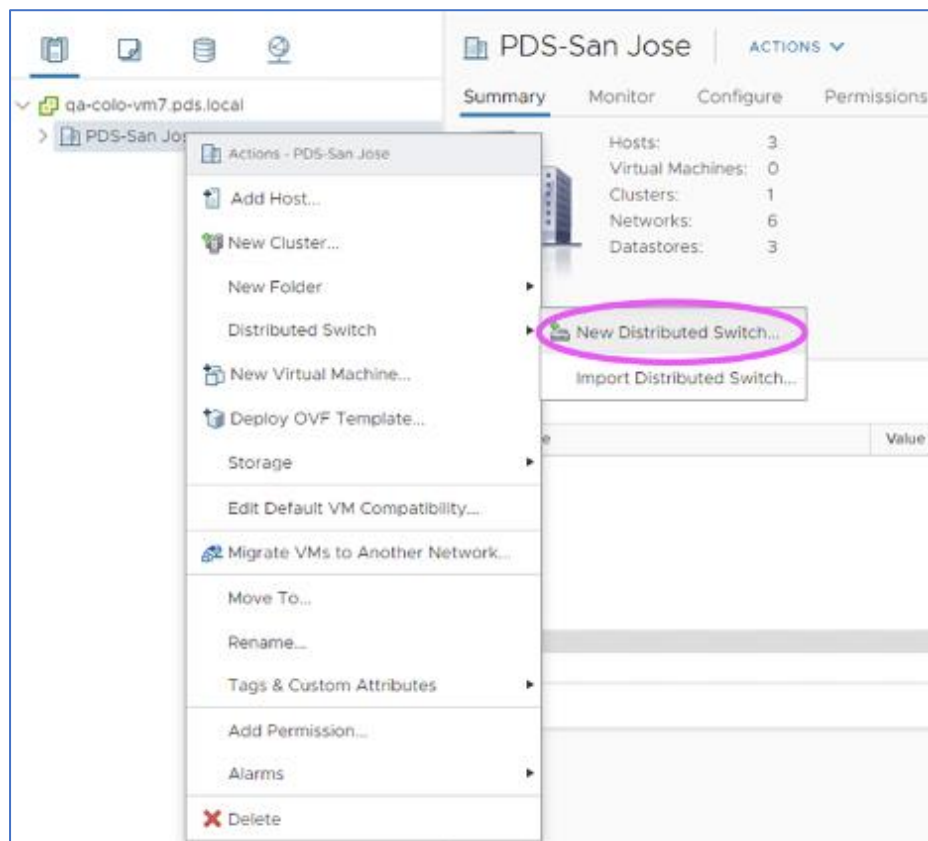
Step 13: The ESXi Cluster with 3 Hosts has been created:



5. Create Distributed Switch for Storage Traffic

This section lists the steps required to create distributed switch for storage traffic.

Step 1: Next step is to Create Distributed Switch for Storage Traffic



Step 2: Enter New distributed switch name:


New Distributed Switch

1 Name and location
2 Select version
3 Configure settings
4 Ready to complete

Name and location

Specify distributed switch name and location.

Name Storage-DSwitch

Location  PDS-SanJose

CANCEL
BACK
NEXT

Step 3: Select ESXi version:

New Distributed Switch

✓ 1 Name and location
2 Select version
3 Configure settings
4 Ready to complete


Select version


Specify a distributed switch version.

☒ 7.0.0 - ESXi 7.0 and later

☐ 6.6.0 - ESXi 6.7 and later

☐ 6.5.0 - ESXi 6.5 and later

 The multicast filtering mode on the switch will be set to IGMP/MLD snooping if you continue with the selected version.

Features per version 

CANCEL
BACK
NEXT

Step 4: Select number of uplinks. For representational purpose 2 uplinks are used. Uncheck “Create default port group”. In the upcoming steps user would learn how to create port groups:

New Distributed Switch

✓ 1 Name and location

✓ 2 Select version

3 Configure settings

4 Ready to complete

Configure settings

Specify number of uplink ports, resource allocation and default port group.

Number of uplinks

2

Network I/O Control

Enabled

Default port group

☐ Create a default port group

Port group name

DPortGroup 1

CANCEL

BACK

NEXT

New Distributed Switch

✓ 1 Name and location

✓ 2 Select version

✓ 3 Configure settings

4 Ready to complete

Ready to complete

Review your settings selections before finishing the wizard.

Name
Storage-DSwitch

Version
7.0.0

Number of uplinks
2

Network I/O Control
Enabled

Suggested next actions

New Distributed Port Group

Add and Manage Hosts

These actions will be available in the Actions menu of the new distributed switch.

CANCEL

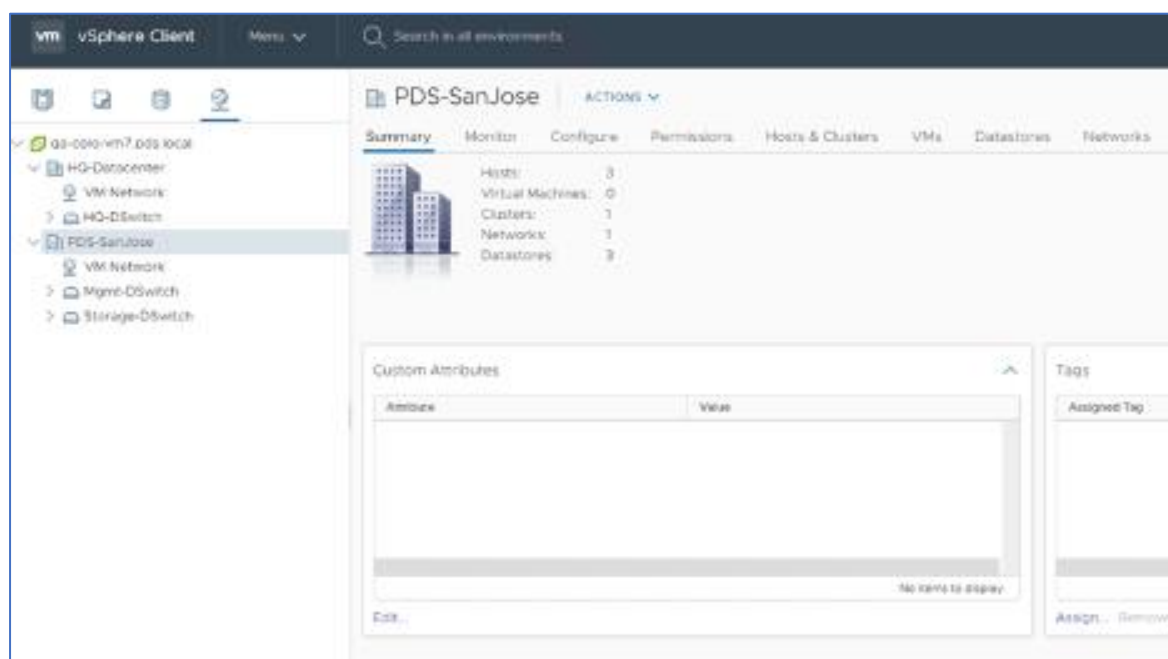
BACK

FINISH

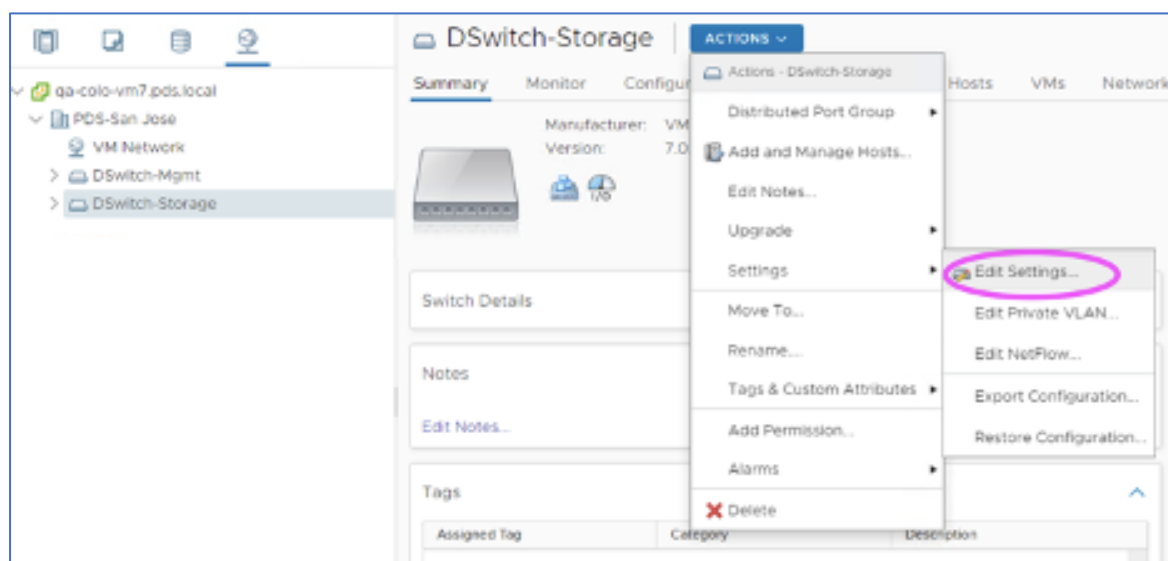
vSphere 7.0: NFS Deployment Guide with Pavilion Hyperparallel Flash Array
© 2020 Pavilion Data Systems. Proprietary. All rights reserved.

Page | 16

Step 5: Distributed Switch gets created:



Step 6: Set MTU on the newly created distributed switch. Navigate to Actions and click “Edit Setting”:



DSwitch-Storage - Edit Settings

General

Advanced

MTU (Bytes)

9000

Multicast filtering mode

IGMP/MLD snooping

Discovery protocol

Type

Cisco Discovery Protocol

Operation

Listen

Administrator contact

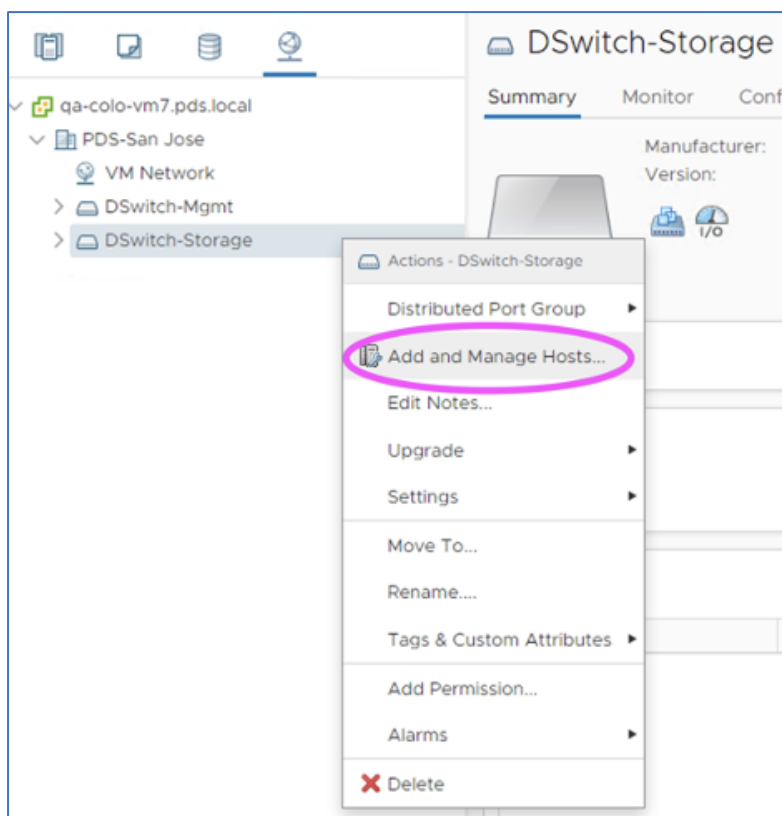
Name

Other details

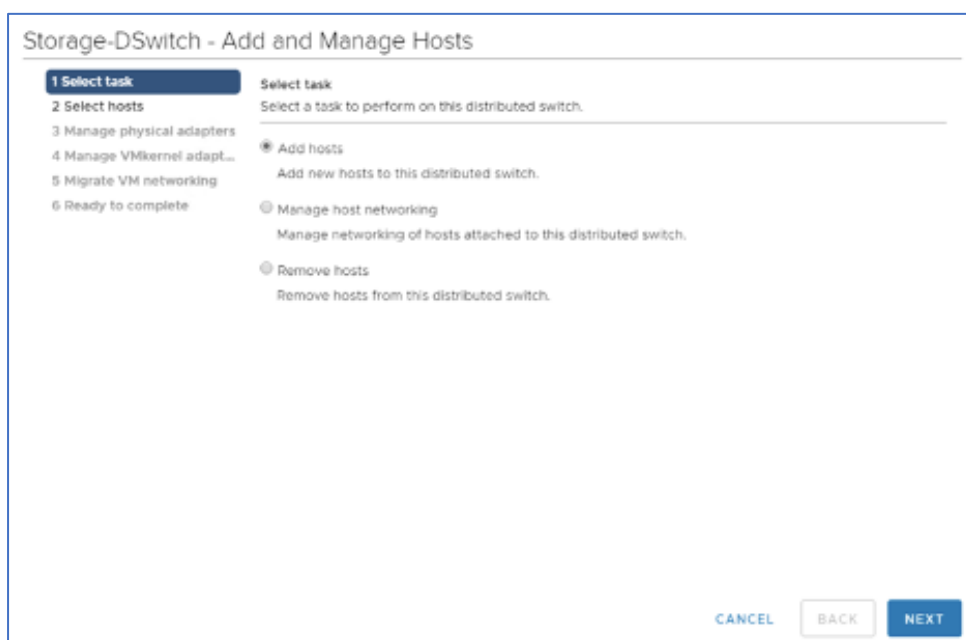
CANCEL

OK

Step 7: Specify which ESXi hosts are to use this Distributed switch and which uplinks are used on those hosts. Next step is to add ESXi hosts which will use the newly created Distributed switch and which uplinks are used on those hosts. Right click on Distributed switch and click “Add and Manage Hosts”:



Step 8: Add Hosts:



Step 9: Click “New Hosts”:

Storage-DSwitch - Add and Manage Hosts

1 Select task

2 Select hosts

3 Manage physical adapters

4 Manage VMkernel adapt...

5 Migrate VM networking

6 Ready to complete

Select hosts

Select hosts to add to this distributed switch.

