Module 5: Physical Storage Management

Exercise 1: Managing Physical Storage

Objectives

This exercise focuses on enabling you to do the following:

- Examine local storage tiers
- Expand an aggregate
- Create an aggregate

Case Study

Zarrot Industries has purchased additional storage space for its NetApp ONTAP system. After the service professional has installed an additional disk shelf, the disks need to be joined into a local storage tier (aggregate) before they can be used. Rather than adding the new disks to an existing nearly full aggregate, it was decided to create an aggregate for the additional storage space.

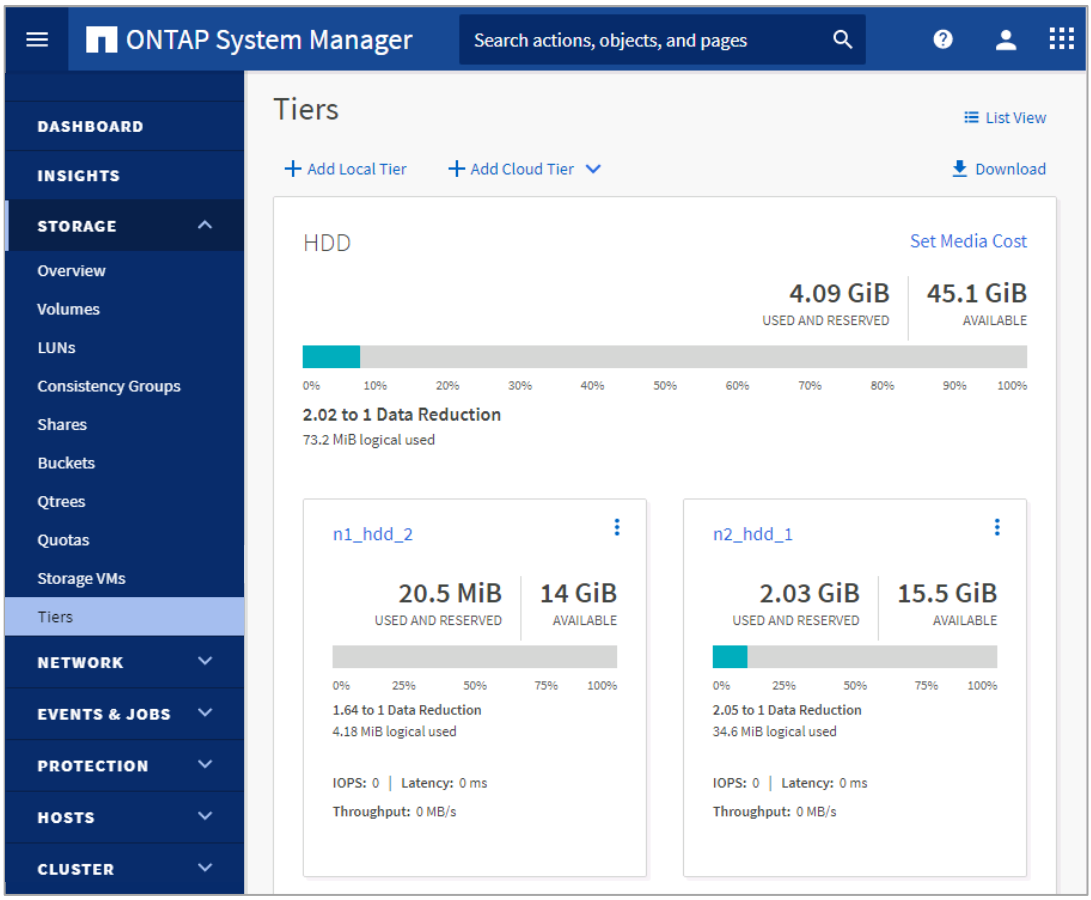
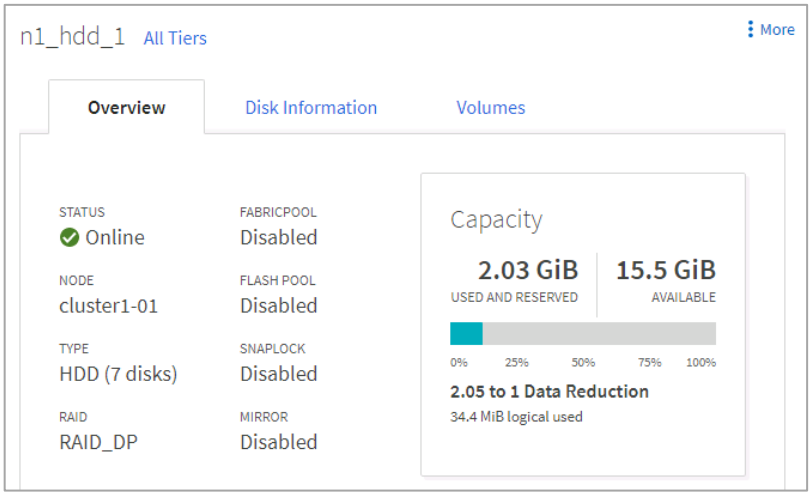
Your colleague George forgot to include all the newly installed disks in the aggregate that he created. You need to add the remaining unused disks (which are not needed as hot spares) into the new aggregate.

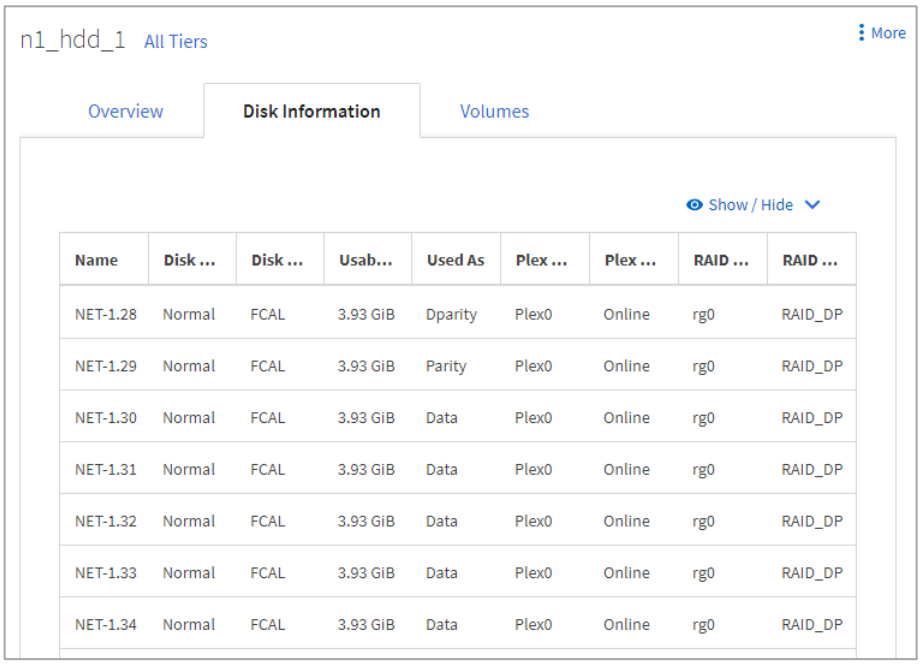
Lab Equipment

Use the following equipment to complete the exercise:

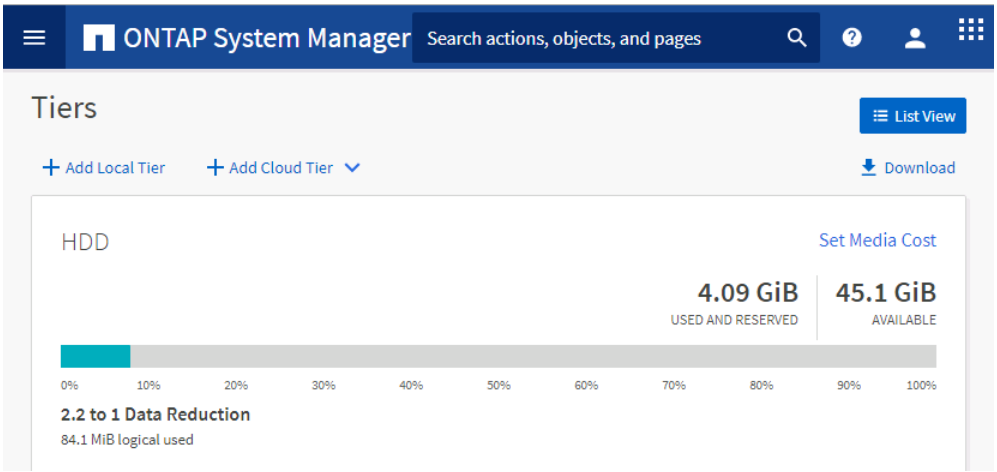
System	Host Name	IP Addresses	User Name	Password
Windows Server	jumphost	192.168.0.5	DEMO\Administrator	Netapp1!
ONTAP cluster-management LIF (cluster1)	cluster1	192.168.0.101	admin (case-sensitive)	Netapp1!
ONTAP cluster-management LIF (cluster2)	cluster2	192.168.0.102	admin (case-sensitive)	Netapp1!

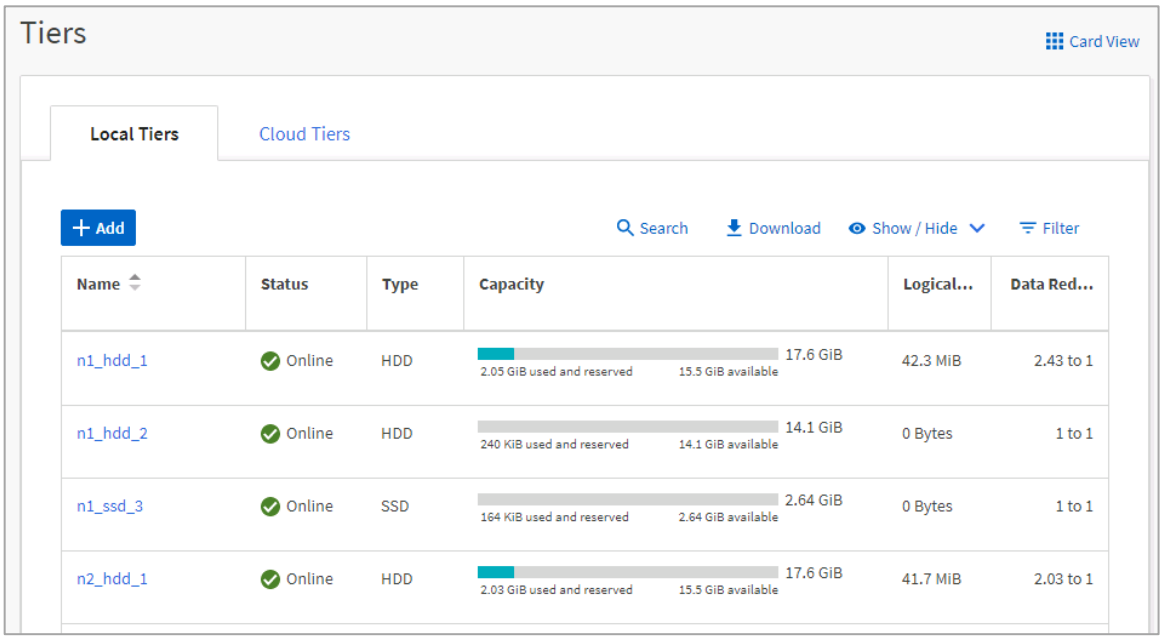
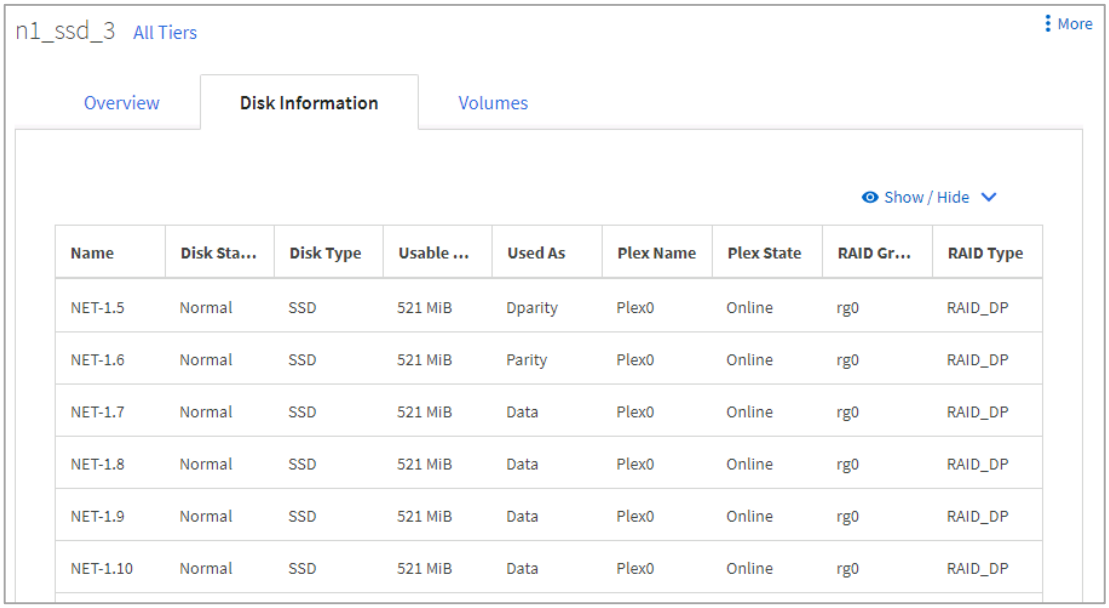
Task 1: Examine Local Storage Tiers

