CLUSTERED DATA ONTAP ADMINISTRATION, 8.2 UPDATE PART 1 SETUP

EXERCISE

In this exercise, you configure a two-node cluster called cluster1, investigate changes in licensing and create a new single-node cluster called cluster2.

NOTE: This is a simulated environment. The clustered Data ONTAP 8.2 vsims are not high-availability (HA) pairs. This is not a supported configuration. The only non-high-availability configuration that is supported is a single-node cluster.

FEATURED NETAPP PRODUCTS

- Clustered Data ONTAP 8.2
- NetApp OnCommand System Manager

KEY FEATURES TO DEMONSTRATE

- RAID 4 and RAID-DP technology
- Licensing
- Single-node clusters

HIGH-LEVEL VALUE PROPOSITION

- Clustered Data ONTAP 8.2 provides a feature-rich environment that is often the best fit for customers.
- Clustered Data ONTAP 8.2 lets you configure a single node as a cost-efficient cluster for small workloads.

OBJECTIVES

By the end of this exercise, you should be able to:

- Install OnCommand System Manager
- Create a cluster
- Add the cluster to NetApp OnCommand System Manager
- Join a node to the cluster
- Manage licenses in Data ONTAP 8.2
- Create a data aggregate
- Create a single-node cluster
- Add the single-node cluster to NetApp OnCommand System Manager

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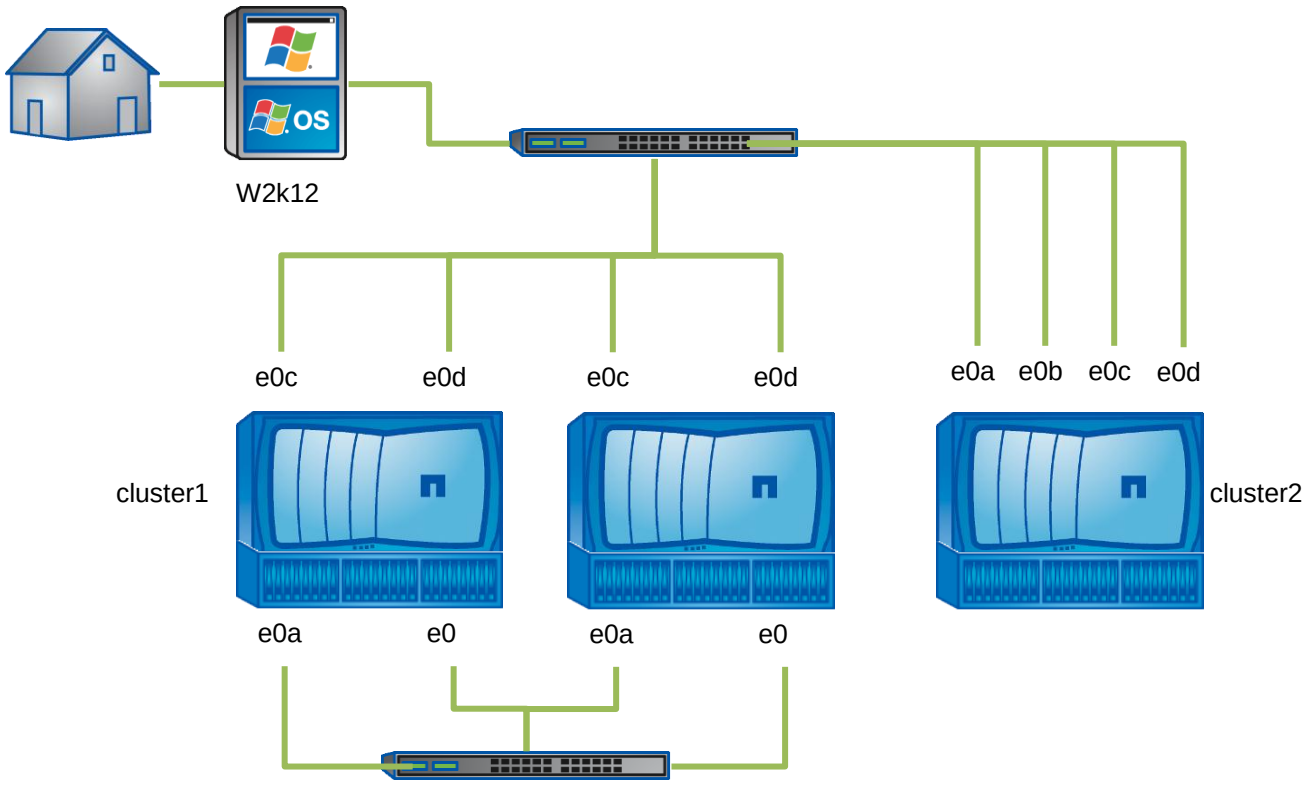
EXERCISE ENVIRONMENT

This environment consists of:

(1) Windows Server 2012 Active Directory
(2) Two-node cluster: cluster1
(3) Single-node cluster: cluster2



Host Name	IP Address(es)	Username	Password
w2k12	192.168.0.11	Administrator	Netapp123
cluster1	192.168.0.101	admin	Netapp123
cluster1-01	192.168.0.91	admin	Netapp123
cluster1-02	192.168.0.92	admin	Netapp123
cluster2	192.168.0.102	admin	Netapp123
cluster2-01	192.168.0.93	admin	Netapp123

NOTE: This table lists only the lab components. Please refer to the tasks that follow for the detailed steps.

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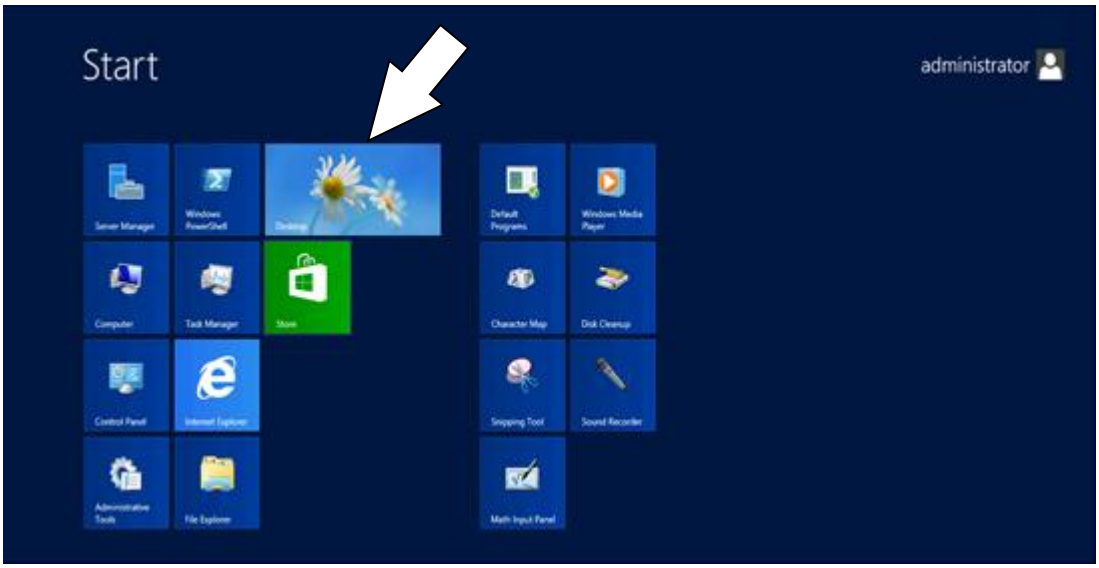
TASK 1: INSTALL ONCOMMAND SYSTEM MANAGER

In this task, you install OnCommand System Manager on your Windows Server.

STEP	ACTION
1.	Verify you see the Modern view of your assigned Windows Server:
2.	Click the **Desktop** tile: 

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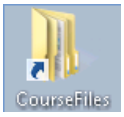
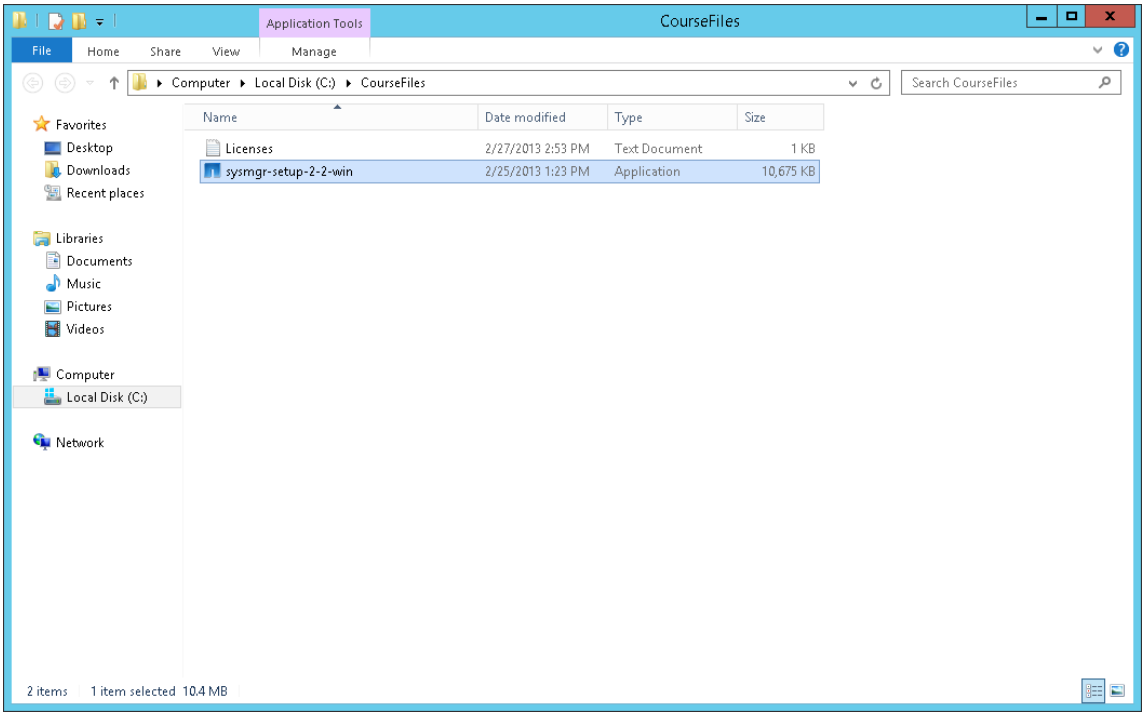
STEP	ACTION
3.	Verify that you see the administrator's desktop:
4.	On your Windows Server's desktop, double-click the **CourseFiles** shortcut: 
5.	Verify the **`C:\CourseFiles`** directory opens: 
6.	Double-click **sysmgr-setup-2-2-win.exe**.

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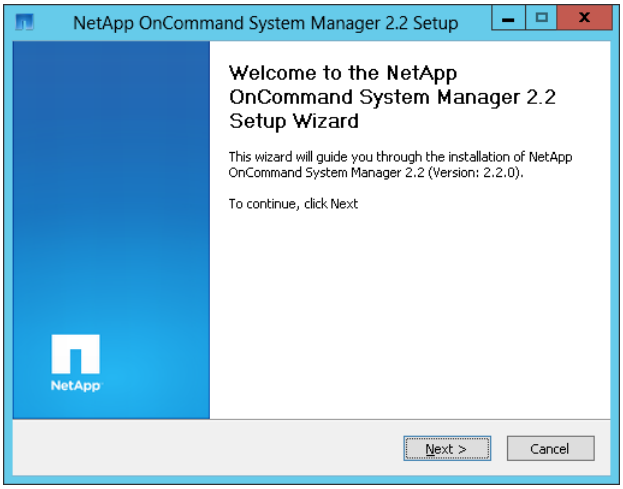
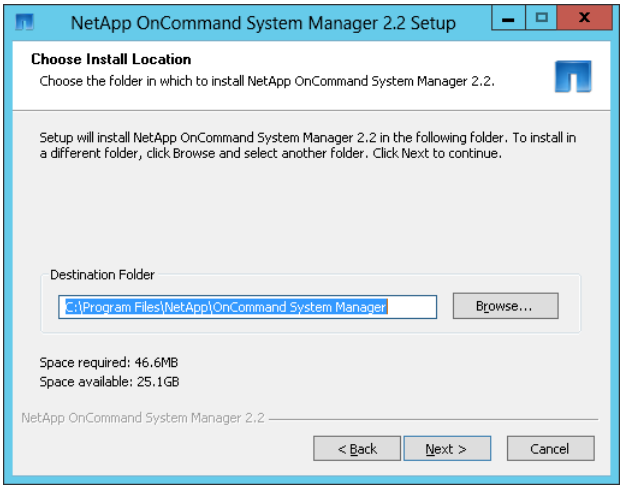
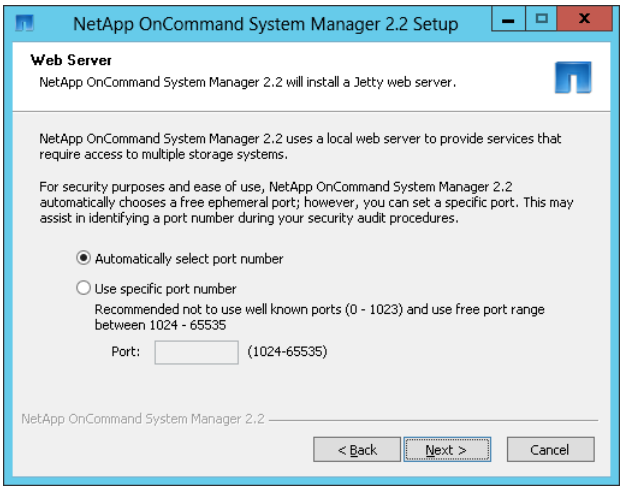
STEP	ACTION
7.	Verify the NetApp OnCommand System Manager Setup Wizard appears: 
8.	Click **Next** to start the wizard.
9.	Accept the default installation location and click **Next**: 
10.	Select **Automatically select port number**: 

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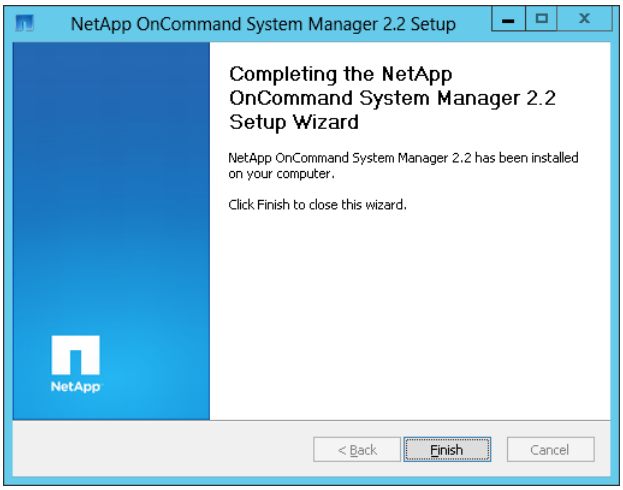
STEP	ACTION
11.	Click **Next**.
12.	After installation, verify that the install completed successfully: 
13.	Click **Finish**.

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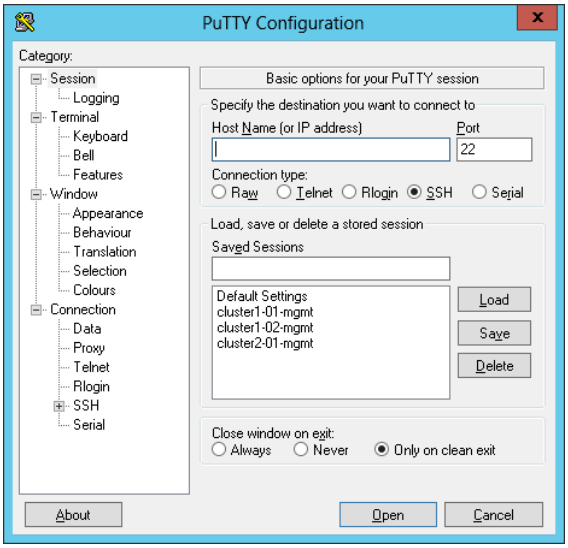
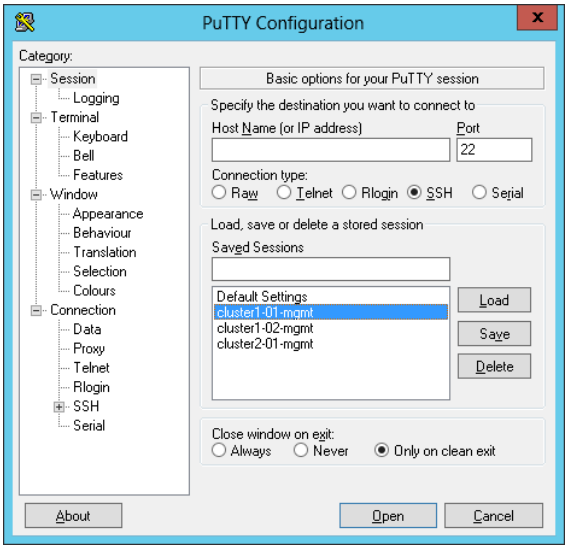
TASK 2: CREATE A CLUSTER

In this task, you log in to your assigned node 1 and create a cluster. Your node 1 is in the state immediately after disk initialization. Cluster interconnect switches have been configured and cabled to the appropriate ports for this node. In order to provide remote access, this node has been configured with a node management logical interface (LIF). You use the LIF to initiate a Secure Shell (SSH) session with node 1.

STEP	ACTION
1.	On your Windows desktop, double-click the link to PuTTY icon:
2.	Verify that the PuTTY Configuration dialog appeared: 
3.	Under Saved Sessions, select the **cluster1-01-mgmt** saved session: 

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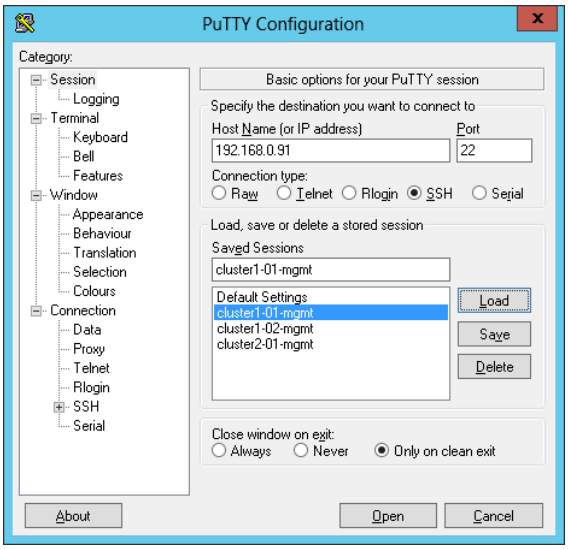
STEP	ACTION
4.	Click **Load**: 
5.	Click **Open** to open a session with your storage system.
6.	The PuTTY Security Alert dialog box appears (your SSH fingerprint might differ from example shown):
7.	Click **Yes** to confirm the SSH fingerprint key.
8.	Verify that you see the login prompt. `login as:`
9.	At the login prompt, type **`admin`**.
10.	The admin login account does not have a password assigned to it yet. Press **Enter**.
11.	Verify that you see the command prompt. `cluster1-01::>`
12.	Start the cluster setup wizard: `cluster1-01::> cluster setup`

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STEP	ACTION
13.	In response to the question "Do you want to create a new cluster or join an existing cluster," enter **`create`** to create a cluster for the first node.
14.	In the response to the question "Do you intend for this node to be used as a single node cluster," enter **`no`** for this cluster will be a multiple node cluster.

15.	Verify the default values for the cluster interconnect:
	`Private cluster network ports [e0a,e0b].`
	`Cluster port MTU values will be set to 1500.`
	NOTE: The exercise environment is a simulated environment. If you use physical hardware, these values are different. For details about recommended cluster interconnect ports and MTU sizes, see the NetApp Support site (http://support.netapp.com).

16.	In response to the question "do you want to use these defaults," enter **`yes`**.
17.	At step 1 of 5, enter the cluster name **`cluster1`**. **NOTE**: Cluster names in clustered Data ONTAP are case-sensitive. "Cluster1" is not the same as "cluster1."
18.	Enter the cluster base license code: **`ETYYFLXUQUMADFAAAAAAAAAAAAAA`** **NOTE**: You can also cut and paste the license code from Licenses.txt in `C:\CourseFiles`. Look for the cluster base license code for cluster1. If you mistype the license code, the setup script will continue to prompt you for the correct code.
19.	At step 2 of 5, enter the CIFS license: KCBNKHHTVDDCMAOZFAAAAAAAAAAA **NOTE**: You can also cut and paste the license code from Licenses.txt in `C:\CourseFiles`. Look for the CIFS license code for cluster1-01.
20.	On prompt "Enter an additional license key," press **Enter** to indicate that you are finished adding license codes.
21.	At step 3 of 5, enter a password for the cluster administrator (admin) account. For example, you can use **`Netapp123`**.
22.	Enter the password again.
23.	Press **Enter** to select the default cluster management interface port: **`e0c`**
24.	Enter this IP address for the cluster management interface: **`192.168.0.101`**
25.	Enter this network mask for the cluster management interface: **`255.255.255.0`**
26.	Enter this default gateway for the cluster management interface: **`192.168.0.1`**
27.	Enter this Domain Name System (DNS) domain name: **`learn.netapp.local`**
28.	Enter this name server IP address: **`192.168.0.11`**
29.	At step 4 of 5, note the statement about storage failover (SFO). Because this is not a high-availability system, it will not use SFO.