+ New hosts... - Remove

Host	Host Status
No items to display	

CANCEL BACK NEXT

Step 10: Select the Hosts:

Select New Hosts | Storage-DSwitch

SHOW INCOMPATIBLE HOSTS

Filter

<input checked="" type="checkbox"/>	Host	Host State	Cluster	Compatibility
<input checked="" type="checkbox"/>	10.1.53.60	Connected	PDS-SanJose-Cluster	✓ Compatible
<input checked="" type="checkbox"/>	10.1.53.61	Connected	PDS-SanJose-Cluster	✓ Compatible
<input checked="" type="checkbox"/>	10.1.53.62	Connected	PDS-SanJose-Cluster	✓ Compatible

3 items

CANCEL OK

Step 11: Click Next:

Storage-DSwitch - Add and Manage Hosts

1 Select task
2 Select hosts
 3 Manage physical adapters
 4 Manage VMkernel adapt...
 5 Migrate VM networking
 6 Ready to complete

Select hosts
 Select hosts to add to this distributed switch.

+ New hosts... - Remove

Host	Host Status
(New) 10.153.60	Connected
(New) 10.153.61	Connected
(New) 10.153.62	Connected

3 items

CANCEL BACK NEXT

Step 12: Assign Uplinks:

DSwitch-Storage - Add and Manage Hosts

1 Select task
 2 Select hosts
3 Manage physical adapters
 4 Manage VMkernel adapt...
 5 Migrate VM networking
 6 Ready to complete

Manage physical adapters
 Add or remove physical network adapters to this distributed switch.

Assign uplink Unassign adapter View settings

Host/Physical Network Adapters	In Use by Switch	Uplink	Uplink Port Group
10.153.60			
On this switch			
On other switches/unclaimed			
vmnic0	vSwitch0	--	--
vmnic1	DSwitch-Mgmt	--	--
vmnic2	--	--	--
vmnic3	--	--	--
10.153.61			
On this switch			
On other switches/unclaimed			
vmnic0	vSwitch0	--	--
vmnic1	DSwitch-Mgmt	--	--

CANCEL BACK NEXT

Step 13: Select the Uplink. Make sure to check “Apply this uplink assignment to the rest of the hosts”:

Select an Uplink | vmnic0

Uplink	Assigned Adapter
Uplink 1	--
Uplink 2	--
(Auto-assign)	

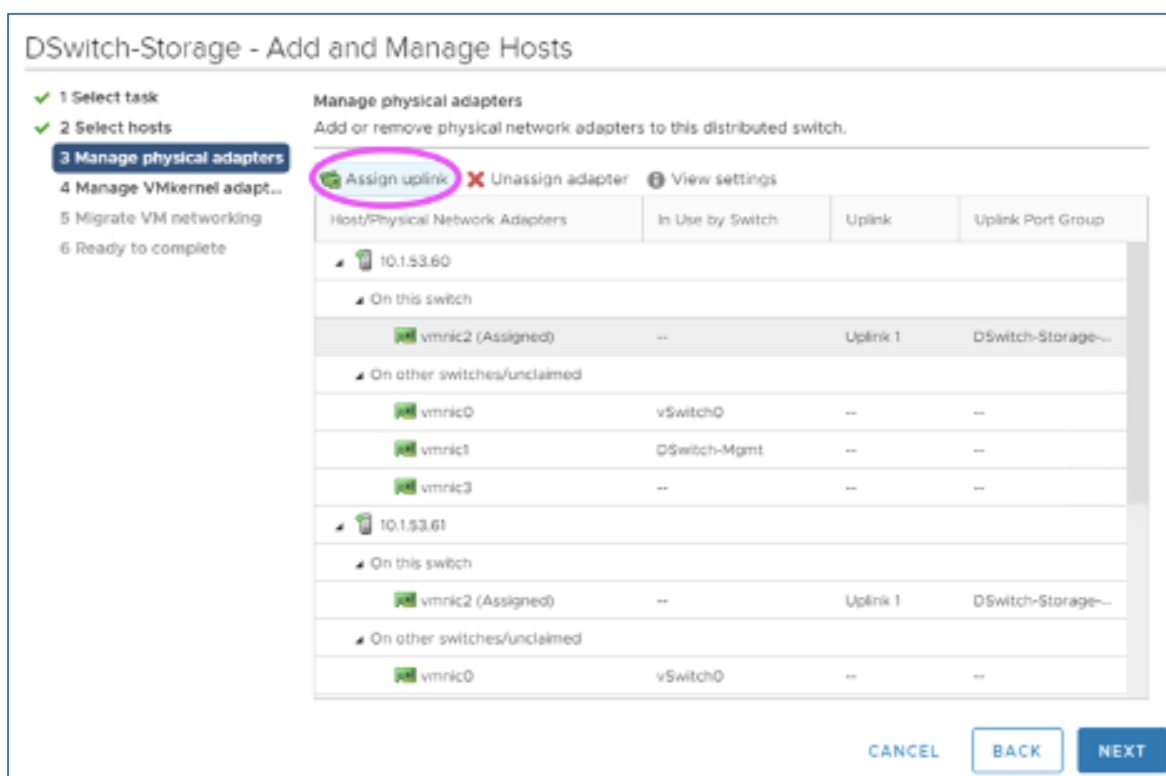
3 Items

☒ Apply this uplink assignment to the rest of the hosts ⓘ

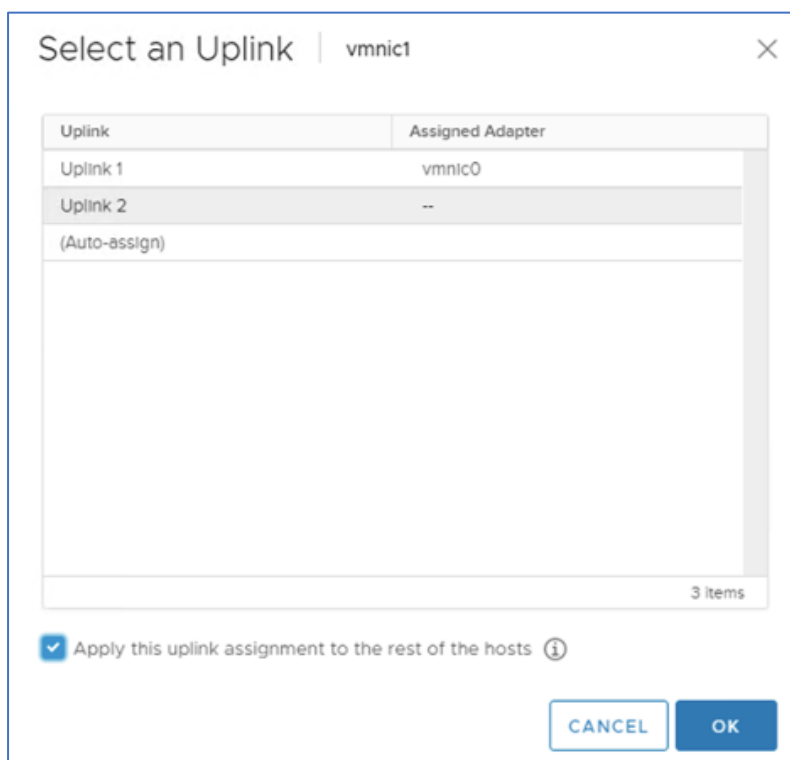
CANCEL

OK

Step 14: Select Assign Uplink and click “NEXT”:



Step 15: Configure Uplink 2



Step 16: Verify NICs are assigned to Uplinks and click “NEXT”:

Storage-DSwitch - Add and Manage Hosts

1 Select task

2 Select hosts

3 Manage physical adapters

4 Manage VMkernel adapt...

5 Migrate VM networking

6 Ready to complete

Manage physical adapters

Add or remove physical network adapters to this distributed switch.

Assign uplink

Unassign adapter

View settings

Host/Physical Network Adapters	In Use by Switch	Uplink	Uplink Port Group
10.153.60			
On this switch			
vmnic0 (Assigned)	--	Uplink 1	Storage-DSwitch...
vmnic1 (Assigned)	--	Uplink 2	Storage-DSwitch...
On other switches/unclaimed			
vmnic2	vSwitch0	--	--
vmnic3	Mgmt-DSwitch	--	--
10.153.61			
On this switch			
vmnic0 (Assigned)	--	Uplink 1	Storage-DSwitch...
vmnic1 (Assigned)	--	Uplink 2	Storage-DSwitch...
On other switches/unclaimed			

CANCEL

BACK

NEXT

Step 17: Click “NEXT”:

Storage-DSwitch - Add and Manage Hosts

1 Select task

2 Select hosts

3 Manage physical adapters

4 Manage VMkernel adapt...

5 Migrate VM networking

6 Ready to complete

Manage VMkernel adapters

Manage and assign VMkernel network adapters to the distributed switch.

Assign port group

Reset changes

View settings

Host/VMkernel Network Adapters	In Use by Switch	Source Port Group	Destination Port Gr...
10.153.60			
On this switch			
On other switches/unclaimed			
vmk0	vSwitch0	Management Net...	Do not migrate
10.153.61			
On this switch			
On other switches/unclaimed			
vmk0	vSwitch0	Management Net...	Do not migrate
10.153.62			
On this switch			
On other switches/unclaimed			
vmk0	vSwitch0	Management Net...	Do not migrate

CANCEL

BACK

NEXT

Step 18: Click “NEXT”:

Storage-DSwitch - Add and Manage Hosts

- ✓ 1 Select task
- ✓ 2 Select hosts
- ✓ 3 Manage physical adapters
- ✓ 4 Manage VMkernel adapt...
- 5 Migrate VM networking**
- 6 Ready to complete

Migrate VM networking
Select virtual machines or network adapters to migrate to the distributed switch.

☐ Migrate virtual machine networking

[Assign port group](#)
[Reset changes](#)
[View settings](#)

Host/Virtual Machine/Network Adapter	NIC Count	Source Port Group	Destination Port Group
No records to display			

CANCEL
BACK
NEXT

Step 19: Click “FINISH”:

Storage-DSwitch - Add and Manage Hosts

- ✓ 1 Select task
- ✓ 2 Select hosts
- ✓ 3 Manage physical adapters
- ✓ 4 Manage VMkernel adapt...
- ✓ 5 Migrate VM networking
- 6 Ready to complete**

Ready to complete
Review your settings selections before finishing the wizard.

Number of managed hosts
 Hosts to add: 3

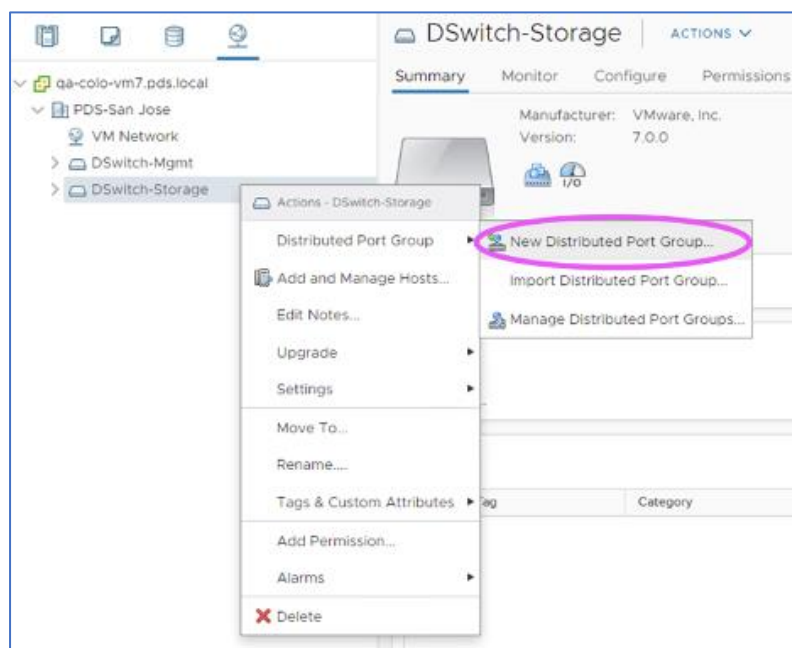
Number of network adapters for update
 Physical adapters: 6

CANCEL
BACK
FINISH

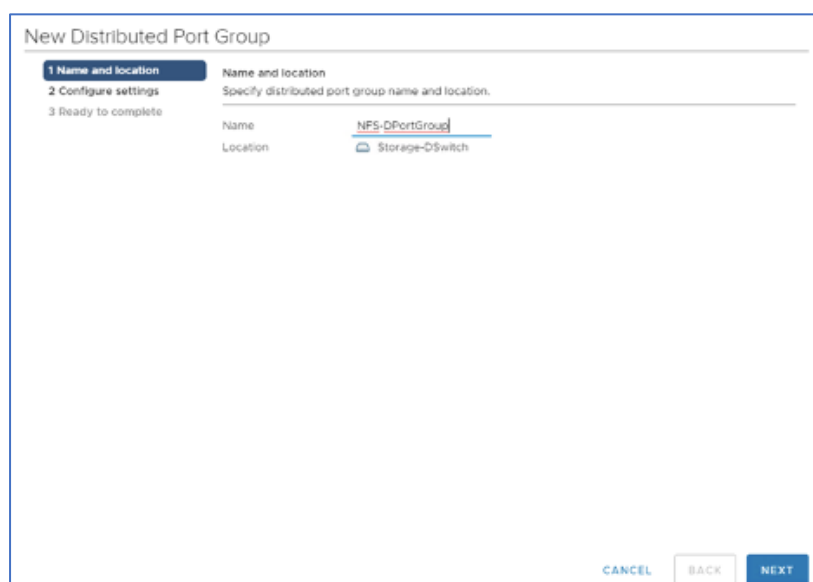
6. Configure Distributed Port Group for NFS Traffic

For representational purpose user can create a single distributed port group “NFS-DPortGroup”.