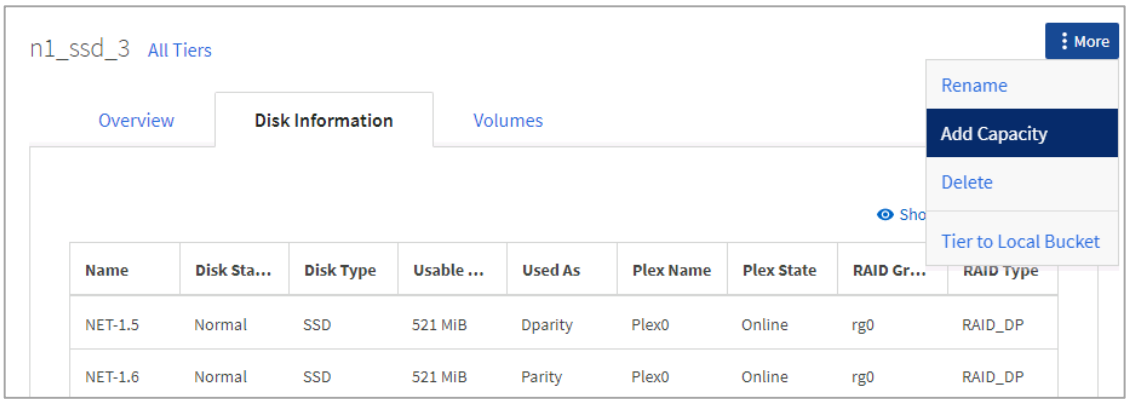
Step	Action
1-1	From the NetApp ONTAP System Manager menu for **cluster1**, in the navigation pane, select **Storage > Tiers**. 
1-2	Click **n1_hdd_1** to view the aggregate details. 

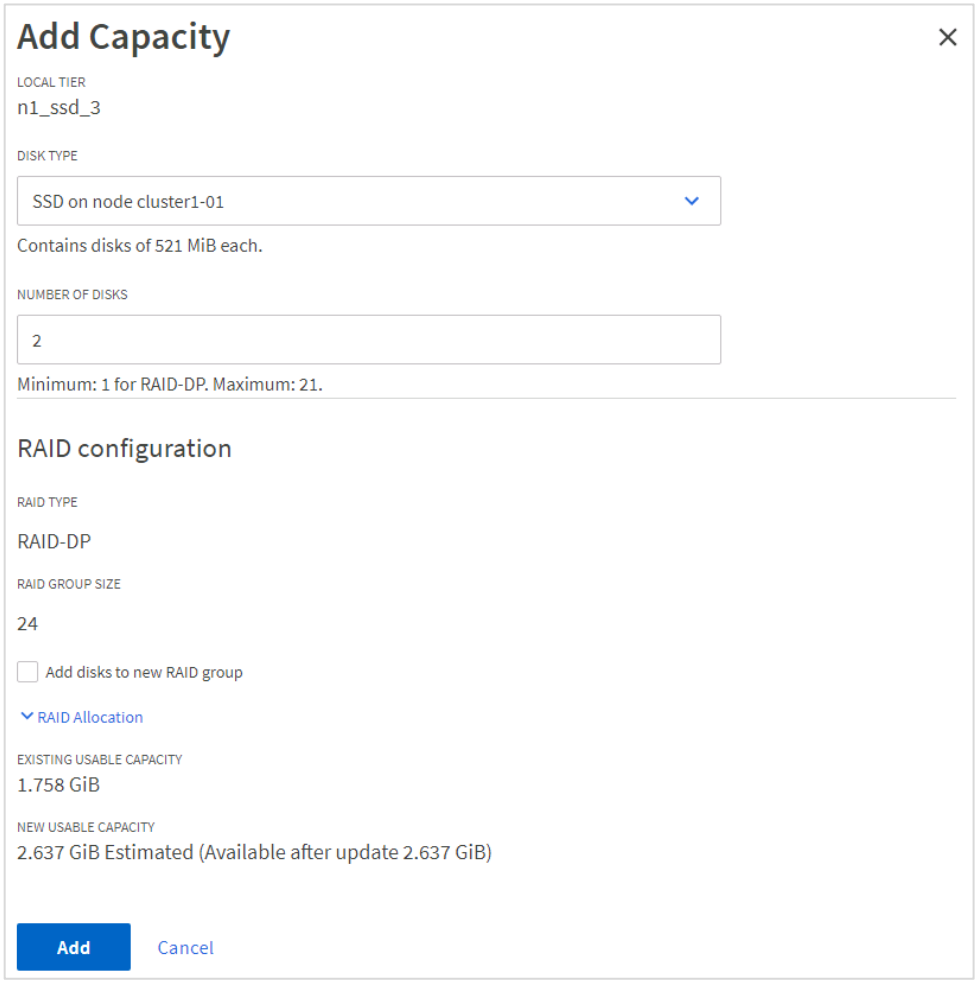
Step	Action
1-3	Click the **Disk Information** tab to view the disks that compose the aggregate. 
1-4	Click the **All Tiers** link to return to the Storage Tiers page.
1-5	Repeat Steps 1-2 through 1-4 to examine the configuration of all the local storage tiers.

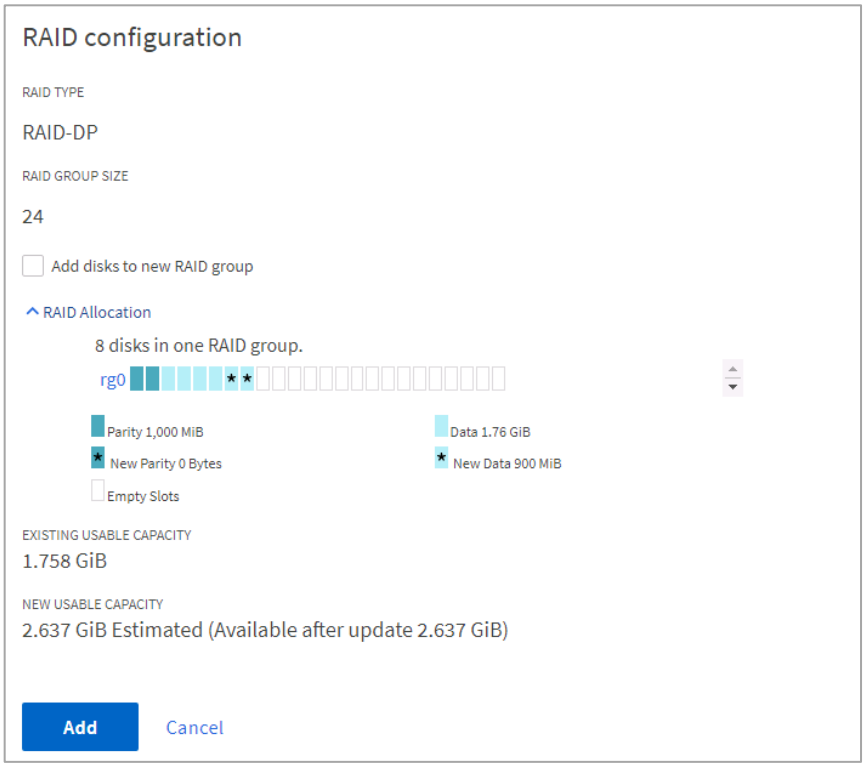
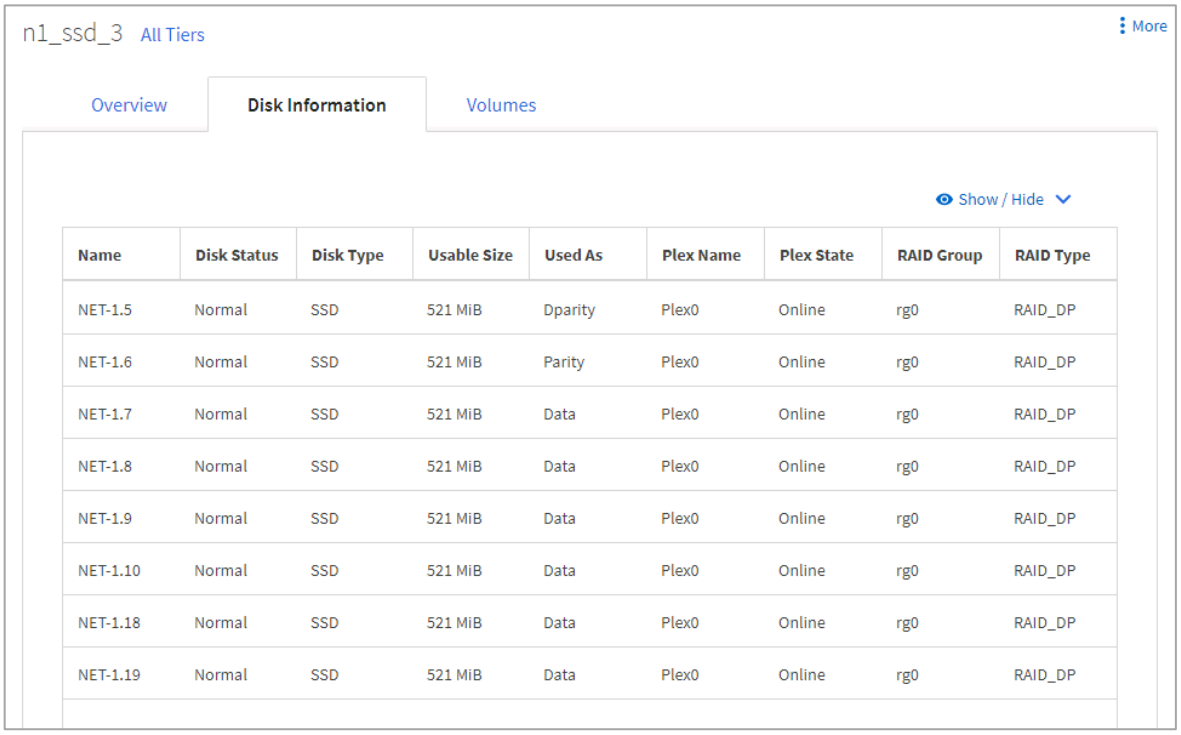
Task 2: Expand an Aggregate