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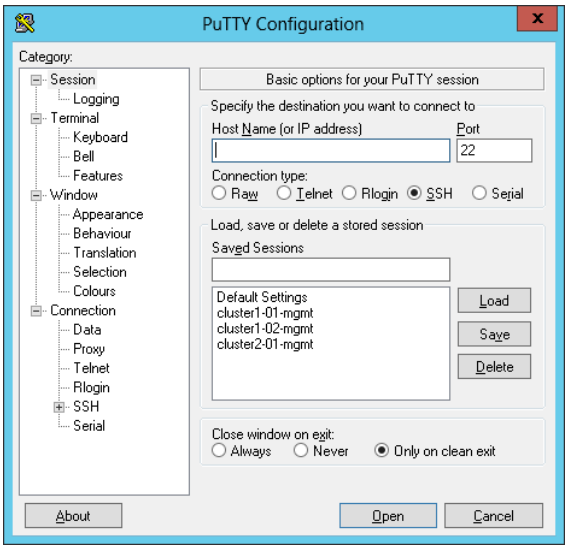
STEP	ACTION
30.	At step 5 of 5, in the text box, enter the location of the controller. **NOTE:** You should enter the physical address of the storage system, because NetApp Global Support uses this information for delivering parts. For this educational environment, you can enter anything value.
31.	Press **Enter** to select the default node management interface port: **`e0c`**
32.	Press **Enter** to use the defined IP address, **`192.168.0.91`**, for this node. **NOTE:** The node management interface was set when the lab environment was prepared.
33.	Press **Enter** to use the defined network mask, **`255.255.255.0`**, for this node.
34.	Enter this default gateway for the cluster management interface: **`192.168.0.1`**
35.	This completes the cluster setup wizard. Verify you now see the cluster shell prompt: `cluster1::>`
36.	Close the PuTTY session for the node management LIF. You can now use SSH to log in to the cluster management port from another PuTTY session.
37.	Click the icon to open another PuTTY window:
38.	Verify that the PuTTY Configuration dialog appears: 

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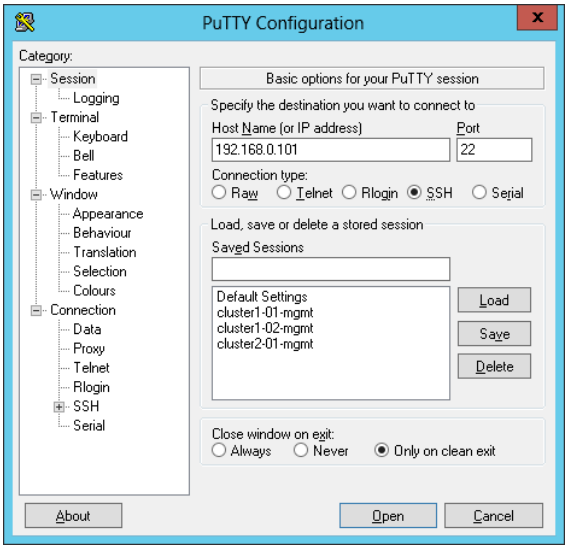
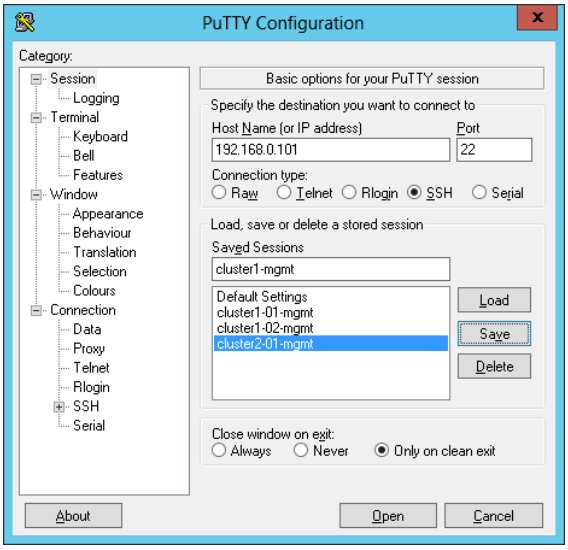
STEP	ACTION
39.	Enter the IP address of the cluster management LIF: **`192.168.0.101`** 
40.	Verify that **`SSH`** is selected as the connection type.
41.	Type a new session for this session: **`cluster1-mgmt`** 
42.	Click **Save**.
43.	Click **Open** to start the session.

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STEP	ACTION
44.	Verify the PuTTY Security Alert dialog box appears (your SSH fingerprint might differ from this one): If you don't see the security alert, then you might have entered an incorrect IP address either at (step 24 or step 39).
45.	Click **Yes** to approve the SSH fingerprint key.
46.	Verify that you see the login prompt. `login as:`
47.	Authenticate as: **`admin`**
48.	Enter the password you provided in step 21 of this task (the suggested password was `Netapp123`).
49.	Verify that you see the clustershell prompt: `cluster1::>`

50.	Check the cluster health:
	`cluster1::> cluster show`
	Sample output:
	`Node Health Eligibility`
	`--- --- ---`
	`cluster1-01 true true`

51.	Verify the version of the Data ONTAP:
	`cluster1::> system node image show`
	Sample output:
	`Is Is Install`
	`Node Image Default Current Version Date`
	`--- --- --- --- --- ---`
	`cluster1-01 image1 true true 8.2X15 -`

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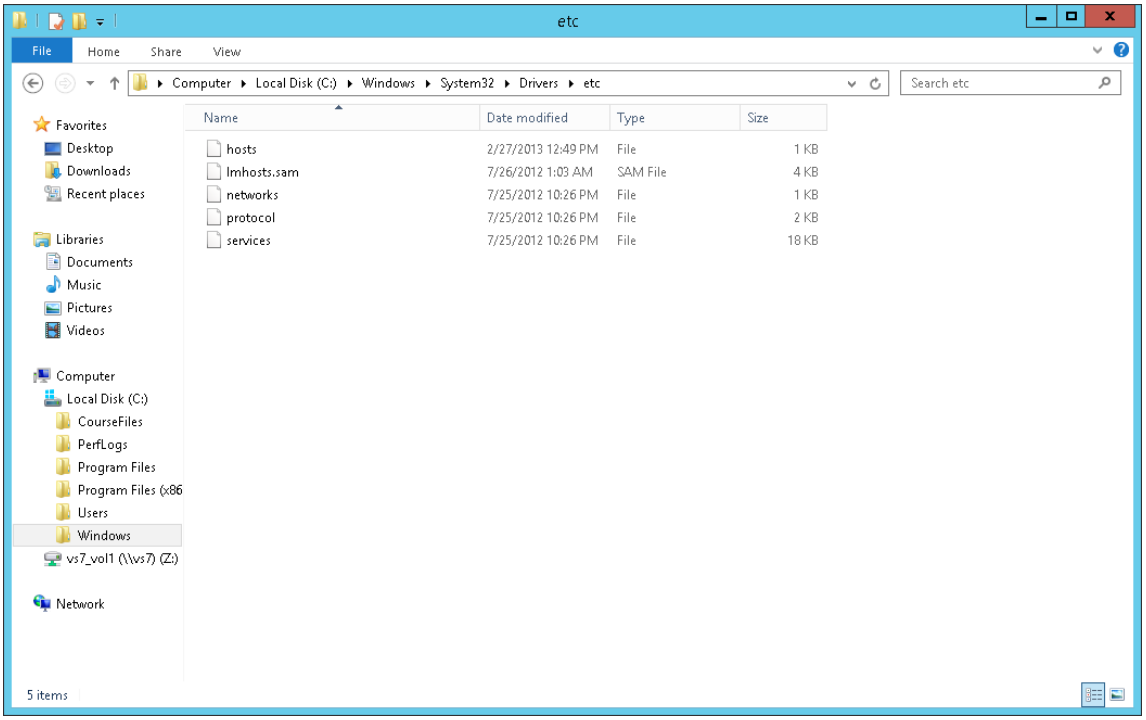
TASK 3: ADD THE CLUSTER TO ONCOMMAND SYSTEM MANAGER

In this task, you add your cluster management port to the local hosts file, launch System Manager, and add your newly created cluster.

NOTE: For more details about configuring a storage system with System Manager, see the *Clustered Data ONTAP Administration* course.

STEP	ACTION
1.	On the administrator desktop, open **File Explorer**:
2.	Navigate to: **`C:\Windows\System32\Drivers\etc`** 
3.	Double-click **hosts**.

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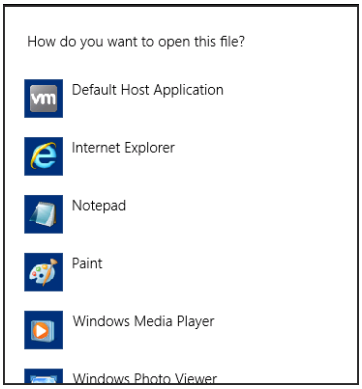
STEP	ACTION
4.	Verify that the operation dialog appears. 
5.	Select **Notepad** to open the hosts file in this tool.
6.	Append to the end of the file the following information: *cluster_management_LIF_IP_address cluster_name* Specifically, you should enter: **`192.168.0.101  cluster1`**
7.	Save the file.
8.	Exit **Notepad**.
9.	Close **File Explorer**.
10.	On your Windows Server desktop, double-click the NetApp OnCommand System Manager icon.

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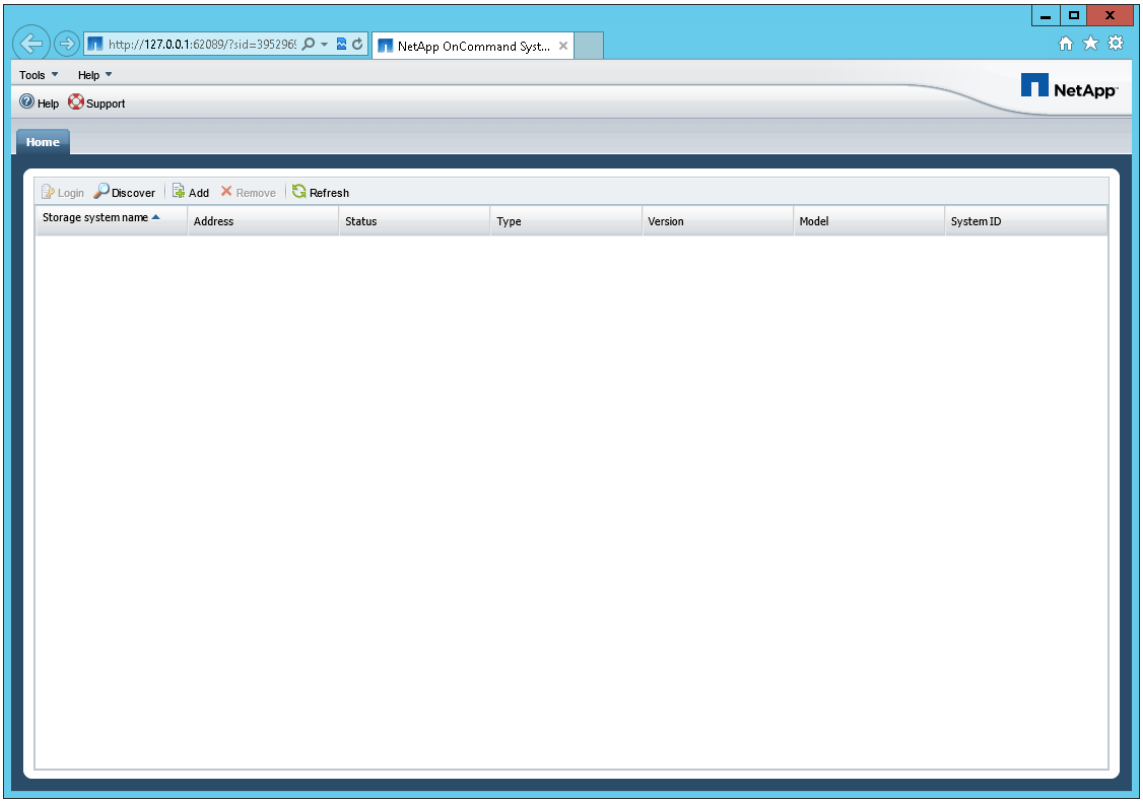
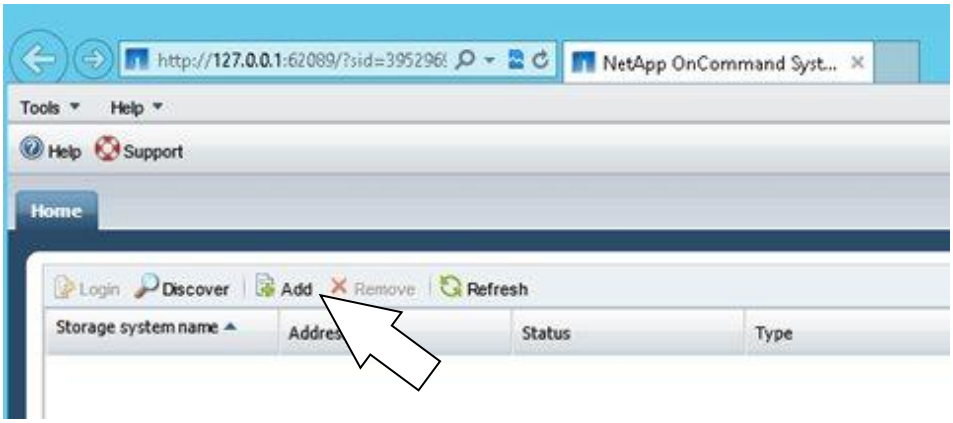
STEP	ACTION
11.	Verify that System Manager launches: 
12.	Click **Add**, which associates the new storage system (cluster1) with System Manager: 

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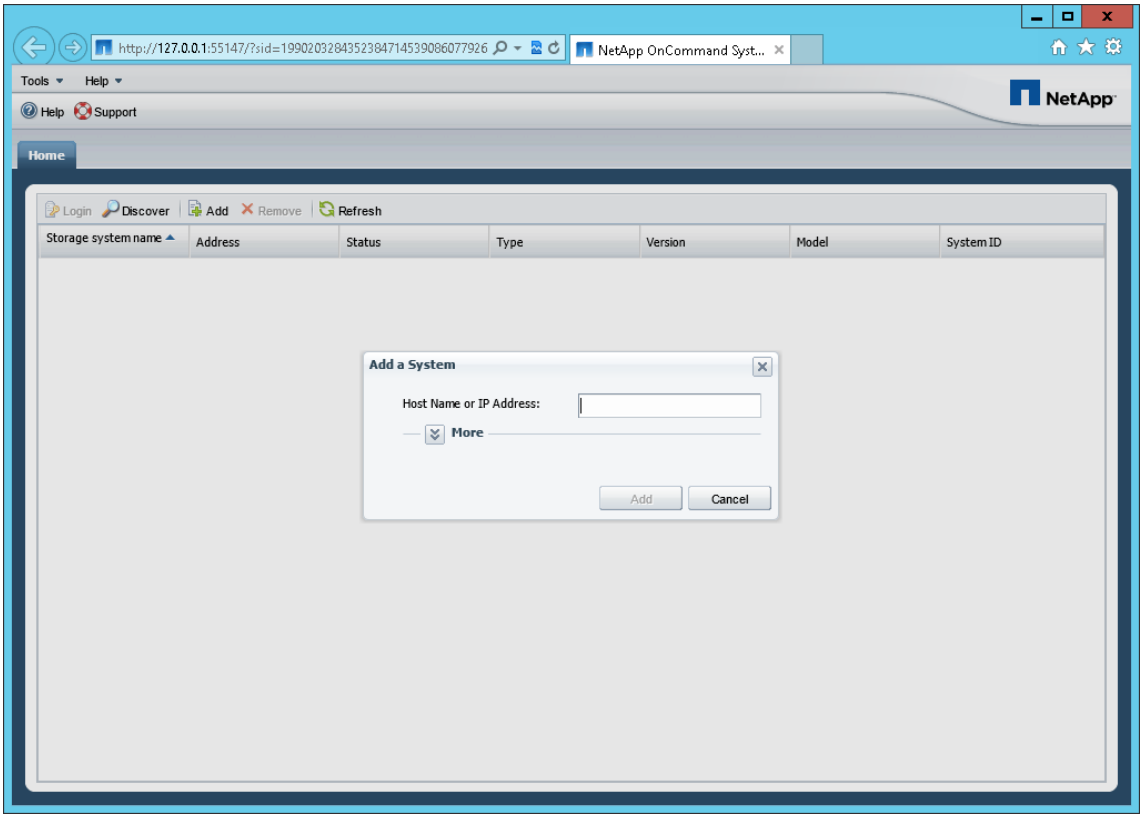
STEP	ACTION
13.	Verify the Add a System dialog box appears. 

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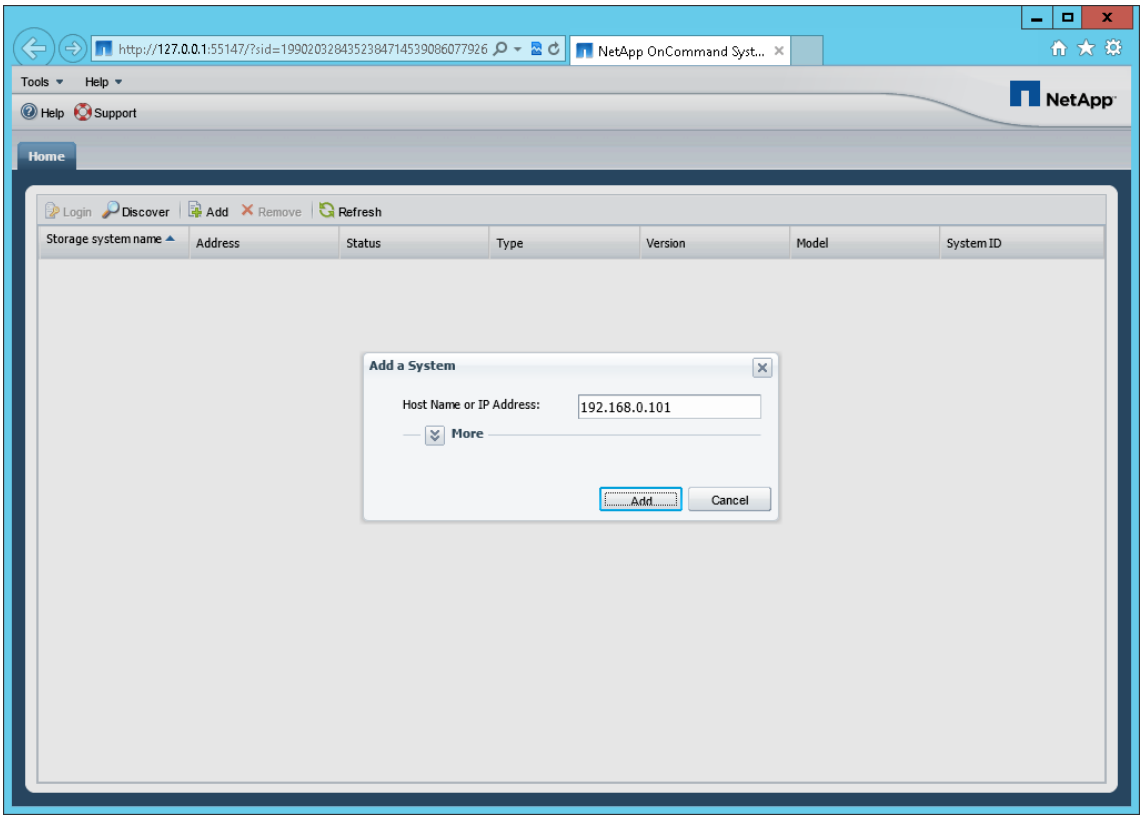
STEP	ACTION
14.	In the Host Name or IP Address text box, enter the IP address of the cluster management LIF: **`192.168.0.101`** 