Step 1: Right click on Distributed switch and select “New Distributed Port Group”:



Step 2: Enter Port Group Name and click “Next”:



The screenshot shows the 'New Distributed Port Group' wizard. The wizard has three steps: 1 Name and location, 2 Configure settings, and 3 Ready to complete. Step 1 is active. The 'Name and location' section has a sub-section 'Name and location' with the instruction 'Specify distributed port group name and location.' Below this, there are two fields: 'Name' with the value 'NFS-DPortGroup' and 'Location' with the value 'Storage-DSwitch'. At the bottom right, there are three buttons: 'CANCEL', 'BACK', and 'NEXT'.

Step 3: Check customize default Policies configuration to set Teaming and Failover settings:

New Distributed Port Group

✓ 1 Name and location

2 Configure settings

3 Security

4 Traffic shaping

5 Teaming and failover

6 Monitoring

7 Miscellaneous

8 Ready to complete

Configure settings

Set general properties of the new port group.

Port binding

Static binding

▼

Port allocation

Elastic

▼

①

Number of ports

8

Network resource pool

(default)

▼

VLAN

VLAN type

None

▼

Advanced

☒ Customize default policies configuration

CANCEL

BACK

NEXT

Step 4: Click “NEXT”:

New Distributed Port Group

✓ 1 Name and location

✓ 2 Configure settings

3 Security

4 Traffic shaping

5 Teaming and failover

6 Monitoring

7 Miscellaneous

8 Ready to complete

Security

Controls promiscuous mode, MAC address changes, and forged transmits.

Promiscuous mode

Reject

▼

MAC address changes

Reject

▼

Forged transmits

Reject

▼

CANCEL

BACK

NEXT

Step 5: Click “NEXT”:

New Distributed Port Group

- ✓ 1 Name and location
- ✓ 2 Configure settings
- ✓ 3 Security
- 4 Traffic shaping
- 5 Teaming and failover
- 6 Monitoring
- 7 Miscellaneous
- 8 Ready to complete

Traffic shaping
Controls average bandwidth, peak bandwidth, and burst size of the ingress and egress traffic on each port.

Ingress traffic shaping

Status: Disabled

Average bandwidth (kbit/s): 100000

Peak bandwidth (kbit/s): 100000

Burst size: 102400

Egress traffic shaping

Status: Disabled

Average bandwidth (kbit/s): 100000

Peak bandwidth (kbit/s): 100000

Burst size (KB): 102400

① Traffic shaping policy is applied individually to each port in the port group.

CANCEL BACK NEXT

Step 6: Set Load Balancing to “Route based on physical NIC load” and Uplink1 and Uplink2 as Active Uplinks:

New Distributed Port Group

- ✓ 1 Name and location
- ✓ 2 Configure settings
- ✓ 3 Security
- ✓ 4 Traffic shaping
- 5 Teaming and failover
- 6 Monitoring
- 7 Miscellaneous
- 8 Ready to complete

Teaming and failover
Controls load balancing, network failure detection, switches notification, fallback, and uplink failover order.

Load balancing: Route based on physical NIC load

Network failure detection: Link status only

Notify switches: Yes

Fallback: Yes

Failover order ①

Active uplinks

- Uplink 1
- Uplink 2

Standby uplinks

Unused uplinks

CANCEL BACK NEXT

Step 7: Click “NEXT”:

New Distributed Port Group

- ✓ 1 Name and location
- ✓ 2 Configure settings
- ✓ 3 Security
- ✓ 4 Traffic shaping
- ✓ 5 Teaming and failover
- 6 Monitoring**
- 7 Miscellaneous
- 8 Ready to complete

Monitoring

Controls NetFlow configuration.

NetFlow

Disabled

CANCEL BACK NEXT

Step 8: Click “NEXT”:

New Distributed Port Group

- ✓ 1 Name and location
- ✓ 2 Configure settings
- ✓ 3 Security
- ✓ 4 Traffic shaping
- ✓ 5 Teaming and failover
- ✓ 6 Monitoring
- 7 Miscellaneous**
- 8 Ready to complete

Miscellaneous

Controls the ports blocking configuration.

Block All Ports

No

CANCEL BACK NEXT

Step 9: Click “NEXT”:

New Distributed Port Group

✓ 1 Name and location

✓ 2 Configure settings

✓ 3 Security

✓ 4 Traffic shaping

✓ 5 Teaming and failover

✓ 6 Monitoring

✓ 7 Miscellaneous

8 Ready to complete

Ready to complete

Review the changes before proceeding.

Distributed port group name	NFS-DPortGroup
Port binding	Static binding
Number of ports	8
Port allocation	Elastic
Network resource pool	(default)
VLAN ID	--

CANCEL

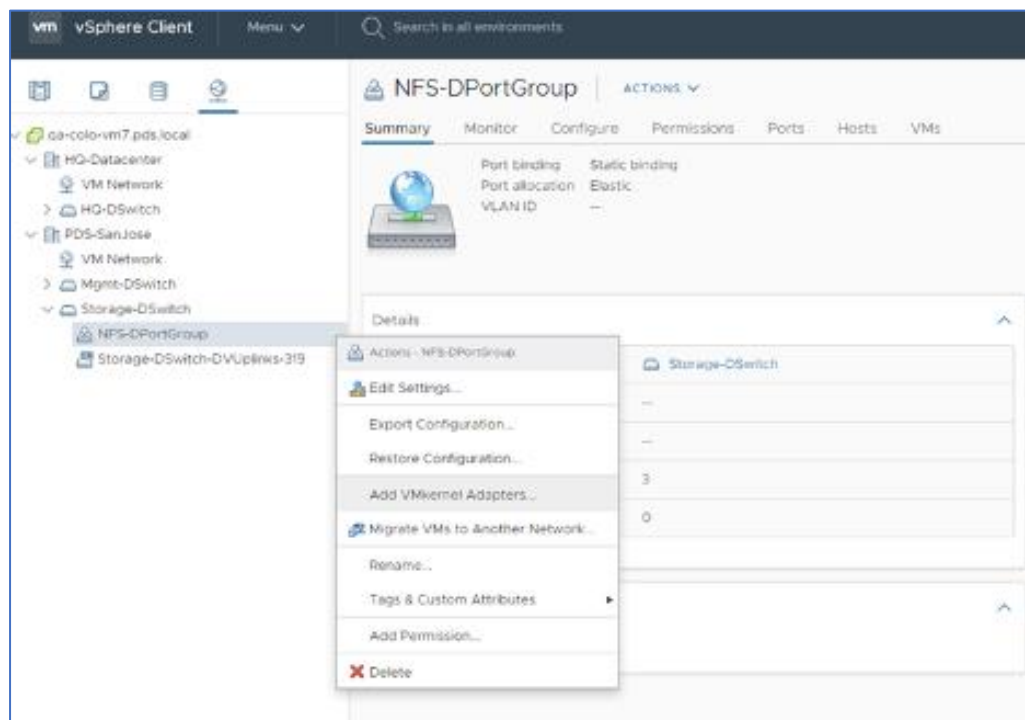
BACK

FINISH

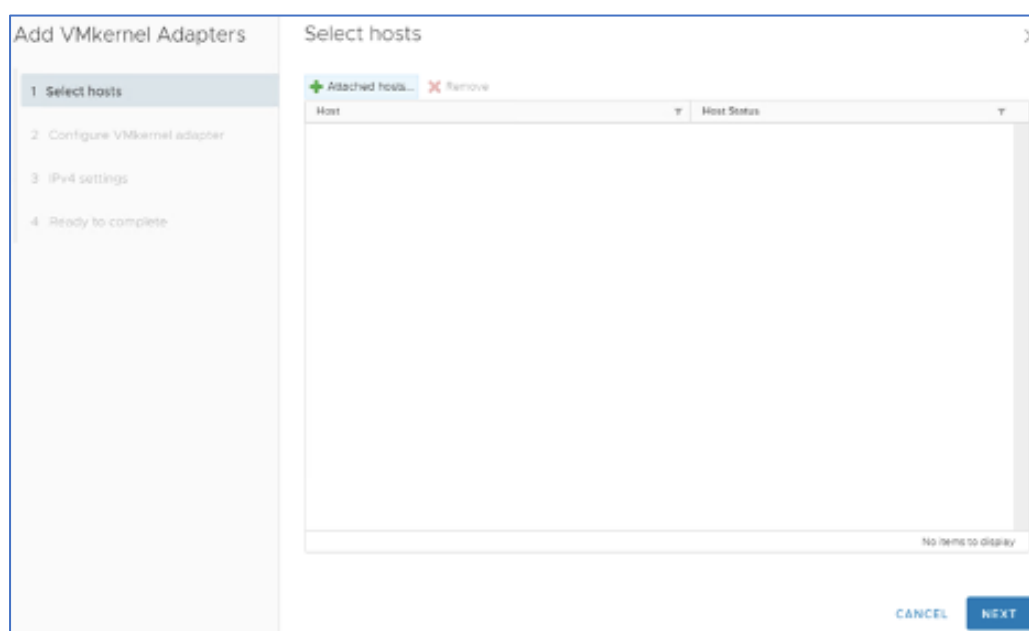
6. Configure VMKernel Port for NFS traffic

This section lists how to configure VMKernel port for NFS traffic:

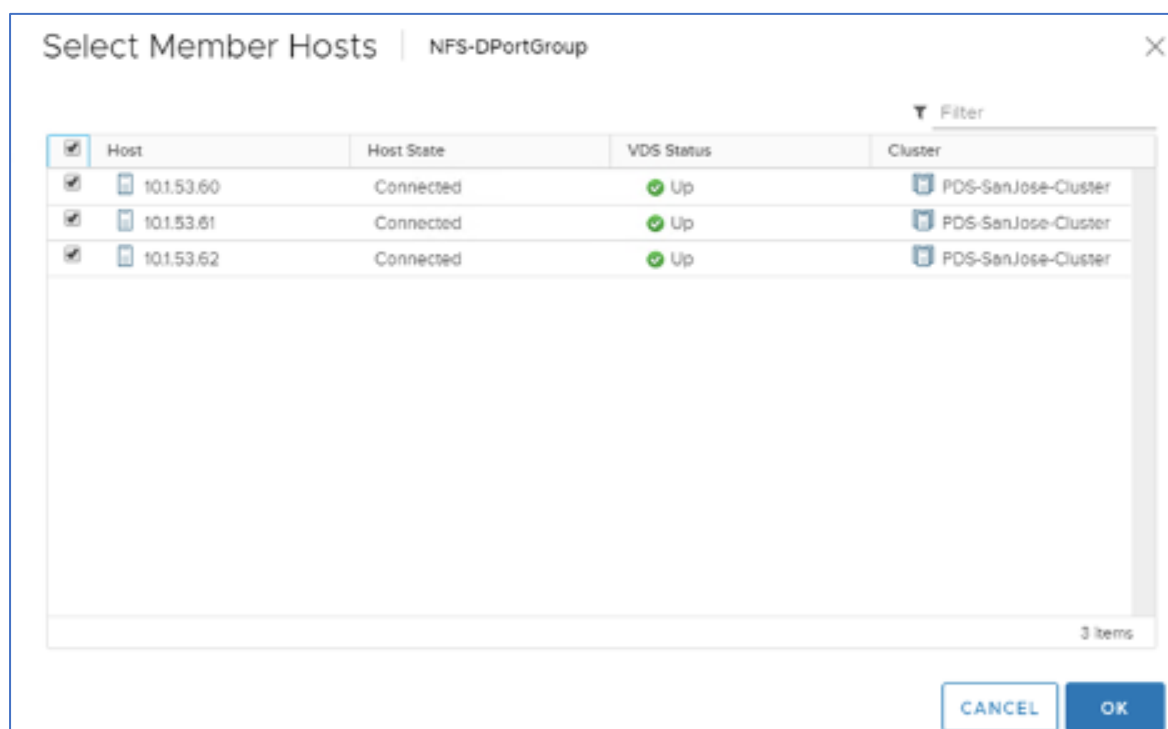
Step 1: Right click the distributed port group and select “Add VMkernel Adapters”:



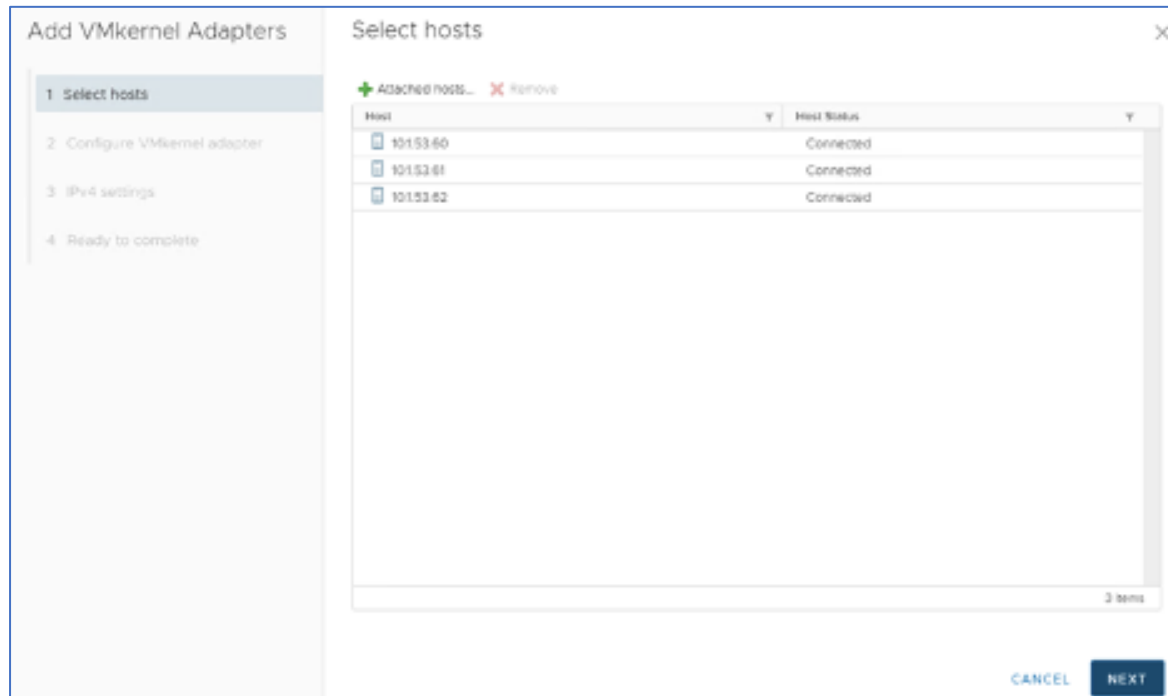
Step 2: Click “Add Hosts”:



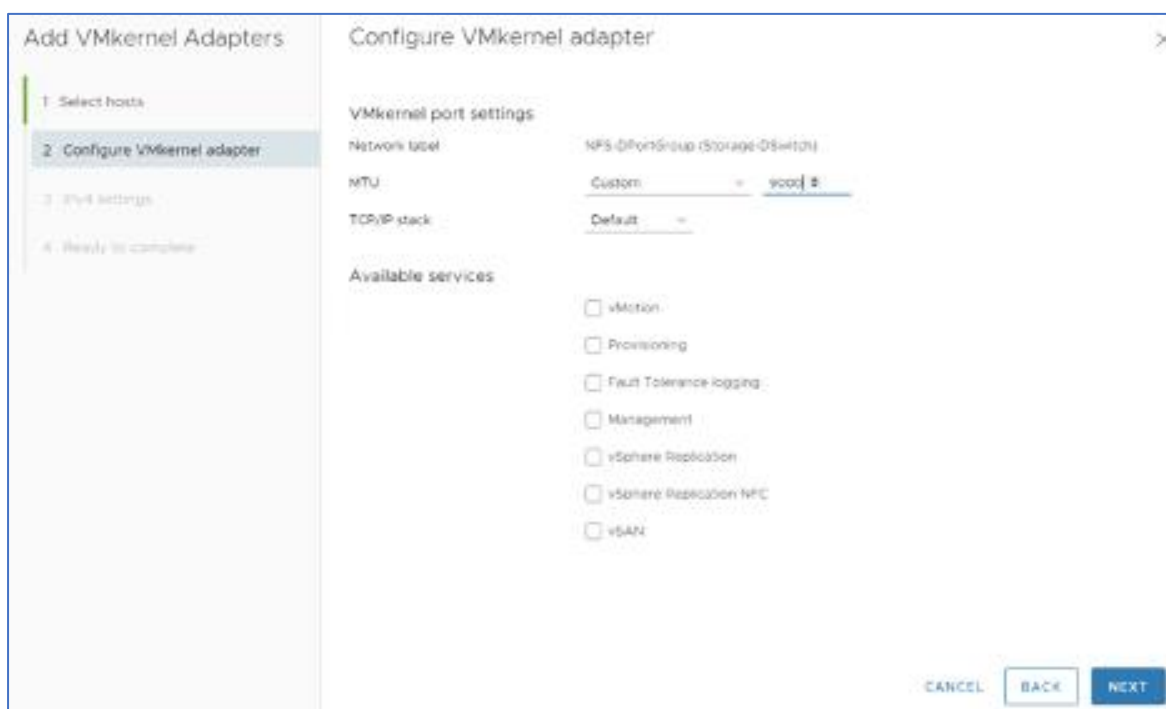
Step 3: Select hosts and Click “OK”:



Step 4: Click “NEXT”:



Step 5: Set MTU to 9000 and click “NEXT”:



Add VMkernel Adapters

- 1. Select hosts
- 2. Configure VMkernel adapter**
- 3. IPv4 settings
- 4. Ready to complete

Configure VMkernel adapter

VMkernel port settings

Network label: NFS-0PortGroup (Storage-0Switch)

MTU: Custom = 9000

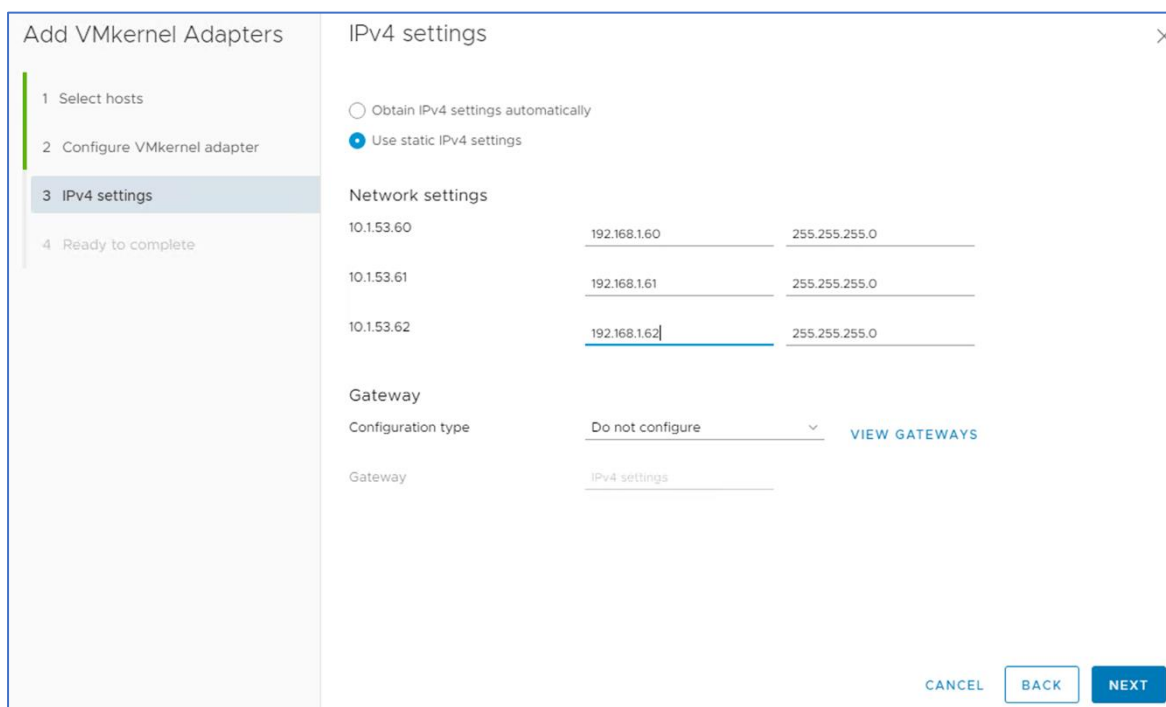
TCP/IP stack: Default

Available services:

- ☐ vMotion
- ☐ Provisioning
- ☐ Fault Tolerance logging
- ☐ Management
- ☐ vSphere Replication
- ☐ vSphere Replication NFS
- ☐ vSAN

CANCEL BACK **NEXT**

Step 6: Assign IP addresses Click “NEXT”:



Add VMkernel Adapters

- 1. Select hosts
- 2. Configure VMkernel adapter
- 3. IPv4 settings**
- 4. Ready to complete

IPv4 settings

☐ Obtain IPv4 settings automatically

☒ Use static IPv4 settings

Network settings

10.153.60	192.168.1.60	255.255.255.0
10.153.61	192.168.1.61	255.255.255.0
10.153.62	192.168.1.62	255.255.255.0

Gateway

Configuration type: Do not configure

Gateway: IPv4 settings

CANCEL BACK **NEXT**

Step 7: Verify and click “Finish”:

Add VMkernel Adapters

1 Select hosts
2 Configure VMkernel adapter
3 IPv4 settings
4 Ready to complete

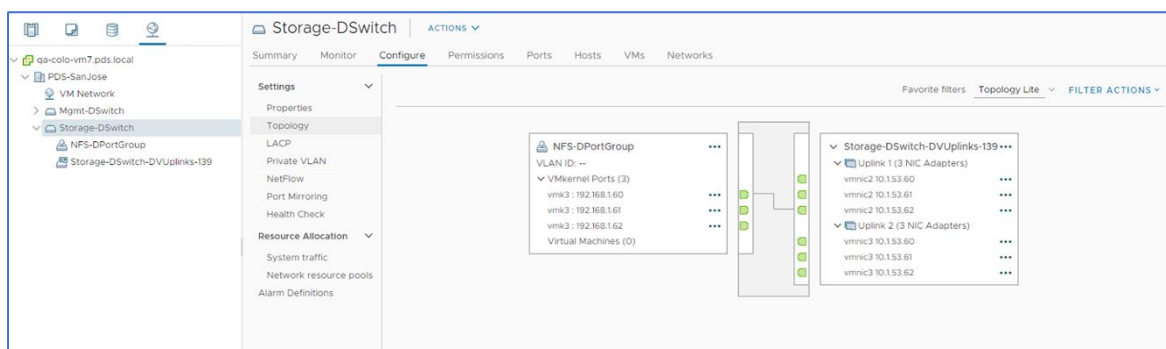
Ready to complete

Network labelNFS-DPortGroup (Storage-DSwitch)
MTU9000
TCP/IP stackDefault
Enabled services

Host Name	IP Family	IP Address	Subnet Mask/Prefix
10.1.53.60	IPv4	192.168.1.60	255.255.255.0
10.1.53.61	IPv4	192.168.1.61	255.255.255.0
10.1.53.62	IPv4	192.168.1.62	255.255.255.0
Gateway	not configured		

CANCELBACKFINISH

Step 8: After all the ESXi Cluster Networking has been Completed all configuration can be verified in Distributed Switch Topology :

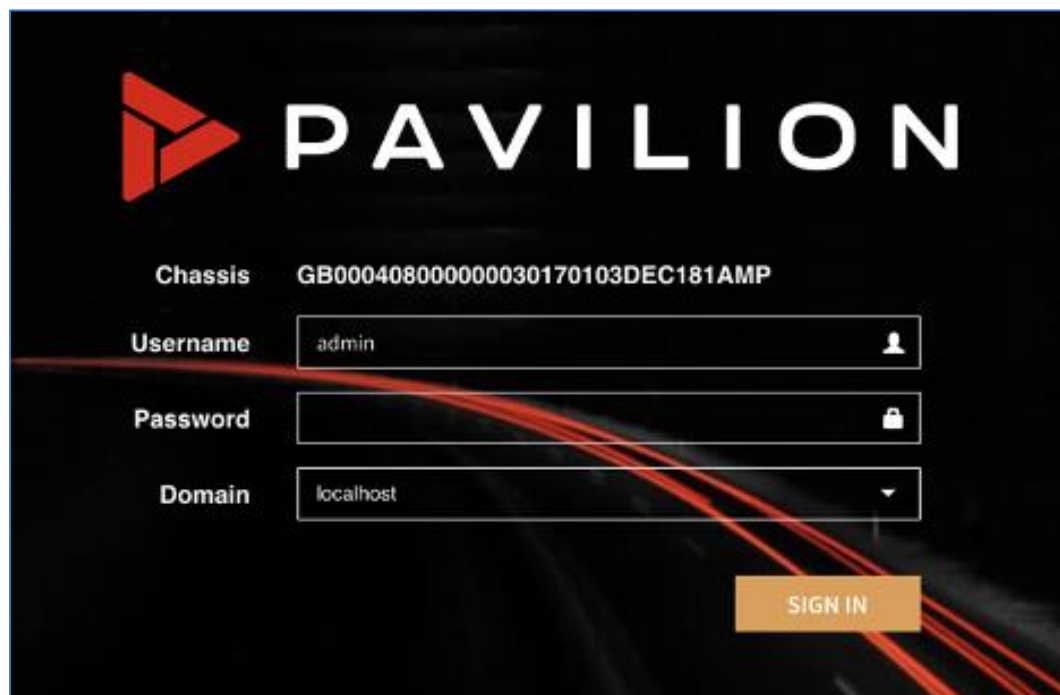


7. Configuring Pavilion Controllers as NFS Servers

This section will provide the steps required to configure two controllers to serve NFS connections. Once they are configured for NFS service, we will pair them up as are required for a HA configuration in later steps.

Login to the Pavilion HFA

Step 1: Using the GUI interface, log in with the administrator login and password.



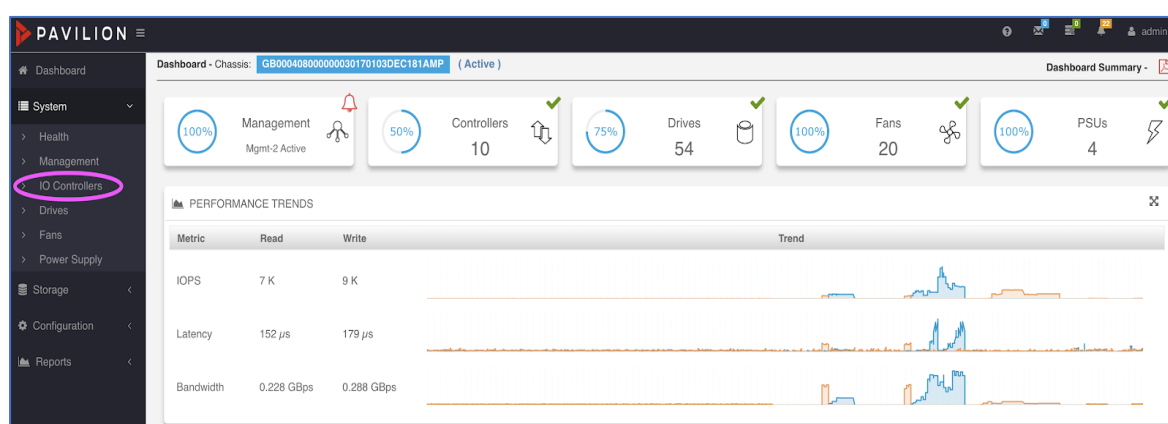
The image shows the Pavilion HFA login interface. At the top left is the Pavilion logo, a red stylized 'P' made of three triangles. To its right is the word 'PAVILION' in large, white, sans-serif capital letters. Below the logo and name, there are four input fields arranged vertically. The first field is labeled 'Chassis' and contains the text 'GB000408000000030170103DEC181AMP'. The second field is labeled 'Username' and contains the text 'admin', with a small user icon to its right. The third field is labeled 'Password' and is empty, with a small lock icon to its right. The fourth field is labeled 'Domain' and contains the text 'localhost', with a small dropdown arrow to its right. At the bottom right of the form is an orange button with the text 'SIGN IN' in white capital letters. The background of the login screen is dark with some abstract red and white light streaks.