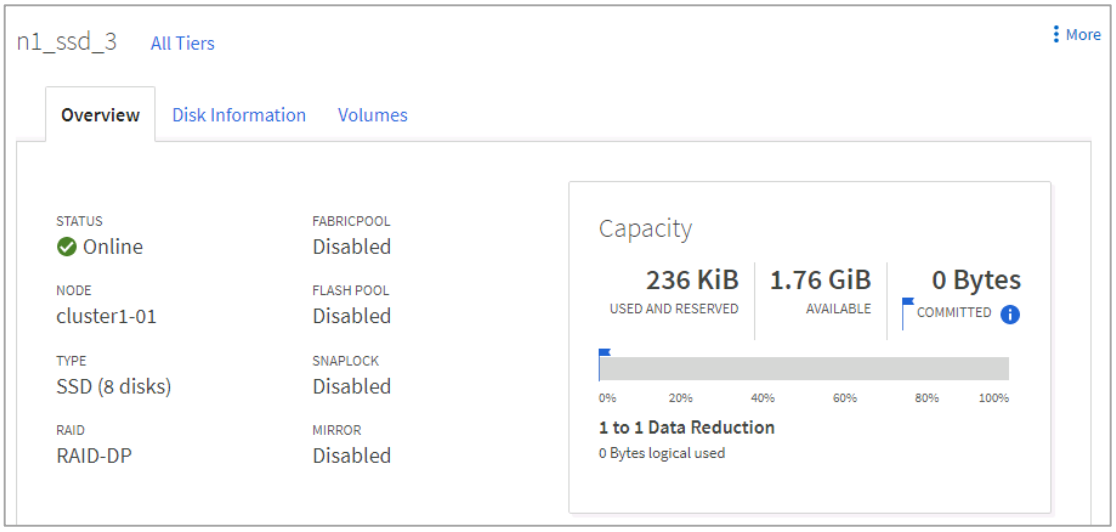
Step	Action
2-1	In the Storage Tiers page, click **List View**. 

Step	Action
2-2	Select **n1_ssd_3**. 
2-3	Notice the number of disks in the aggregate. 

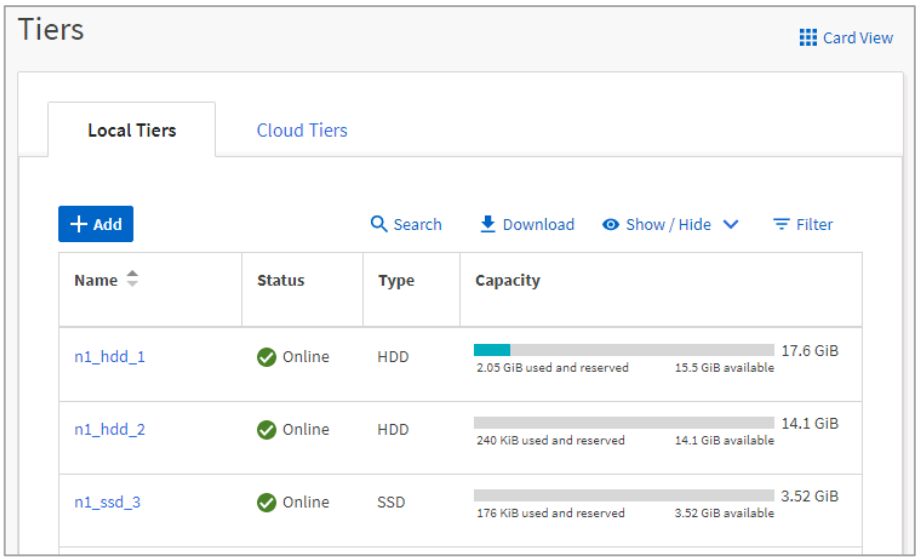
Step	Action
2-4	Click **More,** and then click **Add Capacity**. 
2-5	ONTAP System Manager attempts to add all the available drives to the aggregate while retaining sufficient spare drives. Disregard the message of insufficient space that is caused by the limitations of the training environment and enter the correct number of drives to add.
2-6	Click **More Options**.