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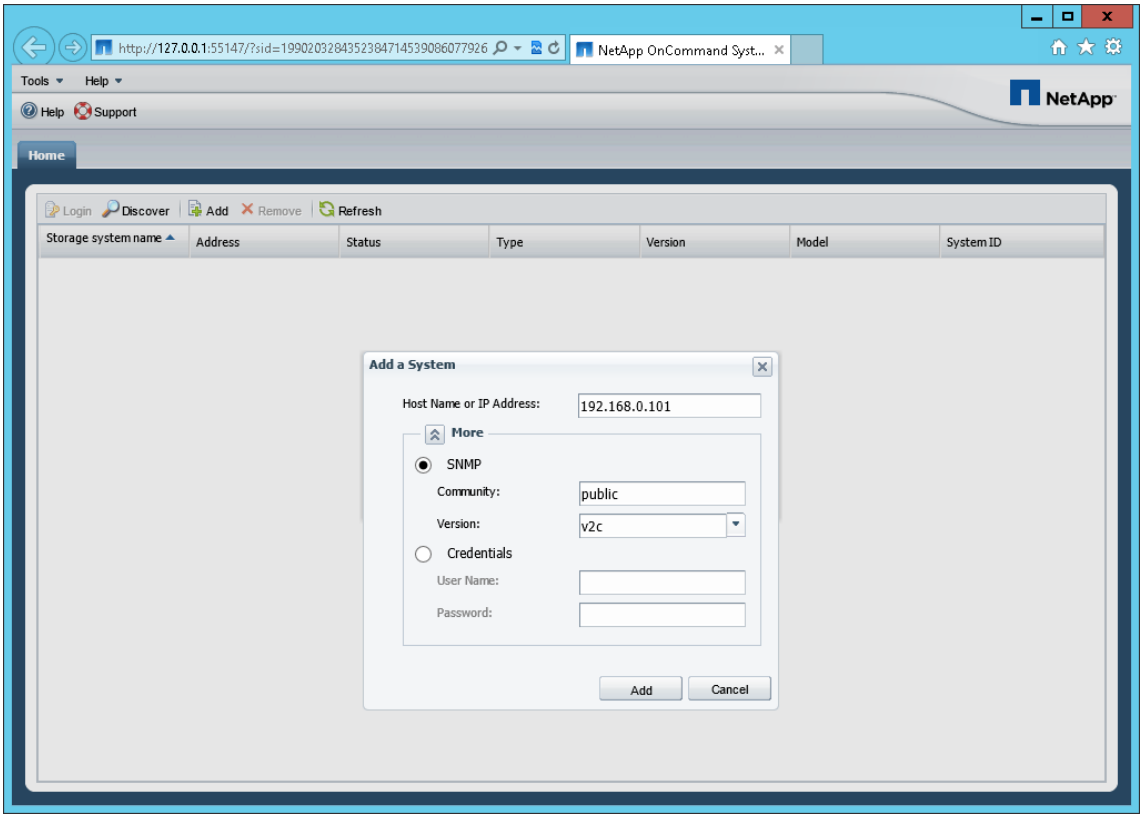
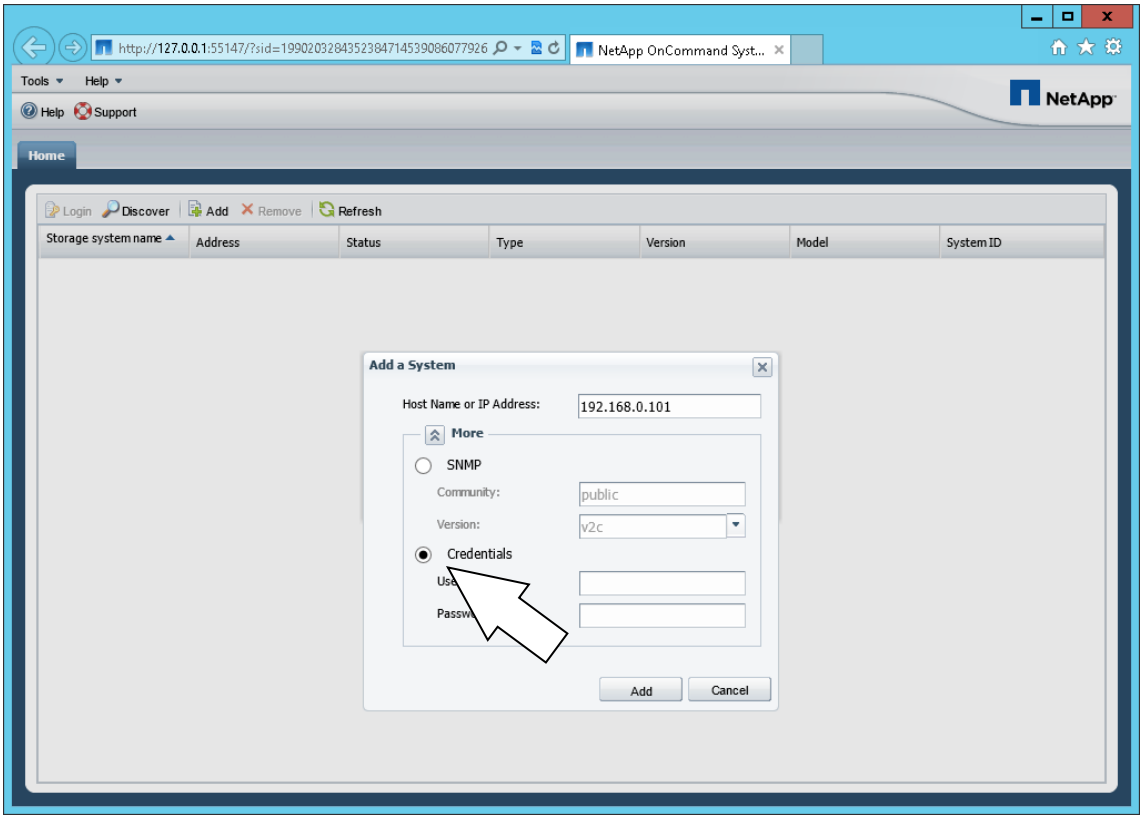
STEP	ACTION
15.	Click the **More** button, expanding the dialog box: 
16.	Select the **Credentials** button: 

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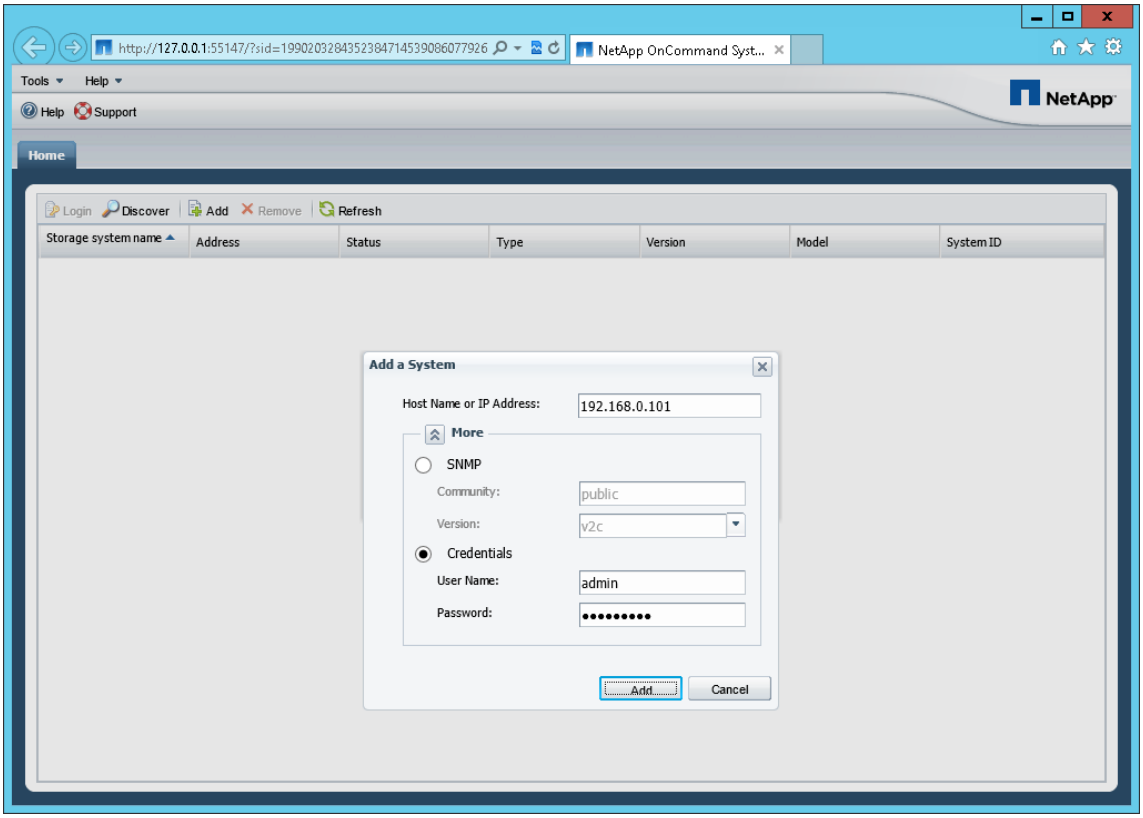
STEP	ACTION
17.	Authenticate as **admin** with the password you provided in Step 21 of Task 2: 
18.	Click **Add**.

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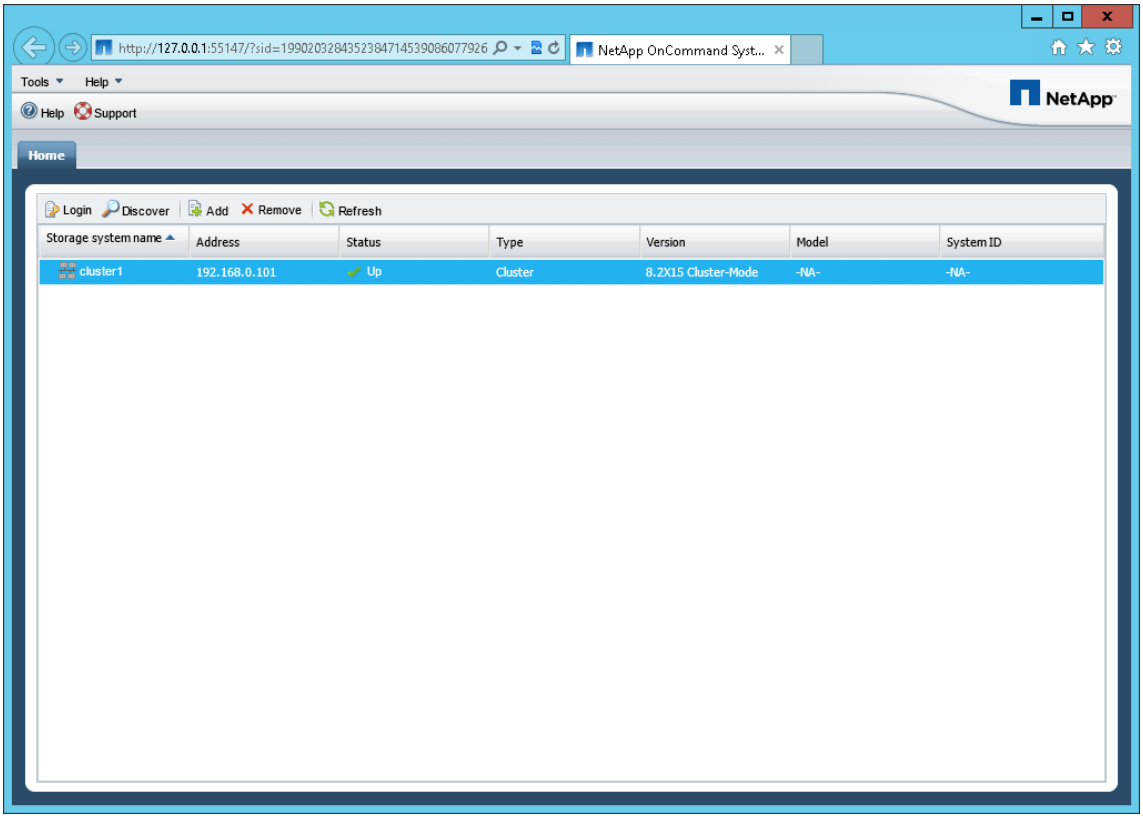
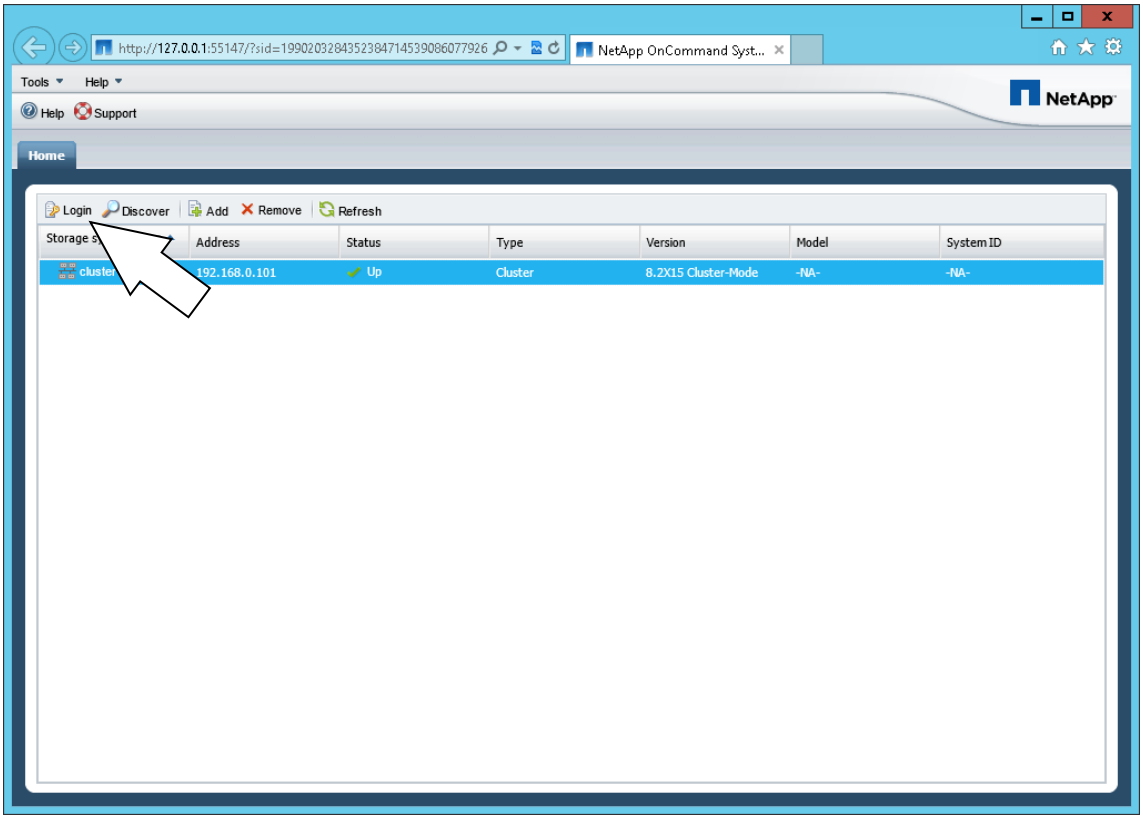
STEP	ACTION
19.	The cluster should be added to the list of storage systems: 
20.	Ensure that cluster1 is selected and click **Login**: 

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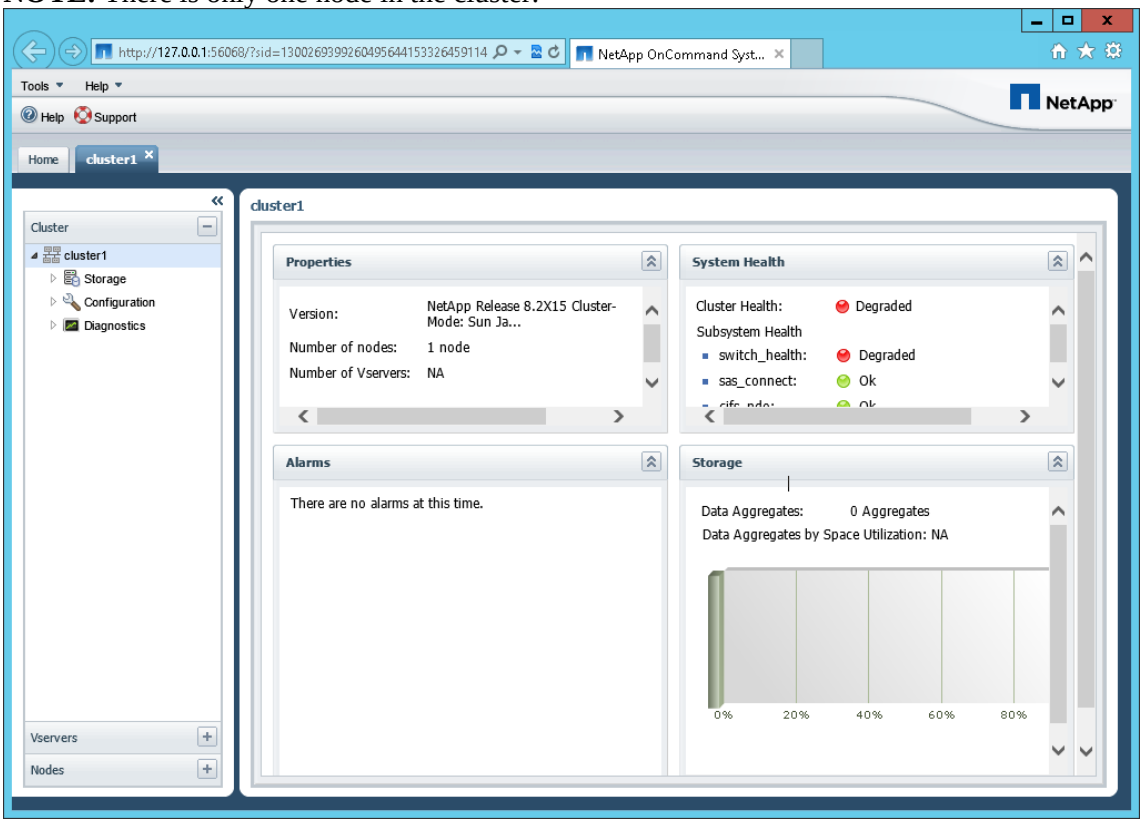
STEP	ACTION
21.	In the left pane of System Manager, expand **cluster1**. **NOTE:** There is only one node in the cluster: 

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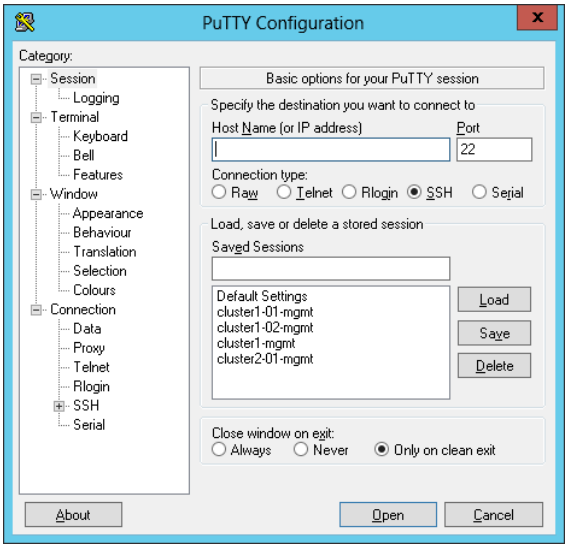
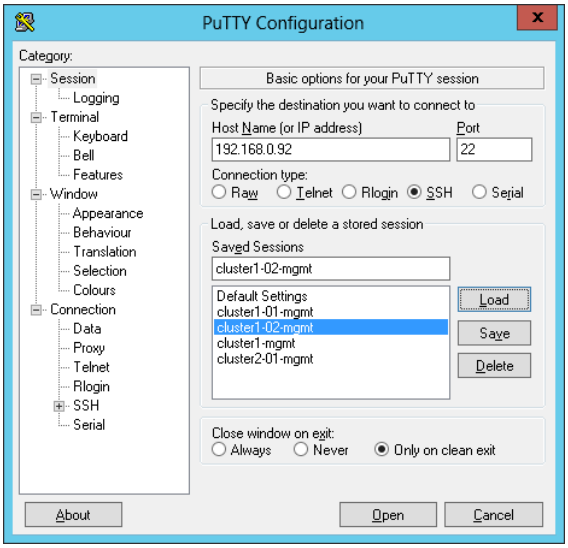
TASK 4: JOIN A NODE TO THE CLUSTER

In this task, you add your second assigned node to the cluster. Just like node 1, node 2 is in the state immediately after disk initialization. The cluster interconnect switches have been configured and cabled to the appropriate ports for this node. In order to provide remote access, this node has been configured with a node management LIF. You use the LIF to initiate an SSH session with node 2.

STEP	ACTION
1.	On your Windows desktop, double-click the link to PuTTY icon:
2.	Verify that the PuTTY dialog has appears: 
3.	Select the **cluster1-02-mgmt** saved session.
4.	Click **Load**: 
5.	Click **Open** to start the session.

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STEP	ACTION
6.	The PuTTY Security Alert should appear.
7.	Click **Yes** to confirm the SSH fingerprint key.
8.	Verify that you see the login prompt. `login as:`
9.	At the login prompt, type: **`admin`**
10.	The admin login account does not have a password assigned to it. Press **Enter**.
11.	Verify the command prompt appears: `cluster1-02::>`
12.	Start the cluster setup wizard: `cluster1-02::> cluster setup`
13.	In response to the question "Do you want to create a new cluster or join an existing cluster," enter **`join`**.

14.	Verify the default values for the cluster network:
	`Private cluster network ports [e0a,e0b].`
	`Cluster port MTU values will be set to 1500.`
	NOTE: The exercise environment is a simulated environment. If you use physical hardware, these values are different.

15.	In response to the question "Do you want to use these defaults," enter **`yes`**.
16.	At Step 1 of 3, verify that the cluster was correctly identified on the valuable clusters to join: **`cluster1`**
17.	Press **Enter** to select the cluster1 cluster.
18.	In Stept 2 of 3, note the statement about storage failover (SFO). This is a non-high-availability system and so will not use SFO.
19.	In Step 3 of 3, press **Enter** to select the default node management interface port: **`e0c`**
20.	The node management interface set during the setup of the lab environment. Press **Enter** to use the predefined IP address. The IP address for this node should be **`192.168.0.92`**.
21.	Press **Enter** to use the predefined network mask. The network mask should be **`255.255.255.0`** for this node.
22.	Enter the following default gateway for the cluster management interface: **`192.168.0.1`**
23.	Verify the cluster setup wizard completes successfully.
24.	Close the node management LIF SSH PuTTY session.
25.	Switch back to the PuTTY SSH session with the cluster management LIF.