7.1 Configure Individual Controllers to serve NFS volumes

This section lists the steps required to configure individual controllers to serve NFS volumes.

Step 1: Click on the “System->IO Controllers” tab on the side menu to bring up the list of installed controllers. We will select two of them to comprise the NFS HA pair. Note that NFS HA pair controllers need to be in the same “Zone” of the array (4th column in the table). You cannot create a HA pair using controllers from different zones.

Step 2: Go to IO Controllers:

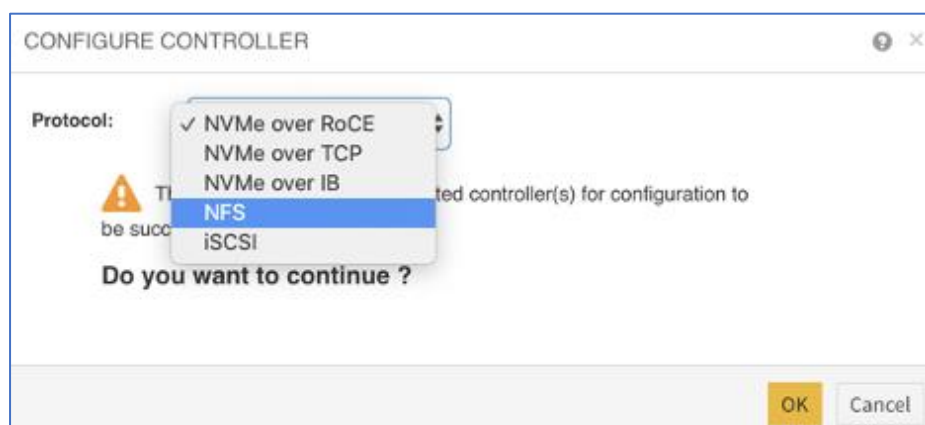


Step 3: Select any controller and click “Configure”:

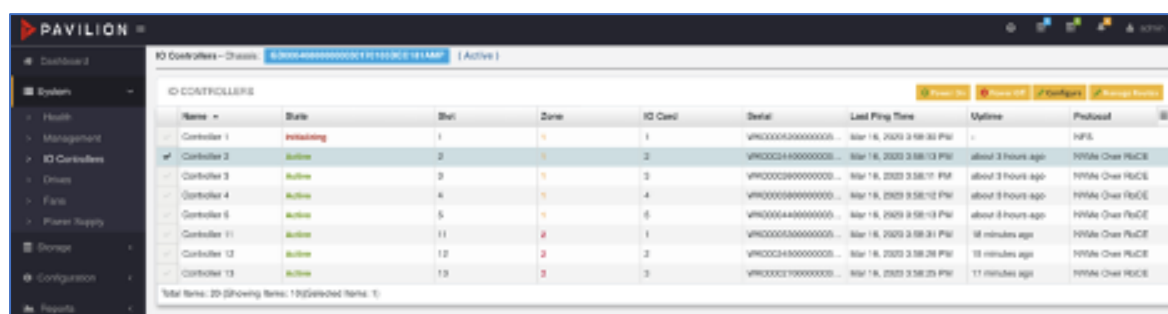
IO CONTROLLERS										Power On	Power Off	Configure	Manage Routes
Name	State	Slot	Zone	IO Card	Serial	Last Ping Time	Uptime	Protocol					
Controller 1	Active	1	1	1	WK0000520000000...	Apr 25, 2020 5:06:15 PM	13 days ago	NVMe Over RoCE					
Controller 2	Active	2	1	2	WK0000244000000...	Apr 25, 2020 5:06:27 PM	13 days ago	NVMe Over RoCE					
Controller 3	Active	3	1	3	WK0000260000000...	Apr 25, 2020 5:06:15 PM	9 days ago	NVMe Over RoCE					
Controller 4	Active	4	1	4	WK0000440000000...	Apr 25, 2020 5:06:16 PM	9 days ago	NVMe Over RoCE					
Controller 5	Active	5	1	5	WK0000580000000...	Apr 25, 2020 5:06:12 PM	9 days ago	NVMe Over RoCE					
Controller 11	Active	11	2	1	WK0000530000000...	Apr 25, 2020 5:06:16 PM	9 minutes ago	NVMe Over RoCE					
Controller 12	Active	12	2	2	WK0000245000000...	Apr 25, 2020 5:06:34 PM	16 minutes ago	NVMe Over RoCE					
Controller 13	Active	13	2	3	WK0000270000000...	Apr 25, 2020 5:06:13 PM	9 days ago	NVMe Over RoCE					

Total Items: 20 (Showing Items: 10)(Selected Items: 1)

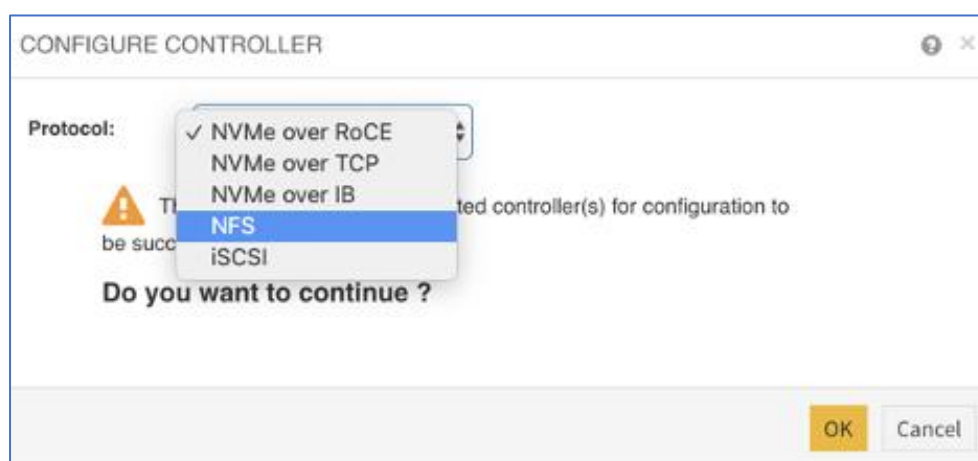
Step 4: Set Protocol to “NFS” and click “OK”:



Step 5: Select any other controller in same zone and click configure:



Step 6: Set Protocol to NFS:



Step 7: Controllers 1 and 2 are configured for NFS:

IO CONTROLLERS								
Name	State	Slot	Zone	IO Card	Serial	Last Ping Time	Uptime	Protocol
Controller 1	Active	1	1	1	VP000002900000000...	Mar 16, 2020 4:07:39 PM	8 minutes ago	NFS
Controller 2	Active	2	1	2	VP000004400000000...	Mar 16, 2020 4:07:59 PM	4 minutes ago	NFS

7.2 Configure Data Network (IP) interfaces for the controller

This section lists the steps required to configure Data Network (IP) interfaces for the controller.

Step 1: Re-select the controller you changed to NFS in the prior step to begin configuring its IP configuration:

IO CONTROLLERS								
Name	State	Slot	Zone	IO Card	Serial	Last Ping Time	Uptime	Protocol
Controller 1	Active	1	1	1	WK000852000000000...	Mar 16, 2020 4:01:09 PM	about a minute ago	NFS
Controller 2	Configuring	2	1	2	WK000246000000000...	Mar 16, 2020 4:05:48 PM	-	NFS
Controller 3	Active	3	1	3	WK000838000000000...	Mar 16, 2020 4:01:11 PM	about 3 hours ago	NVMe Over PCIe
Controller 4	Active	4	1	4	WK000850000000000...	Mar 16, 2020 4:01:12 PM	about 3 hours ago	NVMe Over PCIe
Controller 5	Active	5	1	5	WK000844000000000...	Mar 16, 2020 4:01:13 PM	about 3 hours ago	NVMe Over PCIe
Controller 11	Active	11	2	1	WK000853000000000...	Mar 16, 2020 4:01:01 PM	20 minutes ago	NVMe Over PCIe
Controller 12	Active	12	2	2	WK000245000000000...	Mar 16, 2020 4:05:56 PM	18 minutes ago	NVMe Over PCIe
Controller 13	Active	13	2	3	WK000837000000000...	Mar 16, 2020 4:05:55 PM	20 minutes ago	NVMe Over PCIe

Total Items: 26 (Showing Items: 10/Selected Items: 1)

Data Network Interfaces										
Slot	Operational St...	Admin State...	Type	Speed	Negotiated ...	MTU	IP Address	Netmask	Mac Address	NFS HA Interface
100g-1/4	Down	Down	Static	100 Gb/s	-	9000			04:bb:59:51:98:13	-
100g-1/3	Down	Down	Static	100 Gb/s	-	9000			04:bb:59:51:98:14	-

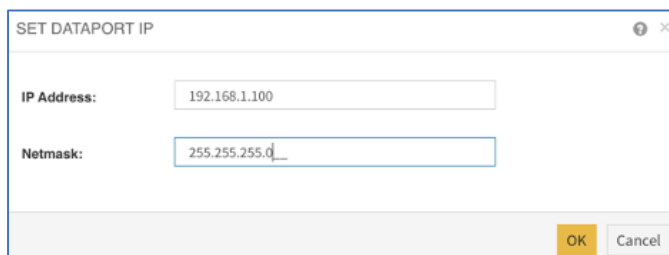
Total Items: 2 (Selected Items: 0)

Step 2: Once the controller is selected, the Data Network Interfaces tab will appear at the bottom of the screen. Select the interface (each controller has two) and use the “Set IP” button to bring up the “Set Dataport IP” window and enter the IP and netmask desired:

Data Network Interfaces										
Slot	Operational St...	Admin State...	Type	Speed	Negotiated ...	MTU	IP Address	Netmask	Mac Address	NFS HA Interface
100g-1/4	Down	Down	Static	100 Gb/s	-	9000			04:bb:59:51:98:13	-
100g-1/3	Up	Up	Static	100 Gb/s	100 Gb/s	9000			04:bb:59:51:98:14	-

Total Items: 2 (Selected Items: 1)

Step 3: Set IP address and Netmask:



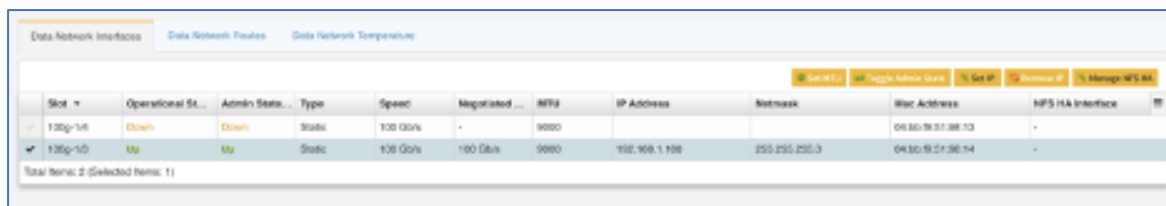
SET DATAPORT IP

IP Address: 192.168.1.100

Netmask: 255.255.255.0

OK Cancel

Step 4: IP address is configured on the Controller Port:



Slot	Operational St...	Admin State...	Type	Speed	Negotiated ...	MTU	IP Address	Netmask	MAC Address	NFS H&A Interface
130g-1/6	Down	Down	Static	100 Gb/s	-	9000			04:50:78:31:38:13	-
130g-1/5	Up	Up	Static	100 Gb/s	100 Gb/s	9000	192.168.1.100	255.255.255.0	04:50:78:31:38:14	-

Total Items: 2 (Selected Items: 1)

Step 5: Repeat above steps to configure IP address on the second controller dataport.

8. Enabling High Availability with NFS

This section describes how to configure a highly available Active/Passive NFS server on Pavilion chassis. Pavilion customers access the Network File System (NFS) through a floating IP address.

The NFS server runs on one of the two nodes. If the node on which the NFS server is run on becomes inoperative, the NFS server starts serving on the second node with minimal service interruption.

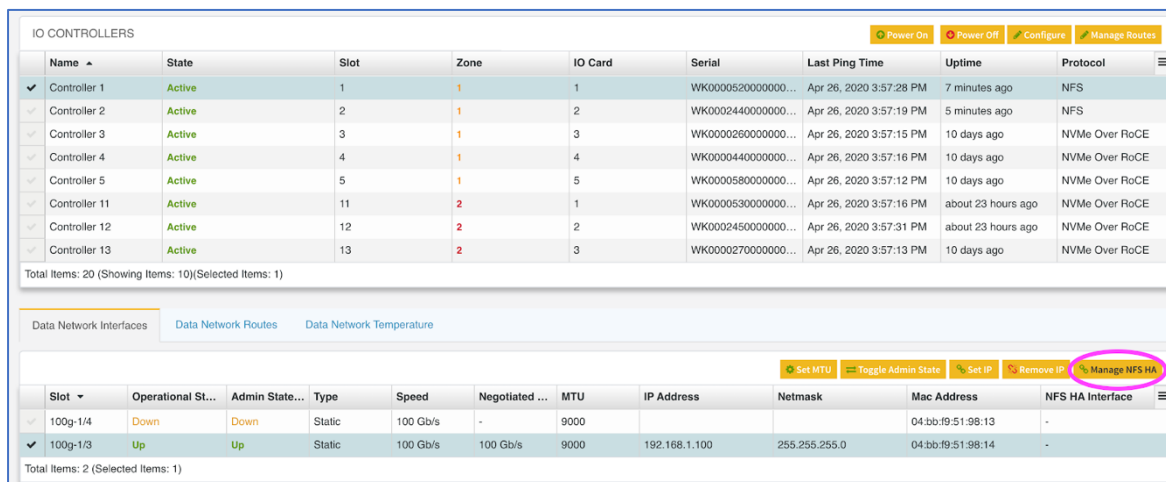
NFS HA Operation

- Two Data Network Interfaces from separate controllers (configured previously for NFS) are configured as an Active/Standby pair
- Once configured, only the active Data Network Interface will have an IP address (that is, the IP address of the NFS service)
- All the volumes assigned to these two ports will be active on the first port and standby on the second port
 - If the active controller or network fails, then all the volumes which are active on this port will automatically migrate to the standby data network port, and the NFS virtual IP will migrate to the surviving controller
- Since NFS clients will be connected to the server using IP address, all the clients will automatically be able to access the volume after a slight failover delay and without client reconfiguration

8.1 Creating the NFS HA pair

This section lists how to create the NFS HA pair:

Step 1: Go to the System>IO Controllers menu item on the main web GUI. Select the desired primary NFS controller (which was set up previously), and on the bottom of the page the Data Network Interfaces tab will appear. Select the previously configured interface and press the “Manage NFS HA” button.