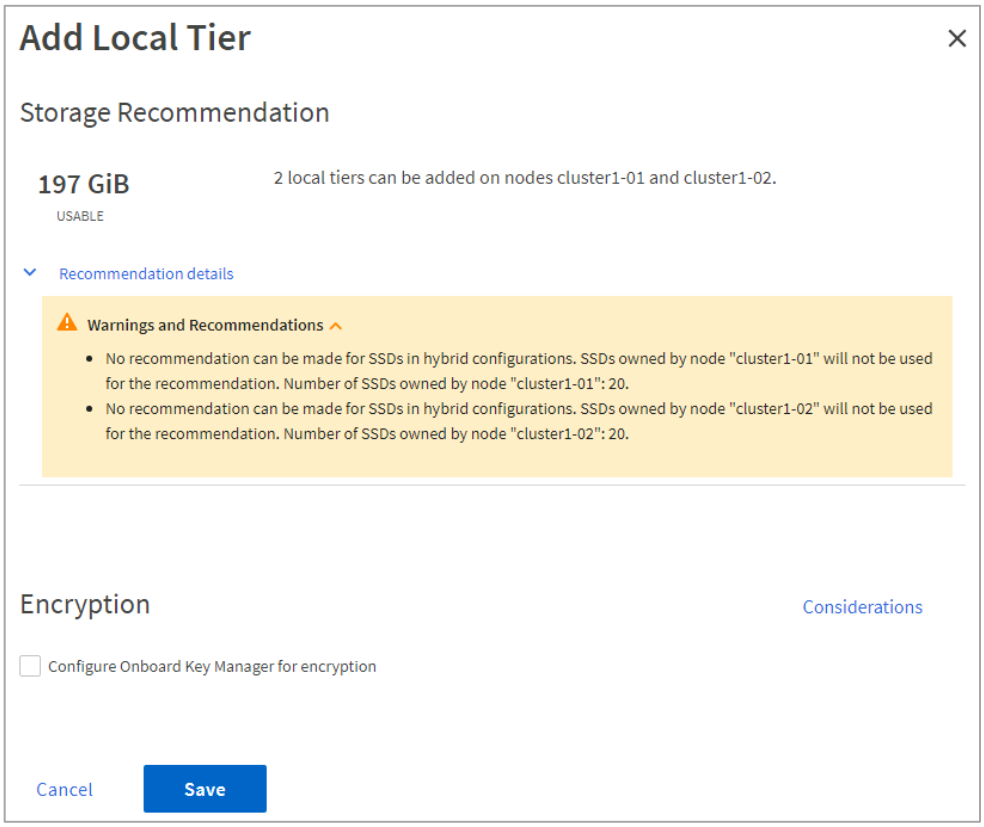
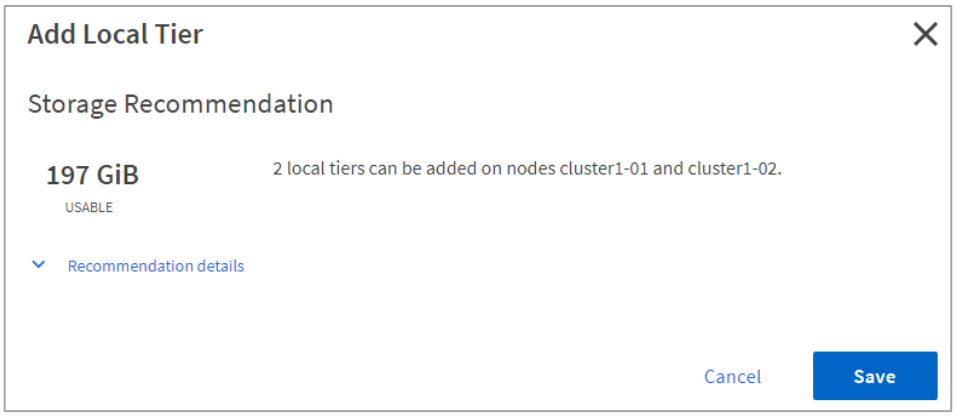
Step	Action
2-7	In the Add Capacity window, enter the following information to expand the aggregate by two drives: • Disk Type: **SSD on node cluster1-01** • Number of Disks: **2** 
2-8	In the RAID configuration section, observe the local tier RAID type and maximum RAID group size.
2-9	Click **RAID Allocation**.

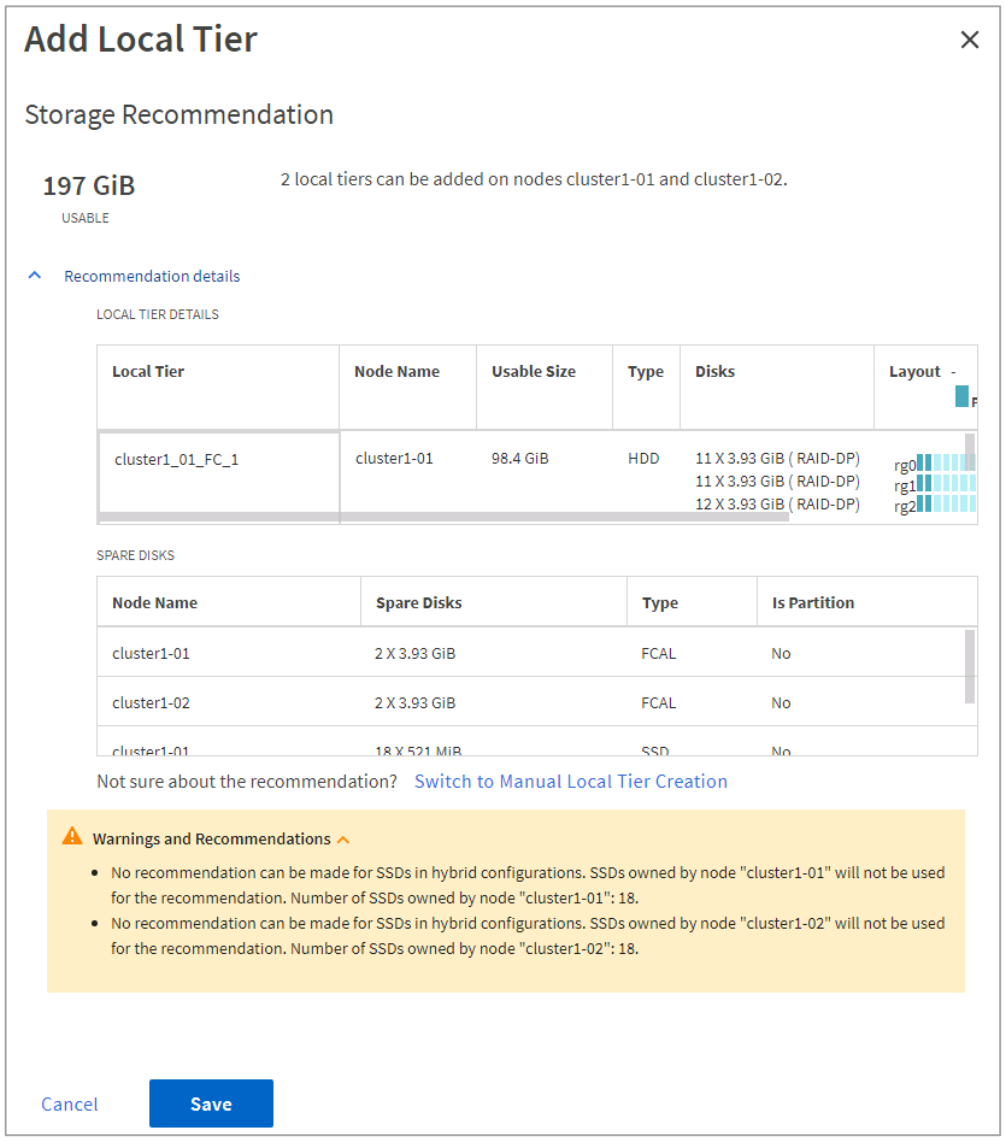
Step	Action
2-10	In the RAID configuration section, observe the new configuration of the RAID group. 
2-11	Click **Add**.
2-12	Verify that the disks are added to the disk count. 