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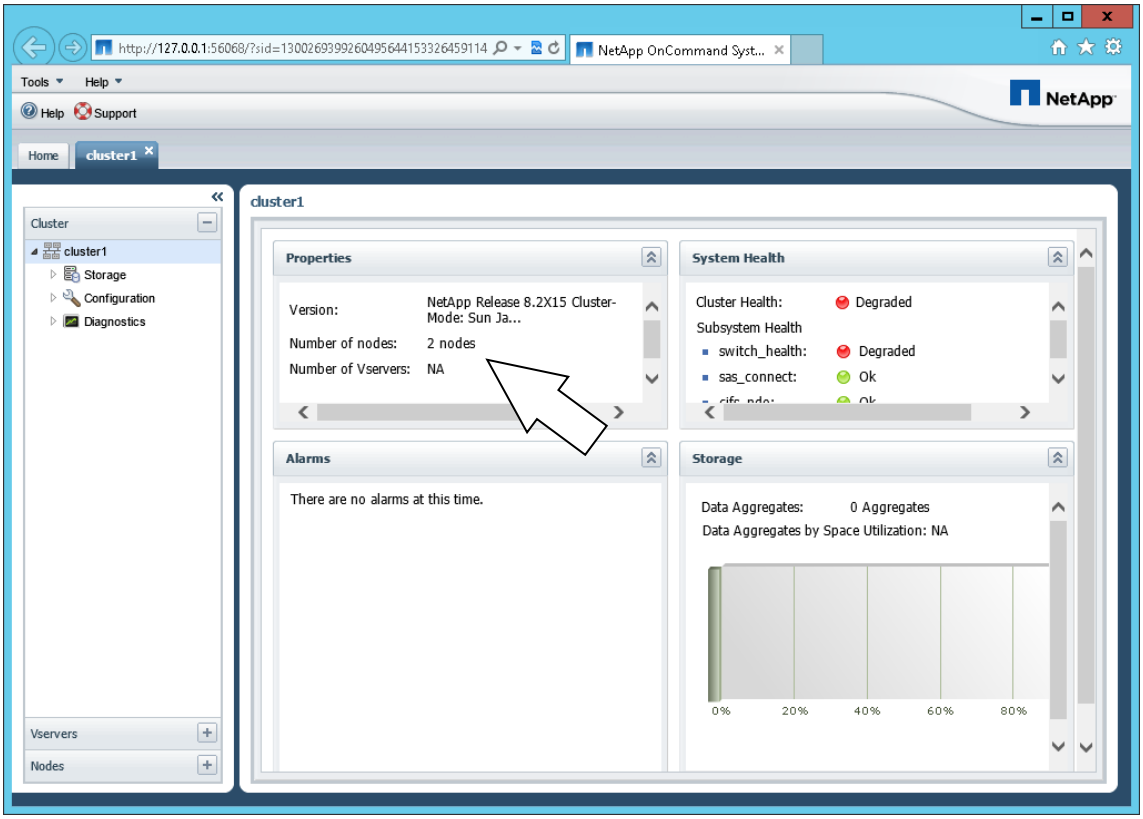
STEP	ACTION

26.	Enter this command to check the cluster health:
	`cluster1::> cluster show`
	Sample output:
	`Node Health Eligibility`
	`--- --- ---`
	`cluster1-01 true true`
	`cluster1-02 true true`
	`2 entries were displayed.`

27.	In System Manager, verify that both nodes are visible: 

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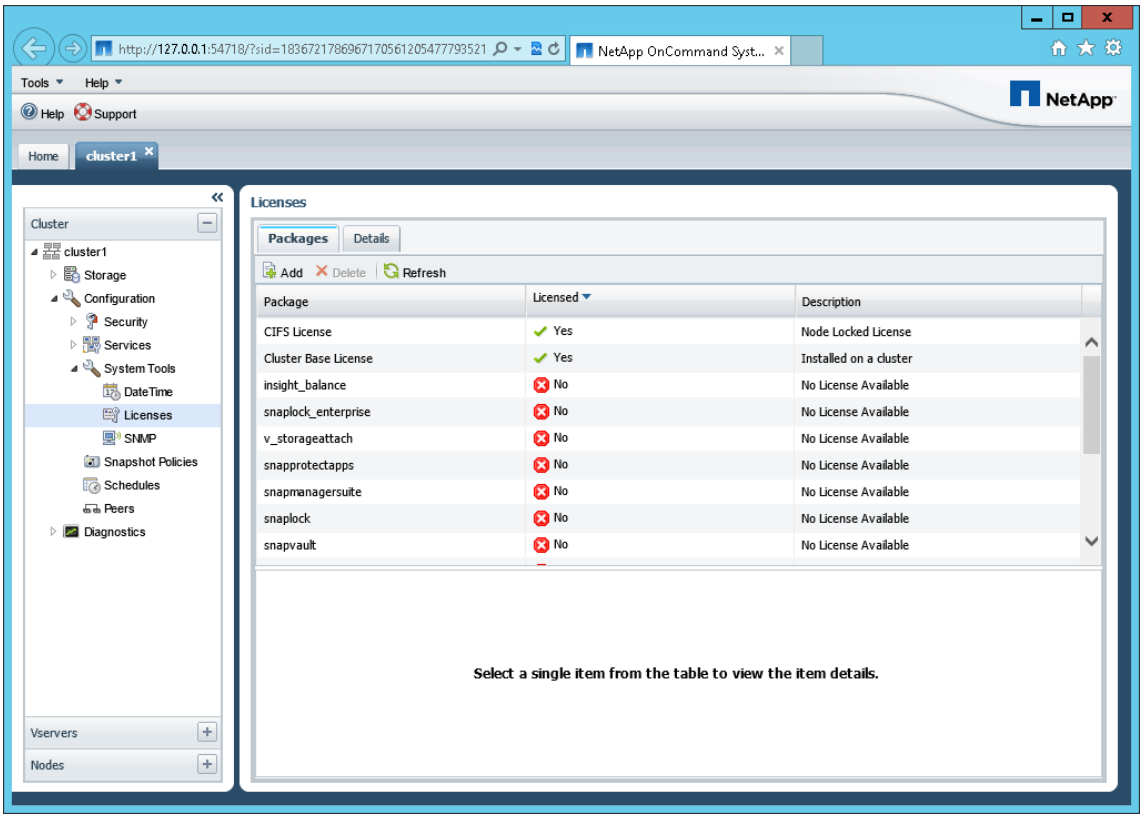
TASK 5: EXPLORE HOW TO LICENSE PACKAGES

In this task, you use System Manager to license the SnapVault package, which is new to clustered Data ONTAP 8.2. Then you use an SSH session to the cluster management LIF to explore licensing packages from the CLI.

STEP	ACTION
1.	Within the cluster1 tab, select **Cluster** > **cluster1** > **Configuration** > **System Tools** > **Licenses**.
2.	Verify that the CIFS package and the base package are licensed. There are three types of licenses: ▪ **Licenses**, which System Manager describes as "Node Locked License." Each node license is locked to a node in the cluster. You should install node licenses for each node in the cluster. The CIFS license is a node license. ▪ **Site licenses**, which System Manager describes as "Installed on a cluster." The base cluster license is a site license. ▪ **Demonstration licenses**, which System Manager describes as "Demo License expires on *end_date*" These licenses are not locked to a particular node. 

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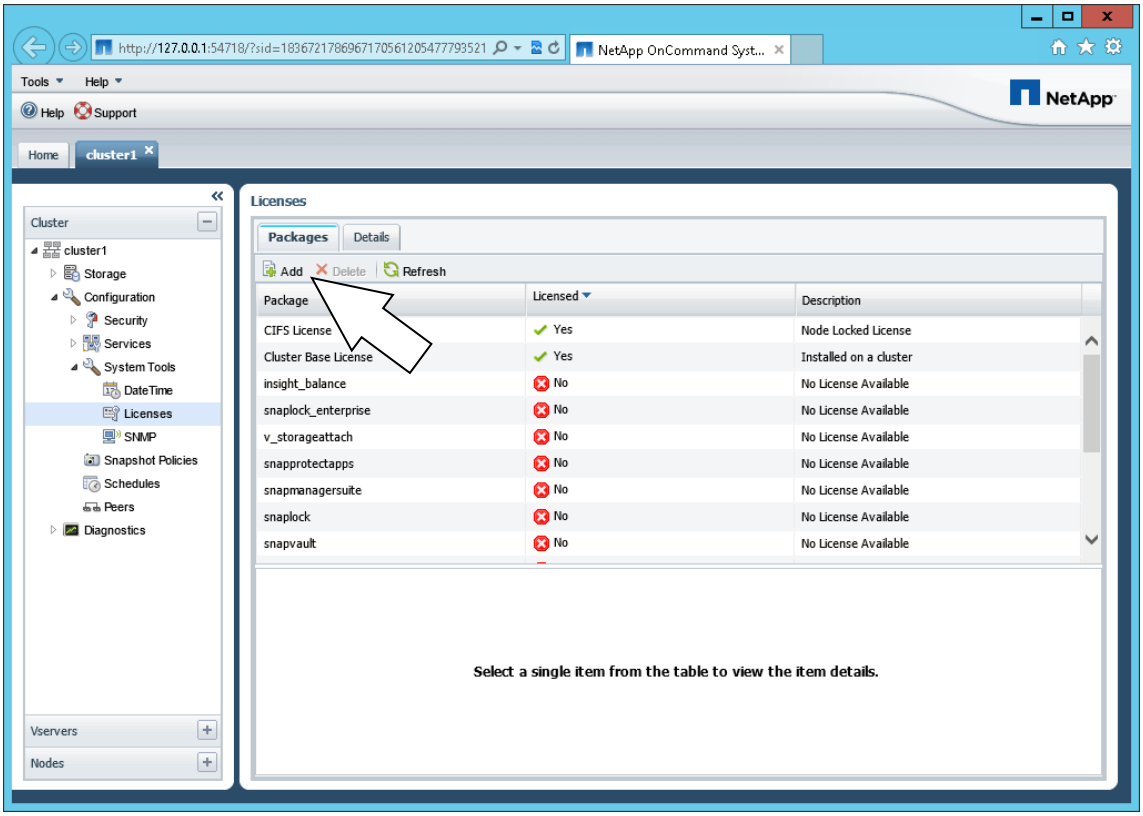
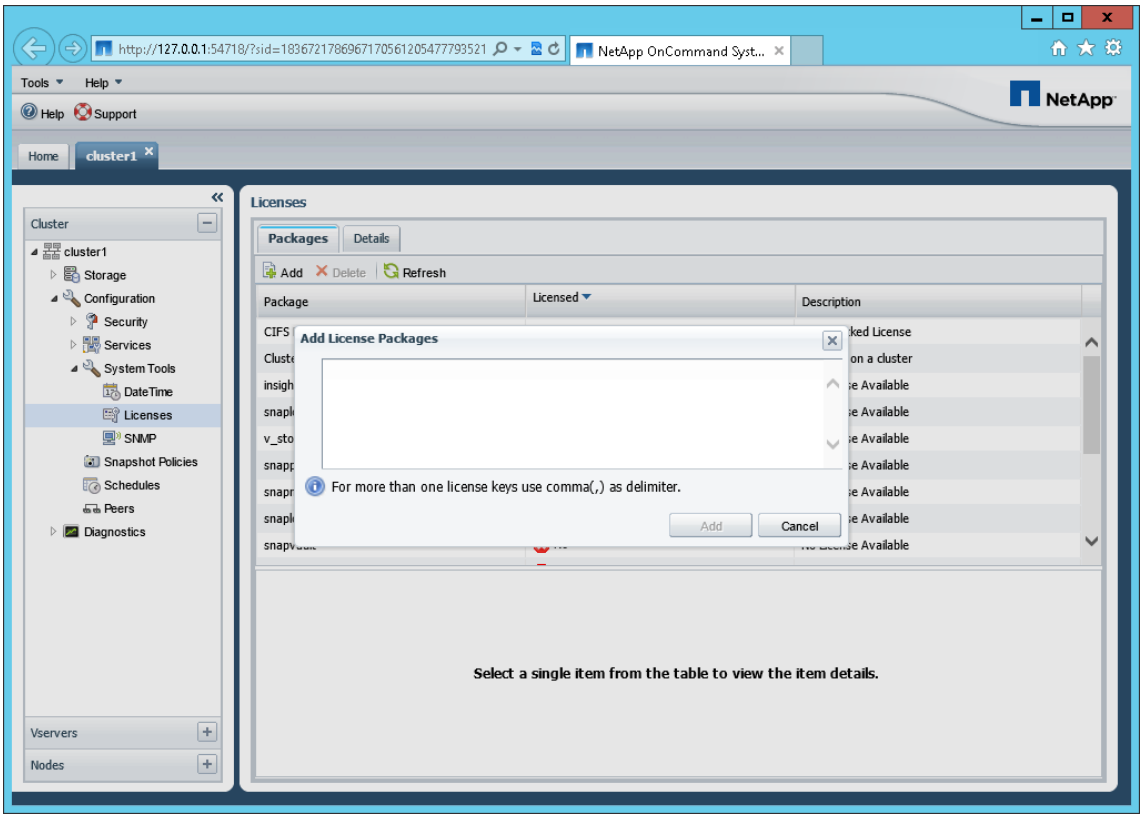
STEP	ACTION
3.	Next, you will add new licenses for the SnapVault feature. Click **Add**: 
4.	Verify that the Add License Packages dialog appears: 

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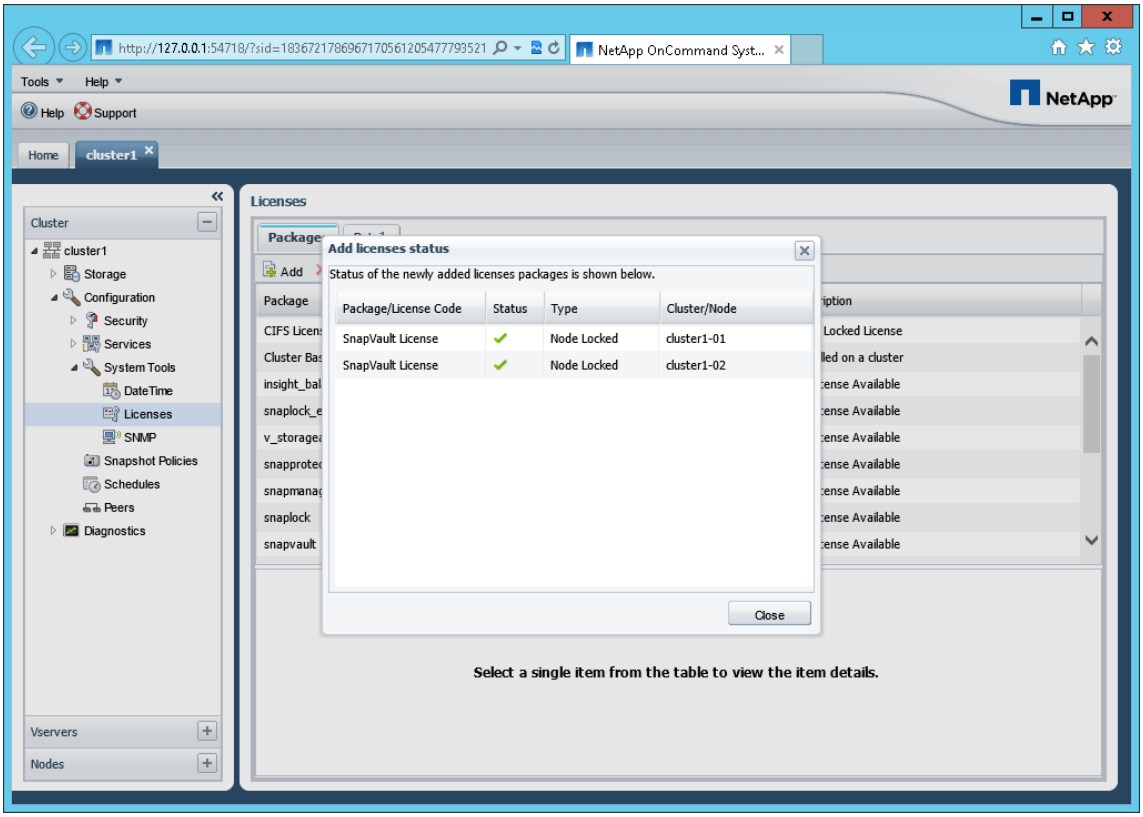
STEP	ACTION
5.	Enter the license codes for SnapVault software for node 1 and node 2: QPLNOHHTVDDCMAOZFAAAAAAAAAAA , EXSBQNSVQFGEYAOZFAAAAAAAAAAA **NOTE**: You can also cut and paste the license codes from the Licenses.txt file in `C:\CourseFiles`. Look for the SnapVault license codes for cluster1-01 and cluster1-02. If you paste in a code but the Add button is not available, delete the last character and then re-add the license code. The Add button should become available.
6.	Click **Add**.
7.	Verify that the SnapVault package was correctly identified. The two license codes are locked to the nodes in the cluster: 
8.	Click **Close**.

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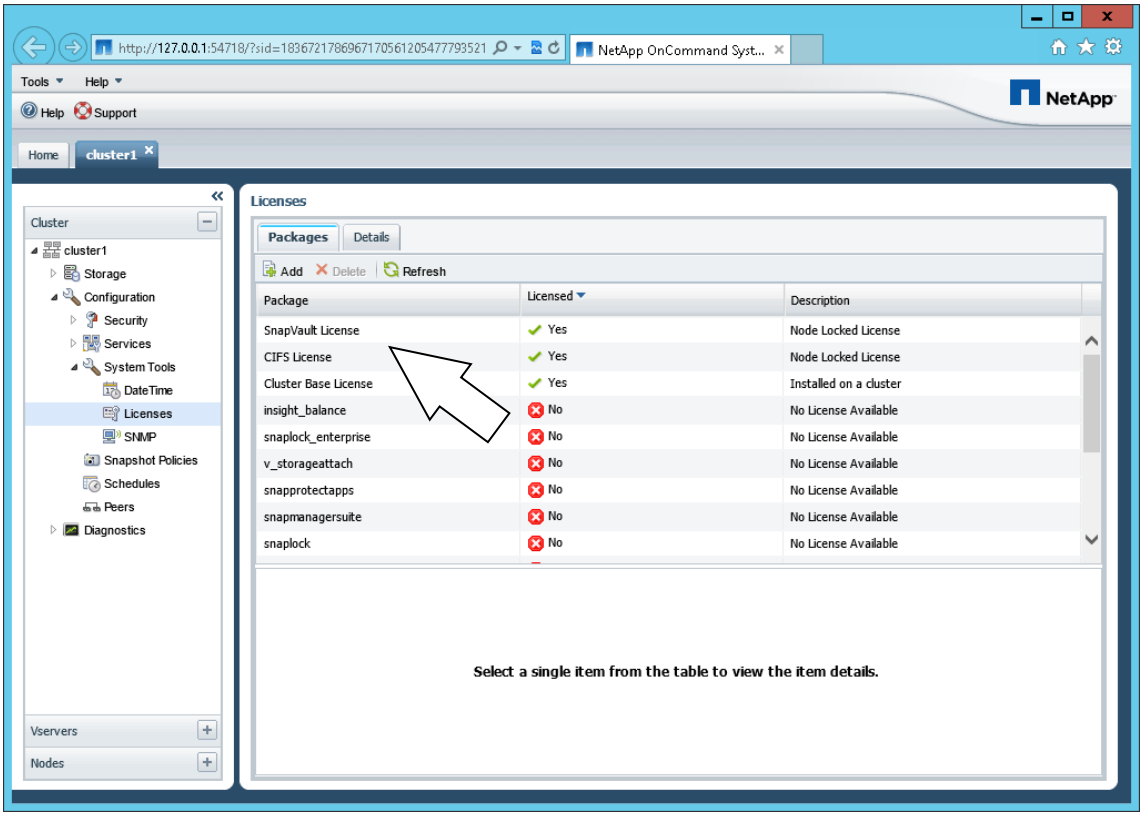
STEP	ACTION
9.	Verify the new package is licensed in the list: 
10.	Switch back to the cluster management LIF SSH PuTTY session. Authenticate as **admin** using the password defined in Task 2 Step 21 if necessary.

11.	View the cluster's serial ID:
	`cluster1::> cluster identity show`
	Sample output:
	`Cluster UUID: a9e342a1-81e5-11e2-93a8-123478563412`
	`Cluster Name: cluster1`
	`Cluster Serial Number: 1-80-000011`
	`Cluster Location:`
	`Cluster Contact:`
	For this sample output, the serial number is 1-80-000011.

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STEP	ACTION

12.	Identify the serial number of each system in the cluster:
	`cluster1::> **system node show –fields node,serialnumber**`
	Sample output:
	`node serialnumber`
	`---------- ------------`
	`cluster1-01 4044744-72-1`
	`cluster1-02 4044744-72-2`
	`2 entries were displayed.`

13.	Navigate to the license hierarchy:
	`cluster1::> **license**`
	The prompt changes to the system license hierarchy:
	`cluster1::system license>`

14.	List the available commands:
	`cluster1::system license> **?**`
	Sample output:
	`add Add one or more licenses`
	`clean-up Remove unnecessary licenses`
	`delete Delete a license`
	`show Display licenses`
	`status> Display license status`

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STEP	ACTION

15.	View the current licensed commands:
	`cluster1::system license>` **`show`**
	Sample output:
	`Serial Number: 1-80-000011`
	`Owner: cluster1`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`Base site Cluster Base License -`
	
	`Serial Number: 1-81-00000000000000004044744721`
	`Owner: cluster1-01`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`CIFS license CIFS License -`
	`SnapVault license SnapVault License -`
	
	`Serial Number: 1-81-00000000000000004044744722`
	`Owner: cluster1-02`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`SnapVault license SnapVault License -`
	`4 entries were displayed.`

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STEP	ACTION

16.	List details about the available license packages:
	`cluster1::system license>` **`status show`**
	Sample output:
	`Package Licensed Method Expiration`
	`---------- ---------- ----------`
	`Base site -`
	`NFS none -`
	`CIFS license -`
	`iSCSI none -`
	`FCP none -`
	`CDMI none -`
	`SnapRestore none -`
	`SnapMirror none -`
	`FlexClone none -`
	`SnapVault license -`
	`SnapLock none -`
	`SnapManagerSuite none -`
	`SnapProtectApps none -`
	`V_StorageAttach none -`
	`SnapLock_Enterprise none -`
	`Insight_Balance none -`
	`16 entries were displayed.`

17.	Add a demonstration license for SnapMirror software:
	`cluster1::system license>` **`add -license-code`**
	SAQJNHHTVDDCMAOZFAAAAAAAAAAA
	NOTE: You can also cut and paste the license code from the Licenses.txt file in `C:\CourseFiles`. Look for the SnapMirror license code.
	Sample output:
	`License for package "SnapMirror" installed successfully.`
	`(1 of 1 added successfully)`

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STEP	ACTION

18.	Verify the demo license:
	`cluster1::system license> **show**`
	Sample output:
	`Serial Number: 1-80-000011`
	`Owner: cluster1`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`Base site Cluster Base License -`
	`SnapMirror demo SnapMirror License 10/5/2015 08:00:00`
	
	`Serial Number: 1-81-0000000000000004044744721`
	`Owner: cluster1-01`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`CIFS license CIFS License -`
	`SnapVault license SnapVault License -`
	
	`Serial Number: 1-81-0000000000000004044744722`
	`Owner: cluster1-02`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`SnapVault license SnapVault License -`
	`5 entries were displayed.`

19.	Delete the new SnapMirror license:
	`cluster1::system license> **delete -serial-number 1-80-000011 -package SnapMirror**`
	Sample output:
	`Warning: The following license will be removed:`
	`SnapMirror 1-80-000011`

20.	Confirm the deletion: `Do you want to continue? {y|n}: **y**`

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STEP	ACTION

21.	Add the CIFS license for node 2:
	`cluster1::system license>` **`add -license-code`**
	YJIBMNSVQFGEYAOZFAAAAAAAAAAA
	
	YNSHQZOAHJMIWBOZFAAAAAAAAAAA
	NOTE: You can also cut and paste the license code from the Licenses.txt file in `C:\CourseFiles`. Look for the CIFS license code for cluster1-02.
	Sample output:
	`License for package "CIFS" and serial number "1-81-000000000000004044744722" installed successfully.`
	`(1 of 1 added successfully)`

22.	Verify the new CIFS license was added:
	`cluster1::system license>` **`show`**
	Sample output:
	`Serial Number: 1-80-000011`
	`Owner: cluster1`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`Base site Cluster Base License -`
	
	`Serial Number: 1-81-000000000000004044744721`
	`Owner: cluster1-01`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`CIFS license CIFS License -`
	`SnapVault license SnapVault License -`
	
	`Serial Number: 1-81-000000000000004044744722`
	`Owner: cluster1-02`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`CIFS license CIFS License -`
	`SnapVault license SnapVault License -`
	`5 entries were displayed.`

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STEP	ACTION

23.	Add the FCP license for a node that is not currently in the cluster:
	`cluster1::system license>` **`add -license-code`**
	YNSHQZOAHJMIWBOZFAAAAAAAAAAA
	NOTE: You might add a license for a node that does not exist to "preload" the license for a node that you will soon add. You can also cut and paste the license code from the Licenses.txt file in `C:\CourseFiles`. Look for the FCP license code for cluster1-xx.
	Sample output:
	`License for package "FCP" and serial number "1-81-00000000000000004044744724" installed successfully.`
	`(1 of 1 added successfully)`

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STEP	ACTION

24.	Verify the new FCP license was added:
	`cluster1::system license> **show**`
	Sample output:
	`Serial Number: 1-80-000011`
	`Owner: cluster1`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`Base site Cluster Base License -`
	
	`Serial Number: 1-81-00000000000000004044744721`
	`Owner: cluster1-01`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`CIFS license CIFS License -`
	`SnapVault license SnapVault License -`
	
	`Serial Number: 1-81-00000000000000004044744722`
	`Owner: cluster1-02`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`CIFS license CIFS License -`
	`SnapVault license SnapVault License -`
	
	`Serial Number: 1-81-00000000000000004044744724`
	`Owner: none`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`FCP license FCP License -`
	`6 entries were displayed.`

25.	Type the following command and then press tab:
	`cluster1::system license> **clean-up -**`
	Sample output:
	`-unused -expired -simulate`
	`cluster1::system license> clean-up -`
	Tab, not Enter
	NOTE: You can select expired or unused licenses to be removed. An unused license is a license that is associated with node that doesn't belong to the cluster.

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STEP	ACTION

26.	Verify what will be cleaned up with the `unused` command:
	`cluster1::system license>` **`clean-up –unused -simulate`**
	Sample output:
	`The following licenses will be cleaned up:`
	`Serial number: 1-81-000000000000000044744724`
	`Owner: none`
	`Package Reason`
	`------------------------ ----------------------------------------------------`
	`FCP Serial number is not used by any node in the cluster`

27.	Clean up the unused licenses: `cluster1::system license>` **`clean-up -unused`** Sample output: `unused license deleted.`

28.	Verify that the FCP license was removed:
	`cluster1::system license>` **`show`**
	Sample output:
	`Serial Number: 1-80-000011`
	`Owner: cluster1`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`Base site Cluster Base License -`
	
	`Serial Number: 1-81-000000000000000044744721`
	`Owner: cluster1-01`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`CIFS license CIFS License -`
	`SnapVault license SnapVault License -`
	
	`Serial Number: 1-81-000000000000000044744722`
	`Owner: cluster1-02`
	`Package Type Description Expiration`
	`---------- ------- ---------- ----------`
	`CIFS license CIFS License -`
	`SnapVault license SnapVault License -`
	`5 entries were displayed.`

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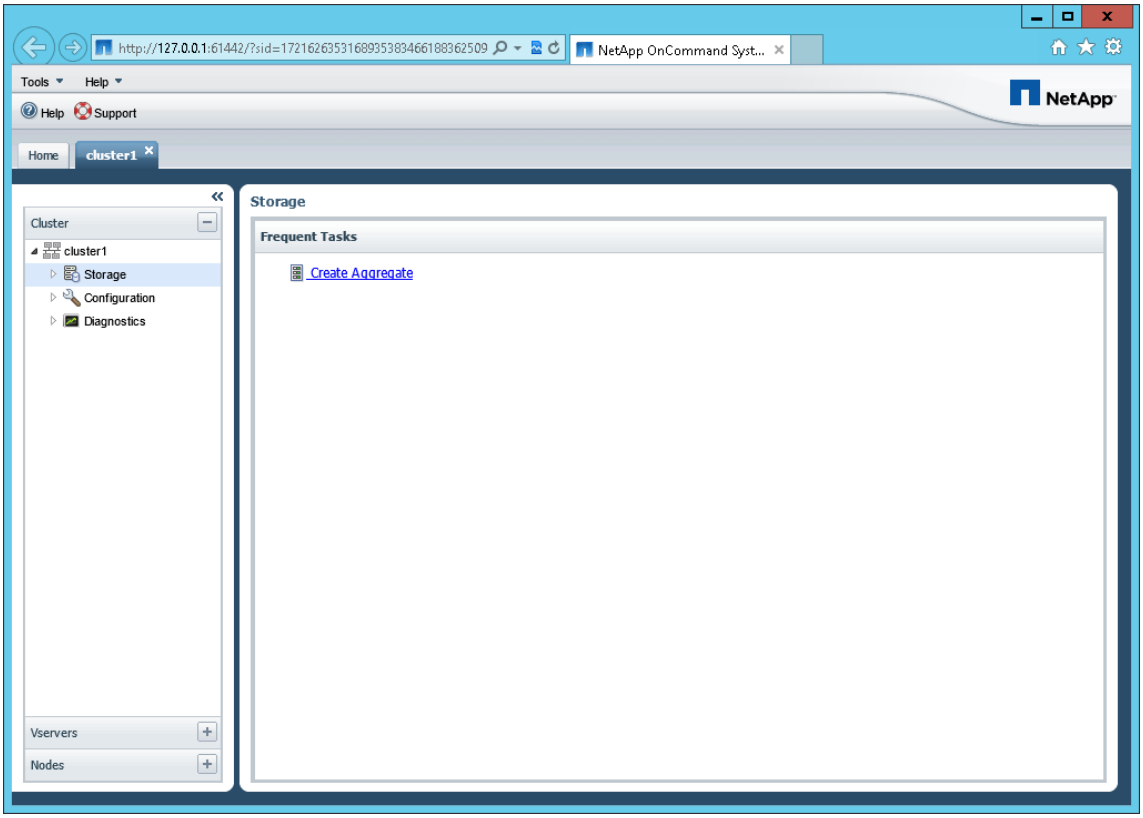
TASK 6: CREATE A DATA AGGREGATE

In this task, you use System Manager to create a data aggregate for volumes used in a Virtual Storage Server (Vserver). To learn how to create a Vserver, see the *Clustered Data ONTAP Administration, 8.2 Update Part 2: Quality of Service* exericse in this series.

STEP	ACTION
1.	In System Manager; in the left pane, click **Storage**: 
2.	Click **Create Aggregate**.

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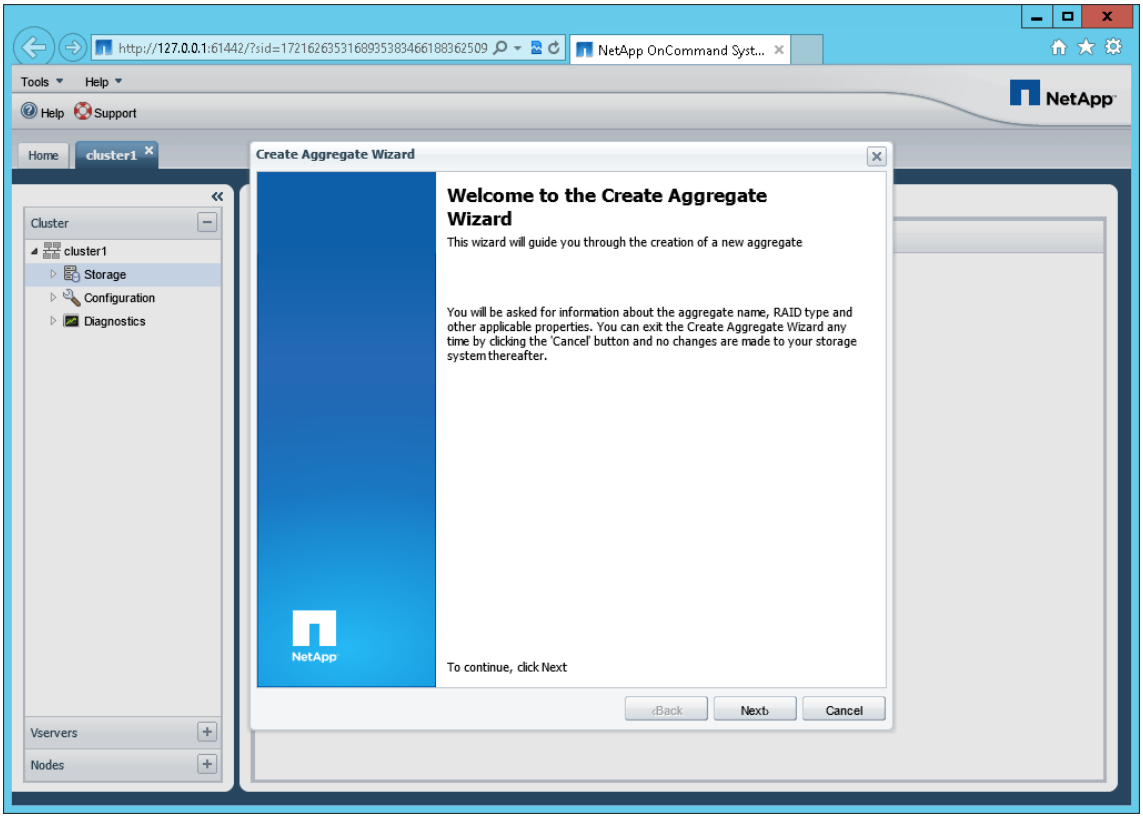
STEP	ACTION
3.	Verify the Create Aggregate Wizard appears: 
4.	Click **Next**.

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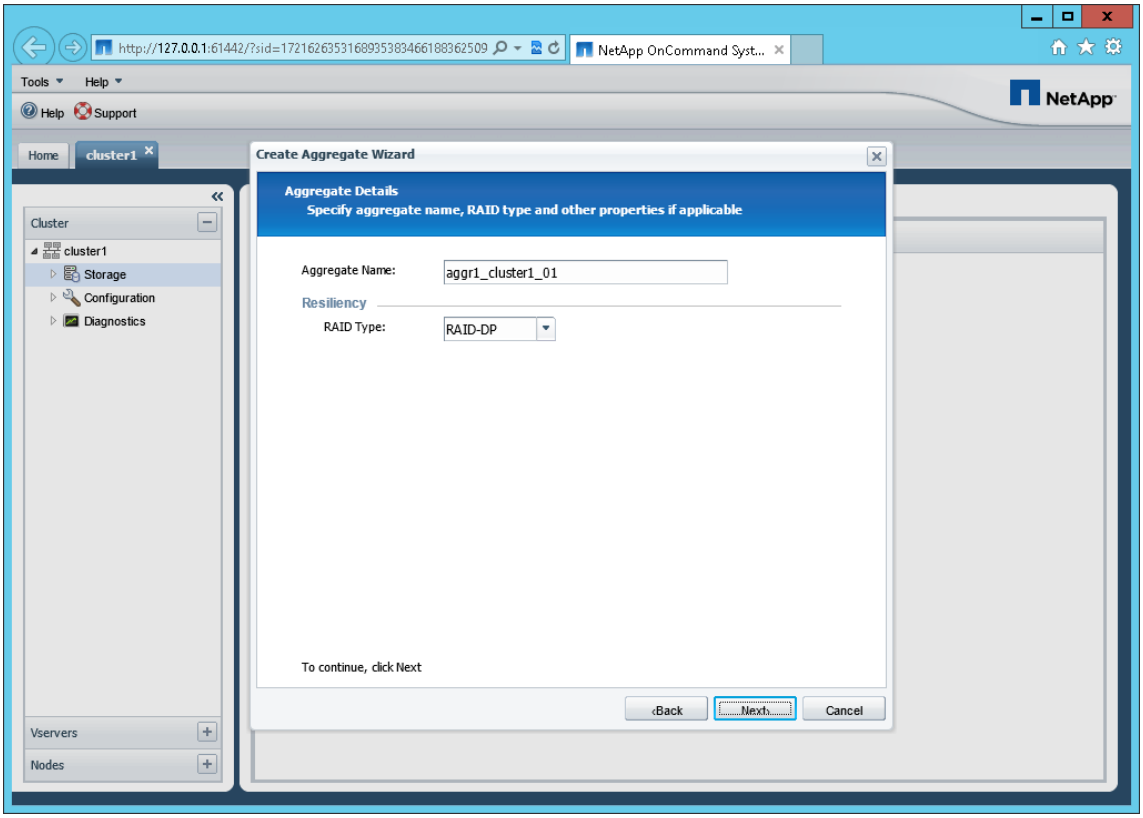
STEP	ACTION
5.	On the Aggregate Details page, specify the following: ▪ Aggregate Name: **`aggr1_cluster1_01`** ▪ RAID Type: **RAID-DP** 
6.	Click **Next**.

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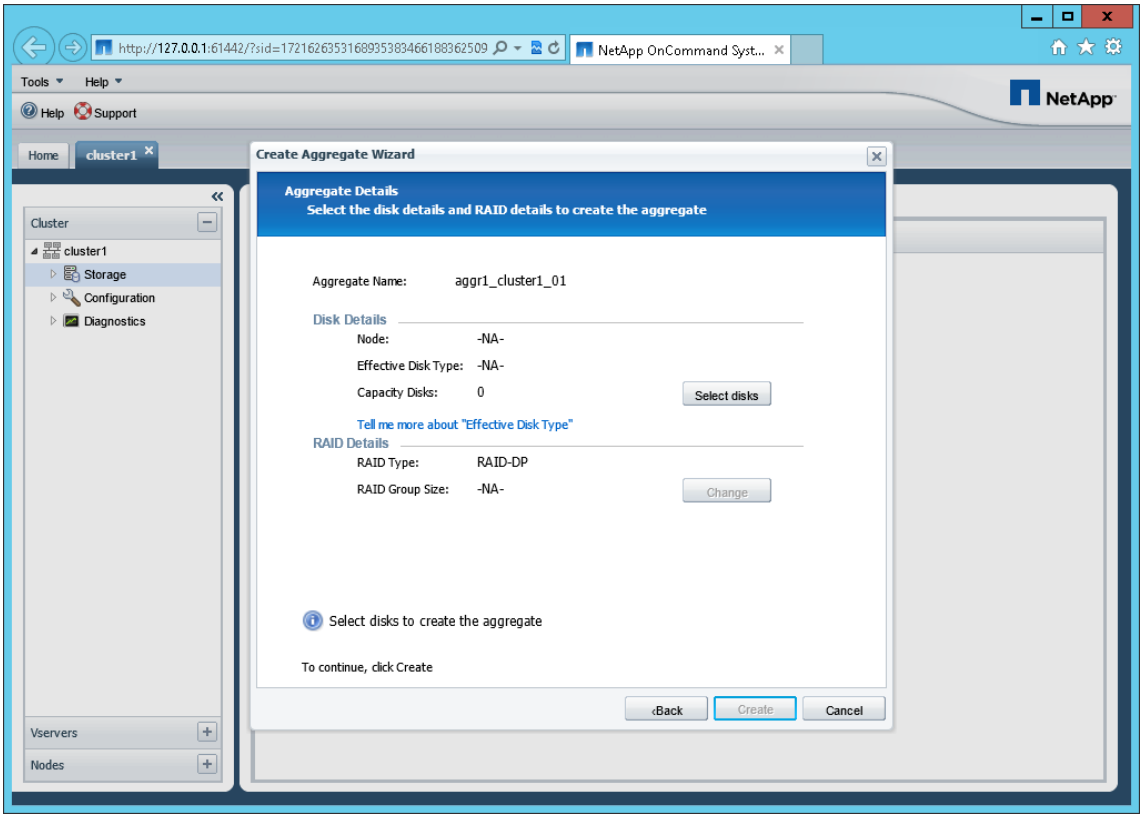
STEP	ACTION
7.	On the Aggregate Details page, click **Select disks**: 

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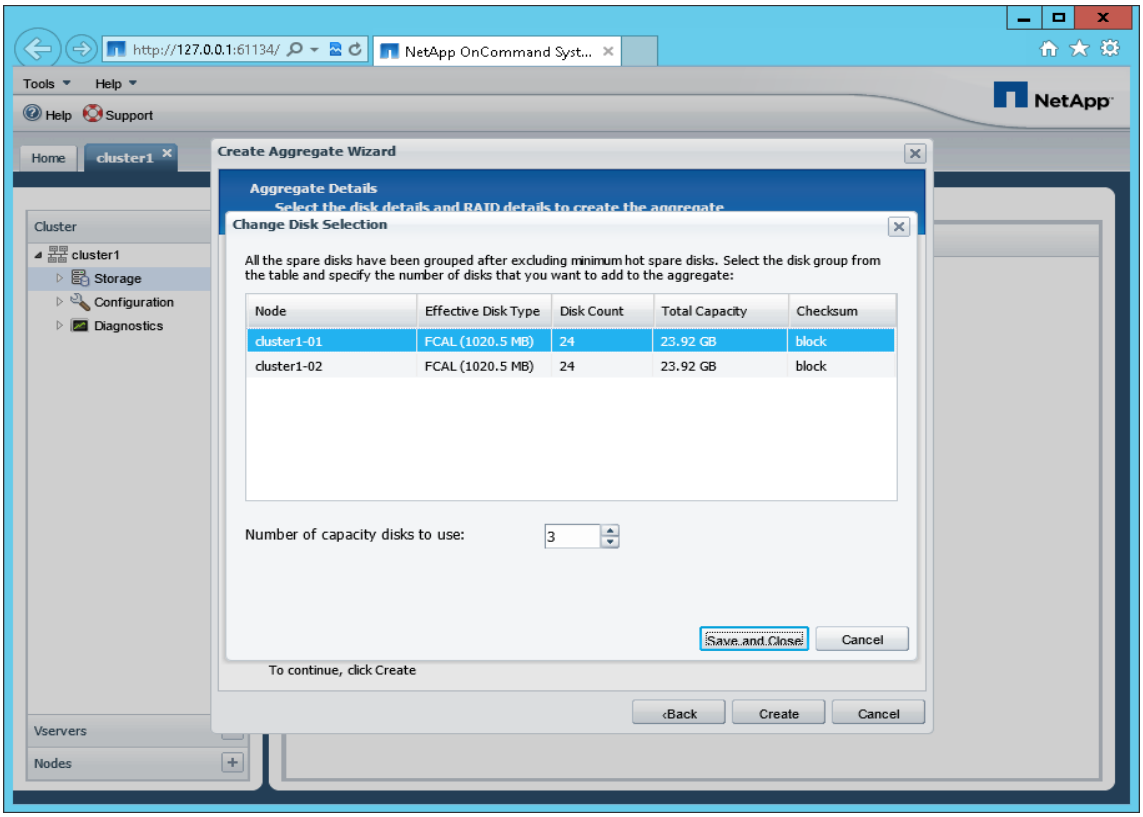
STEP	ACTION
8.	On the Change Disk Selection dialog box, select the following: ▪ Disk group: **cluster1-01 FCAL** ▪ Number of capacity disks to use: **3**  **NOTE:** If you don't see both nodes on the list, close System Manager, restart it, and log back in to cluster 1. After that, restart this task.
9.	Click **Save and Close**.

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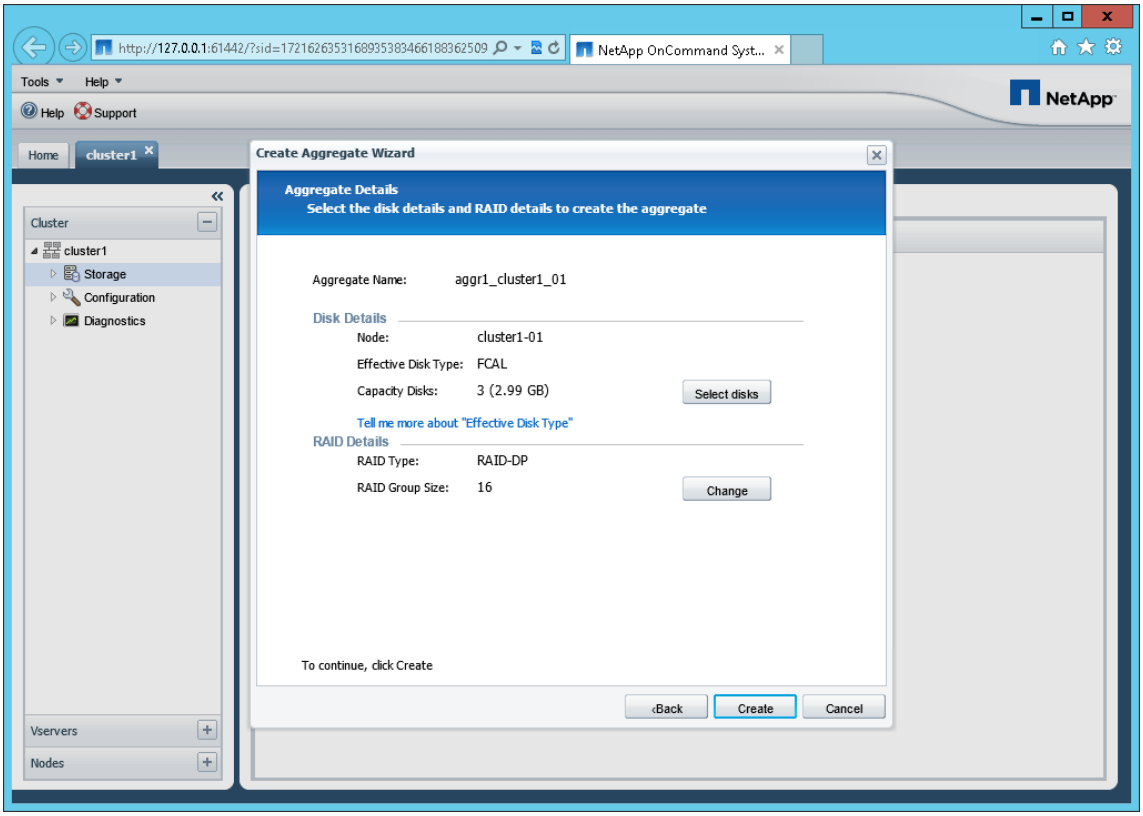
STEP	ACTION
10.	Review the information on the Aggregate Details page: 
11.	Click **Create**.

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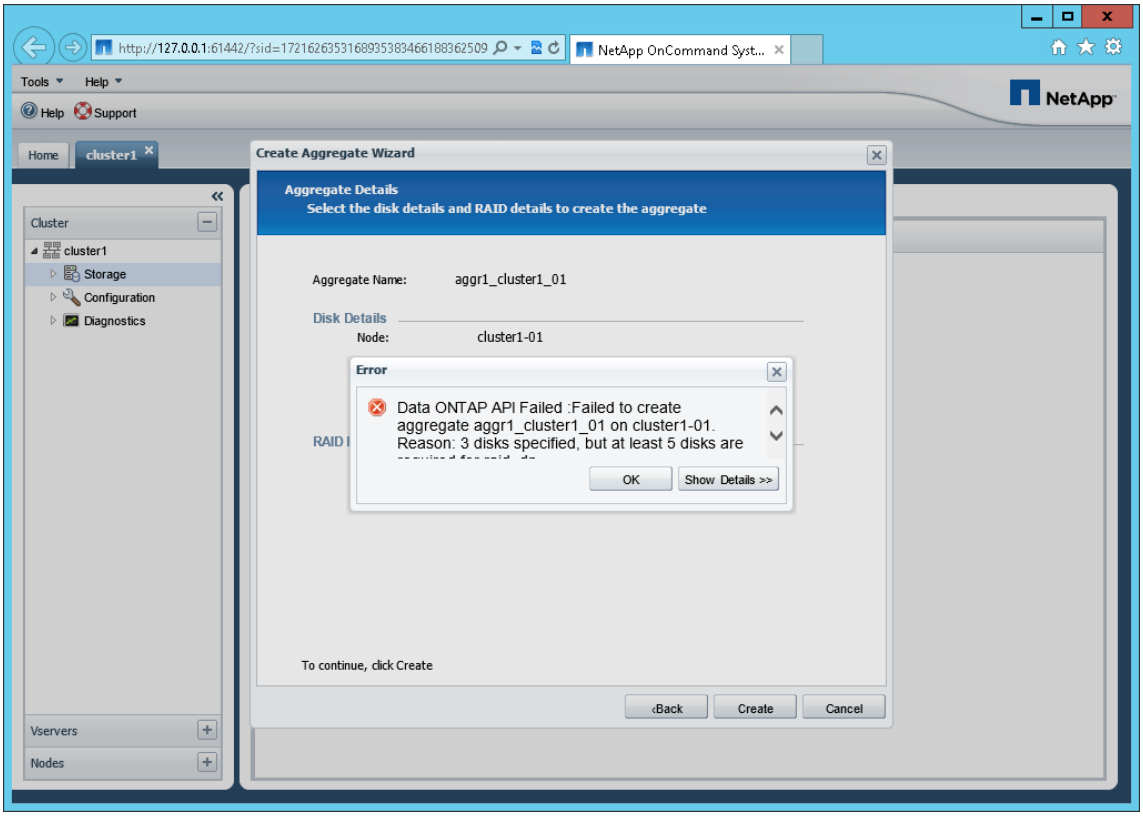
STEP	ACTION
12.	An error message appears, because in Data ONTAP 8.2 and later, you must have at least five disks to create a RAID-DP aggregate. **(**For a RAID 4 aggregate, you must have at least three disks). This change is to ensure that your data is well-protected: 
13.	Click **OK** to acknowledge the error.
14.	Click **Select disks** again.

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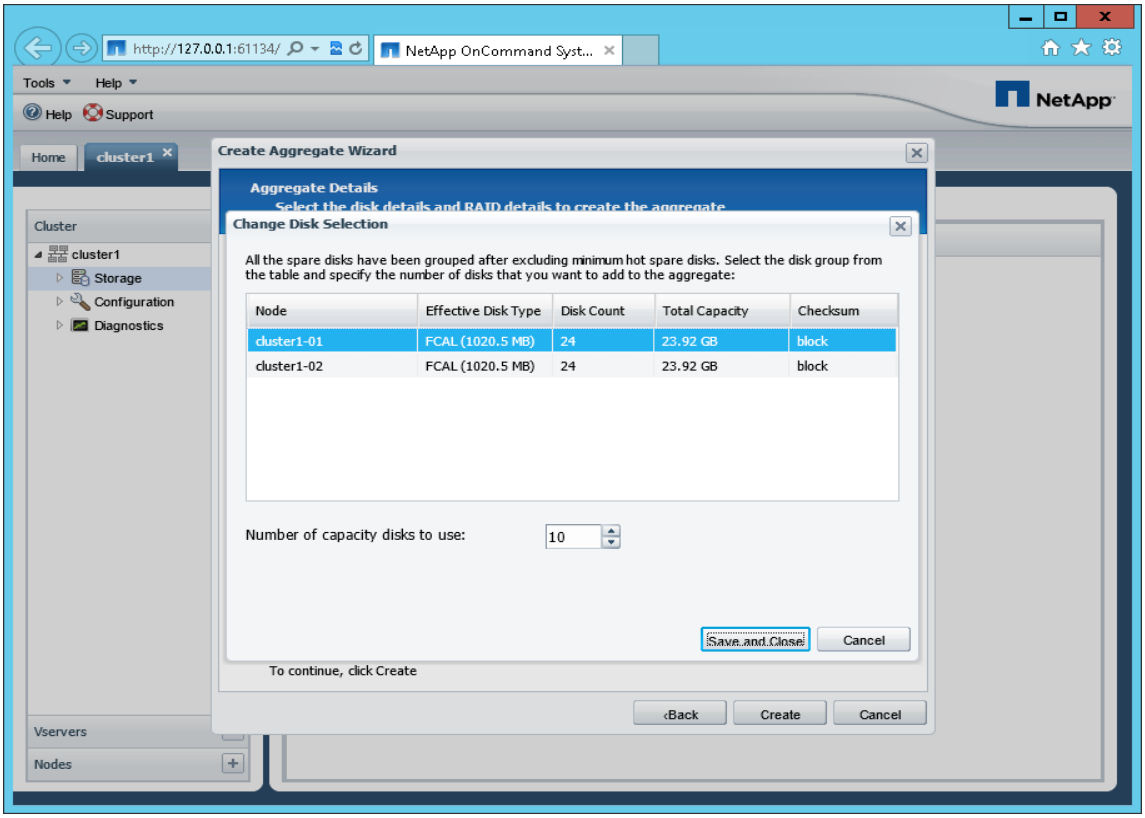
STEP	ACTION
15.	On the Change Disk Selection page, select the following: ▪ Disk group: **cluster1-01 FCAL** ▪ Number of capacity disks to use: **10** 
16.	Click **Save and Close**.

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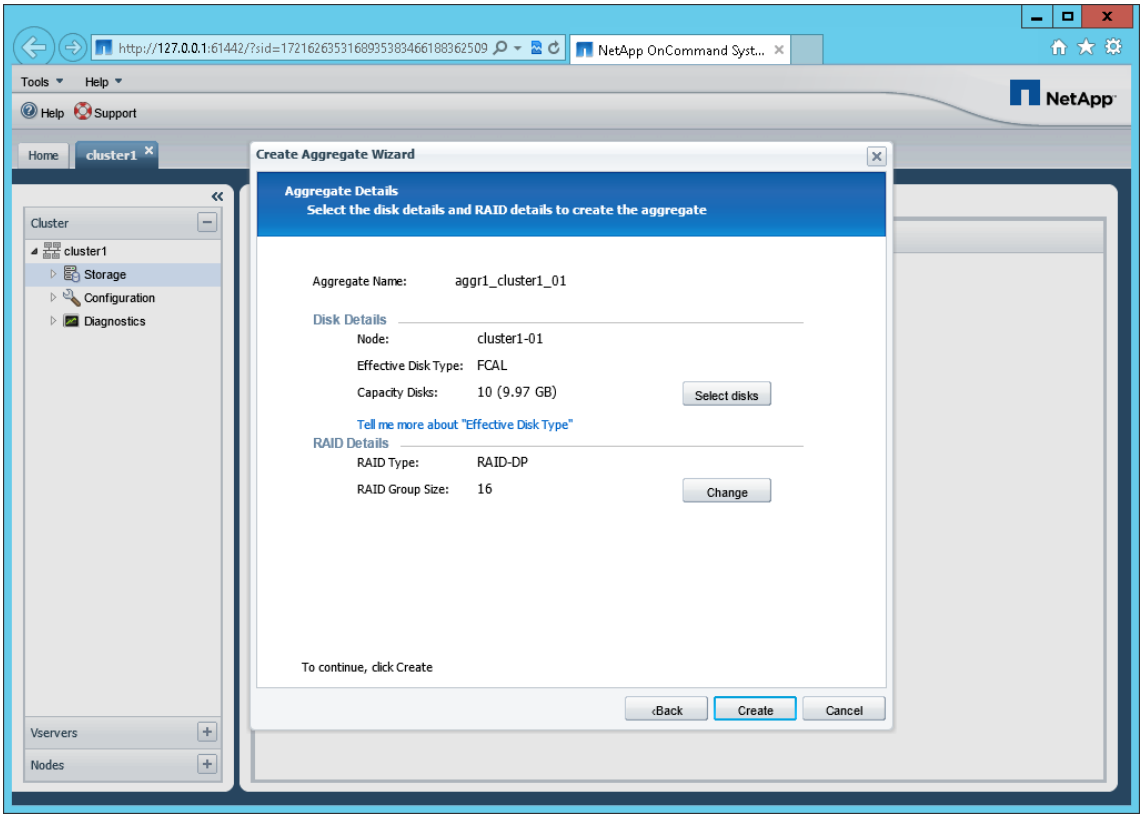
STEP	ACTION
17.	Review the information on the Aggregate Details page: 
18.	Click **Create**.

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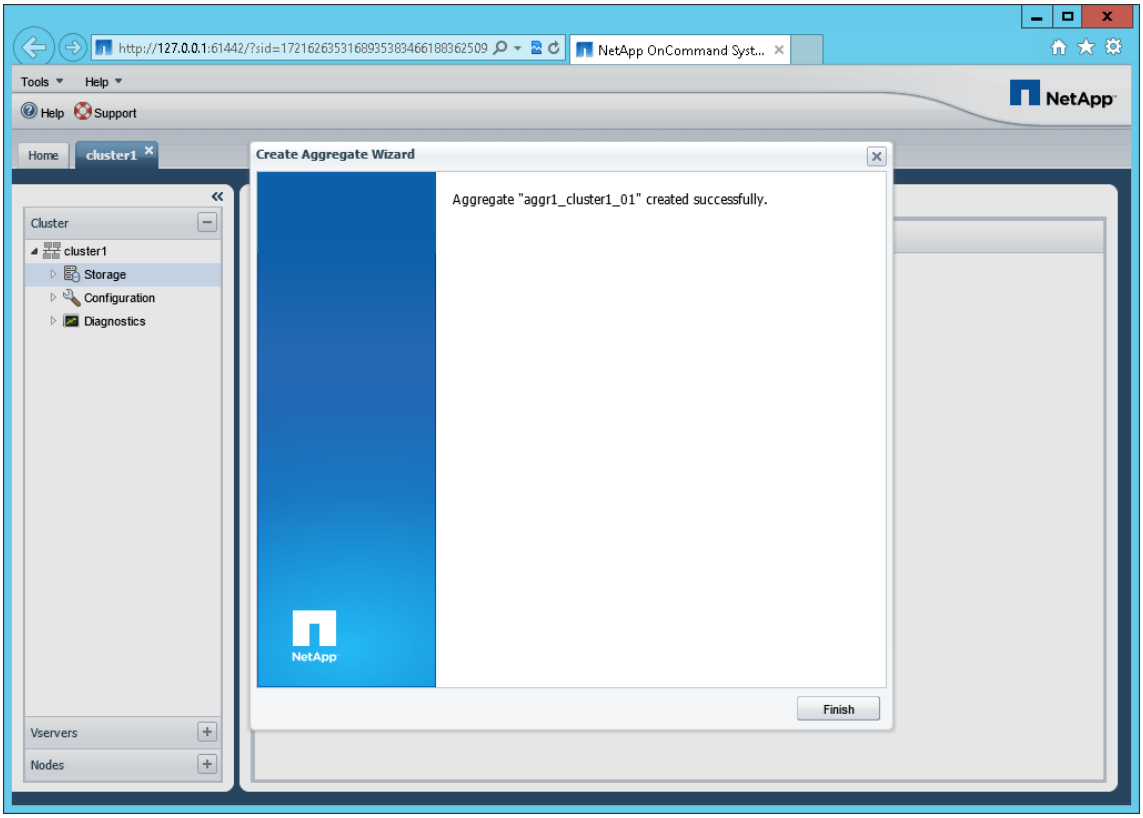
STEP	ACTION
19.	Verify the aggregate was successfully created: 
20.	Click **Finish**.
21.	In the left pane, expand **Storage** and click **Aggregates**.

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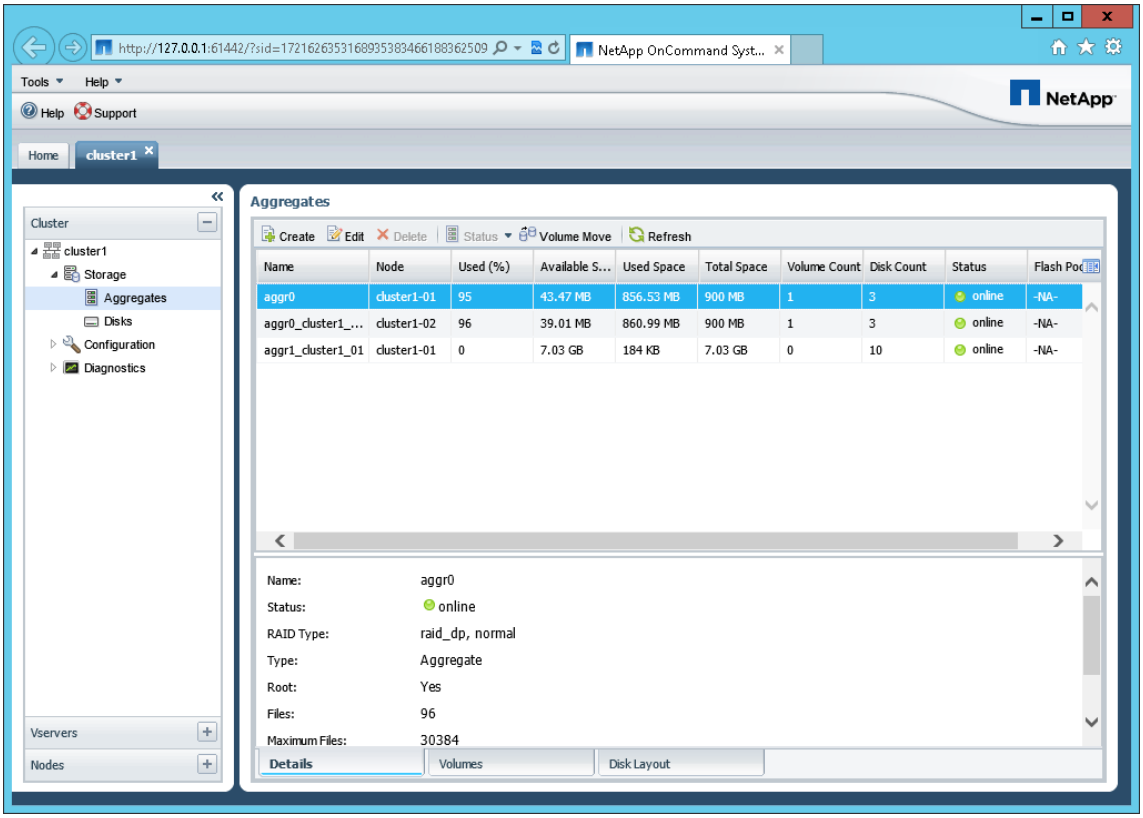
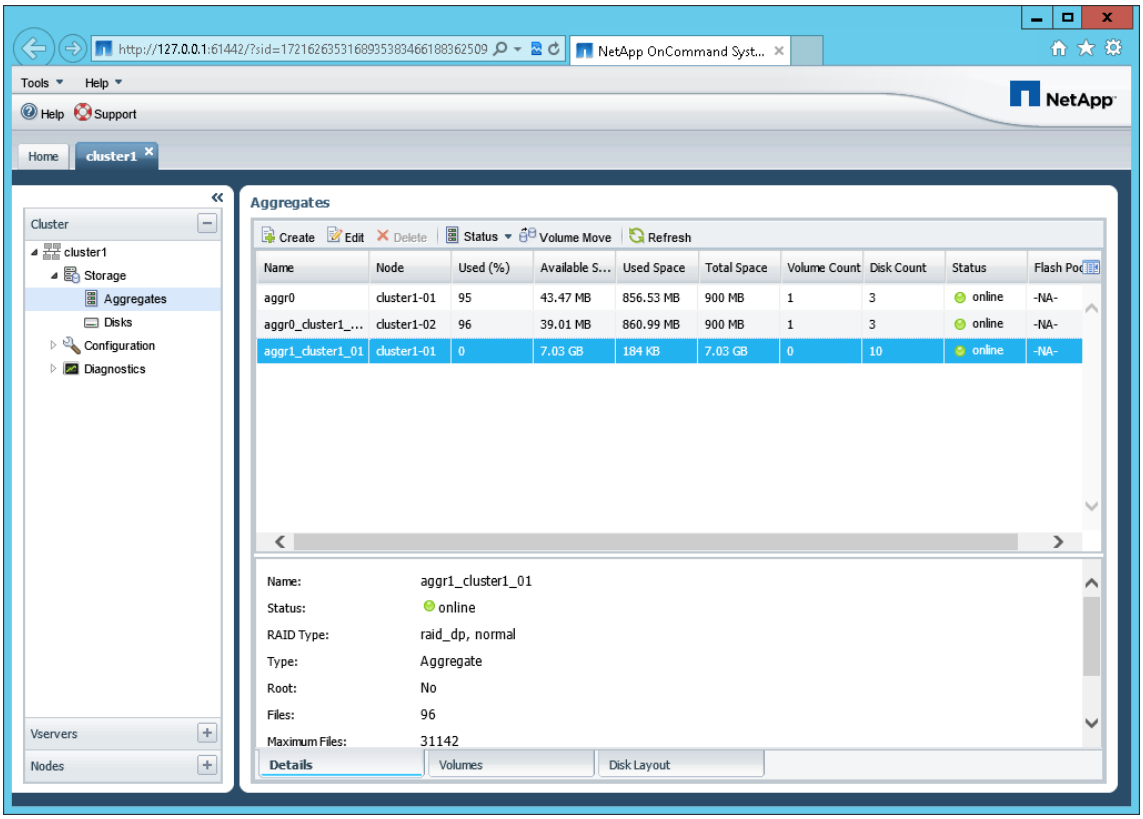
STEP	ACTION
22.	Verify the list of aggregates: 
23.	Select the new aggregate: **`aggr1_cluster1_01`** and review the aggregate details: 

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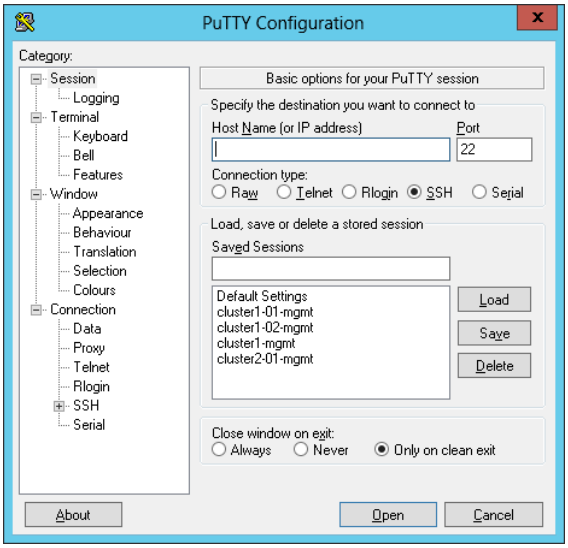
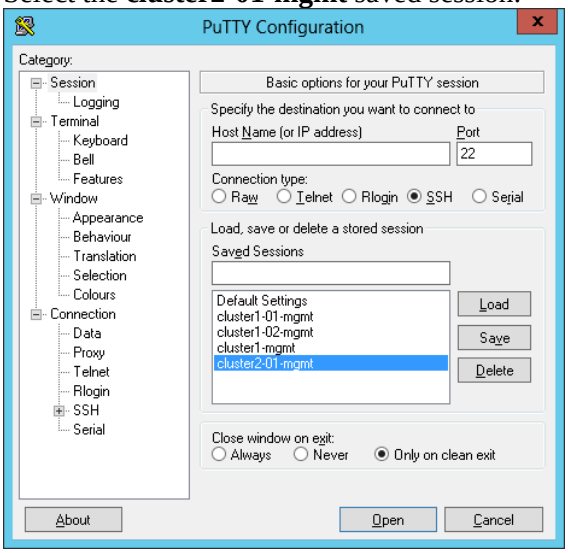
TASK 7: CREATE A SINGLE-NODE CLUSTER

In this task, you log in to your assigned node 3 and create a cluster called cluster2.

STEP	ACTION
1.	On your Windows desktop, double-click the link to PuTTY icon:
2.	Verify that the PuTTY Configuration dialog appeared: 
3.	Select the **cluster2-01-mgmt** saved session: 

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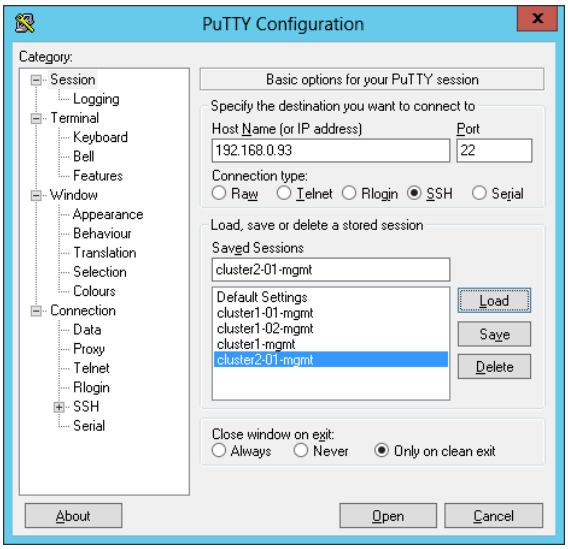
STEP	ACTION
4.	Click **Load**: 
5.	Click **Open** to open a session with your storage system.
6.	The PuTTY Security Alert dialog box appears (your SSH fingerprint will differ):
7.	Click **Yes** to confirm the SSH fingerprint key.
8.	Verify the login prompt appears: `login as:`
9.	At the login prompt, type: **`admin`**
10.	The admin login account does not have a password assigned to it. Press **Enter**.
11.	Verify the command prompt appears: `cluster2-01::>`
12.	Start the cluster setup wizard: `cluster2-01::> cluster setup`
13.	In response to the question "Do you want to create a new cluster or join an existing cluster," enter **`create`** to create a cluster.

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STEP	ACTION
14.	In the response to the question "Do you intend for this node to be used as a single node cluster," enter **`yes`** to create a single-node cluster.
15.	At step 1 of 5, enter the cluster name **`cluster2`**. **NOTE**: Cluster names in clustered Data ONTAP are case-sensitive. "Cluster1" is not the same as "cluster1."
16.	Enter the cluster base license code: **`GINBJXTZGYSEBGAAAAAAAAAAAAAA`** **NOTE**: You can also cut and paste the license code from the Licenses.txt file in `C:\CourseFiles`. Look for the cluster base license code for cluster2. If you mistype the license code, the setup script will continue to prompt you for the correct code.
17.	When asked for an additional license code, enter the CIFS license: **`MRPPNTDYLHJGKBOZFAAAAAAAAAAA`** **NOTE**: You can also cut and paste the license code from the Licenses.txt file in `C:\CourseFiles`. Look for the CIFS license code for cluster2-01.
18.	At step 2 of 5, when additional license codes are requested, enter the SnapVault license: **`SEAQRTDYLHJGKBOZFAAAAAAAAAAA`** **NOTE**: You can also cut and paste the license code from the Licenses.txt file in `C:\CourseFiles`. Look for the SnapVault license code for cluster2-01.
19.	On a blank line, press **Enter** to indicate that you are finished adding license codes.
20.	At step 3 of 5, enter a password for the cluster administrator (admin) account. For example, you can use **`Netapp123`**.
21.	Retype the password and press **Enter**.
22.	Press **Enter** to select the default cluster management interface port: **`e0a`**
23.	Enter this IP address for the cluster management interface: **`192.168.0.102`**
24.	Enter this network mask for the cluster management interface: **`255.255.255.0`**
25.	Enter this default gateway for the cluster management interface: **`192.168.0.1`**
26.	Enter this DNS domain name: **`learn.netapp.local`**
27.	Enter the name server IP address: **`192.168.0.11`**
28.	In screen display Step 4 of 5, note the statement about storage failover (SFO). This is a non-high-availability system and so will not use SFO.
29.	In screen display Step 5 of 5, in the text box, enter a value for the controller location. **NOTE:** You must enter the physical address of the storage system, because NetApp Global Support uses this information for delivering parts.
30.	Press **Enter** to select the default node management interface port: **`e0c`**

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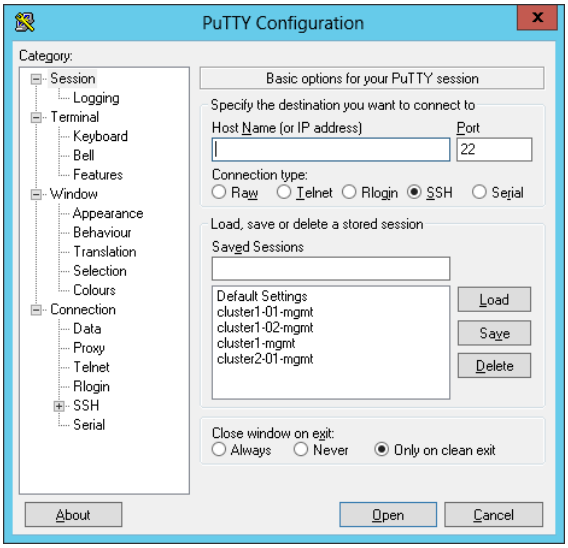
STEP	ACTION
31.	Press **Enter** to use the defined IP address, **`192.168.0.93`**, for this node. **NOTE:** The node management interface was set when the lab environment was prepared.
32.	Press **Enter** to use the defined network mask, **`255.255.255.0`**, for this node.
33.	Enter the following default gateway for the cluster management interface: **`192.168.0.1`**
34.	This completes the cluster setup wizard. Verify you now see the cluster shell prompt: `cluster2::>`
35.	Close the node management LIF SSH PuTTY session. You can now use SSH to log in to the cluster management port through another PuTTY session.
36.	Open another **PuTTY** window:
37.	Verify that the PuTTY Configuration dialog appears: 

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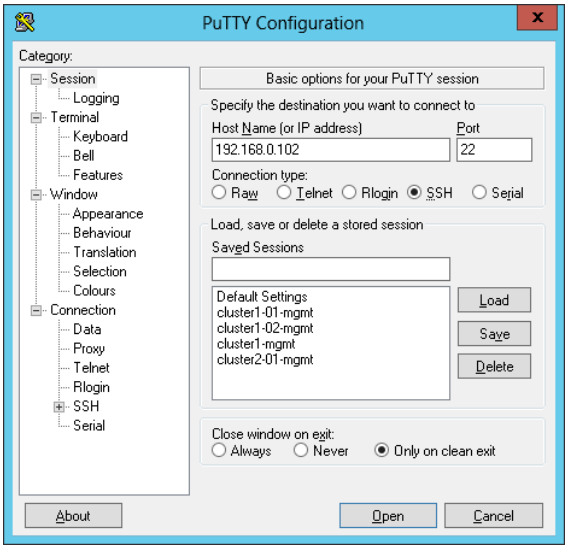
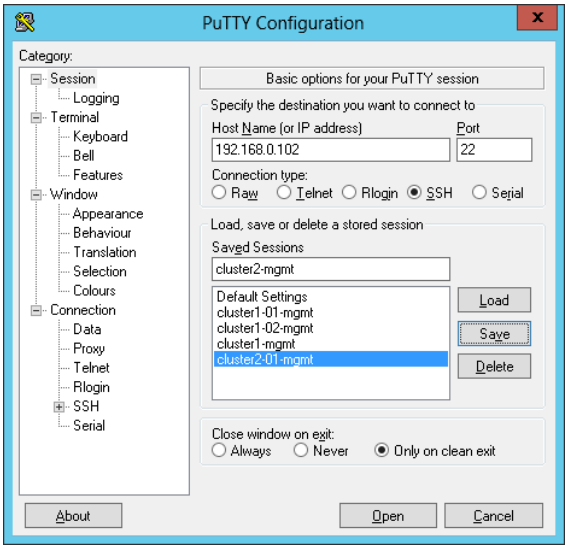
STEP	ACTION
38.	Enter the IP address of the cluster management LIF: **`192.168.0.102`** 
39.	Verify that **`SSH`** is selected as the connection type.
40.	Type a new session for this session: **`cluster2-mgmt`** 
41.	Click **Save**.
42.	Click **Open** to start the session.

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STEP	ACTION
43.	Verify the PuTTY Security Alert dialog box appears (your SSH fingerprint will differ):
44.	Click **Yes** to approve the SSH fingerprint key.
45.	Verify that you see the login prompt: `login as:`
46.	Authenticate as **`admin`** and press **Enter**.
47.	Enter the password you provided in step 19 of this task and press **Enter**. Suggested password was: `Netapp123`
48.	Verify the clustershell prompt appears: `cluster2::>`

49.	Check the cluster health:
	`cluster2::> cluster show`
	Sample output:
	`Node Health Eligibility`
	`--- --- ---`
	`cluster2-01 true true`

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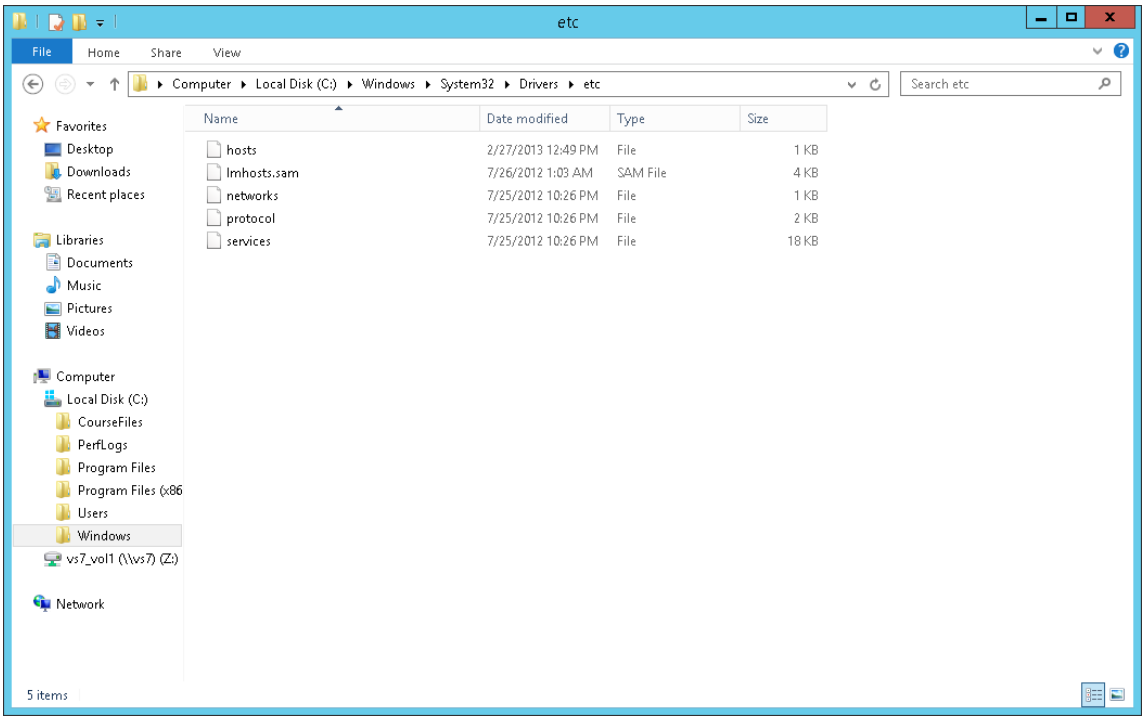
TASK 8: ADD THE SINGLE-NODE CLUSTER TO ONCOMMAND SYSTEM MANAGER

In this task, you add the new single-node cluster to System Manager, along with the source cluster, cluster2.

STEP	ACTION
1.	On the administrator desktop, open **File Explorer**:
2.	Navigate to: **`C:\Windows\System32\Drivers\etc`** 
3.	Double-click **hosts**.

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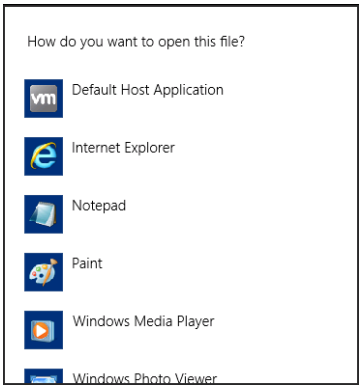
STEP	ACTION
4.	Verify that the operation dialog appears: 
5.	Select **Notepad** to open the hosts file in this tool.
6.	Append to the end of the file the following information: *cluster_management_LIF_IP_address cluster_name* Specifically, you should enter: `192.168.0.102  cluster2`
7.	Save the file.
8.	Exit **Notepad**.
9.	Close **File Explorer**.

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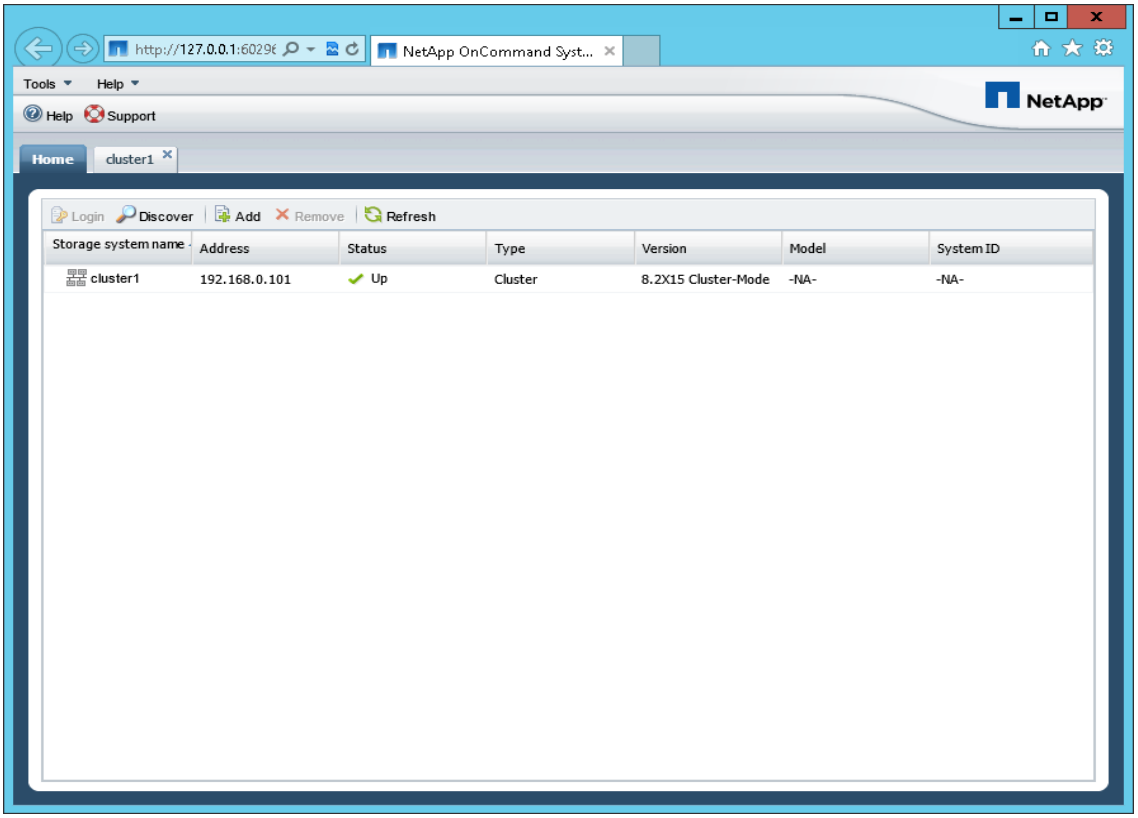
STEP	ACTION
10.	In System Manager, switch back to the **Home** tab. 
11.	Click **Add** to associate your new cluster2 with System Manager.

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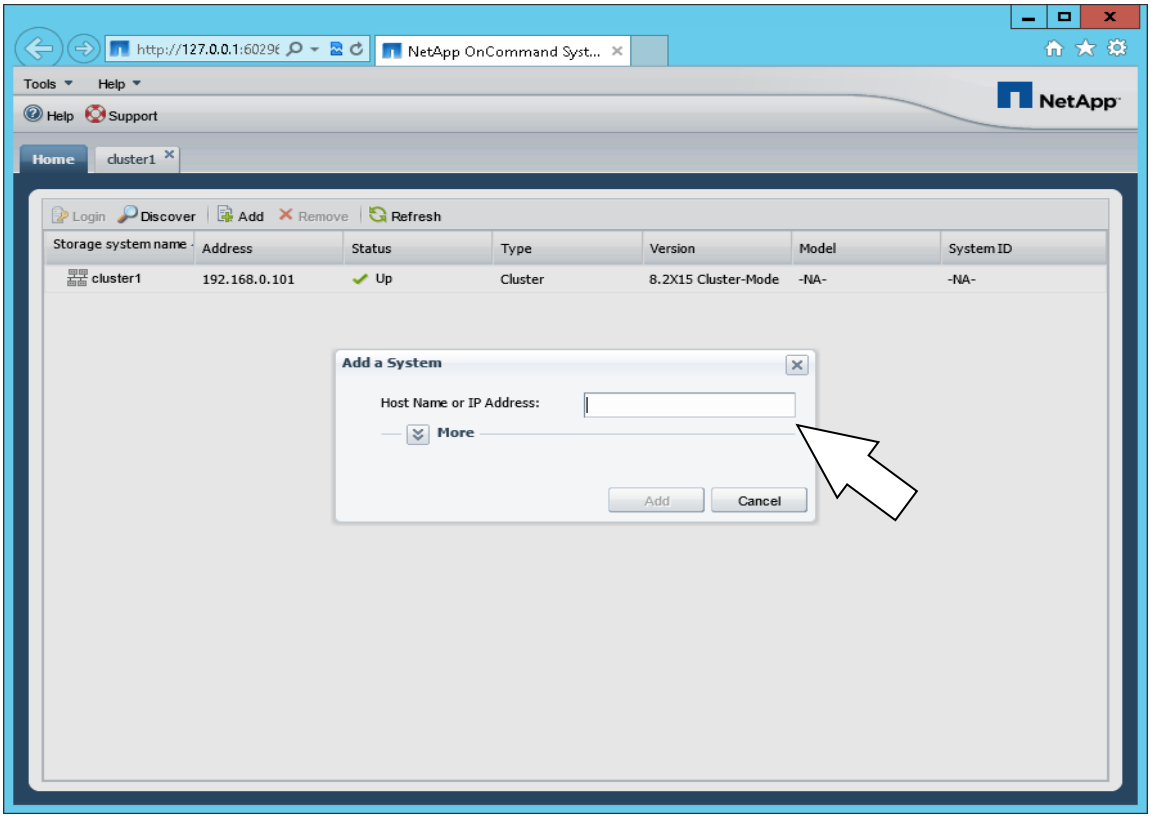
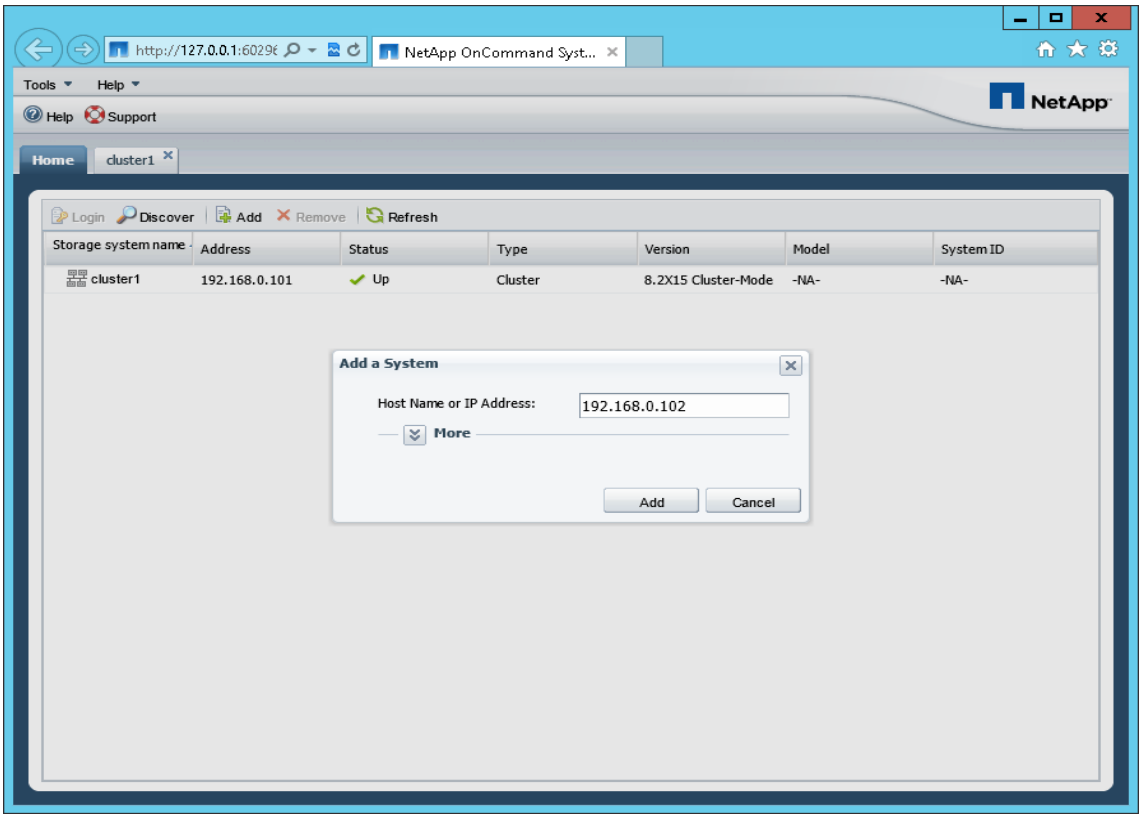
STEP	ACTION
12.	Verify the Add a System dialog box appears: 
13.	Enter the IP address of the cluster management LIF: **`192.168.0.102`** 

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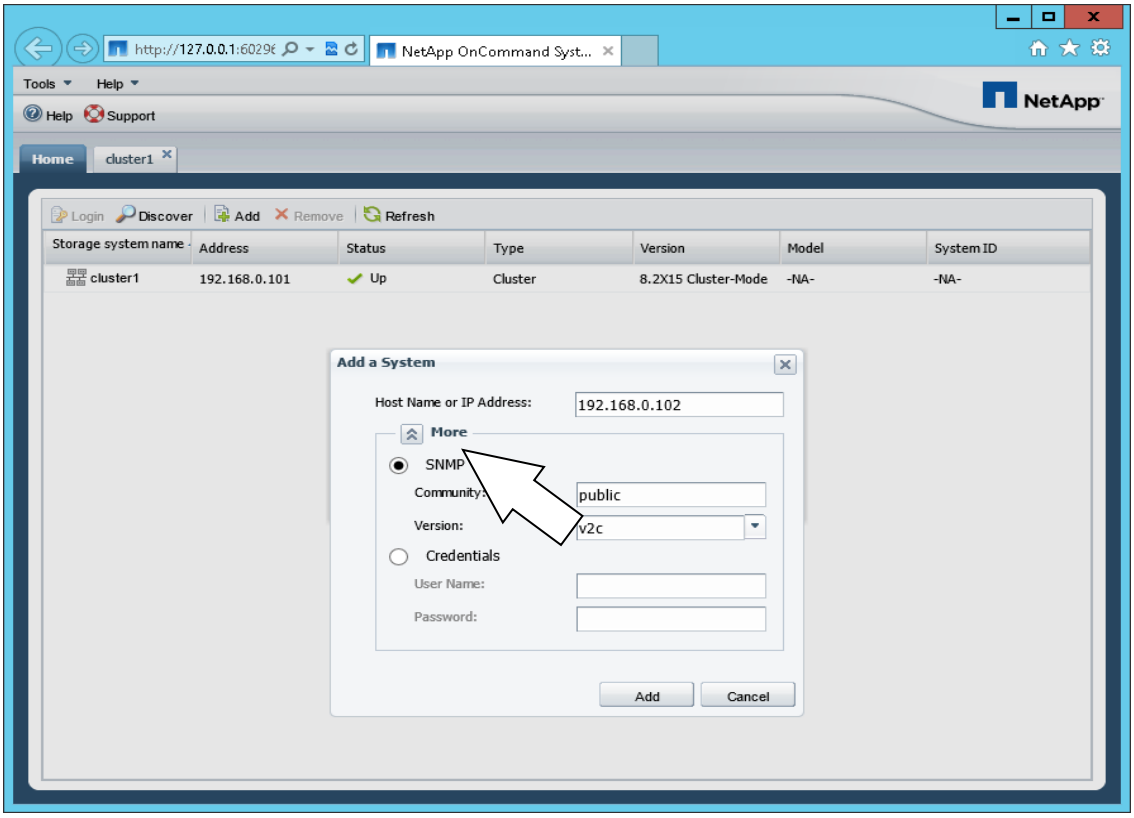
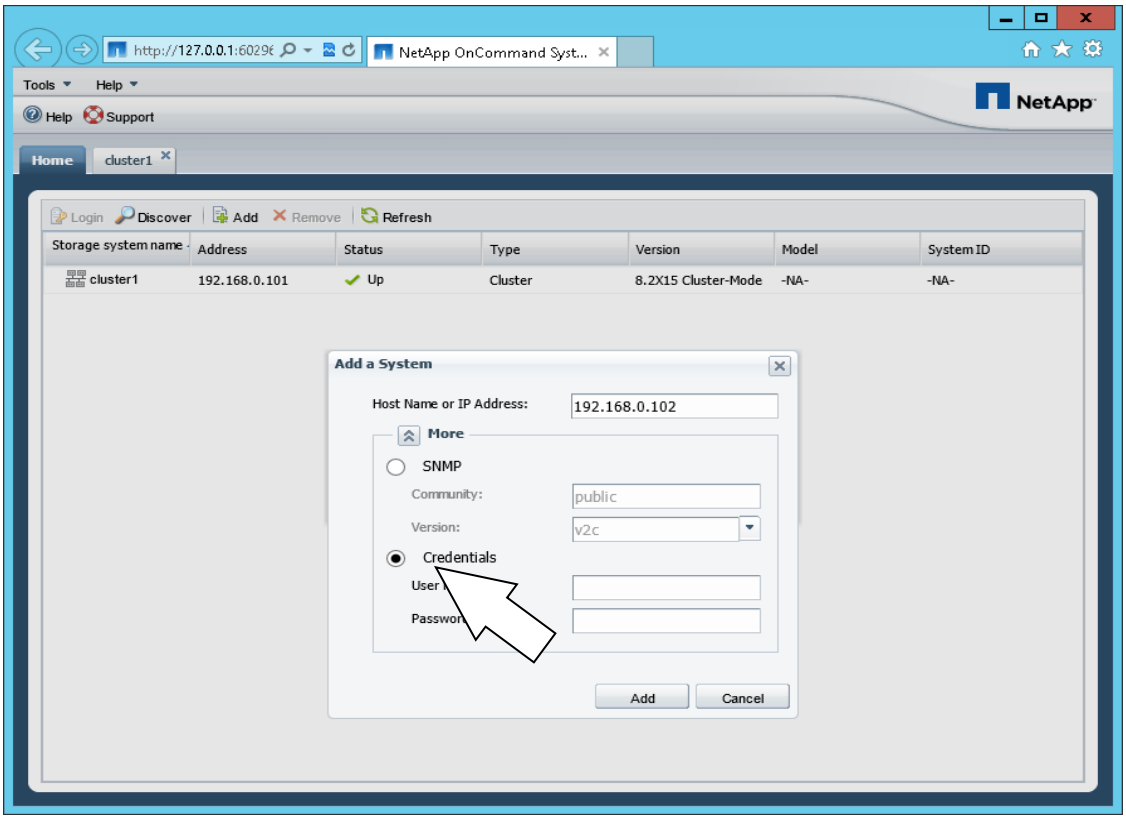
STEP	ACTION
14.	Click the **More** button, expanding the dialog box: 
15.	Select **Credentials**: 

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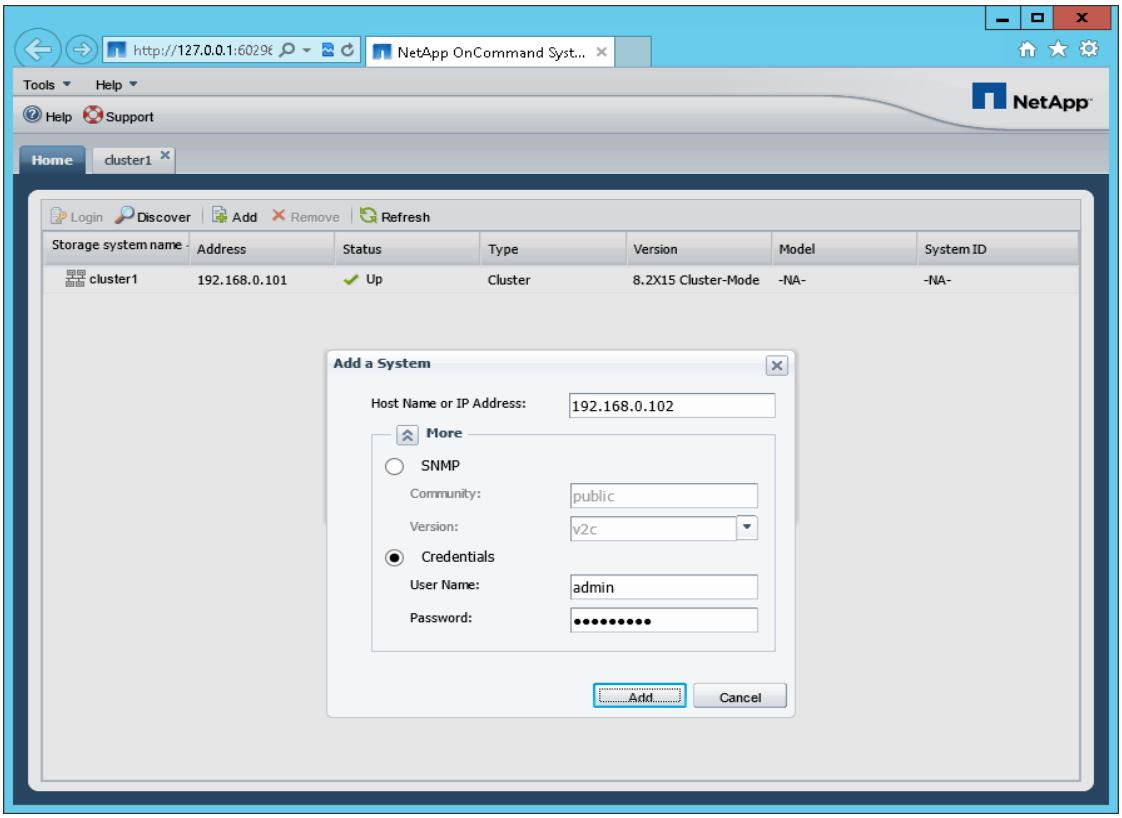
STEP	ACTION
16.	Enter the user name **admin** and the password that you provided for this account in Step 21 of Task 7: 
17.	Click **Add**.

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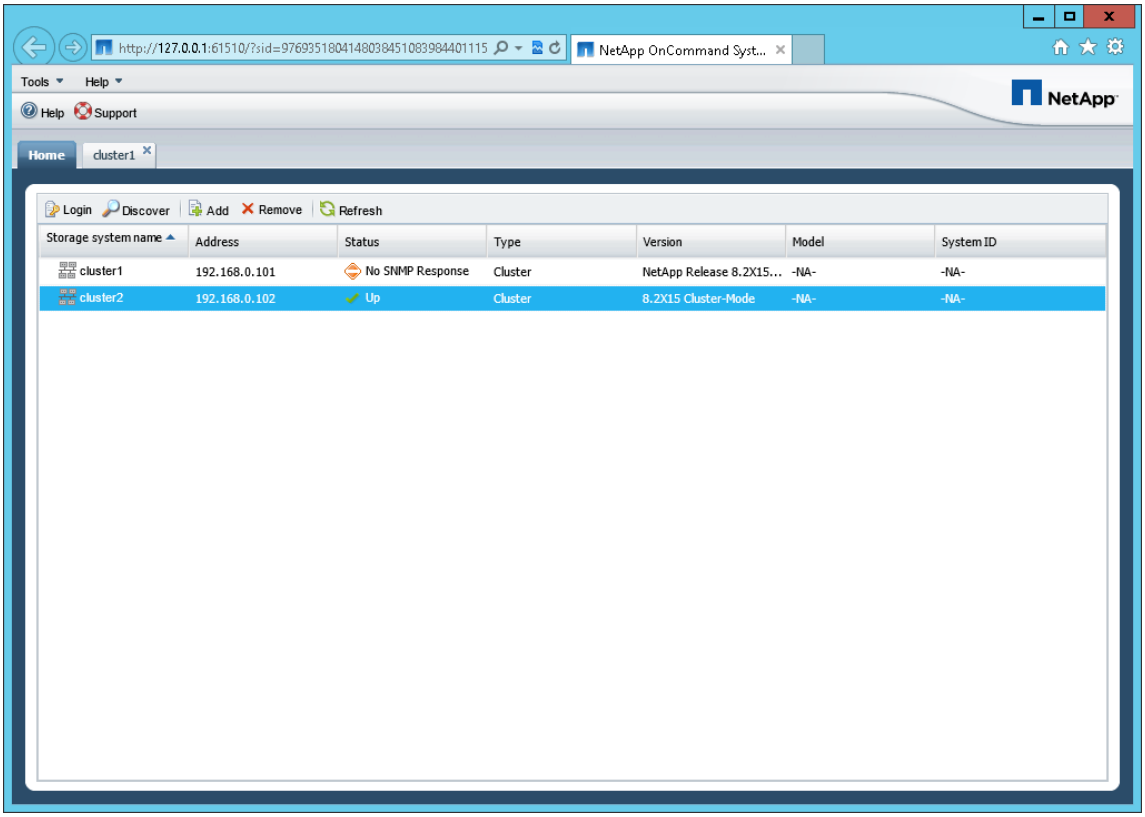
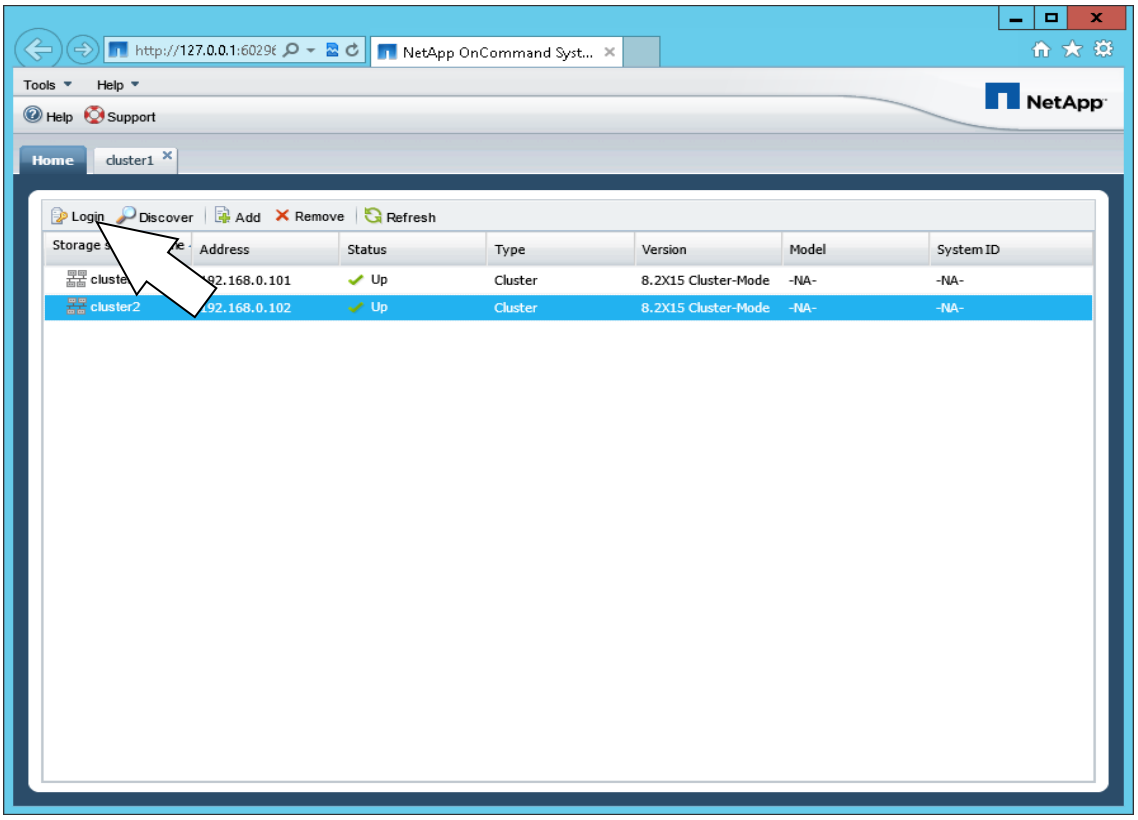
STEP	ACTION
18.	Verify the cluster was added to the list of storage systems: 
19.	Ensure that cluster2 is selected and click **Login**: 

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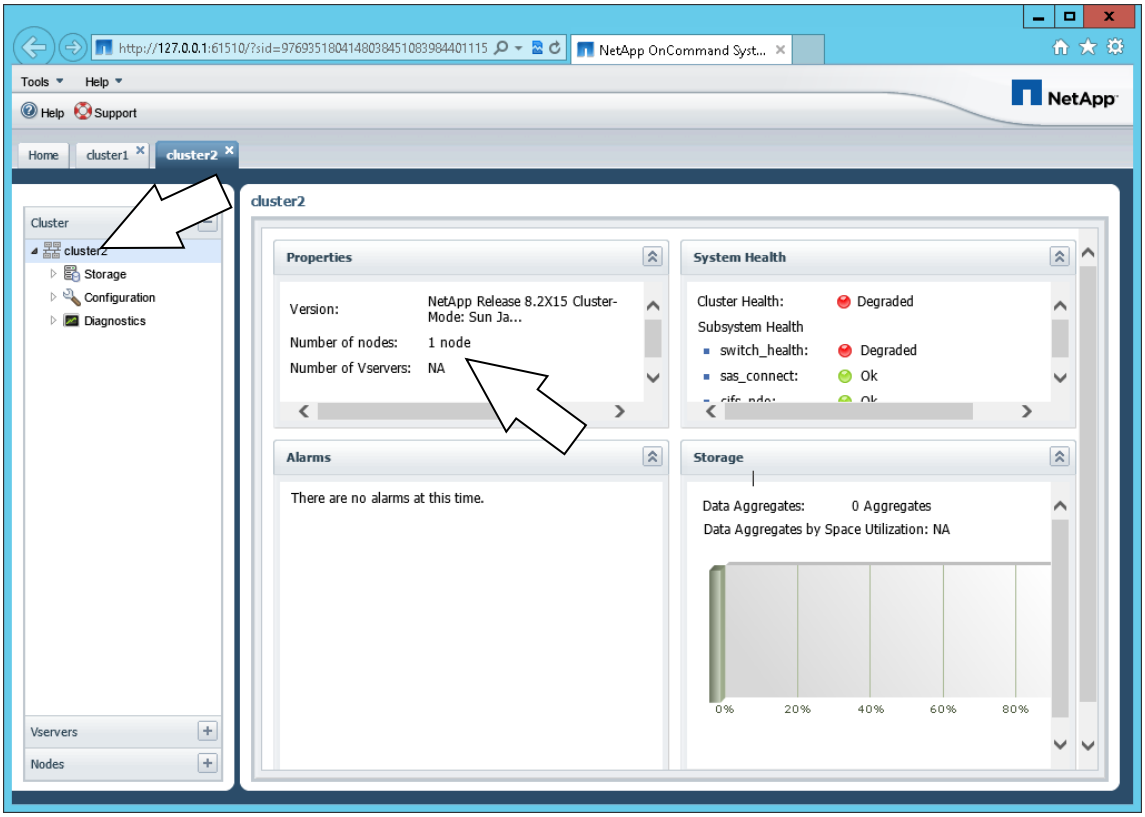
STEP	ACTION
20.	In the left pane of System Manager, expand **cluster2**. **NOTE:** there is only one node in the cluster: 

END OF EXERCISE

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