The screenshot shows the 'IO CONTROLLERS' page. At the top, there are buttons for 'Power On', 'Power Off', 'Configure', and 'Manage Routes'. Below is a table of controllers:

Name	State	Slot	Zone	IO Card	Serial	Last Ping Time	Uptime	Protocol
Controller 1	Active	1	1	1	WK0000520000000...	Apr 26, 2020 3:57:28 PM	7 minutes ago	NFS
Controller 2	Active	2	1	2	WK0000244000000...	Apr 26, 2020 3:57:19 PM	5 minutes ago	NFS
Controller 3	Active	3	1	3	WK0000260000000...	Apr 26, 2020 3:57:15 PM	10 days ago	NVMe Over RoCE
Controller 4	Active	4	1	4	WK0000440000000...	Apr 26, 2020 3:57:16 PM	10 days ago	NVMe Over RoCE
Controller 5	Active	5	1	5	WK0000580000000...	Apr 26, 2020 3:57:12 PM	10 days ago	NVMe Over RoCE
Controller 11	Active	11	2	1	WK0000530000000...	Apr 26, 2020 3:57:16 PM	about 23 hours ago	NVMe Over RoCE
Controller 12	Active	12	2	2	WK0000245000000...	Apr 26, 2020 3:57:31 PM	about 23 hours ago	NVMe Over RoCE
Controller 13	Active	13	2	3	WK0000270000000...	Apr 26, 2020 3:57:13 PM	10 days ago	NVMe Over RoCE

Total Items: 20 (Showing Items: 10)(Selected Items: 1)

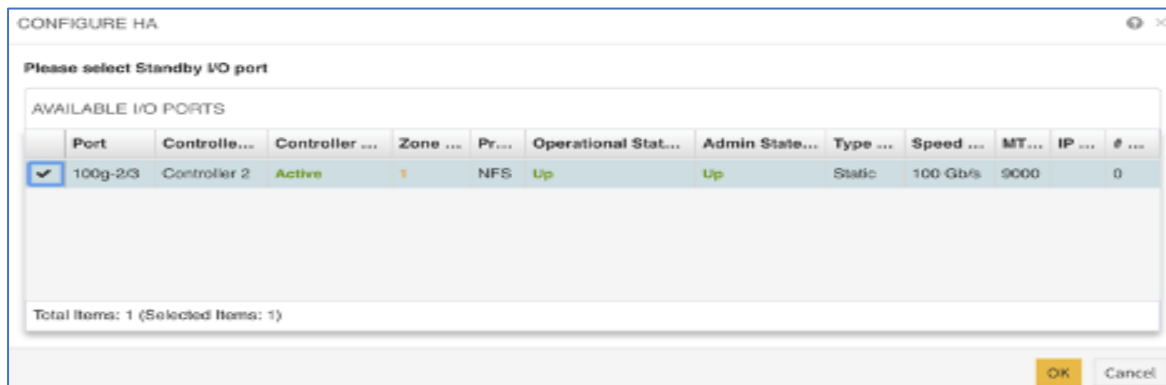
At the bottom, the 'Data Network Interfaces' tab is selected. It shows a table of network interfaces:

Slot	Operational St...	Admin State...	Type	Speed	Negotiated ...	MTU	IP Address	Netmask	Mac Address	NFS HA Interface
100g-1/4	Down	Down	Static	100 Gb/s	-	9000			04:bb:f9:51:98:13	-
100g-1/3	Up	Up	Static	100 Gb/s	100 Gb/s	9000	192.168.1.100	255.255.255.0	04:bb:f9:51:98:14	-

Total Items: 2 (Selected Items: 1)

At the bottom right of the 'Data Network Interfaces' table, there is a button labeled 'Manage NFS HA' which is circled in red.

Step 2: Select the Standby IO Port



The screenshot shows the 'CONFIGURE HA' page. It prompts the user to 'Please select Standby IO port'. Below this, there is a table of 'AVAILABLE I/O PORTS':

Port	Controlle...	Controller ...	Zone ...	Pr...	Operational Stat...	Admin State...	Type ...	Speed ...	MT...	IP ...	# ...
100g-2/3	Controller 2	Active	1	NFS	Up	Up	Static	100 Gb/s	9000		0

Total Items: 1 (Selected Items: 1)

At the bottom right, there are 'OK' and 'Cancel' buttons.

Step 3: At this point, the NFS HA pair will be created and usable by clients:

IO CONTROLLERS

Power On

Power Off

Configure

Manage Routes

Name	State	Slot	Zone	IO Card	Serial	Last Ping Time	Uptime	Protocol
✓ Controller 1	Active	1	1	1	WK0000520000000...	Apr 26, 2020 4:01:28 PM	11 minutes ago	NFS
✓ Controller 2	Active	2	1	2	WK00002440000000...	Apr 26, 2020 4:01:19 PM	9 minutes ago	NFS
✓ Controller 3	Active	3	1	3	WK00002600000000...	Apr 26, 2020 4:01:45 PM	10 days ago	NVMe Over RoCE
✓ Controller 4	Active	4	1	4	WK00004400000000...	Apr 26, 2020 4:01:16 PM	10 days ago	NVMe Over RoCE
✓ Controller 5	Active	5	1	5	WK00005800000000...	Apr 26, 2020 4:01:42 PM	10 days ago	NVMe Over RoCE
✓ Controller 11	Active	11	2	1	WK00005300000000...	Apr 26, 2020 4:01:16 PM	about 23 hours ago	NVMe Over RoCE
✓ Controller 12	Active	12	2	2	WK00002450000000...	Apr 26, 2020 4:01:31 PM	about 23 hours ago	NVMe Over RoCE
✓ Controller 13	Active	13	2	3	WK00002700000000...	Apr 26, 2020 4:01:43 PM	10 days ago	NVMe Over RoCE

Total Items: 20 (Showing Items: 10)(Selected Items: 1)

Data Network Interfaces

Data Network Routes

Data Network Temperature

Set MTU

Toggle Admin State

Set IP

Remove IP

Manage NFS HA

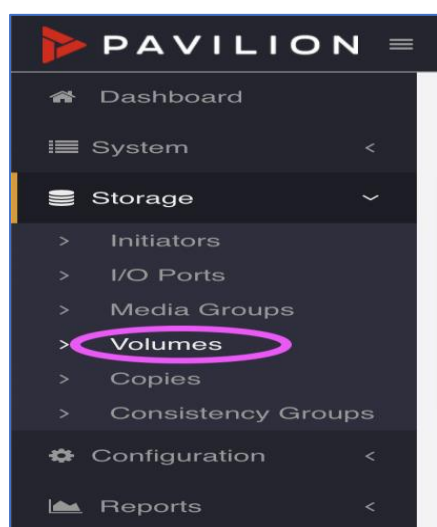
Slot	Operational St...	Admin State...	Type	Speed	Negotiated ...	MTU	IP Address	Netmask	Mac Address	NFS HA Interface
✓ 100g-1/4	Down	Down	Static	100 Gb/s	-	9000			04:bb:f9:51:98:13	-
✓ 100g-1/3	Up	Up	Static	100 Gb/s	100 Gb/s	9000	192.168.1.100	255.255.255.0	04:bb:f9:51:98:14	100g-2/3

Total Items: 2 (Selected Items: 1)

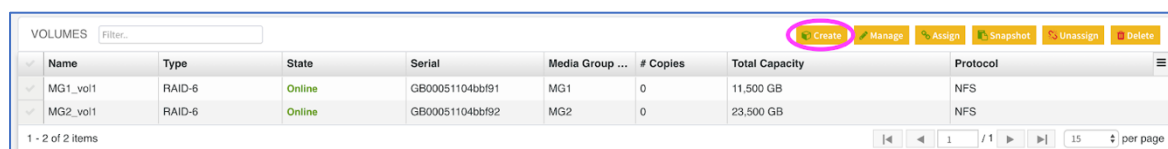
8.2 Creating an NFS volume

This section lists the steps required to create NFS volumes.

Step 1: Log in to the administration GUI, as usual. Go to “Storage Pane” menu and select “Volumes” You will be presented with a list of pre-existing volumes, and a set of buttons to manage them.



Step 2: Select “Create” to begin NFS export creation:



Step 3: Use the options (media group, name, total capacity, etc.) and configure the volume as desired. There is no special option needed to build an NFS volume, it uses the same procedure as an NVMe or iSCSI volume.

CREATE VOLUME(S)

Media Group:

MG1

(Volume Type: RAID-6)

Volumes:

1

(Max # Volumes: 23)

Name:

NFS-Datastore-1

Capacity :

1000

GB

(Max Size: 23762 GB / 23 TB)

Reservation (%):

100

Advanced

Block Size:

☐ Enable 512e format

Discovery:

☐ Discover Storage Entity by Name

Encryption:

☐ Enable Encryption

Security:

☐ Enable security around Host NQN

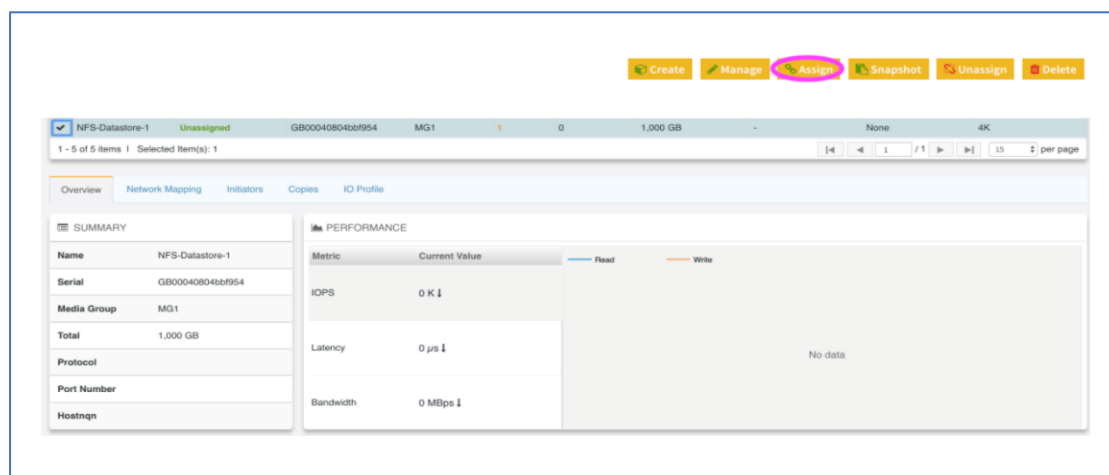
OK

Cancel

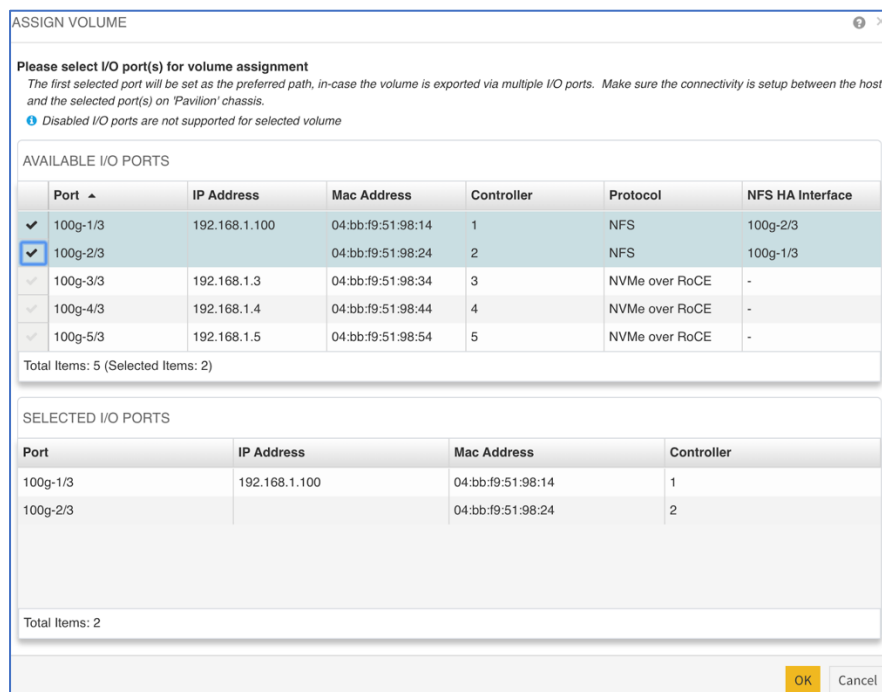
8.3 Assigning the volume to an NFS export

This section lists the steps to assign the volume to an NFS export.