Step	Action
2-13	Verify that the additional space is available in the n1_ssd_3 aggregate. 
2-14	Click the **All Tiers** link to return to the Storage Tiers page.

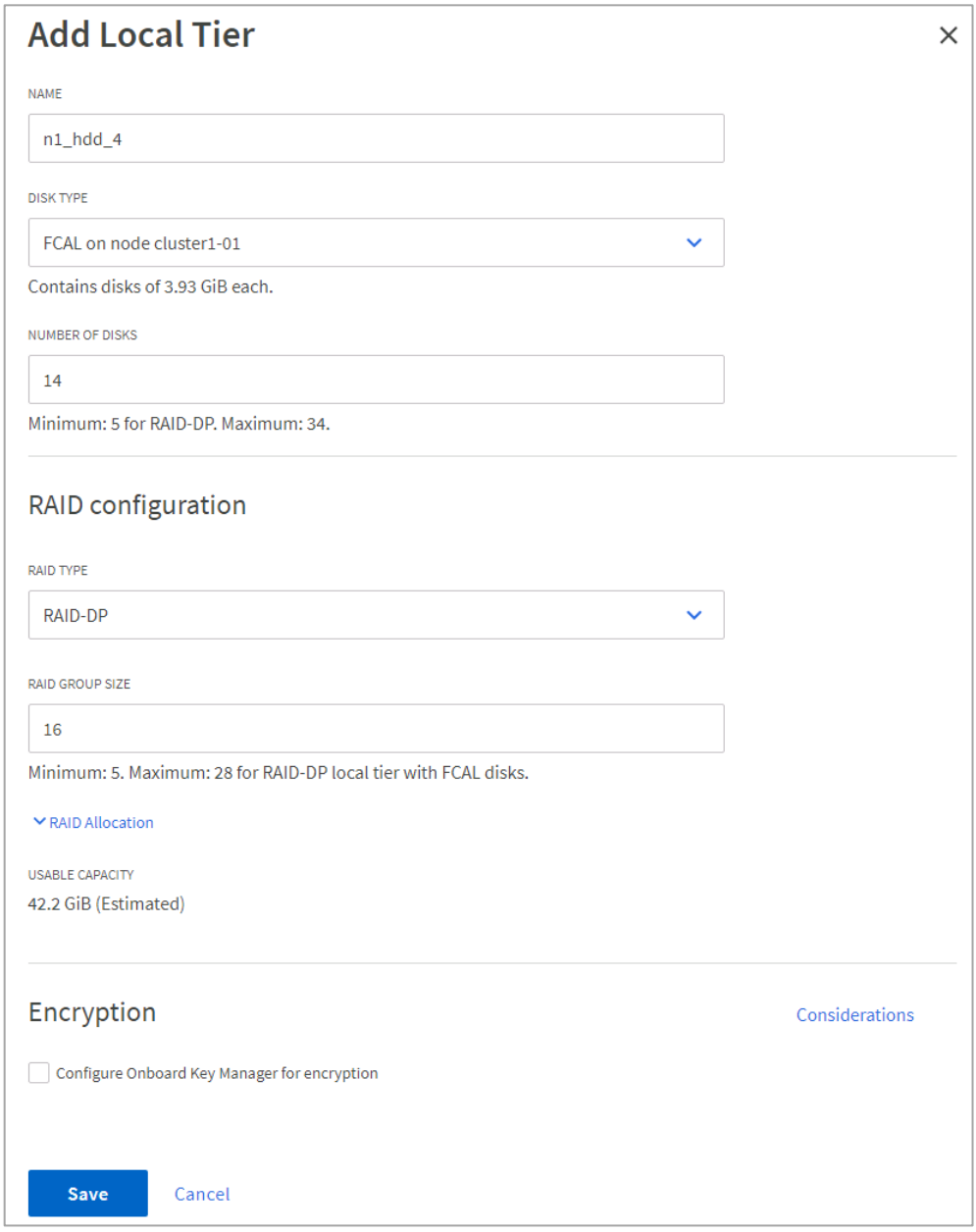
Task 3: Create an Aggregate

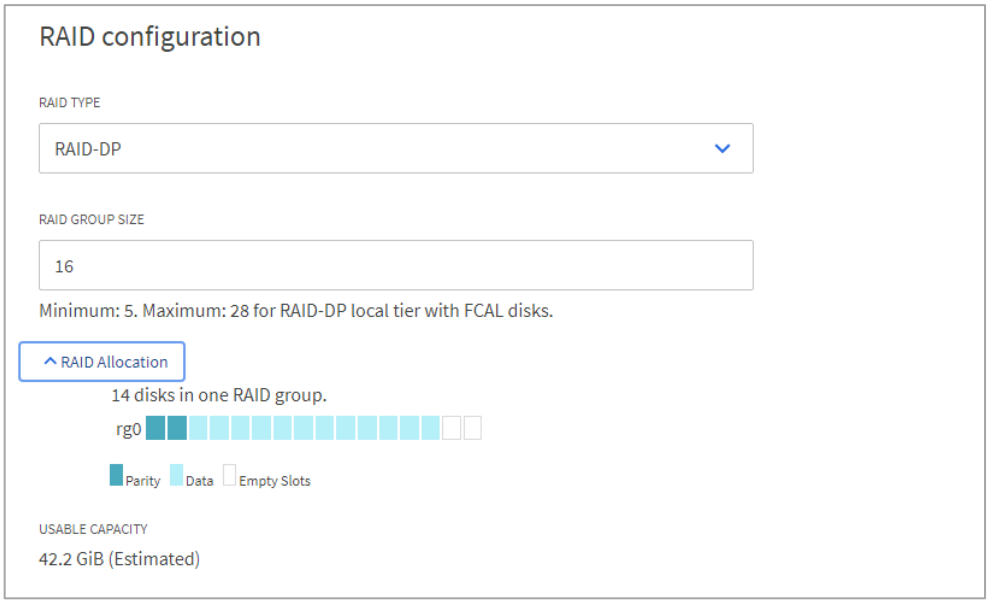
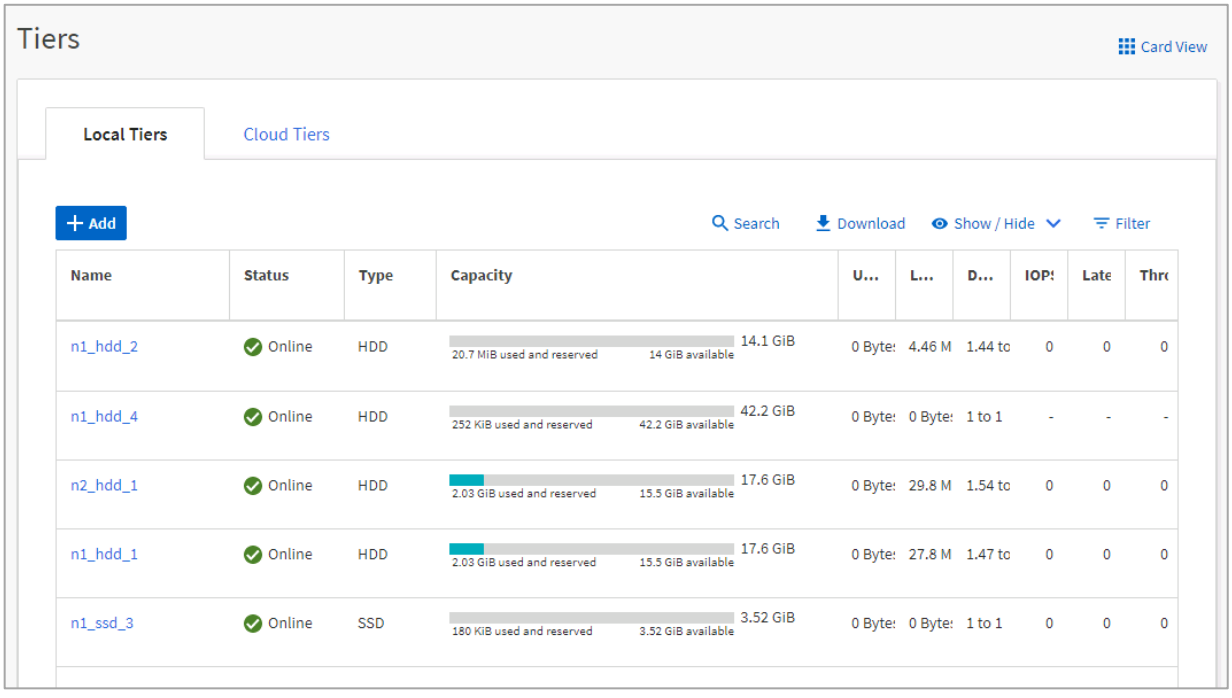
Step	Action
3-1	Click **Add** to create a new local data aggregate. 