Step 1: Select the newly created volume in the list and click on the “Assign” button:



Step 2: At this point, select the active and standby data ports used to build the NFS HA volume previously and hit “OK”:

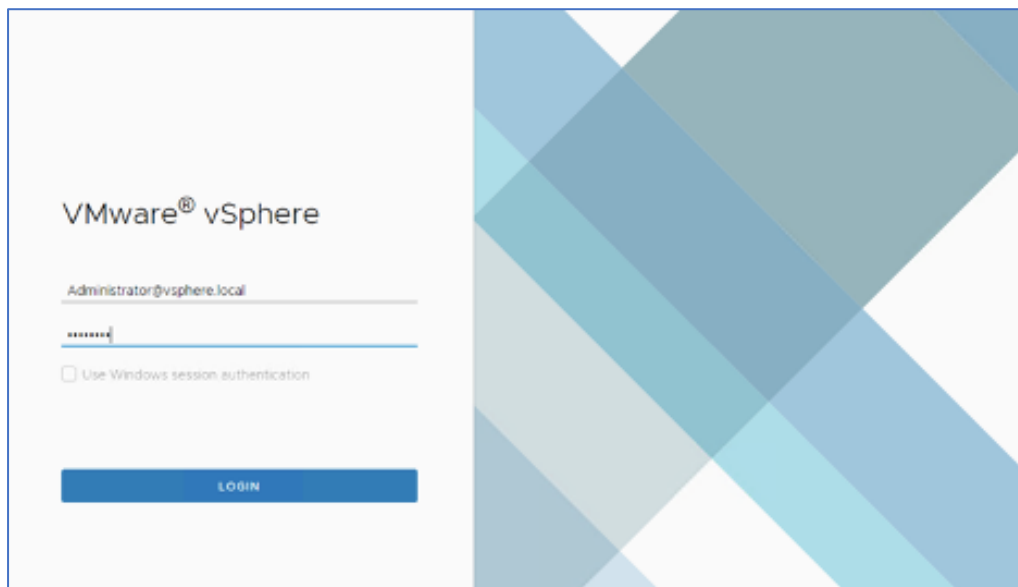


Step 3: The export will now be available for use by clients of the HA pair as /nfs/<volumeserial>, where <volumeserial> is the string shown in the “Volume tab” (normally “GB” followed by a string of numbers).

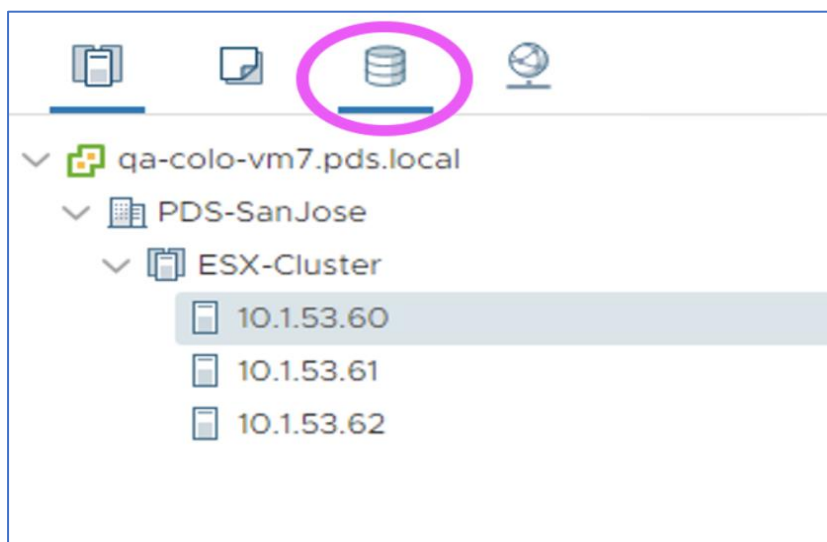
9. VMWare NFS Client Mounting and Options

This section lists the steps required for VMware NFS client mounting and options.

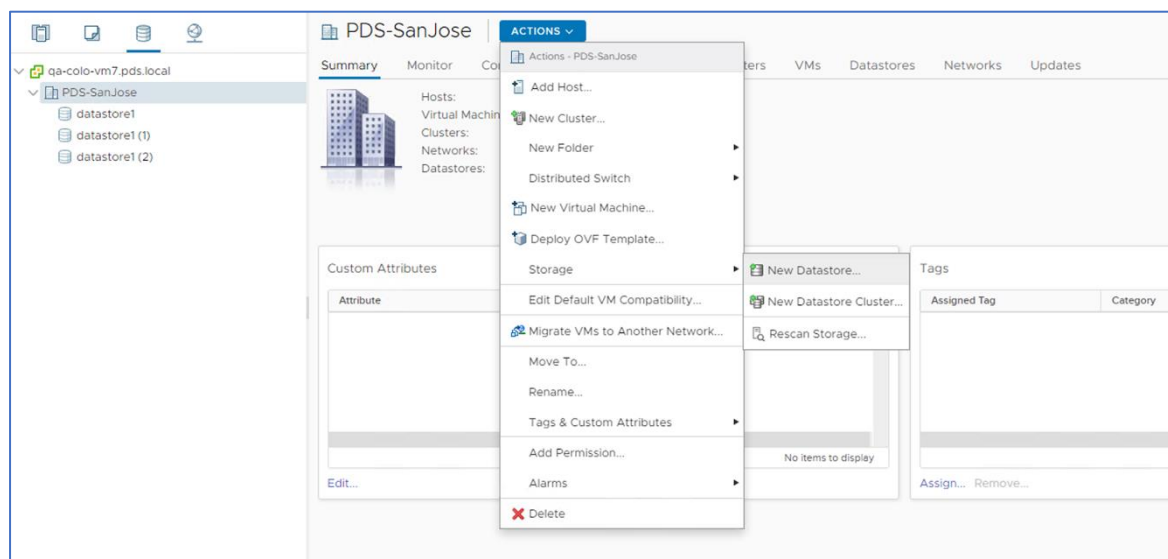
Step 1: Login Back to VCenter Server:



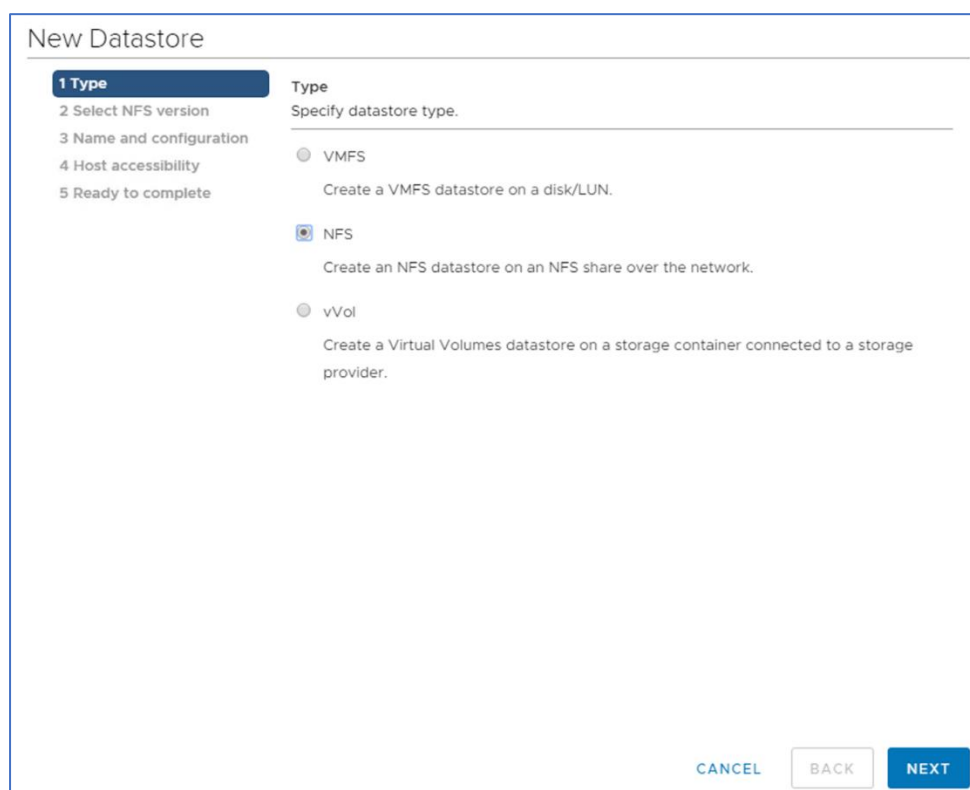
Step 2: At VCenter, click Storage Icon:



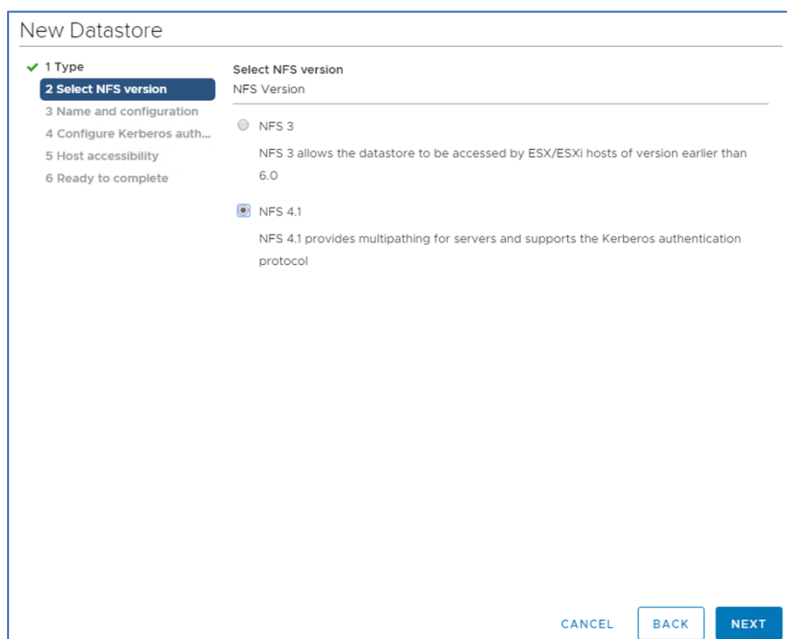
Step 3: Go to Actions and click “New Datastore”:



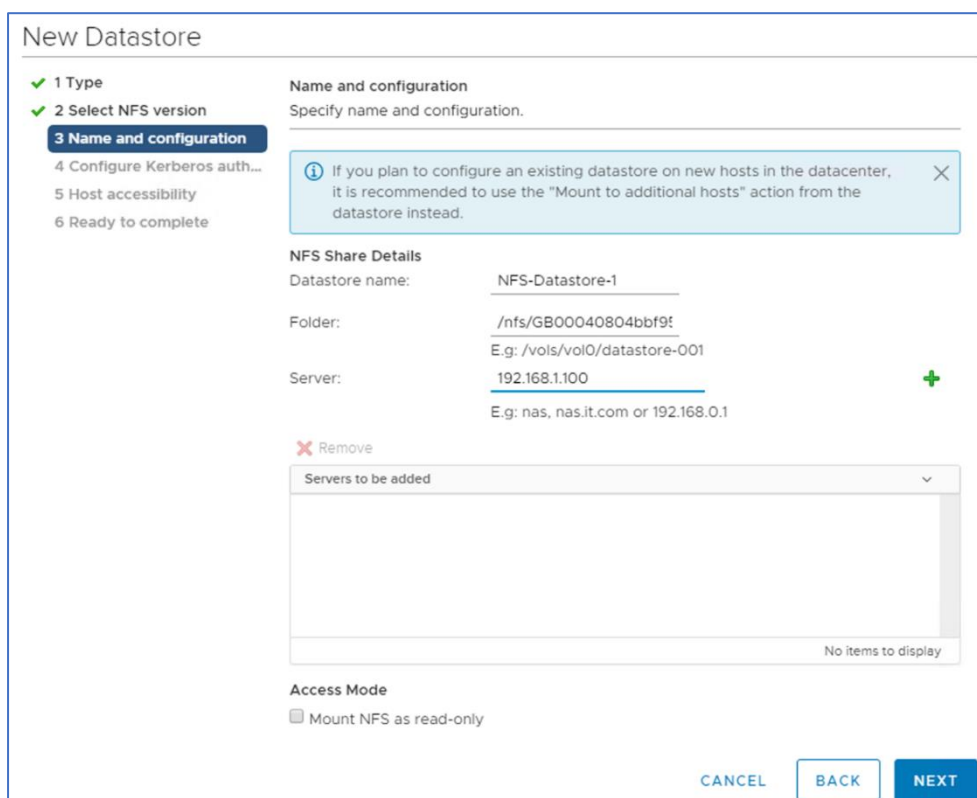
Step 4: Select Datastore type as “NFS”:



Step 5: Select the NFS version. For this document we will use NFS version 4.1:



Step 6: In the next step provide the new datastore name, path of the pavilion volume and NFS Server IP address (Pavilion Controller IP address):



Step 7: Click “NEXT”:

New Datastore

✓ 1 Type

✓ 2 Select NFS version

✓ 3 Name and configuration

4 Configure Kerberos auth...

5 Host accessibility

6 Ready to complete

Configure Kerberos authentication

The NFS 4.1 client can secure NFS messages using Kerberos. You can enable the requisite security level below.

☒ Don't use Kerberos authentication

☐ Use Kerberos for authentication only (krb5)

☐ Use Kerberos for authentication and data integrity (krb5i)

⚠

To use Kerberos authentication, each host that mounts this datastore has to be a part of an Active Directory domain and its NFS authentication credentials need to be set. This is done on the Authentication Services page on each host.

CANCEL

BACK

NEXT

Step 8: Select the Hosts that will have access to the new NFS datastore:

New Datastore

✓ 1 Type

✓ 2 Select NFS version

✓ 3 Name and configuration

✓ 4 Configure Kerberos auth...

5 Host accessibility

6 Ready to complete

Host accessibility

Select the hosts that require access to the datastore.

<input checked="" type="checkbox"/>	Host	Cluster
<input checked="" type="checkbox"/>	10.153.60	ESX-Cluster
<input checked="" type="checkbox"/>	10.153.61	ESX-Cluster
<input checked="" type="checkbox"/>	10.153.62	ESX-Cluster

3 items

CANCEL

BACK

NEXT

Step 9: Verify Information and click Finish:

New Datastore

✓ 1 Type

✓ 2 Select NFS version

✓ 3 Name and configuration

✓ 4 Configure Kerberos auth...

✓ 5 Host accessibility

6 Ready to complete

Ready to complete

Review your settings selections before finishing the wizard.