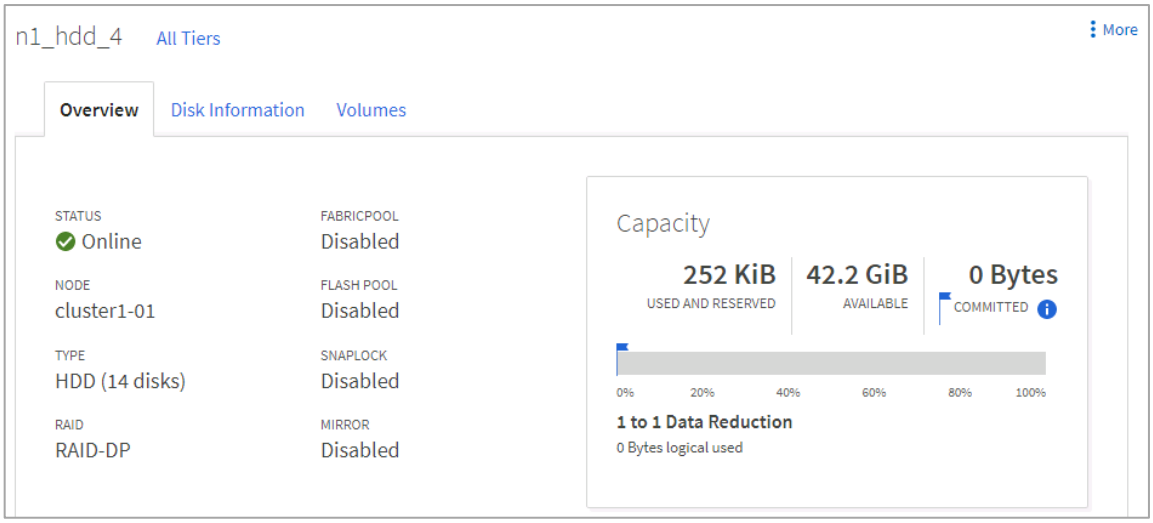
Step	Action
3-2	In the Add Local Tier window, unselect the checkbox to prevent enabling the Onboard Key Manager. You will configure the Onboard Key Manager to manage encryption keys in a later exercise. 
3-3	In the Add Local Tier window, expand the **Recommendation details**. 

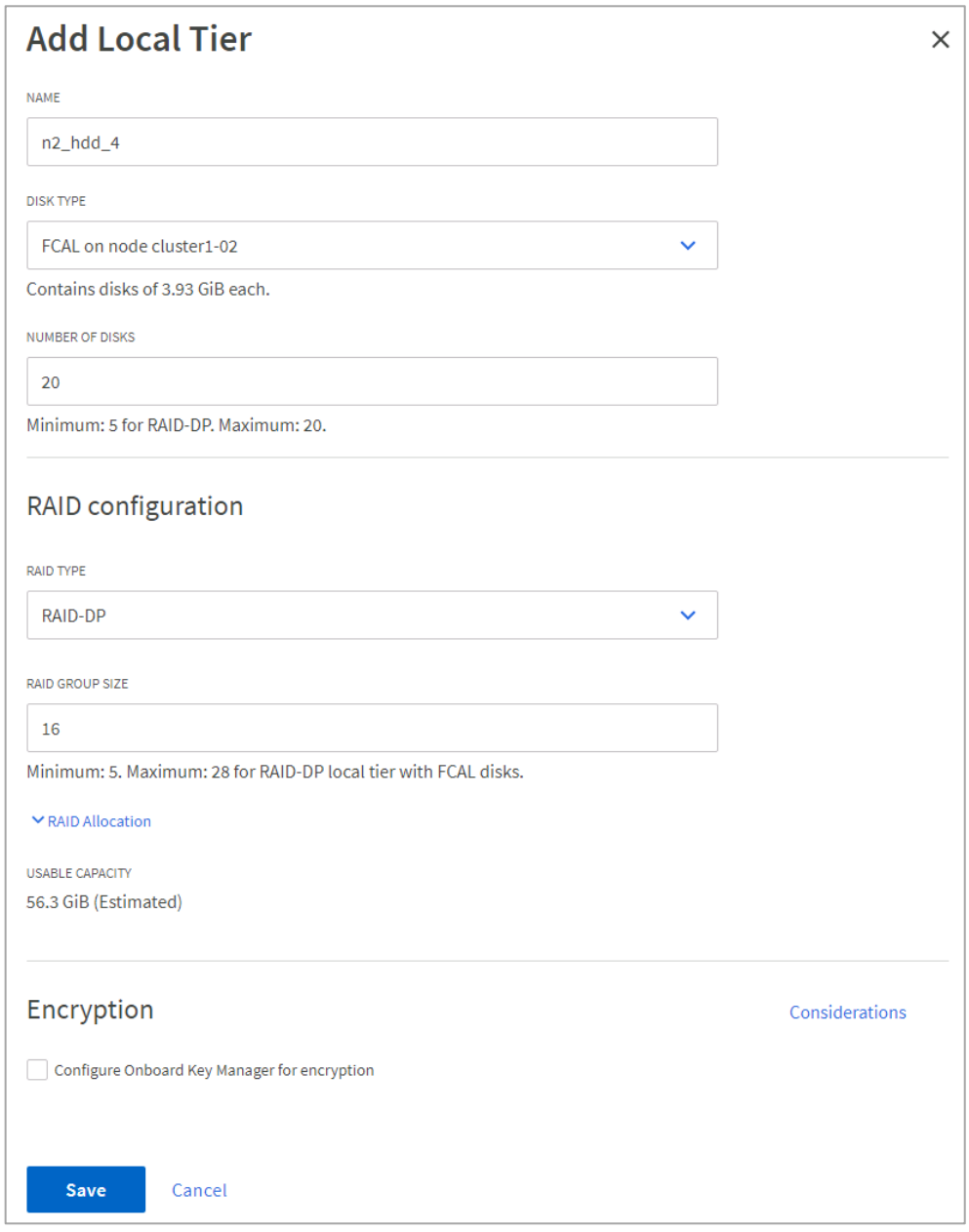
Step	Action
3-4	Use the scroll bars to review the suggested configuration for newly created local tiers. 
3-5	Because SSDs can be used in either FlashPool aggregates or SSD-only aggregates, System Manager does not provide recommendations for their use in hybrid FAS systems.
3-6	Click **Switch to Manual Local Tier Creation**.

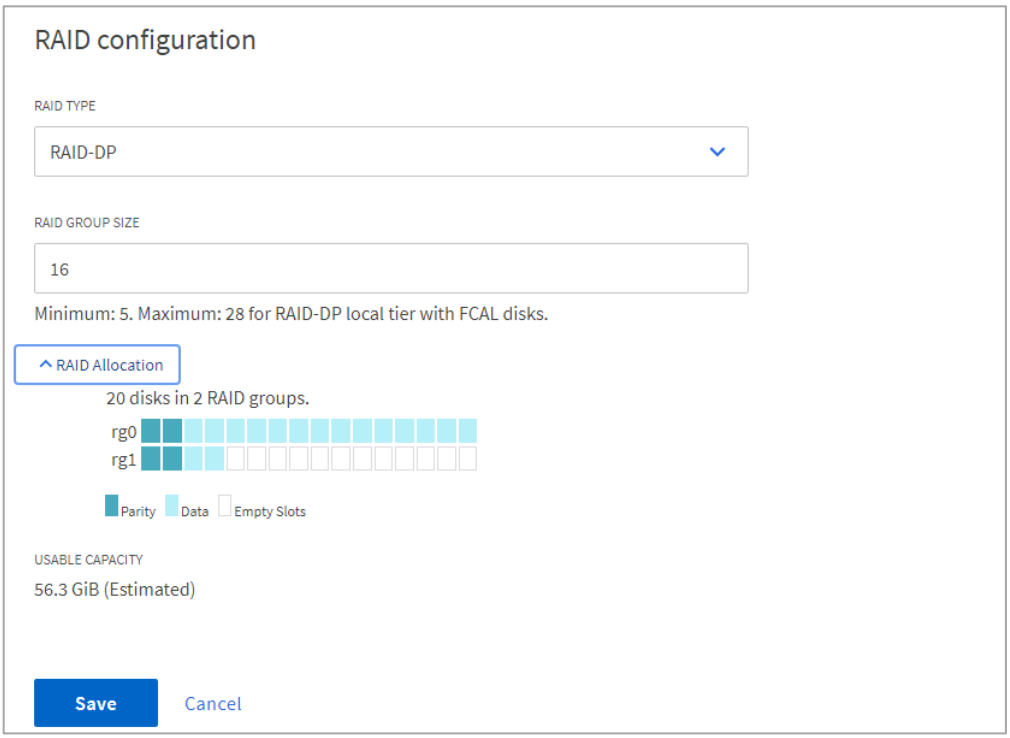
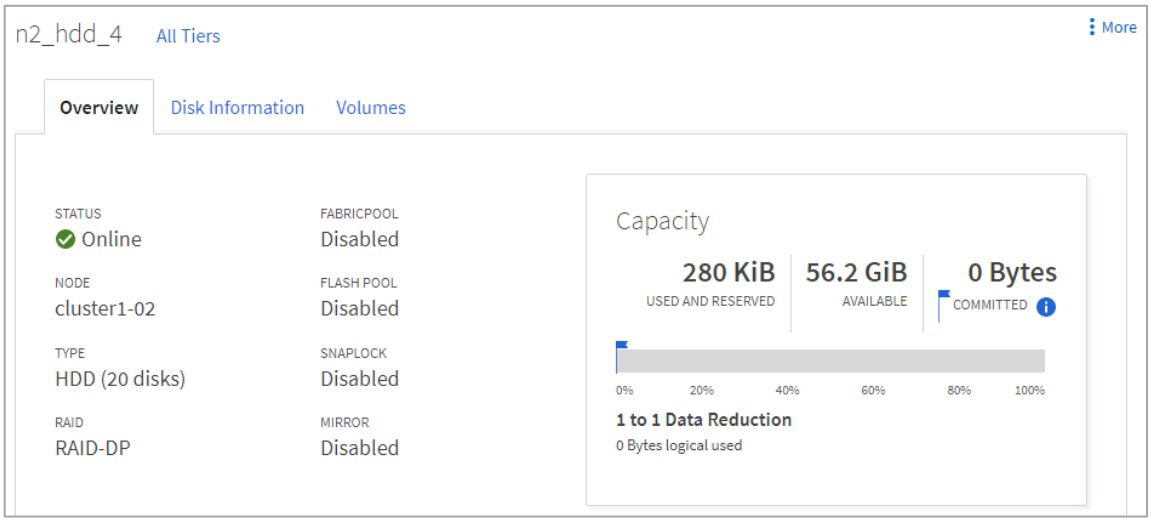
Step	Action
3-7	In the Add Local Tier window, define an aggregate that is comprised of HDDs on node 1, with the following settings: • Name: **n1_hdd_4** • Disk Type: **FCAL on node cluster1-01** • Number of Disks: **14** • RAID Type: **RAID-DP** (default) • RAID Group Size: **16** (default) • Configure Onboard Key Manager for encryption: **<unselected>**



Step	Action
3-8	You select *only* the suggested number of disks (fourteen). Disks are limited, and if you use too many disks, you might run out before you complete the course.
3-9	Click **RAID Allocation**. 
3-10	Answer the following question: In a real-world environment, would the specified allocation be an efficient use of disks? _____
3-11	Click **Save**.
3-12	Examine the new aggregate: 

Step	Action
3-13	Click **n1_hdd_4** and observe the aggregate details. 
3-14	Click **All Tiers** to return to the Tiers page.
3-15	Click **Add** to create a second new local data aggregate.
3-16	In the Add Local Tier dialog box, expand the **Recommendation details**.
3-17	Click **Switch to Manual Local Tier Creation**.

Step	Action
3-18	In the Add Local Tier window, define an aggregate that is comprised of HDDs on node 2, with the following settings: • Name: **n2_hdd_4** • Disk Type: **FCAL on node cluster1-02** • Number of Disks: **20** • RAID Type: **RAID-DP** • RAID Group Size: **16** • Configure Onboard Key Manager for encryption: **<unselected>** 

Step	Action
3-19	Click **RAID Allocation**. 
3-20	Answer the following question: In a real-world environment, would the specified allocation be an efficient use of disks? _____
3-21	Click **Save**.
3-22	Click **n2_hdd_4** and observe the aggregate details. 
3-23	Click **All Tiers** to return to the Tiers page.

End of exercise