General

Name: NFS-Datastore-1

Type: NFS 4.1

NFS settings

Server: 192.168.1.100

Folder: /nfs/GB00040804bbf954

Access Mode: Read-write

Kerberos: Disabled

Hosts that will have access to this datastore

Hosts:

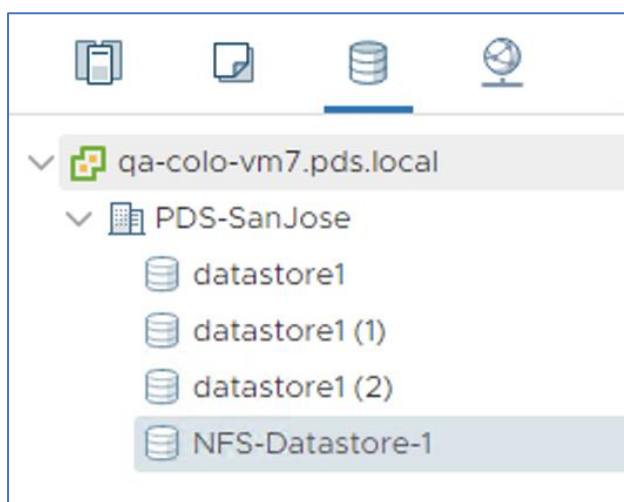
- 10.1.53.60
- 10.1.53.61
- 10.1.53.62

CANCEL

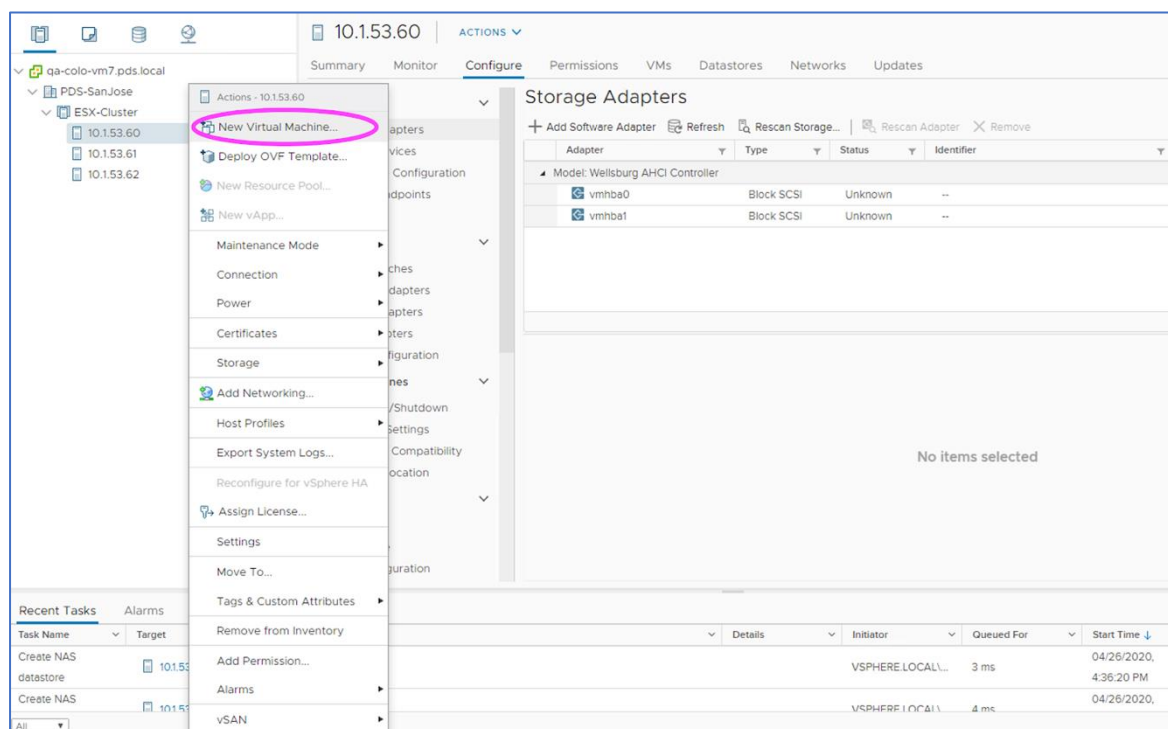
BACK

FINISH

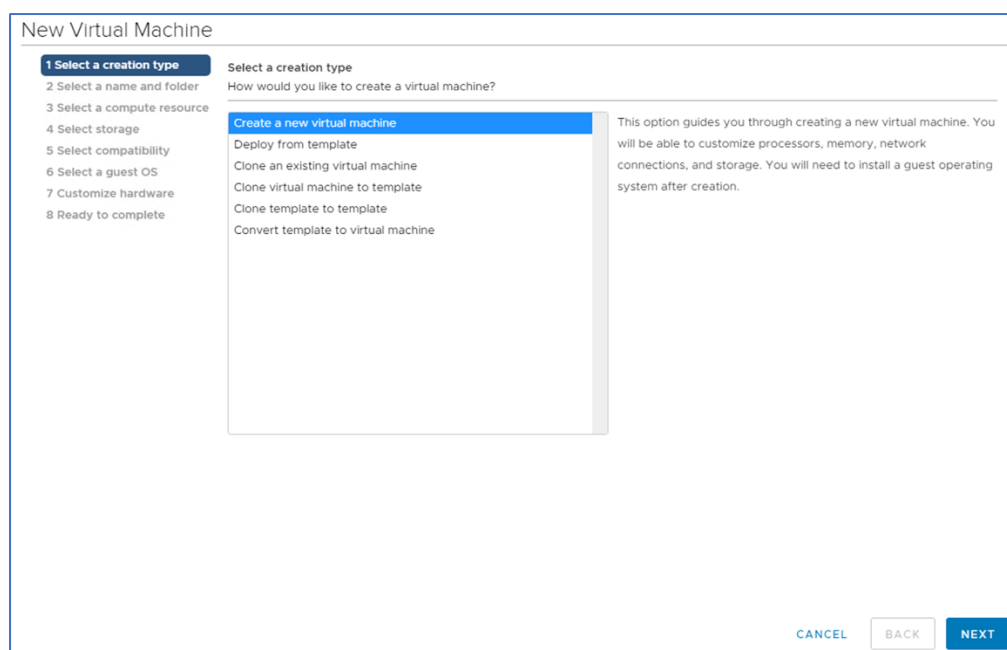
Step 10: New datastore “NFS-Datastore-1” has been configured and ready to use:



Step 11: Go back to Host and Clusters in Vcenter. Right click on any hosts in your ESX cluster and select New Virtual Machine:



Step 12: Select Creation type and click “NEXT”:



Step 13: Specify Virtual Machine Name and click “NEXT”:

New Virtual Machine

✓ 1 Select a creation type

2 Select a name and folder

3 Select a compute resource

4 Select storage

5 Select compatibility

6 Select a guest OS

7 Customize hardware

8 Ready to complete

Select a name and folder

Specify a unique name and target location

Virtual machine name: PDS-VM1

Select a location for the virtual machine.

qa-colo-vm7.pds.local

PDS-SanJose

CANCEL

BACK

NEXT

Step 14: Select primary host for the virtual machine and click “NEXT”:

New Virtual Machine

✓ 1 Select a creation type

✓ 2 Select a name and folder

3 Select a compute resource

4 Select storage

5 Select compatibility

6 Select a guest OS

7 Customize hardware

8 Ready to complete

Select a compute resource

Select the destination compute resource for this operation

PDS-SanJose

ESX-Cluster

10.1.53.60

10.1.53.61

10.1.53.62

Compatibility

✓ Compatibility checks succeeded.

CANCEL

BACK

NEXT

Step 15: Select datastore for the virtual machine and click “NEXT”:

New Virtual Machine

✓ 1 Select a creation type

✓ 2 Select a name and folder

✓ 3 Select a compute resource

4 Select storage

5 Select compatibility

6 Select a guest OS

7 Customize hardware

8 Ready to complete

Select storage

Select the storage for the configuration and disk files

☐ Encrypt this virtual machine (Requires Key Management Server)

VM Storage Policy:

Datastore Default

▼

Name	Capacity	Provisioned	Free	Type	Cluster
datastore1 (2)	337.5 GB	1.41 GB	336.09 GB	VMFS 6	
NFS-Datastore-1	984.18 GB	76.02 MB	984.11 GB	NFS v4.1	

Compatibility

✓

Compatibility checks succeeded.

CANCEL

BACK

NEXT

Step 16: Select Compatibility and click “NEXT”:

New Virtual Machine

✓ 1 Select a creation type

✓ 2 Select a name and folder

✓ 3 Select a compute resource

✓ 4 Select storage

5 Select compatibility

6 Select a guest OS

7 Customize hardware

8 Ready to complete

Select compatibility

Select compatibility for this virtual machine depending on the hosts in your environment

The host or cluster supports more than one VMware virtual machine version. Select a compatibility for the virtual machine.

Compatible with:

ESXi 7.0 and later

▼

ⓘ

This virtual machine uses hardware version 17, which provides the best performance and latest features available in ESXi 7.0

CANCEL

BACK

NEXT

vSphere 7.0: NFS Deployment Guide with Pavilion Hyperparallel Flash Array
© 2020 Pavilion Data Systems. Proprietary. All rights reserved.

Page | 54

Step 17: Select OS and click “NEXT”:

New Virtual Machine

✓ 1 Select a creation type

✓ 2 Select a name and folder

✓ 3 Select a compute resource

✓ 4 Select storage

✓ 5 Select compatibility

6 Select a guest OS

7 Customize hardware

8 Ready to complete

Select a guest OS

Choose the guest OS that will be installed on the virtual machine

Identifying the guest operating system here allows the wizard to provide the appropriate defaults for the operating system installation.

Guest OS Family: Linux

Guest OS Version: CentOS 7 (64-bit)

Compatibility: ESXi 7.0 and later (VM version 17)

CANCEL

BACK

NEXT

Step 18: Specify Virtual Machine Hardware (CPU, Memory, Network, Hard Disk etc):

New Virtual Machine

✓ 1 Select a creation type

✓ 2 Select a name and folder

✓ 3 Select a compute resource

✓ 4 Select storage

✓ 5 Select compatibility

✓ 6 Select a guest OS

7 Customize hardware

8 Ready to complete

Customize hardware

Configure the virtual machine hardware

Virtual Hardware

VM Options

> CPU

4

> Memory

8

GB

> New Hard disk *

40

GB

> New SCSI controller *

VMware Paravirtual

> New Network *

VM Network

> Video card *

Specify custom settings

> Security Devices

Not Configured

VMCI device

> New SATA Controller

New SATA Controller

> Other

Additional Hardware

ADD NEW DEVICE

Disks, Drives and Storage

Hard Disk

Existing Hard Disk

RDM Disk

Host USB Device

NVDIMM

CD/DVD Drive

Controllers

NVMe Controller

SATA Controller

SCSI Controller

USB Controller

Other Devices

PCI Device

Watchdog Timer

Precision Clock

Serial Port

Network

Network Adapter

Compatibility: ESXi

CANCEL

BACK

NEXT

vSphere 7.0: NFS Deployment Guide with Pavilion Hyperparallel Flash Array

© 2020 Pavilion Data Systems. Proprietary. All rights reserved.

Page | 55

New Virtual Machine

- ✓ 1 Select a creation type
- ✓ 2 Select a name and folder
- ✓ 3 Select a compute resource
- ✓ 4 Select storage
- ✓ 5 Select compatibility
- ✓ 6 Select a guest OS
- 7 Customize hardware**
- 8 Ready to complete

Customize hardware
Configure the virtual machine hardware

Virtual Hardware VM Options

[ADD NEW DEVICE](#)

> CPU	4	
> Memory	8	GB
> New Hard disk *	40	GB
> New SCSI controller *	VMware Paravirtual	
> New Network *	VM Network	Connect...
> New Network *	VM Network	Connect...
> Video card *	VM Network	Settings...
> Security Devices	Not Configured	
VMCI device		
New SATA Controller	New SATA Controller	
> Other	Additional Hardware	

Compatibility: ESX 7.0 and later (VM version 17)

[CANCEL](#) [BACK](#) [NEXT](#)

Select Network

Filter

Name	NSX Port Group ID	Distributed Switch
NFS-DPortGroup	--	Storage-DSwitch
VM Network	--	--

2 items

[CANCEL](#) [OK](#)

New Virtual Machine

- ✓ 1 Select a creation type
- ✓ 2 Select a name and folder
- ✓ 3 Select a compute resource
- ✓ 4 Select storage
- ✓ 5 Select compatibility
- ✓ 6 Select a guest OS
- 7 Customize hardware**
- 8 Ready to complete

Customize hardware
Configure the virtual machine hardware

Virtual Hardware VM Options

ADD NEW DEVICE

> CPU	4	
> Memory	8	GB
> New Hard disk *	40	GB
> New SCSI controller *	VMware Paravirtual	
> New Network *	VM Network	<input checked="" type="checkbox"/> Connect...
> New Network *	NFS-DPortGroup	<input checked="" type="checkbox"/> Connect...
> Video card *	Specify custom settings	
> Security Devices	Not Configured	
VMCI device		
New SATA Controller	New SATA Controller	
> Other	Additional Hardware	

Compatibility: ESXi 7.0 and later (VM version 17)

CANCEL BACK NEXT

Step 19: Verify VM Information and click “FINISH”:

New Virtual Machine

- ✓ 1 Select a creation type
- ✓ 2 Select a name and folder
- ✓ 3 Select a compute resource
- ✓ 4 Select storage
- ✓ 5 Select compatibility
- ✓ 6 Select a guest OS
- ✓ 7 Customize hardware
- 8 Ready to complete**

Ready to complete
Click Finish to start creation.

Virtual machine name	POS-VM1
Folder	POS-SanJose
Cluster	POS-ESXi-Cluster
Datastore	NFS1
Guest OS name	Red Hat Enterprise Linux 7 (64-bit)
Virtualization Based Security	Disabled
CPUs	4
Memory	8 GB
NICs	2
NIC 1 network	VM Network
NIC 1 type	E1000E
NIC 2 network	NFS-DPortGroup (Storage-DSwitch)
NIC 2 type	VMXNET 3
SCSI controller 1	VMware Paravirtual
Create hard disk 1	New virtual disk

CANCEL BACK FINISH

Step 20: Power On the new created VM and install OS:

