NEXSAN
A StorCentric Company

BEAST and E-Series

Nexsan Storage Systems Plugin for VMware vCenter User Guide

Part Number: D6200052, Rev. C

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About this manual

This user guide provides procedures for monitoring, configuration, provisioning, and maintenance of Nexsan Storage Systems using the Nexsan High-Density Storage Plugin for VMware vCenter.

Note While Nexsan makes every effort to ensure the accuracy of technical documentation, screen images and procedures may change after publication. In case of discrepancy, please check for the latest updates on the E-Series and BEAST Documents and Downloads page. Also, refer to the latest Release Notes.

Conventions

Here is a list of text conventions used in this document:

Convention	Description
underlined blue	Cross-references, hyperlinks, URLs, and email addresses.
boldface	Labels on the physical Nexsan Storage System or interactive items in the graphical user interface (GUI).
italics	System messages and non-interactive items in the GUI. References to software user guides.
`monospace`	Command-line interface (CLI) text or text that refers to file or directory names.
`monospace bold`	Text strings that must be entered by the user in the CLI or in text fields in the GUI.

Notes, tips, cautions, and warnings

Note Notes contain important information, present alternative procedures, or call attention to certain items.

Tip Tips contain handy information for end-users, such as other ways to perform an action.

CAUTION: In hardware manuals, cautions alert the user to items or situations which may cause damage to the Nexsan Storage System or result in mild injury to the user, or both. In software manuals, cautions alerts the user to situations which may cause data corruption or data loss.

WARNING: Warnings alert the user to items or situations which may result in severe injury or death to the user.

Contacting Nexsan

For questions about Nexsan products, please visit the Nexsan support Web page, and the E-Series and BEAST Documents and Downloads page. If you are unable to find the answer to your question there, please see our contact information below.

Service and support

Nexsan's Technical Services Group provides worldwide assistance with installation, configuration, software support, warranty, and repair for all Nexsan products. A variety of service and support programs are available to provide you with the level of coverage and availability your operation requires.

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https://helper.nexsansupport.com/esr_support

Contact:

https://helper.nexsansupport.com/contact

Revision history

D6200052, Rev. C, March 2022

Updated for technical accuracy, applied new Nexsan template and branding.

Here is a list of the feature-based revisions to this document:

Dates	Release	Feature
July/August 2019	Release 1.2.6	Added units selector (GB/TB/GiB/TiB) to “Create Volume” and “Expand Volume” actions. Added “Beacon” button under system “General” configuration page. Added free space and capacity graphic to system “Storage Pools” configuration page.
	Release 1.2.5	Added support for managing hardware-based replication. Added a field to display the creation date for volumes and storage pools.
	Release 1.1.18	Added the Import Datastore. Added the Check for Updates feature. Added a column for host multipathing policy in the Nexsan System, Volume, and Connected Hosts workspaces and host Nexsan Storage workspaces. In the performance monitoring graphs and tables, added average latency by port type to the Nexsan Storage System and Volume workspaces.

Related documents

The following Nexsan product manuals contain related information:

- *Nexsan VMware Best Practices Guide*
- *Nexsan High-Density Storage User Guide*
- *Nexsan Snapshots and Replication User Guide*
- *Nexsan Multipathing Best Practices Guide*

Chapter 1

Introduction

The Nexsan High-Density Storage Plugin for VMware vCenter enables monitoring, configuration, provisioning, and maintenance of Nexsan Storage Systems, and integrates Nexsan Storage with VMware vSphere.

The plugin is also intended to enable vCenter administrators to understand relationships between VMware infrastructure – ESXi hosts and clusters, datastores and virtual machines – and Nexsan Storage Systems, Nexsan Volumes, and Storage Pools, particularly where these systems are handled by different teams.

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Features at a glance

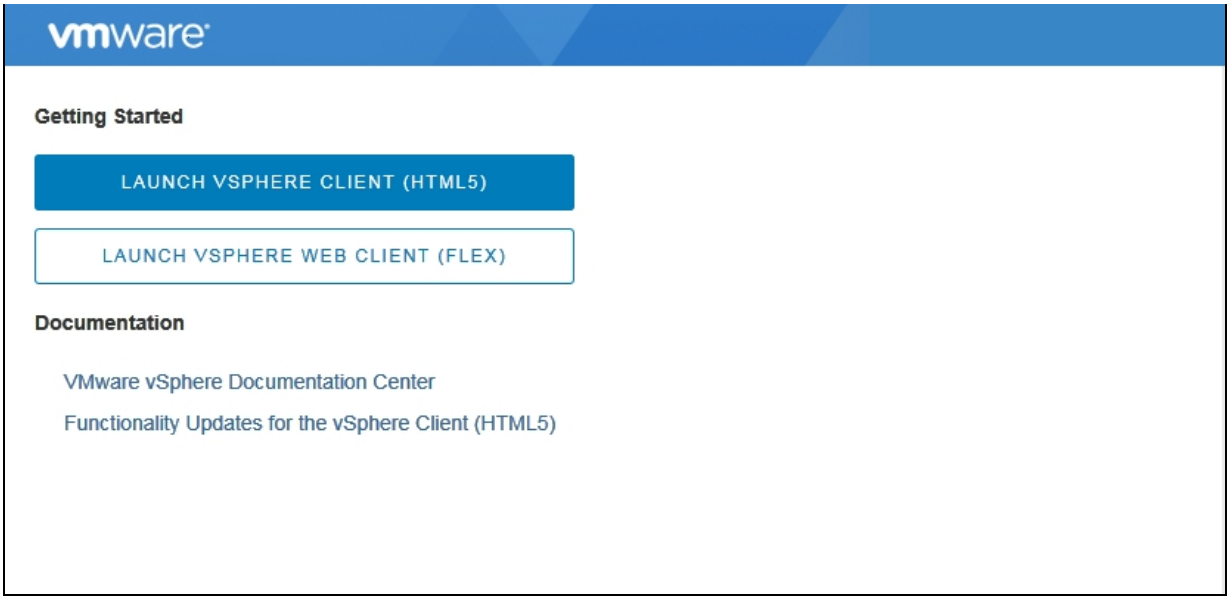
The Nexsan High-Density Storage Plugin for VMware vCenter:

- Integrates Nexsan E-Series and BEAST storage into vSphere infrastructure management
- Shows the relationships between vSphere hosts and datastores and Nexsan Storage Systems and volumes
- Provides reporting of Nexsan Storage System health, warnings, and I/O performance
- Displays Nexsan event logs and system settings within vSphere
- Enables direct provisioning of new storage into managed VMware infrastructure
- Manages Nexsan Storage Systems, volumes and datastores, and physical disks

Once the plugin is added to vCenter, you'll find links to **Nexsan Storage**, where you can view and manage Nexsan Storage Systems. See "The Nexsan Storage workspace" (page 11)

The Nexsan High-Density Storage Plugin for VMware vCenter supports all Nexsan E-Series and BEAST systems, and VMware vCenter Server v. 6.0 and VMware vCenter Server v. 6.5.

Note Nexsan recommends using the Nexsan Storage plugin with the vSphere Client (HTML5) user interface, but the vSphere Flash Client is also supported. vSphere 6.0 supports only the Flash Client. Procedures and illustrations in this document generally reflect the vSphere Client (HTML5) user interface.

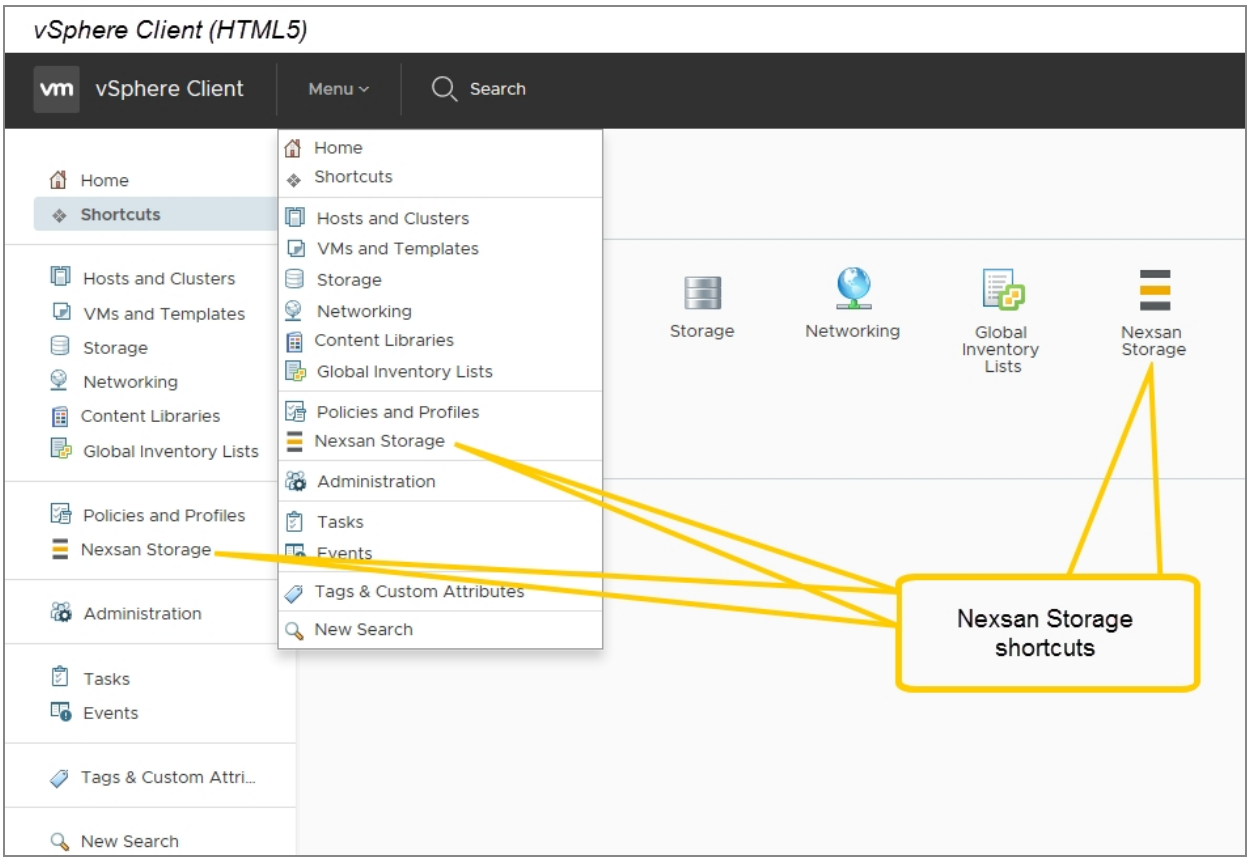


The Nexsan Storage workspace

The **Nexsan Storage** workspace provides an overview of provisioned **Nexsan Storage Systems** and **Nexsan Volumes** and VMware Datastores.

You can use the **Options**, **Add System**, and **Refresh** buttons to change monitoring options, add Nexsan Storage Systems, and to refresh the workspace.

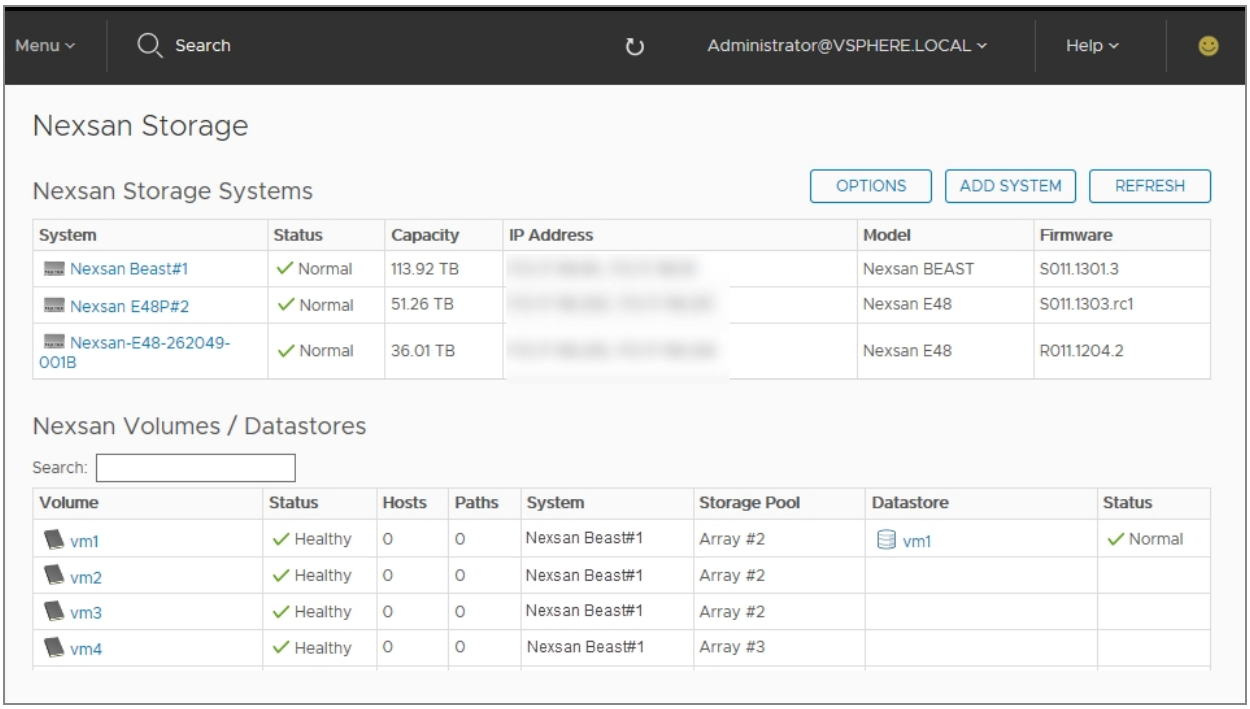
You can also follow links to added systems and volumes, and view details such as status, capacity, IP address, model, and firmware.



▶ To open the Nexsan Storage workspace:

1. Log in to a vSphere client.
2. Do any of the following:
   - In the Object Navigator, select **Nexsan Storage**.
   - On the vSphere toolbar,
     - Select **Menu** (HTML5) / **Home** (Flash) to open the menu.
     - Select **Nexsan Storage**.
   - In the **Shortcuts** workspace (HTML5) / **Home** workspace (Flash), select **Nexsan Storage**.

Here's an example of a Nexsan Storage workspace, populated with Nexsan Storage Systems and Nexsan Volumes and VMware datastores. To add your first Nexsan Storage System, see "Adding a Nexsan Storage System to vSphere" (page 18)



Use this table for details about the Nexsan Storage workspace:

Section	Field	Description
Nexsan Storage Systems		Provides links to Nexsan Storage Systems added to vCenter, their statuses, capacities, IP addresses, and the associated Nexsan model and firmware.
	System	The model name of the Nexsan Storage System
	Status	The system status: Healthy, Fault, or Unknown
	Capacity	System storage capacity and number of drives
	IP Address	The IP addresses of the system.
	Model	Nexsan E-Series or Nexsan BEAST Storage System model
	Firmware	The Nexsan firmware version
Nexsan Volumes / Data-stores		Provides links to each configured Nexsan Volume workspace, health status, number of hosts and paths, system name, and related storage pool and data-store and datastore status
	Volume	Names and links for configured volumes
	Status	The status of configured volumes

Section	Field	Description
	Hosts	The number of assigned hosts
	Paths	The number of connected paths
	System	The name of the associated system
	Storage Pool	The associated storage pool / array
	Datastore	Any associated datastore
	Status	The status of the datastore

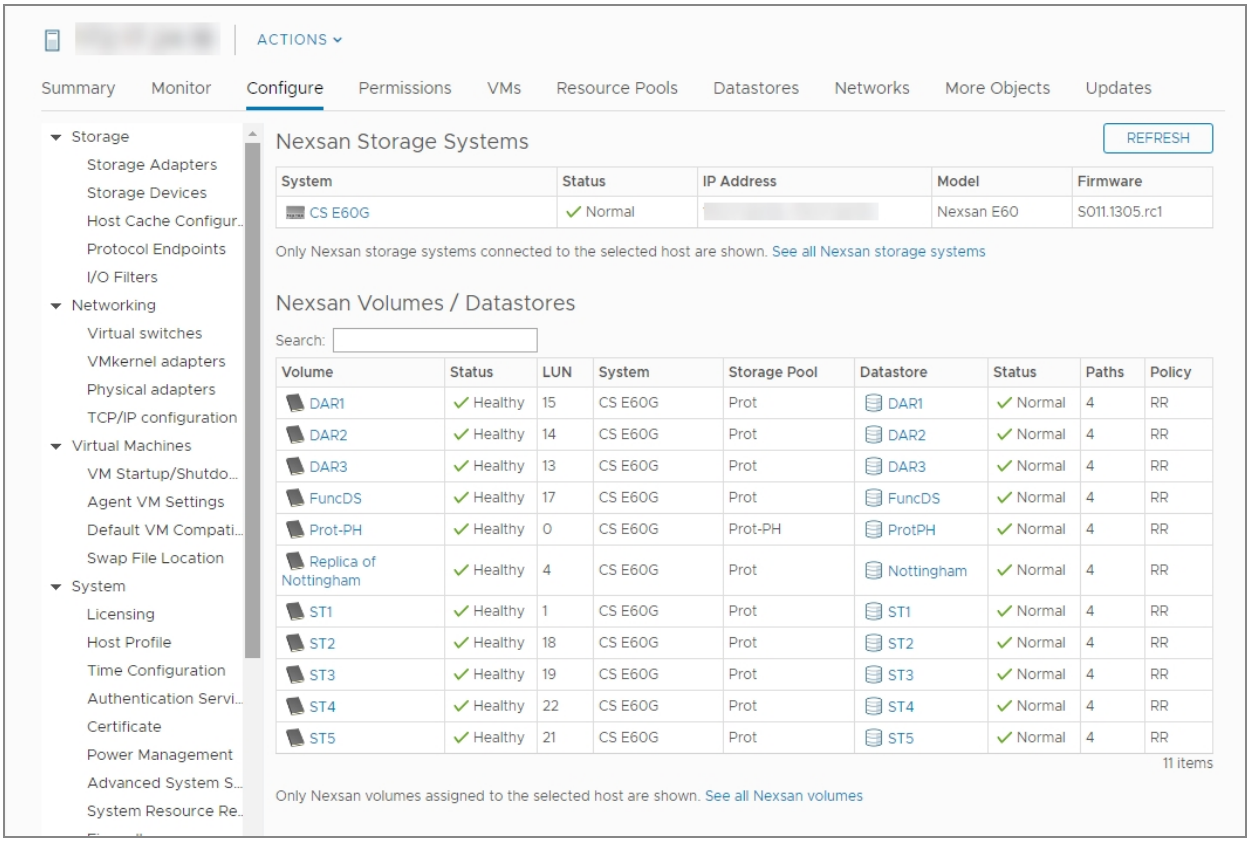
Next, see "Adding a Nexsan Storage System to vSphere" (page 18)

Other vSphere client entry points to Nexsan Storage

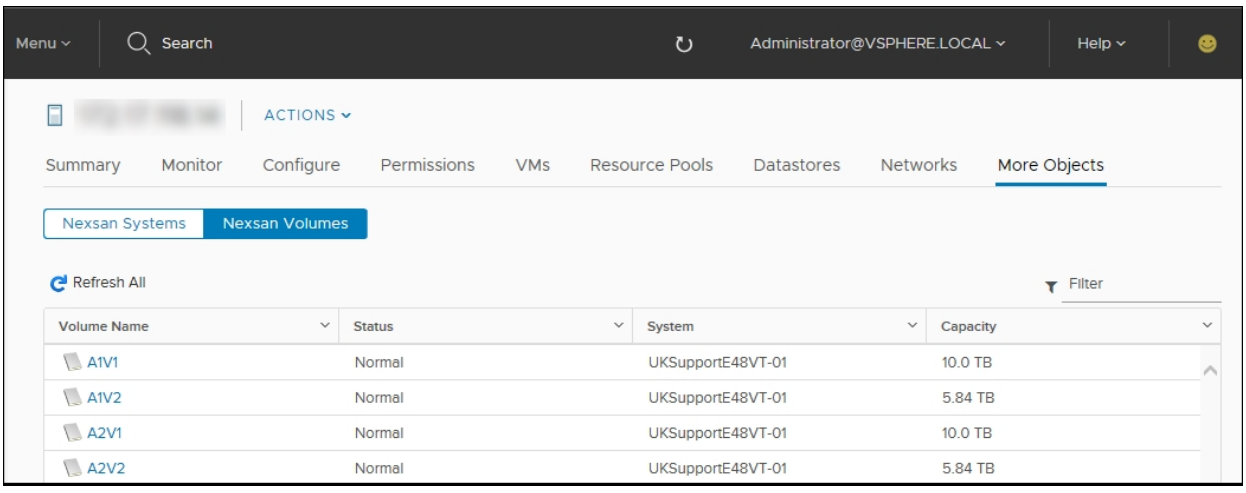
The plugin also provides context-sensitive entry points to Nexsan Storage from the vSphere client. Here are some examples:

Hosts and Clusters workspace

- Open the vSphere client **Hosts and Clusters** workspace.

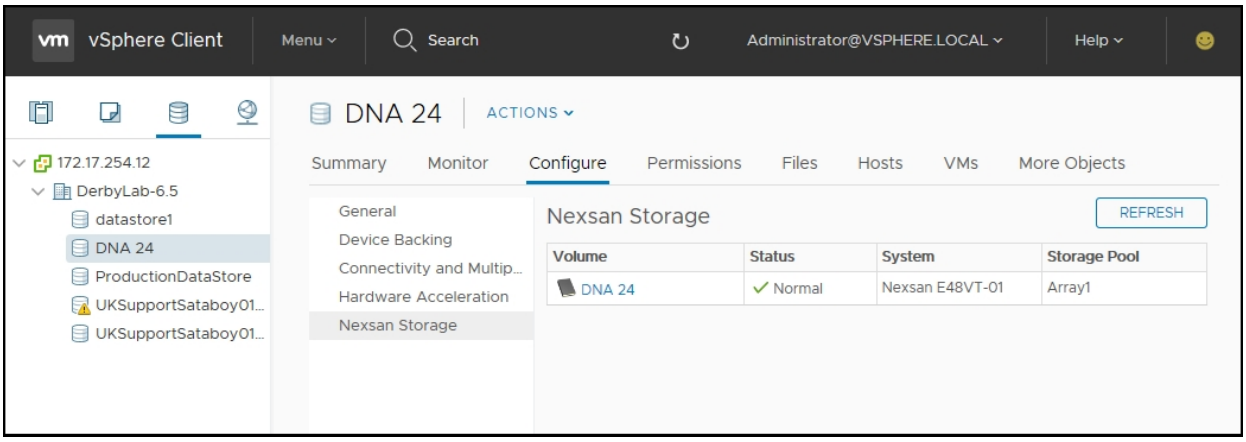


- Select **More Objects**, then the **Nexsan Systems** or **Nexsan Volumes** tab.



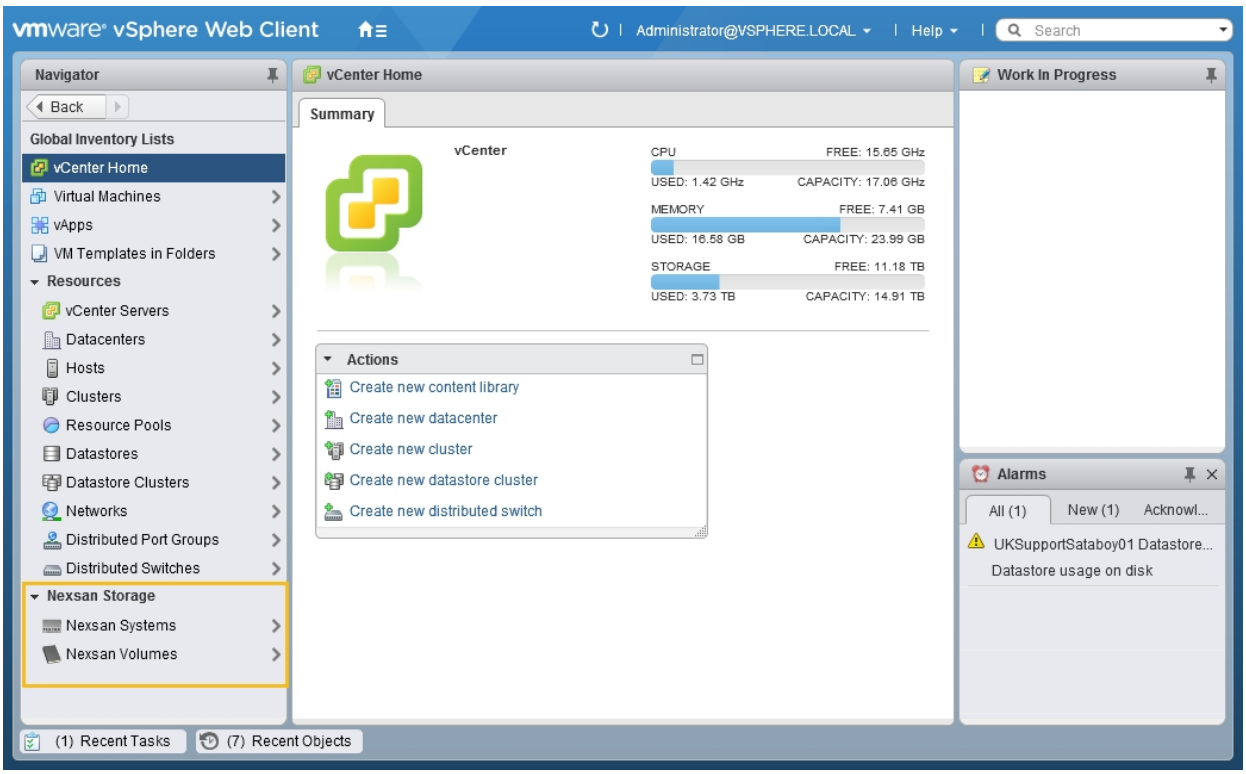
Storage workspace

- Select **Configure > Nexsan Storage**:



Global Inventory Lists workspace

In the Object Navigator, select **Resources > Nexsan Storage**.



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Chapter 2

Configuring the plugin

This chapter includes the following topics to help you configure the plugin:

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Opening a Nexsan Storage System workspace 19
Editing Connection Settings 20
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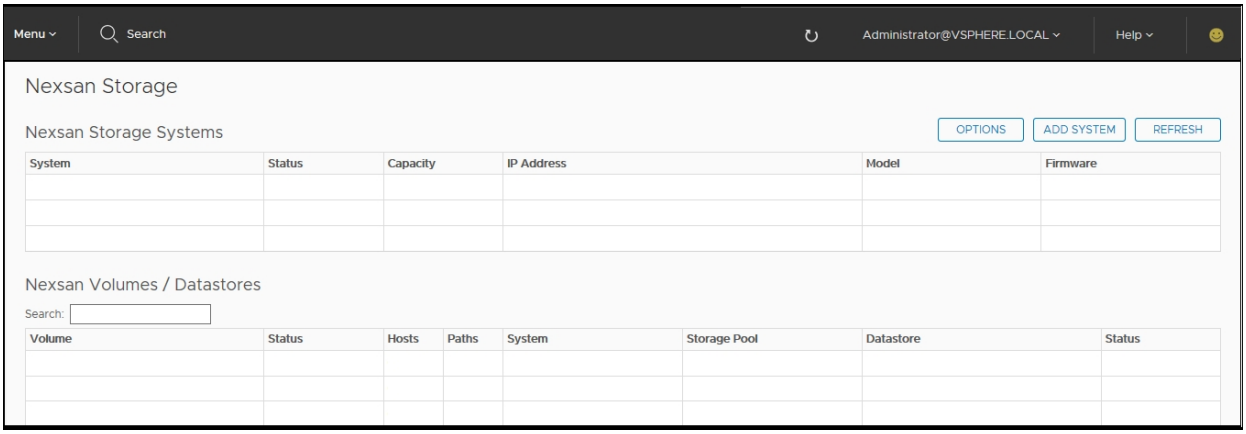
Adding a Nexsan Storage System to vSphere

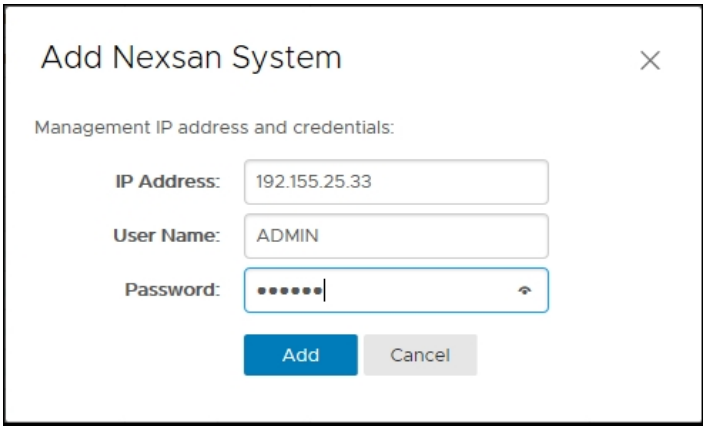
Use this procedure for details about adding your first Nexsan Storage System to vSphere.

To add a Nexsan Storage System:

1. Open the **Nexsan Storage** workspace.

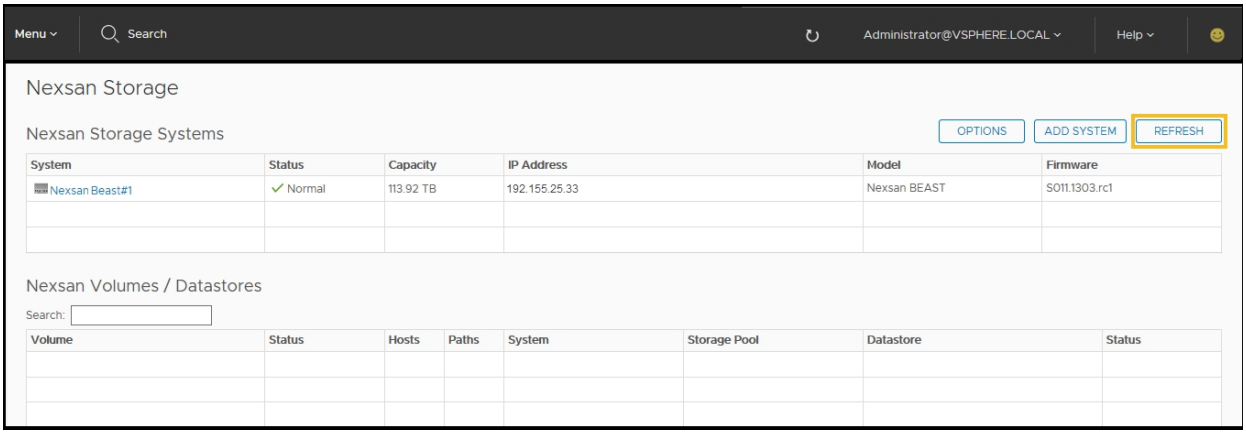


2. Click **Add System**.
3. In the **Add Nexsan System** window, enter the IP address and password for the new system.

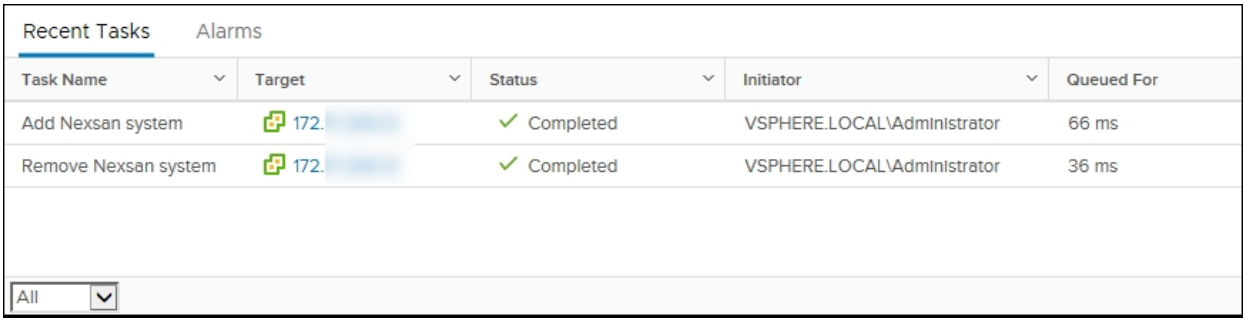


Note If you want to view Nexsan Storage in both vSphere clients, repeat this procedure in the second client.

4. Click **Refresh** to display the new system. See "Refreshing workspaces" (page 22)



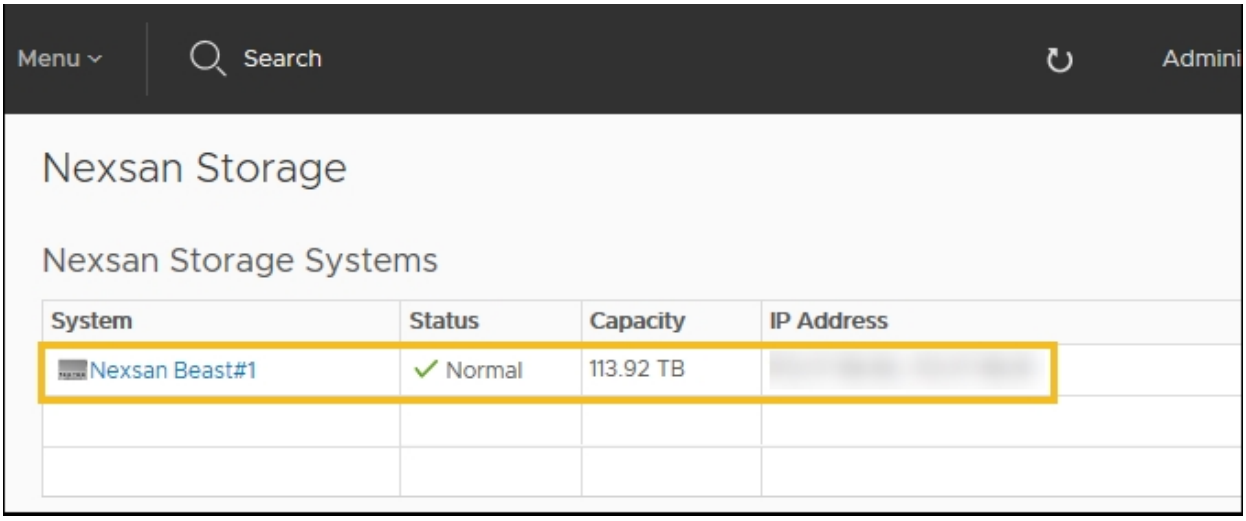
5. To monitor the system creation progress and related VMware activities, expand the **Recent Tasks** pane at the bottom of the **Nexsan Storage System** workspace.



Opening a Nexsan Storage System workspace

To open a Nexsan Storage System workspace:

- In the **Nexsan Storage workspace**, click a link in the **System** column.



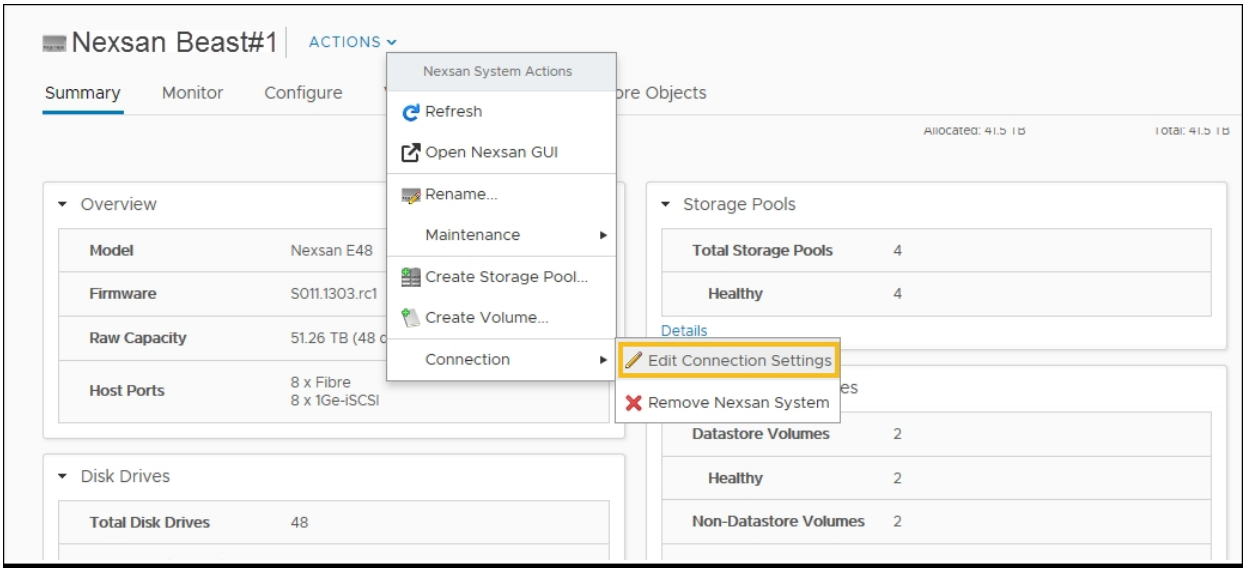
The Nexsan Storage System opens. See "The Nexsan Storage System workspace" (page 28)

Editing Connection Settings

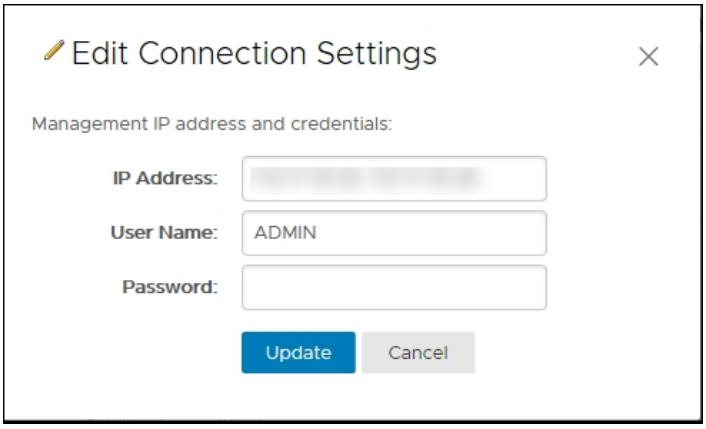
Use this procedure for help about changing user credentials required to access the E-Series or BEAST Nexsan Storage System the plugin connects to. Without proper authentication, system status fields display as **Unknown**.

To edit connection settings:

1. Open the **Nexsan Storage System** workspace.
2. Select **Actions > Connection > Edit Connection Settings**.



3. Make any necessary changes to the **User Name** and **Password** in the **Edit Connection Settings** window.



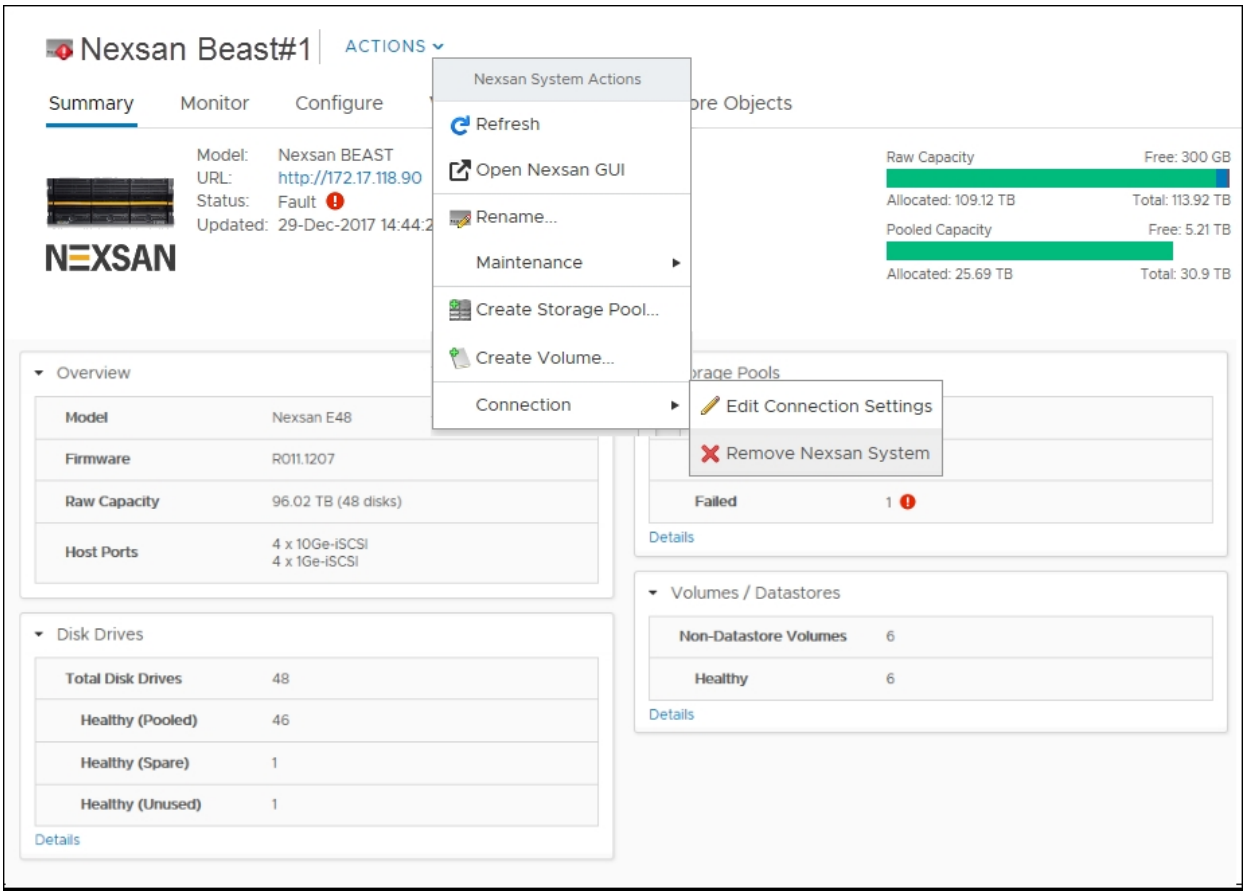
4. After you've made your changes, click **Update**.
5. Verify your changes in the **Recent Tasks** pane at the bottom of the workspace.

Removing a Nexsan Storage System from vSphere

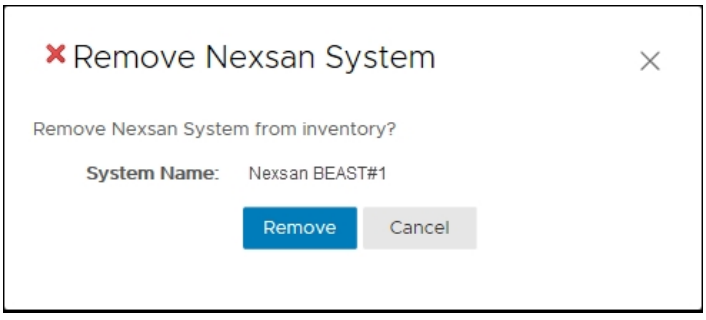
Use this procedure for help with removing a Nexsan Storage System from vSphere.

To remove a Nexsan Storage System from vSphere:

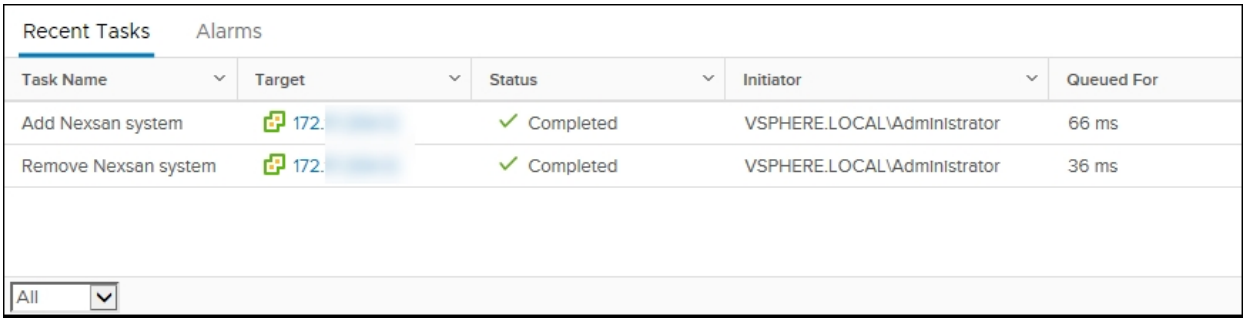
1. Open the **Nexsan Storage System** workspace that you plan to remove.
2. Select **Actions > Connection > Remove Nexsan System**.



3. In the **Remove Nexsan System** window, click **Remove**.



4. Check **Recent Tasks** to confirm that the system has been removed.



Refreshing workspaces

In cases where your changes to do not automatically update, and in team environments, use the methods in this topic for help with manually refreshing data changes in the vSphere workspaces and Nexsan Storage workspaces.

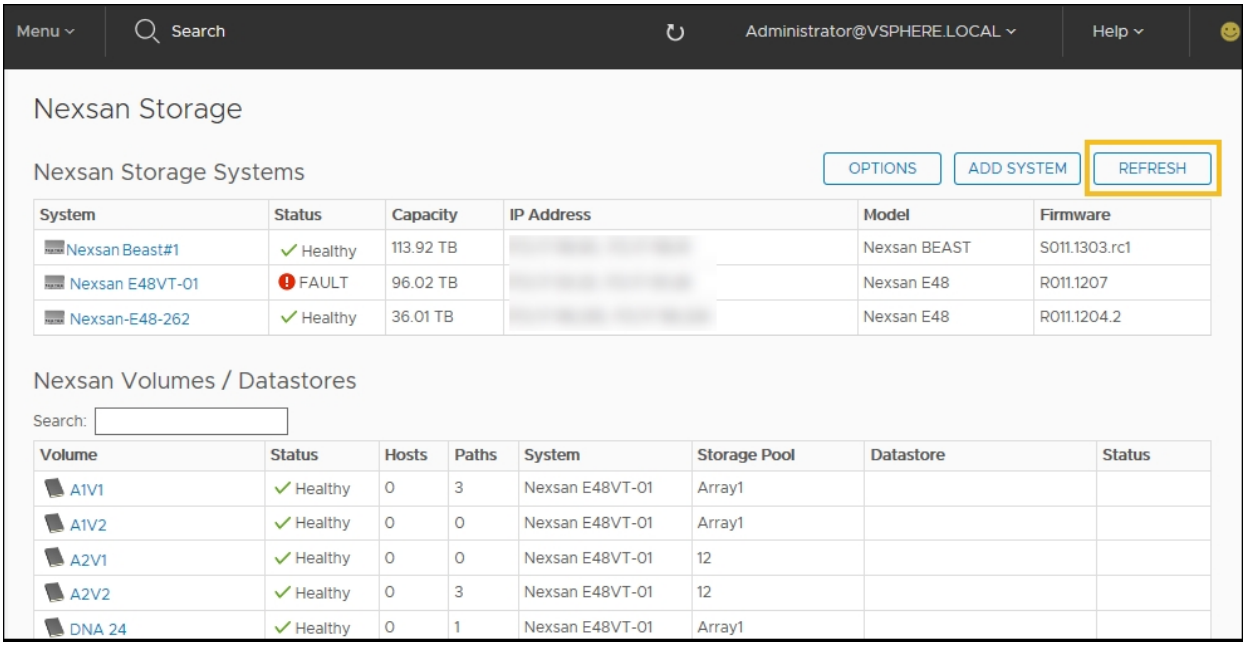
▶ To refresh the vSphere Client:

- Click the **Refresh** icon on the vSphere toolbar to refresh the entire vSphere Client view.

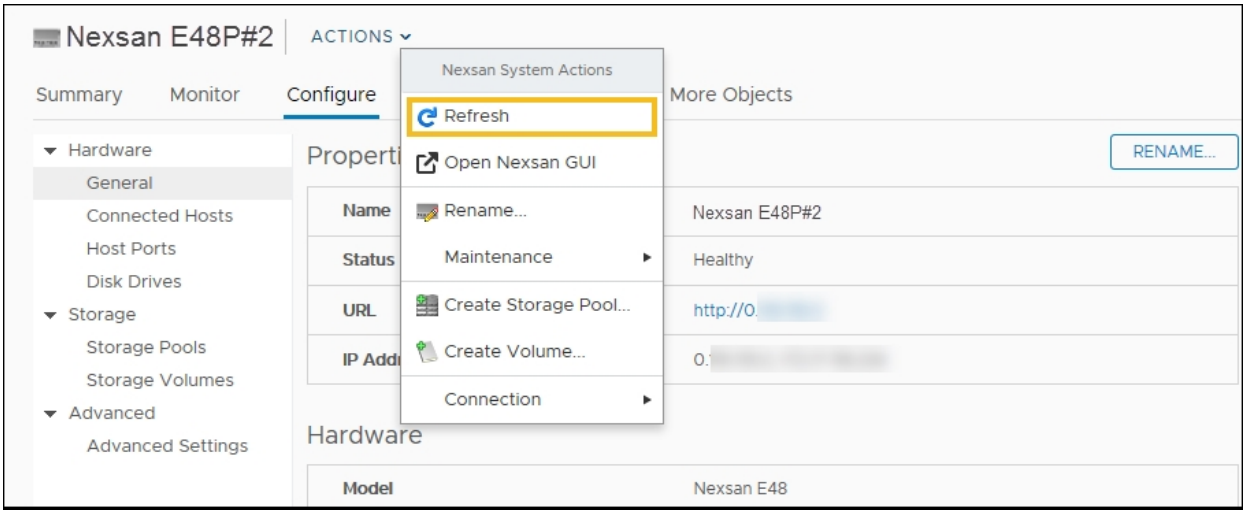
Note In vSphere it is sometimes necessary to force a refresh by switching your view to another location, such as another workspace or tab, and then return to the original location to view your updates.

▶ To refresh the Nexsan Storage workspace:

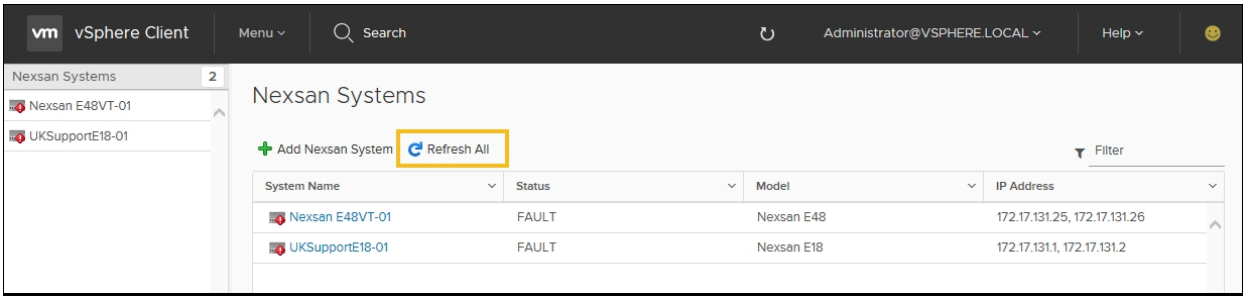
- Click the **Refresh** button at the top right of the main **Nexsan Storage** workspace to display newly added storage systems or changes made by other users.



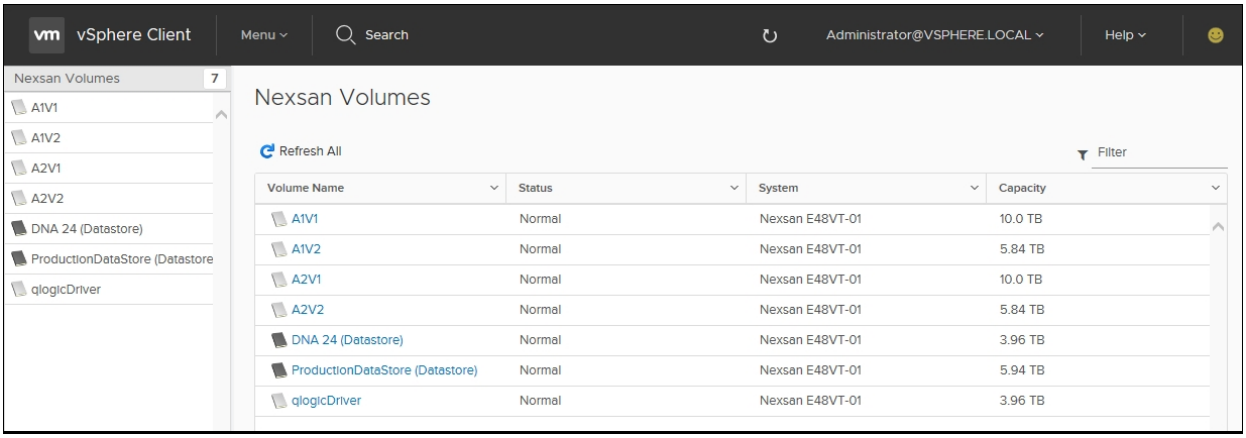
- In other Nexsan Storage plugin windows, click **Actions > Refresh**.



- In **Global Inventory Lists > Nexsan Systems**, click **Refresh All**



- In **Global Inventory Lists > Volumes**, click **Refresh All**



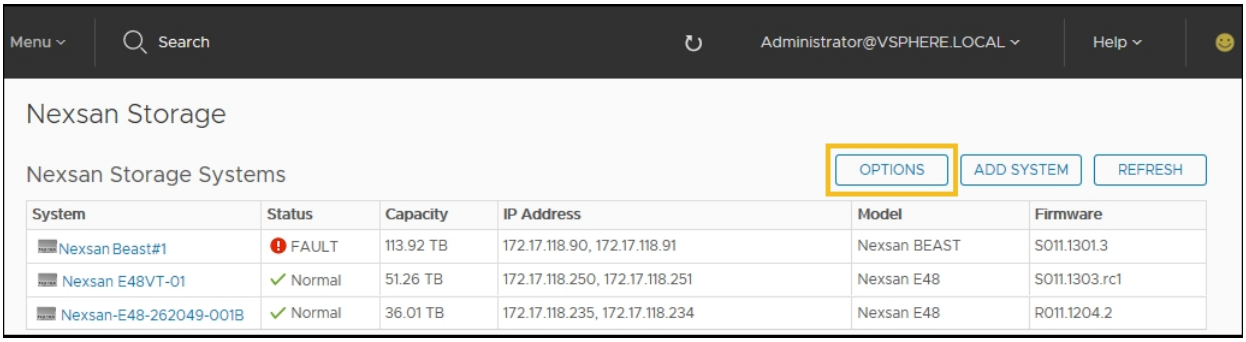
Changing monitoring options

Use the Nexsan options page to change monitoring options for:

- Nexsan Storage change events
- VMware infrastructure change events
- The inactivity timeout for monitoring

To change monitoring options:

1. Open the **Nexsan Storage System** workspace.
2. Click **Options**.



3. Update any of these settings:
   - Disable or enable monitoring of Nexsan Storage change events
   - Disable or enable monitoring of VMware infrastructure change events
   - Change the duration of the monitoring inactivity timeout

4. After you've made your changes, click **Save**.

Updating the plugin

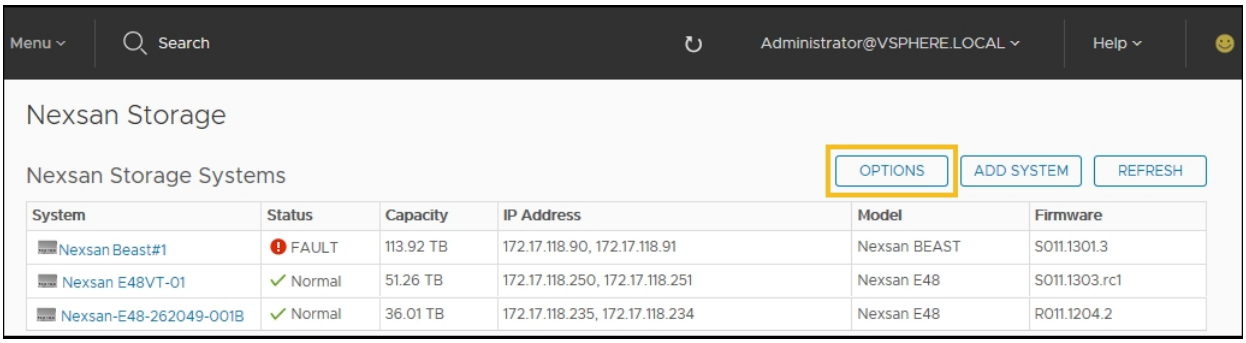
Use the Nexsan options page to check for updates and install changes to the plugin.

Once installed, the plugin can normally be upgraded without using the Installation Tool.

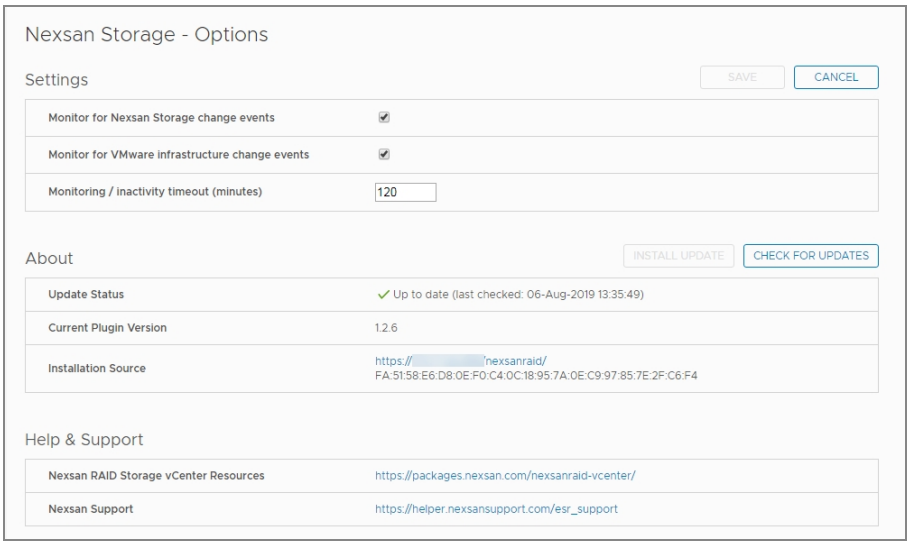
The plugin checks for updates available on the public or private deployment server used during the original installation.

To update the plugin:

1. Open the **Nexsan Storage System** workspace.
2. Click **Options**.



3. Click **Check for Updates**.
4. If updates are available, click **Install Update**.



Chapter 3

Nexsan Storage Systems

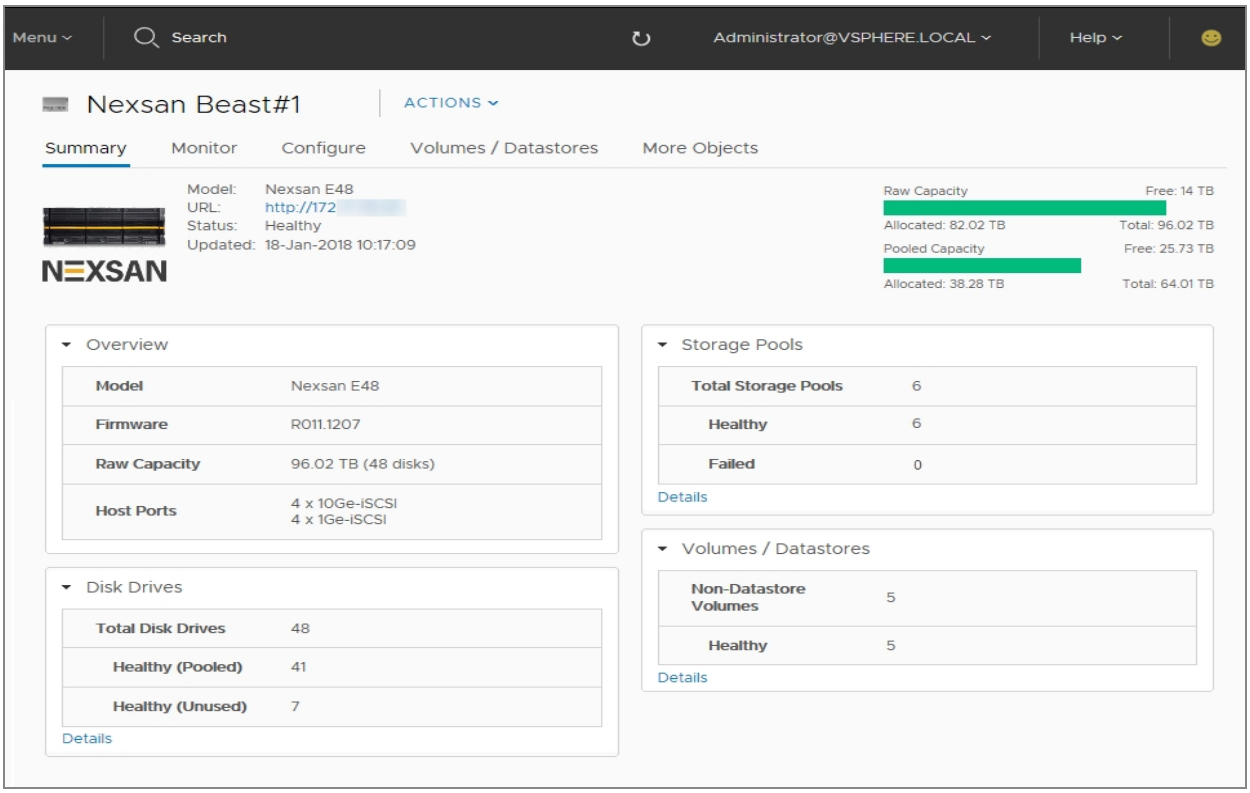
This chapter contains the following topics about the Nexsan High-Density Storage Plugin for VMware vCenter features at the Storage System level. See also "Managing Nexsan Storage" (page 53)

The Nexsan Storage System workspace 28
Accessing the Nexsan GUI 31
Monitoring Nexsan Storage Systems 33
The Nexsan Volumes / Datastores tab 37
The Storage Pools workspace 39
The Disk Drives workspace 41
The Replications workspace 42

The Nexsan Storage System workspace

The **Nexsan Storage System** workspace provides a system summary, Actions menu, and tab bar.

The **Summary** tab provides a direct link to the Nexsan GUI, information about and links to system hardware, **Storage Pools**, **Disk Drives**, and **Volumes / Datastores**. See also "Managing Nexsan Storage" (page 53)



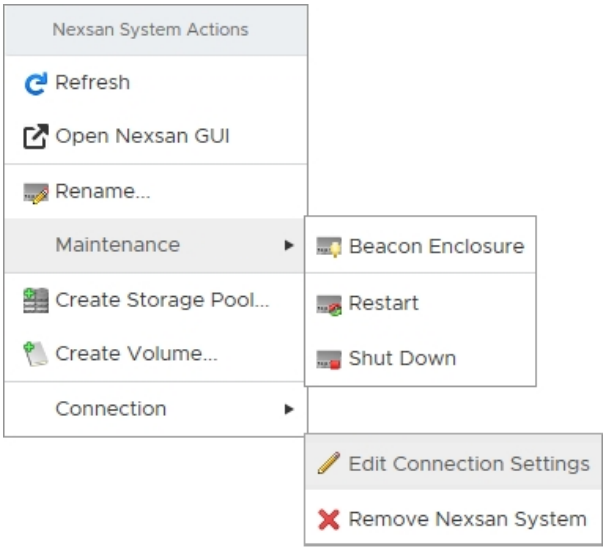
Use this table for details about the Nexsan System Summary workspace:

Section	Field	Description
Overview		Displays model name, firmware, raw capacity, and the number and types of host ports
	Model	The model name of the Nexsan Storage System
	Firmware	The current Nexsan firmware version
	Raw Capacity	System storage capacity and number of drives
	Host Ports	The number and type of host ports used
Storage Pools		Displays the number of Storage Pools, including pool health status, and provides a link to the **Storage Pools** page
	Total Storage Pools	Displays all deployed storage pools

Section	Field	Description
	Healthy	Displays the number of healthy pools
	Failed	Displays the number of failed storage pools, if applicable
	Details	Directly opens the **Storage Pools** page
Disk Drives		Displays total disk drives, the health status and number of pooled and unused drives, and provides a link to the **Disk Drives** page
	Total Disk Drives	Displays the total number of drives
	Healthy/ Unhealthy (Pooled)	Displays the health status and number of drives assigned to a storage pool
	Healthy/ Unhealthy (Unused)	Displays the health status and number of drives not assigned to a storage pool
	Details	Directly opens the **Disk Drives** page
Volumes / Datastores		Displays total number of volumes with or without VMware datastores and their health status, and provides a link to the **Volumes / Datastores tab** page
	Non-Datastore Volumes	Displays the number of volumes without associated VMware datastores
	Healthy/Unhealthy	Displays the number and health status of volumes without associated VMware datastores
	Datastore Volumes	Displays the number of volumes with VMware datastores, if applicable
	Healthy/Unhealthy	Displays the number and health status of volumes with VMware datastores, if applicable
	Details	Directly opens the **Volumes / Datastores tab** page

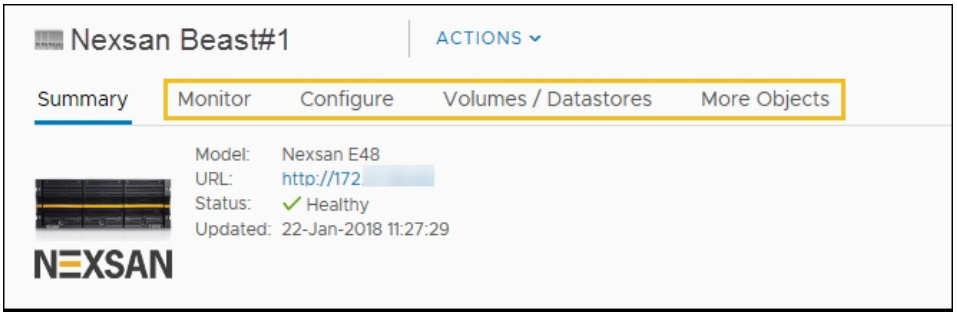
Nexsan Storage System Actions

Here are the commands and related topics for the **Actions** menu:

Menu commands	Related topics
	"Refreshing workspaces" (page 22) "Accessing the Nexsan GUI" (page 31) "Renaming a Nexsan Storage System" (page 91) **Maintenance** • "Setting a beacon on an enclosure" (page 96) • "Restarting a Nexsan Storage System" (page 92) • "Shutting down a Nexsan Storage System" (page 95) "Creating a Storage Pool / Array" (page 56) "Creating a Nexsan Volume and datastore" (page 67) **Connection** • "Editing Connection Settings" (page 20) • "Removing a Nexsan Storage System from vSphere" (page 21)

Nexsan Storage System tab bar

- On the tab bar, you can click **Monitor**, **Configure** (**Manage** in the Flash GUI), **Volumes / Datastores**, or **More Objects** (shows **Nexsan Volumes** and **Connected Hosts**).



Related topics

"Opening a Nexsan Storage System workspace" (page 19)

"Monitoring Nexsan Storage Systems" (page 33)

"Managing Nexsan Storage" (page 53)

"The Nexsan Volumes / Datastores tab" (page 37)

"Viewing connected hosts" (page 87)

Accessing the Nexsan GUI

The Nexsan GUI provides operations not currently available in the Nexsan High-Density Storage Plugin for VMware vCenter. For details, please see the *Nexsan High-Density Storage User Guide*.

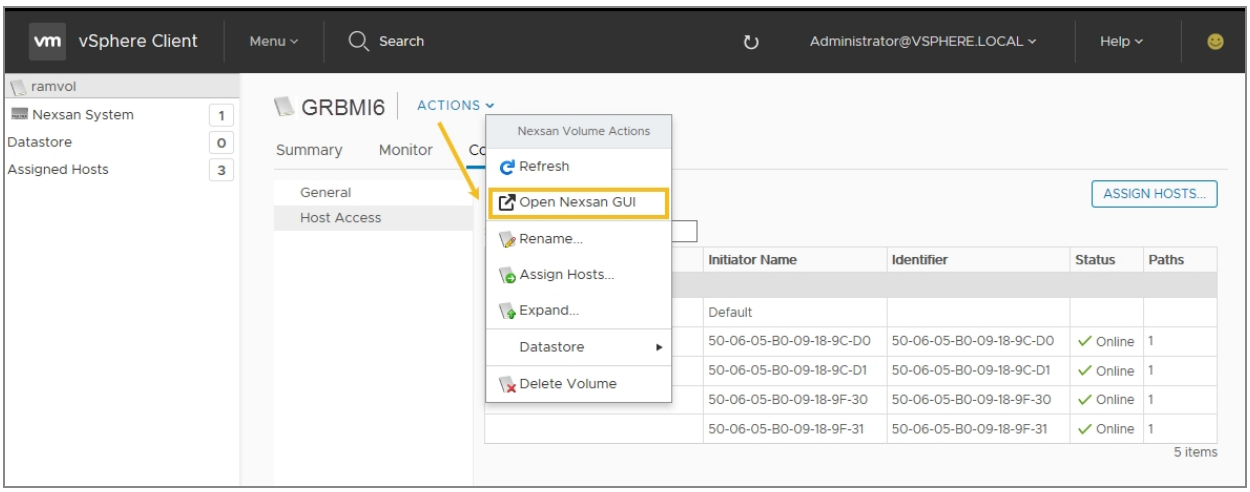
You can open the Nexsan GUI Web interface from:

- the **Actions** menus
- the **URL** in the **Nexsan Storage System Summary** workspace

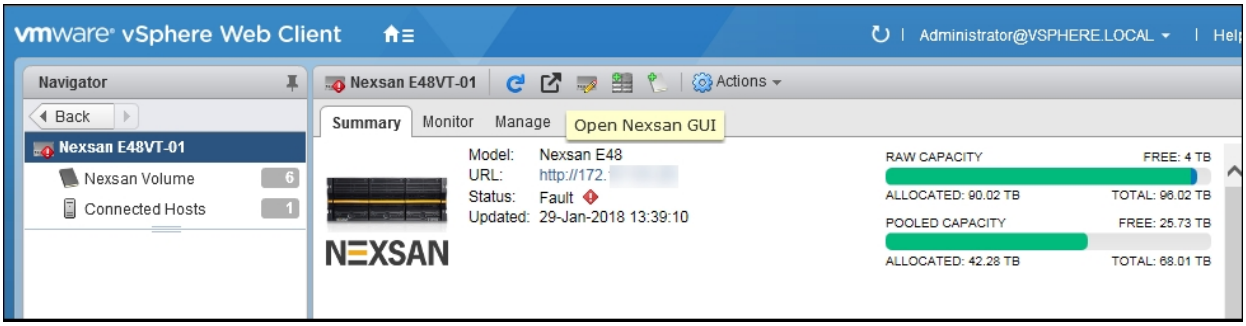
From the Actions menu

► **To open the Nexsan GUI:**

1. Open the Nexsan Storage System workspace.
2. Select **Actions > Open Nexsan GUI**.

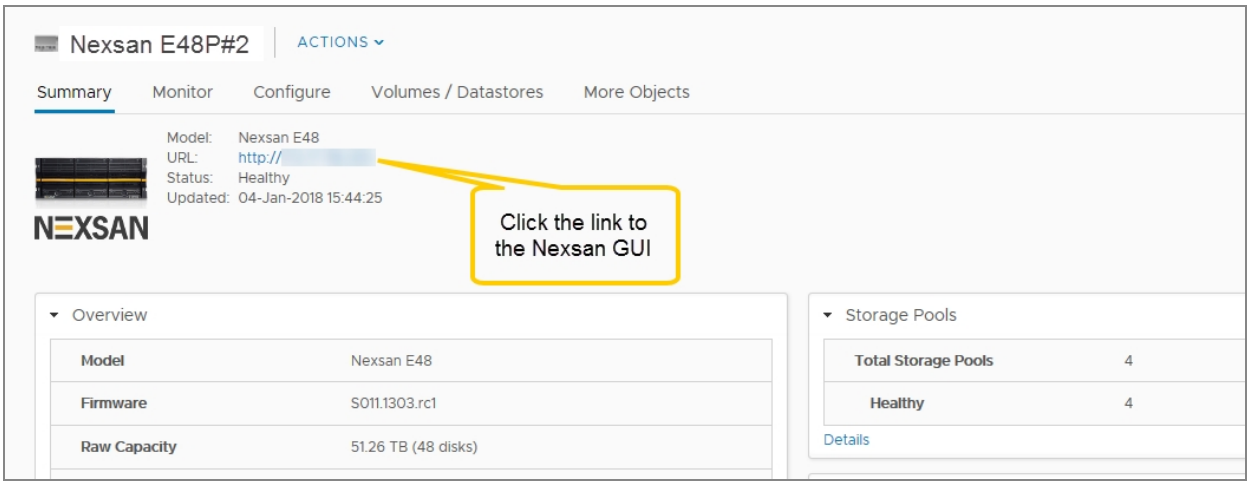


Alternatively, in the vSphere Client Flash interface, click the **Nexsan GUI** icon on the toolbar:



From the Nexsan Storage System Summary workspace

1. Open the Nexsan Storage System workspace.
2. On the **Summary** tab, click the link to the **URL**:



Monitoring Nexsan Storage Systems

This section provides the following topics, providing details about monitoring Nexsan Storage Systems:

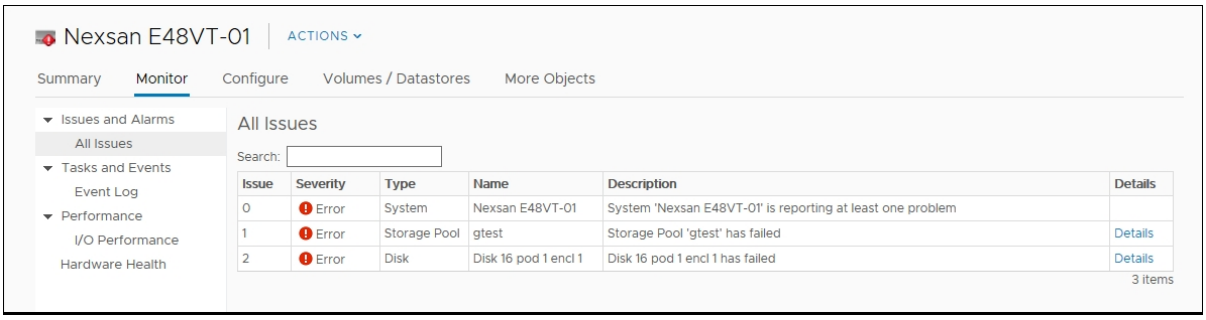
Viewing systems issues and alarms 33
Viewing tasks and events 35
Viewing system I/O performance data 36

Viewing systems issues and alarms

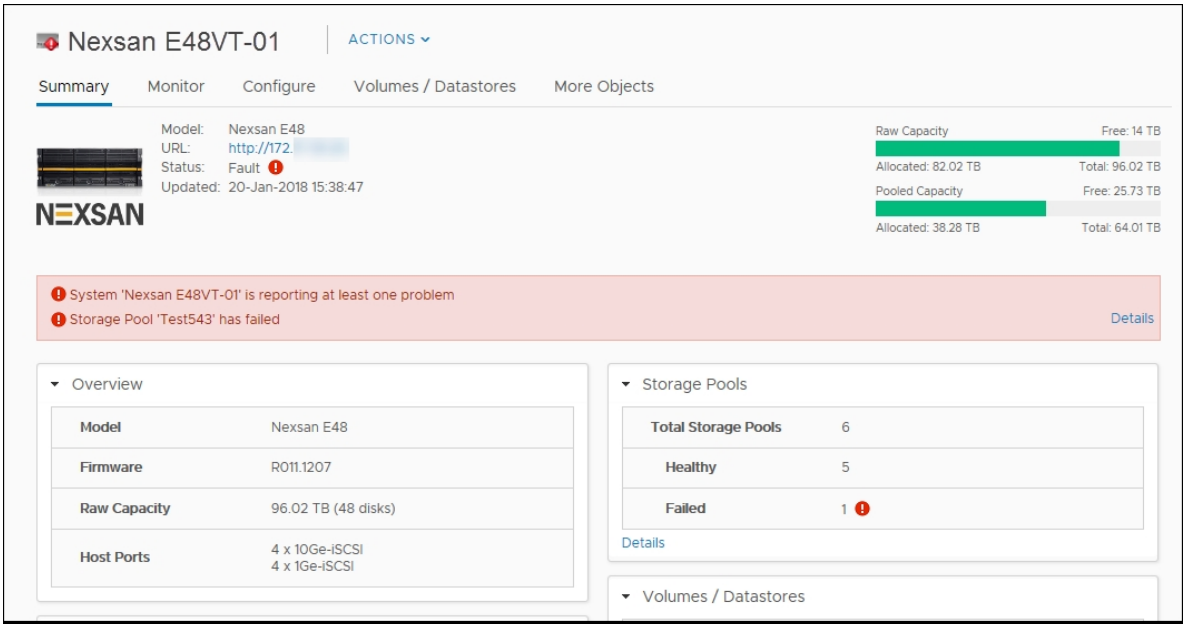
Use this procedure for help with viewing issues and alarms for Nexsan Storage Systems.

To view issues and alarms:

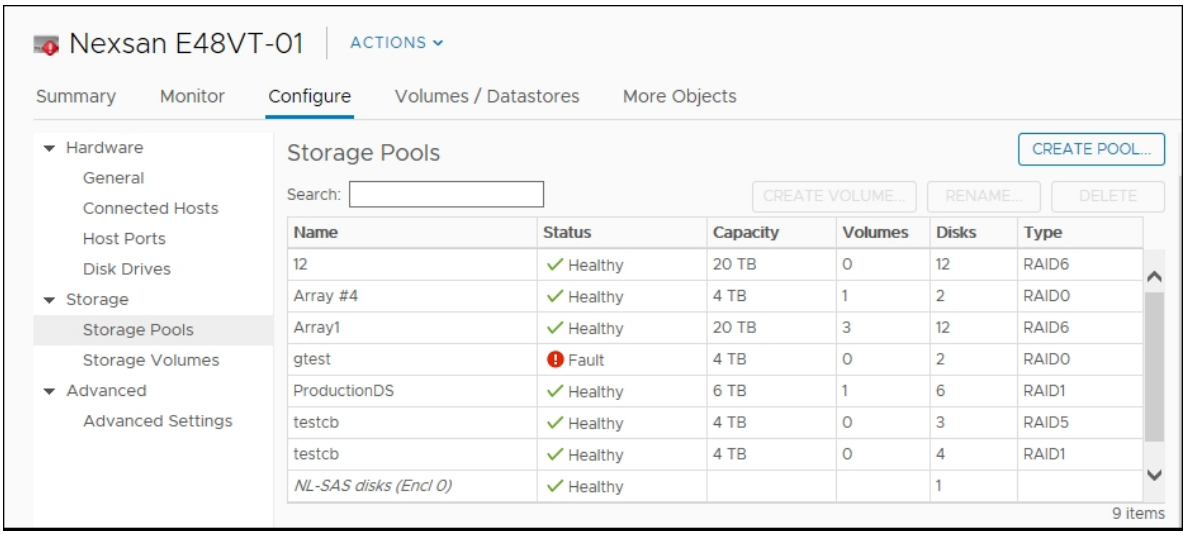
1. Open the **Nexsan Storage System** that you want to monitor.
2. On the tab bar, select **Monitor**. The initial view shows **Issues and Alarms > All Issues**:



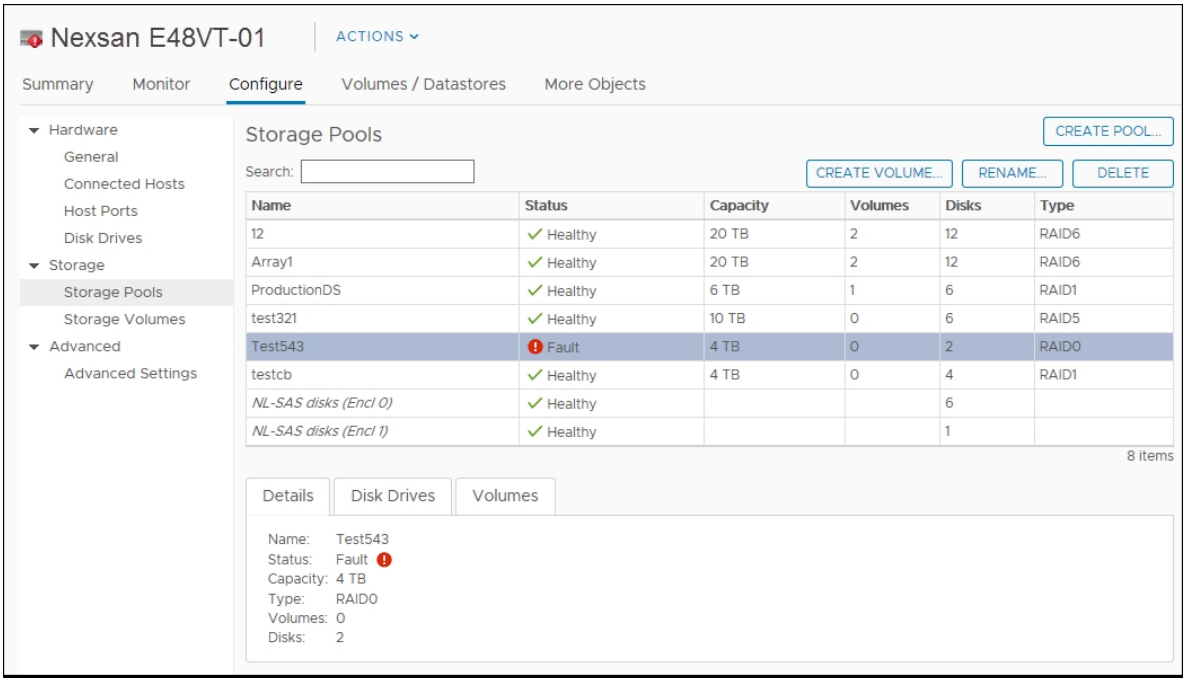
3. Click **Details**. In the example here, a **Storage Pool** has failed. When a fault is detected, the **Summary** page shows fault status on the system icon and status line, and an additional section highlighting the issue.



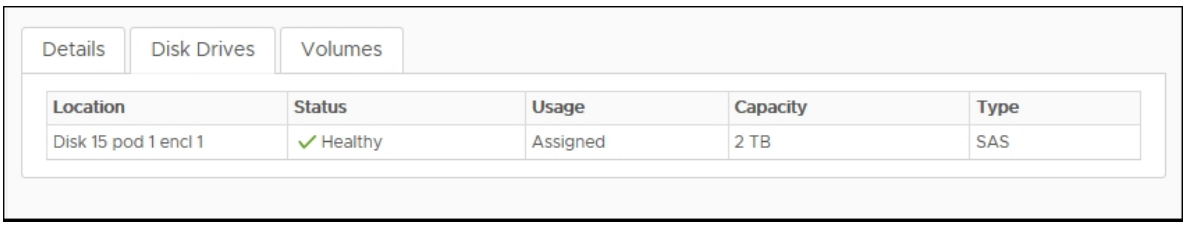
4. In **Storage Pools**, click **Details** to display the workspace.



5. Select the affected item to display details.



6. Click the **Details**, **Disk Drives**, and **Volumes** tabs for more details:

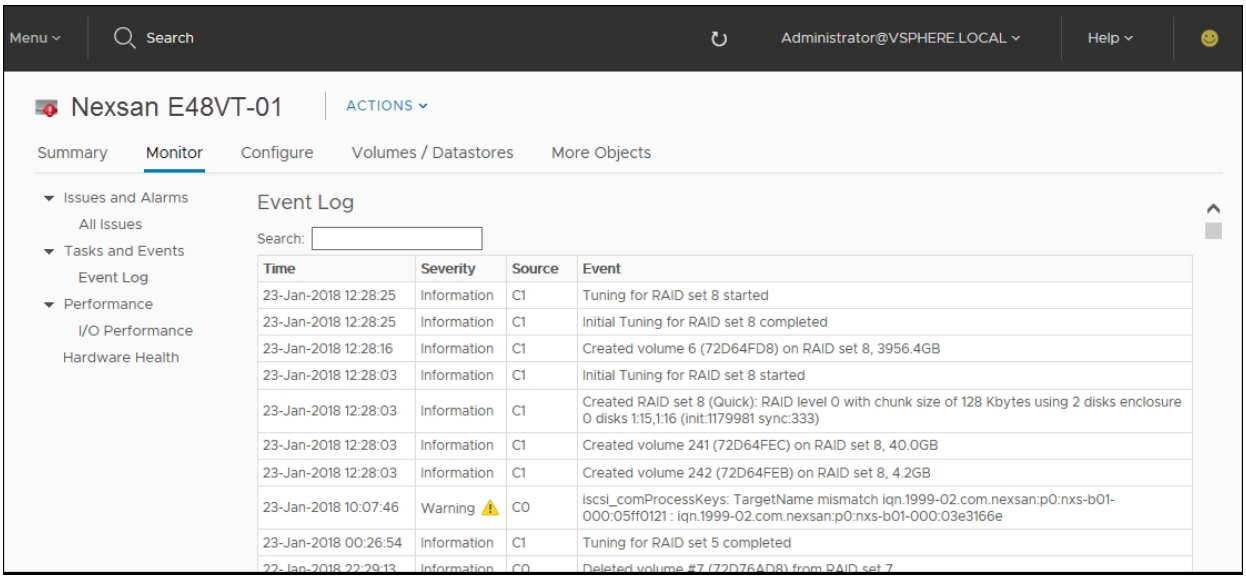


Viewing tasks and events

Use this procedure for help with viewing tasks and events for Nexsan Storage Systems.

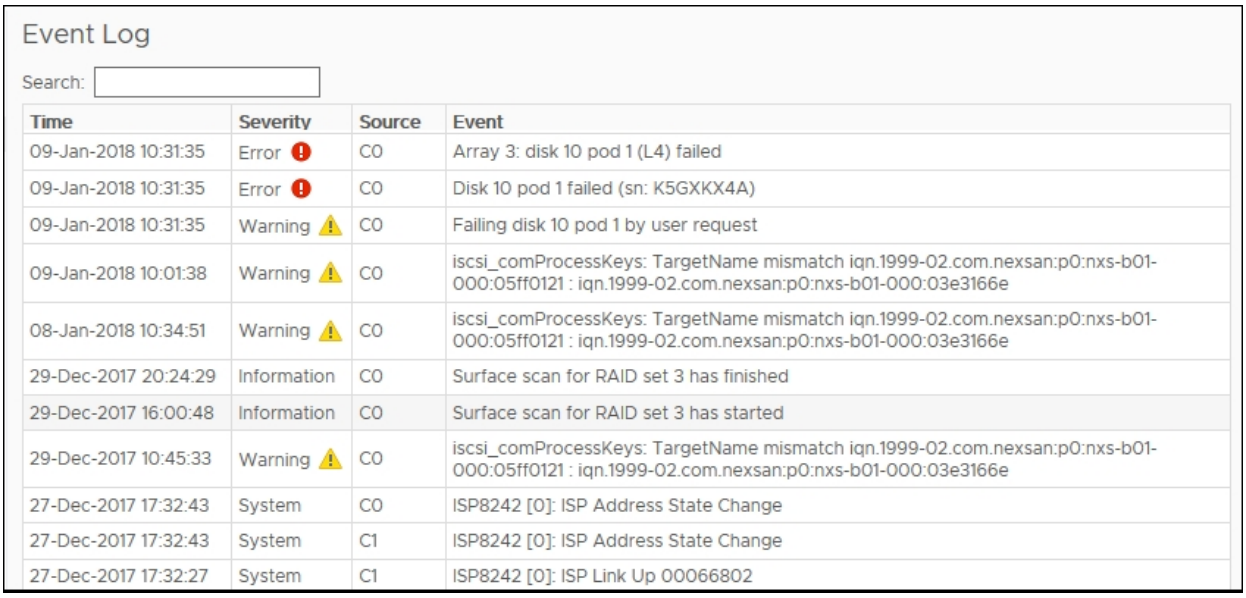
To view tasks and events:

1. Open the **Nexsan Storage System** you want to monitor.
2. On the tab bar, select **Monitor**.
3. Under **Tasks and Events**, select **Event Log**.



The **Event Log** table shows information such as **Time**, **Severity**, **Source**, and an **Event** description.

Use the instant **search** feature to locate specific messages quickly.

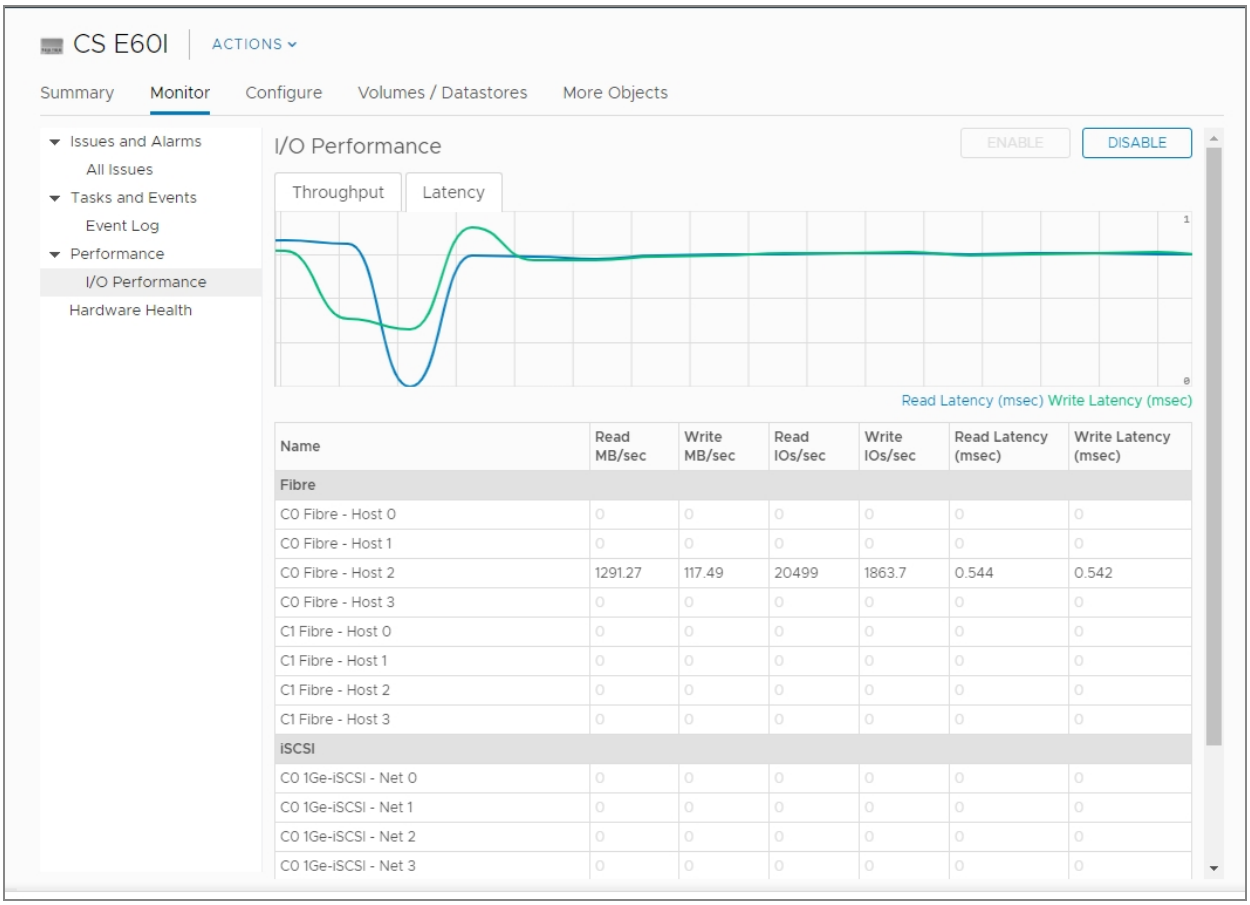


Viewing system I/O performance data

The **I/O performance data** page provides live graphical monitoring of Nexsan Storage Systems and Nexsan Volumes. *See also* "Viewing I/O performance data for volumes" (page 49)

To monitor I/O Performance for a Nexsan Storage System:

1. Open the **Nexsan Storage System** workspace.
2. On the tab bar, select **Monitor**.
3. Select **I/O Performance**.
4. Click **Enable**. The window displays live I/O **Throughput** and **Latency** by port type to the system, measured in **Read MB/sec** and **Write MB/sec**.



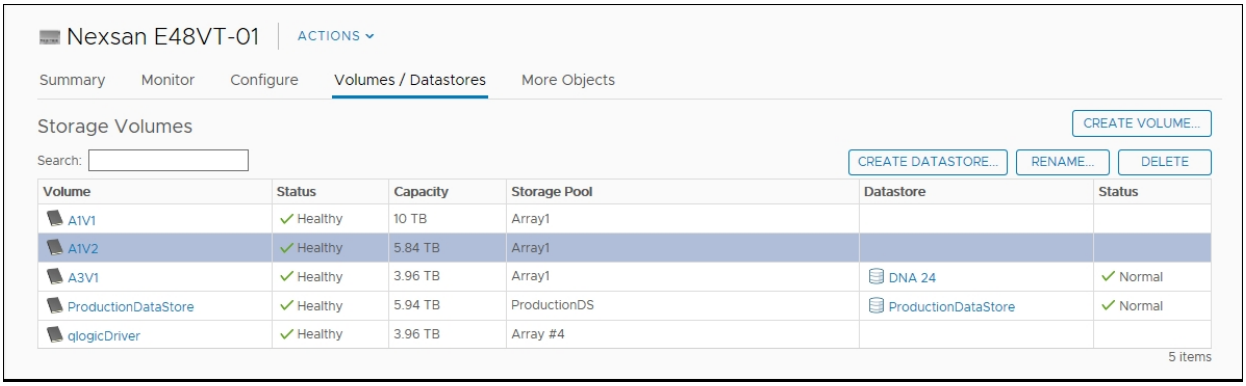
The Nexsan Volumes / Datastores tab

The **Nexsan Volumes / Datastores** tab displays all Nexsan Volumes and any related **datastores**[1] on the current Nexsan Storage System, and provides buttons for Create a Nexsan Volume, Creating a datastore, Renaming a Nexsan Volume, and Deleting a Nexsan Volume. The Storage Volumes grid includes:

- Volume Name and Status
- Capacity
- Storage Pool (array)
- Datastore
- Datastore status

To open the Nexsan Volumes / Datastores tab:

1. Open a **Nexsan Storage System**.
2. On the tab bar, select **Volumes / Datastores**.



3. Optionally, click **Create Volume** if you need to create a Nexsan Volume.
4. Select a volume to perform any of these tasks:
   - Creating a datastore
   - Renaming a datastore
   - Renaming a Nexsan Volume
   - Deleting a Nexsan Volume

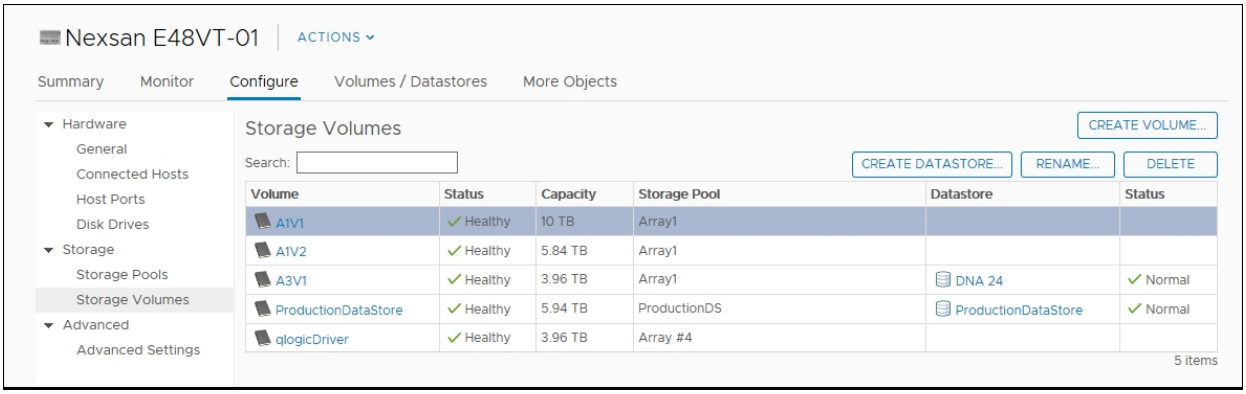
[1] In VMware, datastores are virtual containers for files. Datastores contain structures used to store virtual machine files and hide the details about each storage device. Datastores can also store VM templates, ISO images, and floppy images. See https://pubs.vmware.com

Opening the Storage Volumes page

Use this procedure for help with opening the **Storage Volumes** page.

To open the Storage Volumes page:

1. Open a **Nexsan Storage System**.
2. On the tab bar, select **Configure** (**Manage** in Flash).



3. Select **Storage Volumes**.

For details about this page, see "The Nexsan Volumes / Datastores tab" (page 37).

The Storage Pools workspace

The **Storage Pools** workspace features:

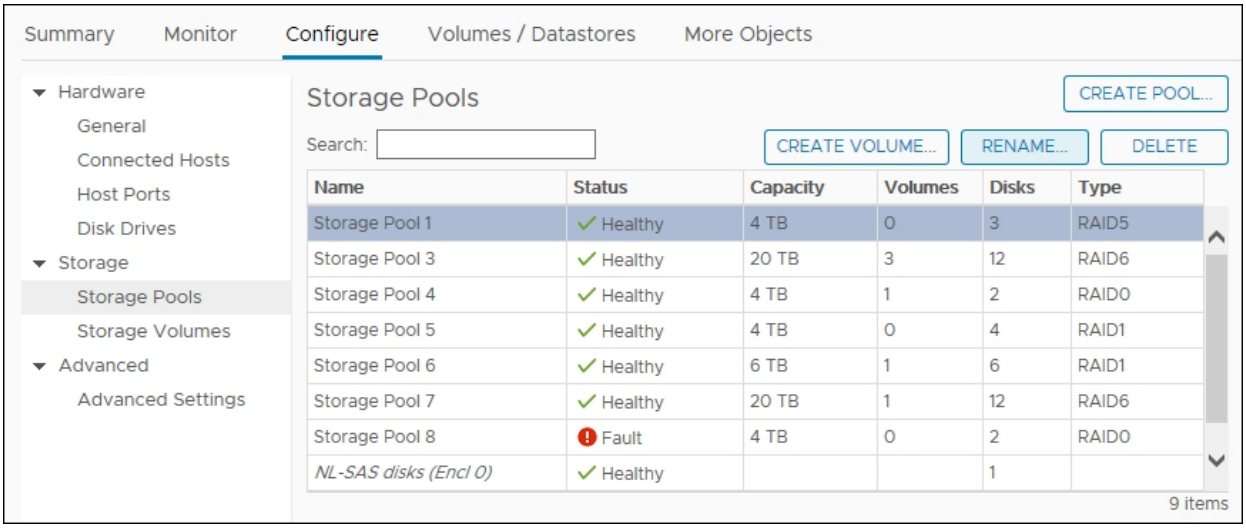
- Details about all **storage pools** (Nexsan **arrays**[1]) on the current Nexsan Storage System
- Buttons to Create a Storage Pool / Array, Create a Nexsan Volume and datastore, Rename a Nexsan Volume, and Delete a Nexsan Volume.

The **Storage Pools** grid displays:

- Storage pool (array) name
- Status (Healthy or Fault)
- Capacity
- Free space
- Number of volumes in the pool
- Number of disks in the pool
- Storage pool type (Array type)

To open the Storage Pools page:

1. Open a **Nexsan Storage System**.
2. On the tab bar, select **Configure** (**Manage** in Flash).
3. Select **Storage Pools**.



[1]In Nexsan storage terms, an array is a linked group of one or more physical, independent hard disk drives. In VMware, a storage pool is equivalent to an array. See also “RAID”.

4. Select a storage pool to view information in the **Details**, **Disk Drives**, and **Volumes** tabs below the grid.

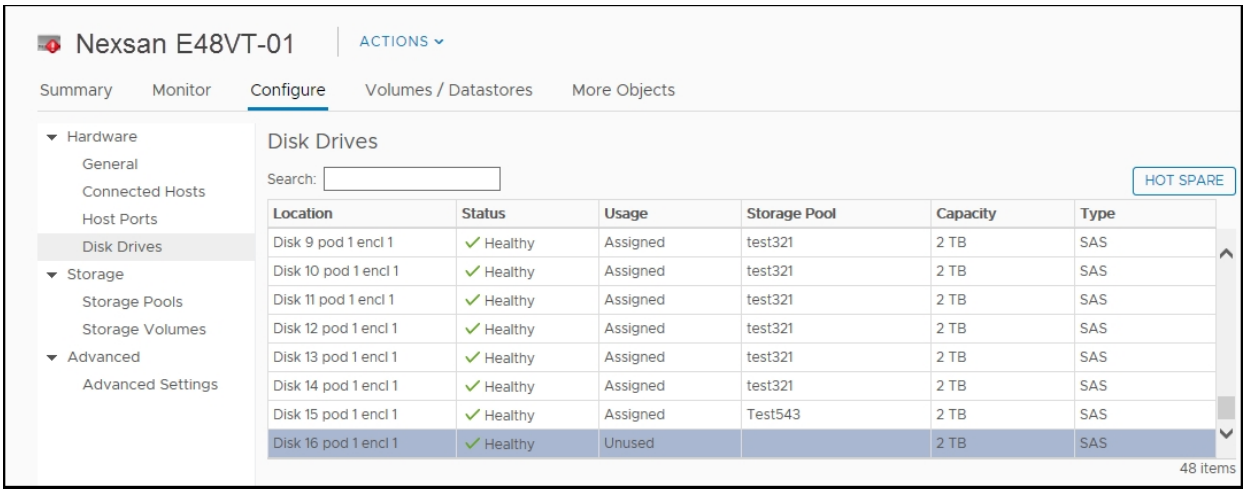
5. Optionally, you can:
   - Click **Create Pool** to create a storage pool. See "Creating a Storage Pool / Array" (page 56)
   - Click **Create Volume** to create a volume. See "Creating a Nexsan Volume and datastore" (page 67)
6. Select a volume to perform either of the following actions:
   - Rename a volume. See "Renaming a Nexsan Volume" (page 70)
   - Delete a volume. See "Deleting a Nexsan Volume" (page 72)

The Disk Drives workspace

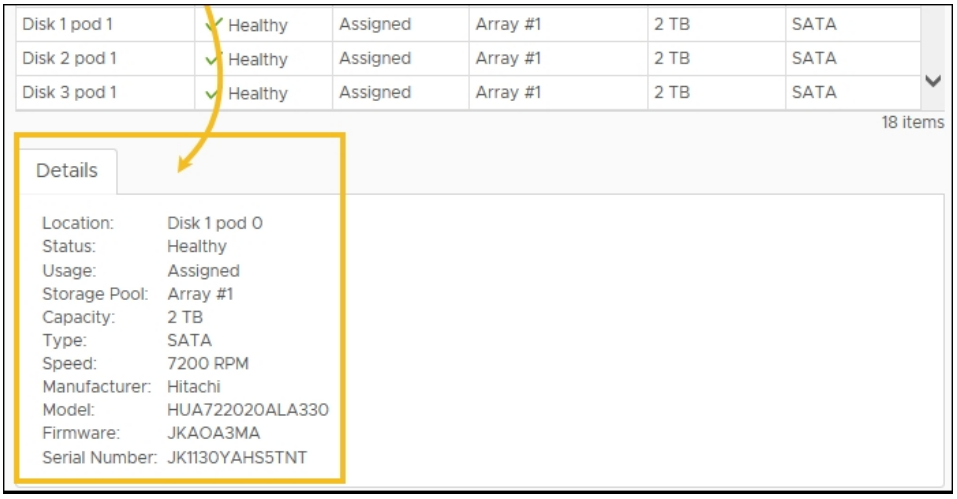
The **Disk Drives** workspace features a **Hot Spare** command and lists drives, health and usage statuses, associated storage pool, capacities, and types. See also "Adding a hot spare disk" (page 63)

To open the Disk Drives page:

1. Open a **Nexsan Storage System**.
2. Select **Configure** (**Manage** in Flash) **> Disk Drives** to display details.



3. Select a disk to display details such as manufacturer, model, firmware, and serial number.

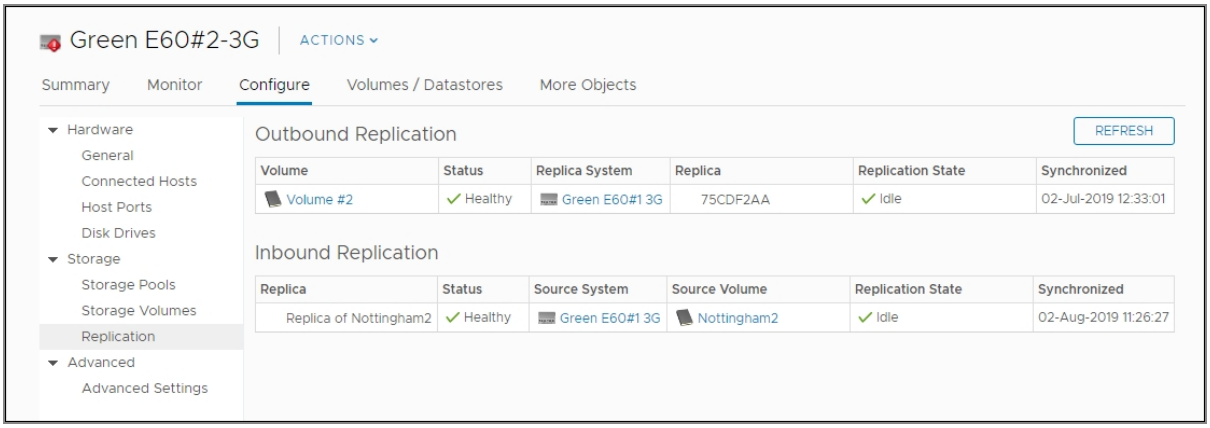


The Replications workspace

Use the **Replication** workspace at the Nexsan Storage System level to view outbound and inbound replications, as configured in the Nexsan GUI.

To open the Nexsan System Replication workspace:

1. Open the **Nexsan Storage System** workspace.
2. On the tab bar, select **Configure**.
3. Select **Replication** from the **Storage** submenu to display replications, per volume.
4. Click **Refresh** to see new replications in progress.



The following table provides a brief summary of replication details:

Column	Description
Outbound Replication	
Volume	Displays the volume name or serial number.
Status	Displays the volume status: Healthy, Fault, or Unknown.
Replica System	Displays the name of the Nexsan Storage System to which the volume is being replicated.
Replica	Displays the name or serial number of the replica volume.
Replication State	Displays the status of the replication. Click **Refresh** to immediately display the status.
Synchronized	Displays the time and date of the last replication.
Inbound Replication	
Source System	Displays the name of the Nexsan Storage System containing the volume being replicated.
Source Volume	Displays the name or serial number of the volume being replicated.

Chapter 4

Nexsan Volumes

This section provides the following topics for help with understanding Nexsan Volumes. See also: "Working with Nexsan Volumes and VMware datastores" (page 66)

The Nexsan Volumes workspace 43
Opening a Nexsan Volume 46
Opening a Storage Pool / Array from a Nexsan Volume 47
Monitoring Nexsan Volumes 48
Viewing issues and alarms with volumes 48
Viewing tasks and events for volumes 48
Viewing I/O performance data for volumes 49
Viewing replication in the Volume workspace 50

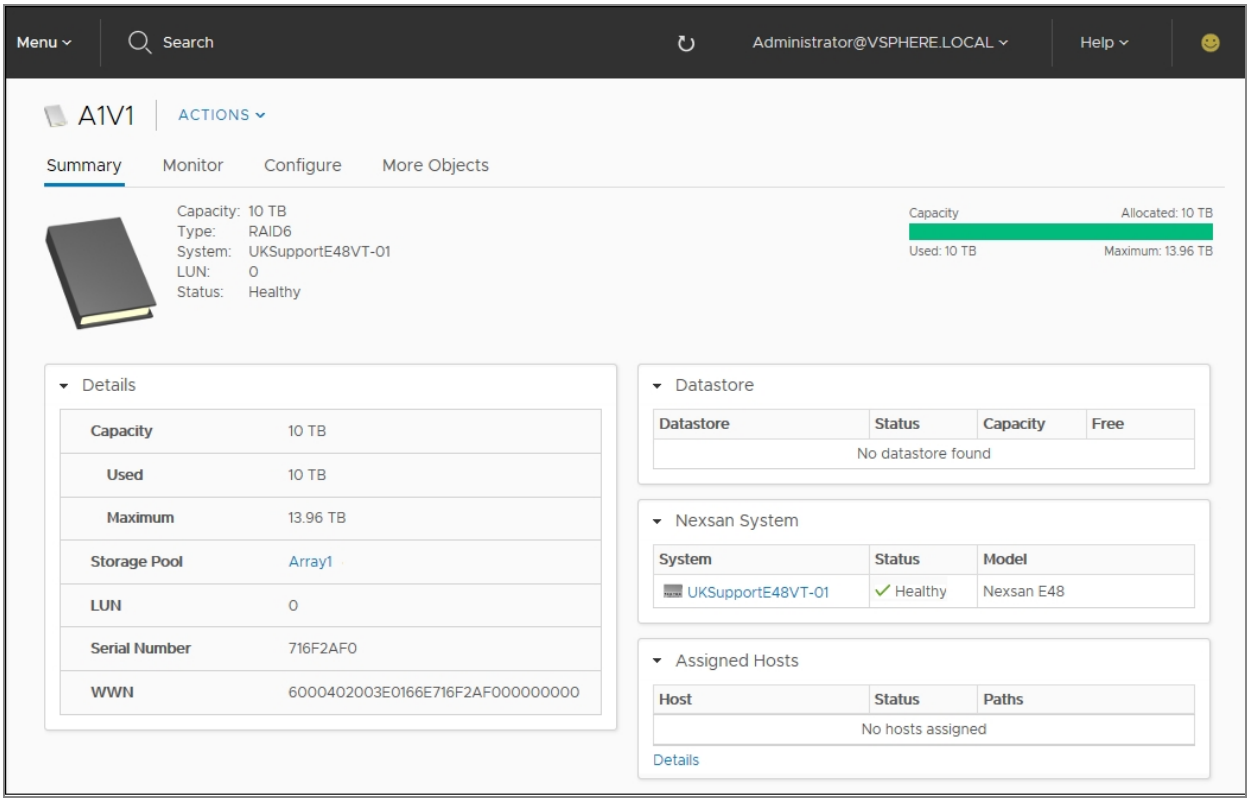
The Nexsan Volumes workspace

The **Nexsan Volumes** workspace **Summary** tab displays data about capacity, type, system name, health, snapshots, datastores, and links to storage pools and datastores. See "Working with Nexsan Volumes and VMware datastores" (page 66)

In this topic:

Nexsan Volume Summary
Opening a Nexsan Volume
Nexsan Volume Actions
Nexsan Volumes tab bar

Here is a typical **Volume Summary**:



Use this table for details about the Nexsan Volume Summary workspace:

Field	Description
Overview	Displays an overview of the volume: Capacity, Type, System, and Status, and graphical and numeric views of capacity allocated, used and maximum space, and snapshot space (used, reserved, and maximum).
Nexsan Volume	Displays Volume capacity, number of storage pools, LUNs, serial number, and WWN.
Capacity	The total amount of data a disk can hold.
• Used	Used and allocated disk space.
• Maximum	Maximum useable space, including used space and allocated space.
Snapshot Space Reserved	The amount of disk space reserved for snapshots, including metrics for: • Used: The amount of space currently used for snapshots. • Maximum: The maximum amount of space permitted for snapshots.
Storage pool	The number of storage pools (arrays) in the volume
Created	The date the volume was created.

Field	Description
Serial Number	The volume serial number.
WWN	The world wide name identifier of the volume.
Datastore	The associated VMware datastore name, status, and capacity or free space (if applicable).
Nexsan System	Displays the Nexsan Storage System name. Also provides a link to the **Nexsan Storage System** workspace.
Assigned Hosts	Displays assigned hosts, status, and paths for the volume, and provides a link to the **Assigned Hosts** page.

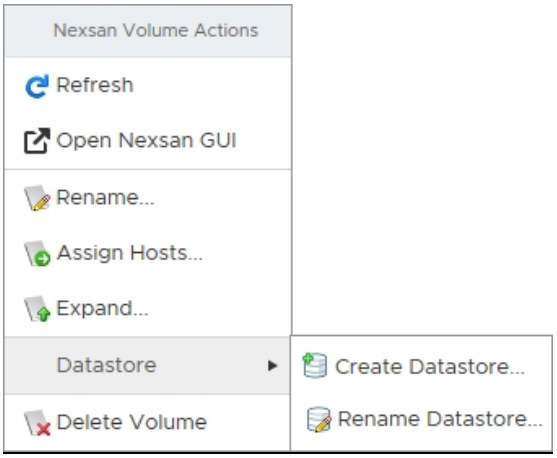
Opening a Nexsan Volume

To open a Nexsan Volume:

1. Open the **Nexsan Storage System** containing the volume.
2. Under **Nexsan Volumes / Datastores**, click a **Volume** link to open its workspace.

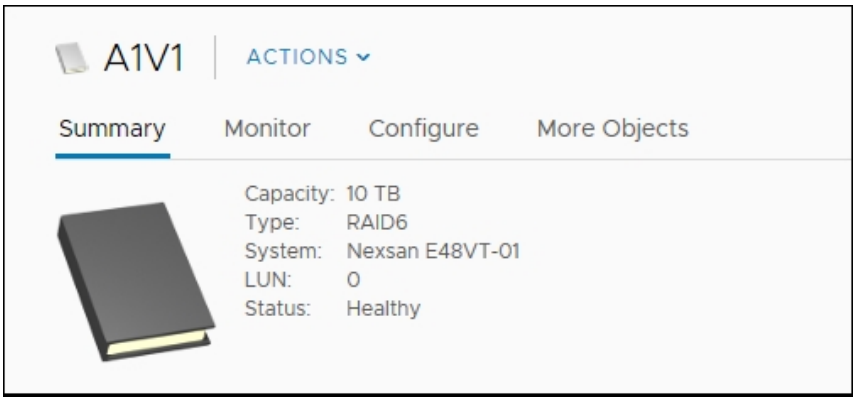
Nexsan Volume Actions

Here are the commands and procedures for the **Nexsan Volume Actions** menu:

Menu commands	Related procedures
	"Refreshing workspaces" (page 22) "Accessing the Nexsan GUI" (page 31) "Renaming a Nexsan Volume" (page 70) "Assigning a host to a Nexsan Volume" (page 80) "Expanding a Nexsan Volume" (page 71) **Datastore** • "Creating a datastore" (page 74) • "Importing a datastore" (page 75) • "Renaming a datastore" (page 78) "Deleting a Nexsan Volume" (page 72)

Nexsan Volumes tab bar

In any **Volume** workspace, you can also click the **Monitor** tab, **Configure** tab (**Manage** in Flash), or **More Objects** tab.



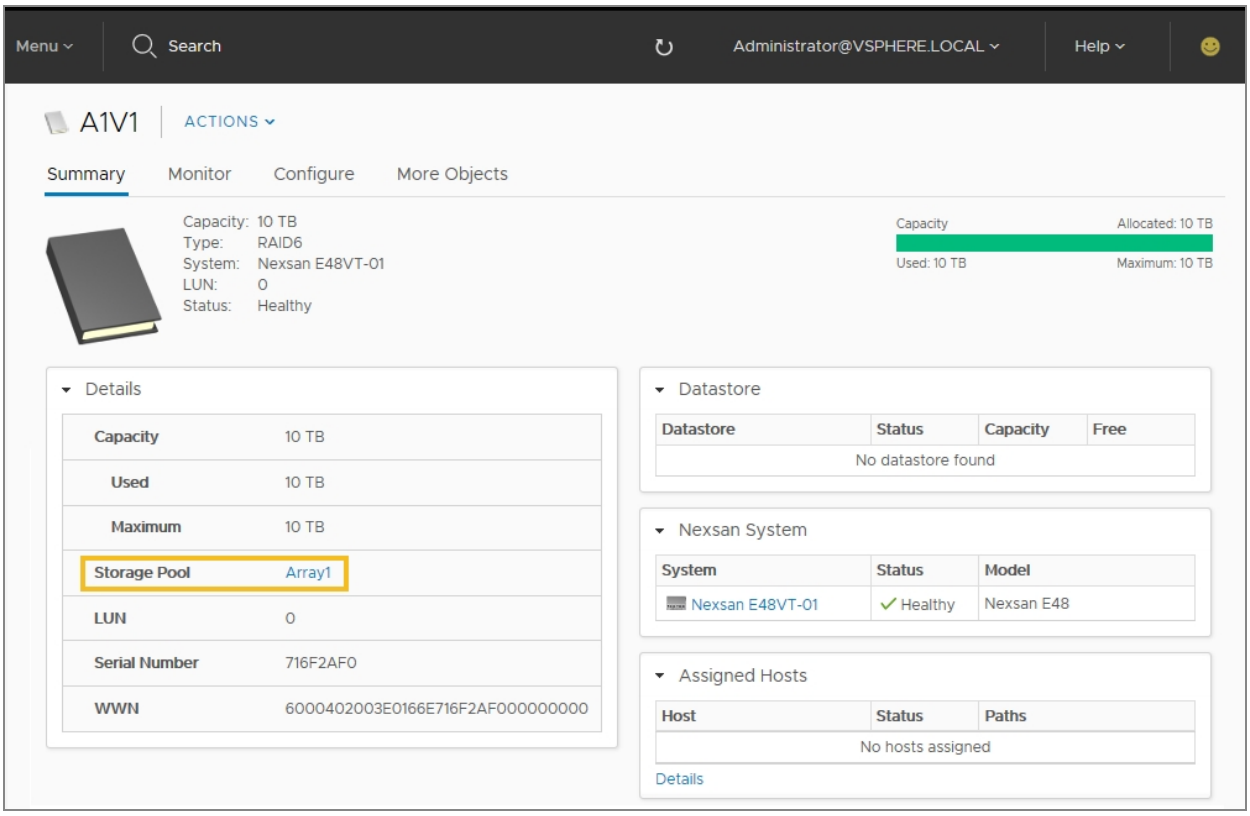
4

Opening a Storage Pool / Array from a Nexsan Volume

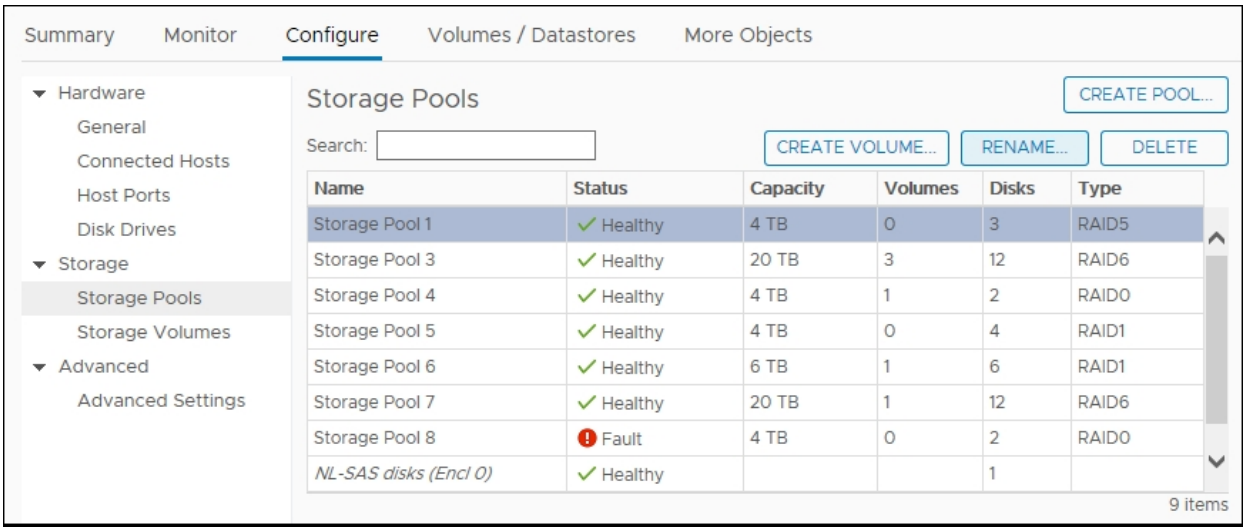
Use this procedure for help with opening a Storage Pool / Array from a Nexsan Volume.

To open the Storage Pool / Array:

1. Open a **Nexsan Volume**.
2. Click a link to a **Storage Pool**.



The **Storage Pools** page opens.



Monitoring Nexsan Volumes

This section provides the following topics for help with monitoring Nexsan Volumes:

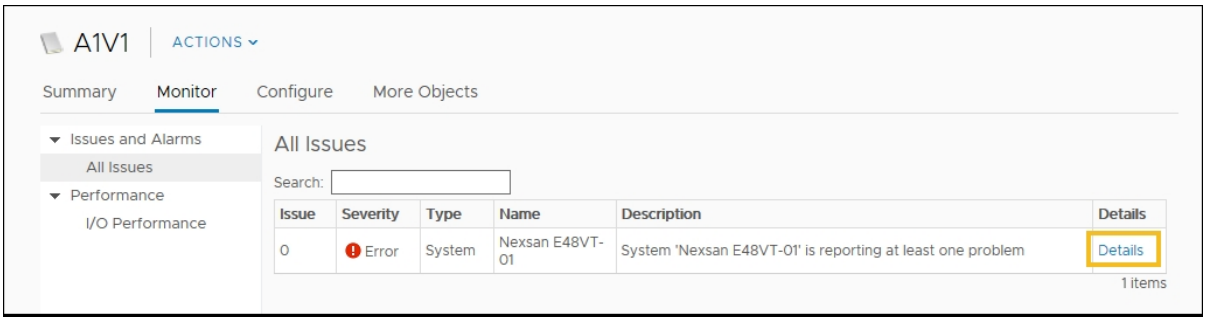
Viewing issues and alarms with volumes 48
Viewing tasks and events for volumes 48
Viewing I/O performance data for volumes 49
Viewing replication in the Volume workspace 50

Viewing issues and alarms with volumes

Use this procedure for help with viewing issues and alarms for Nexsan Volumes.

To view issues and alarms:

1. Open a **Nexsan Volume** you want to monitor.
2. On the tab bar, select **Monitor**. The initial view lists any issues under **Issues and Alarms.** Click the **Details** link for more information.



Viewing tasks and events for volumes

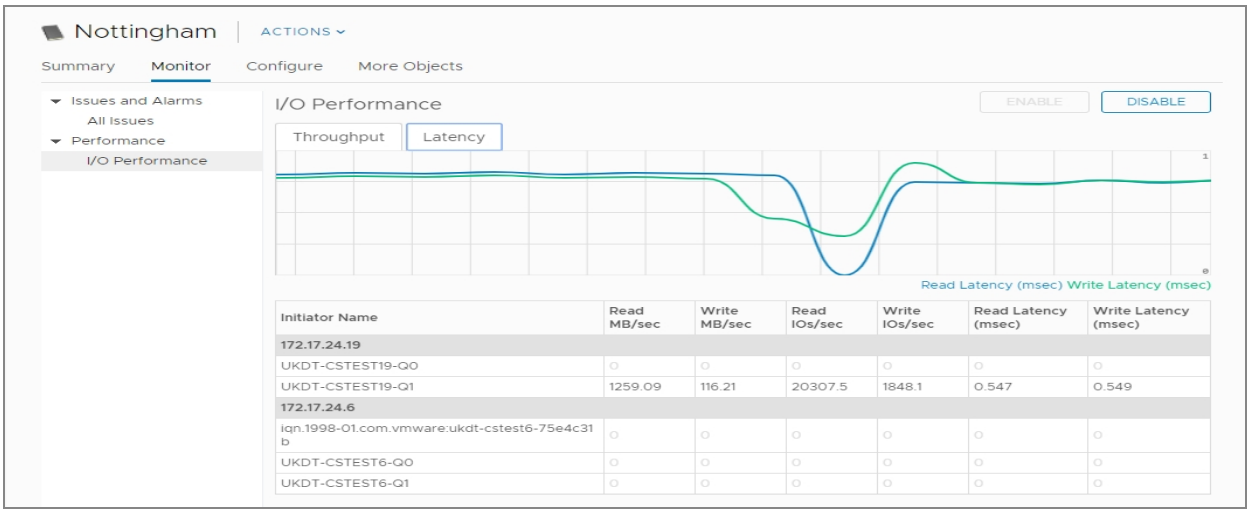
See "Viewing tasks and events" (page 35)

Viewing I/O performance data for volumes

The **I/O performance data** page provides live graphical monitoring of Nexsan Storage Systems and Nexsan Volumes. See also "Viewing system I/O performance data" (page 36)

To monitor I/O Performance data for a Nexsan Volume:

1. Open a **Nexsan Volume**.
2. On the tab bar, select **Monitor**.
3. Select **I/O Performance**.
4. Click **Enable**. The window displays live I/O **Throughput** and **Latency** by port type to the system, measured in **Read MB/sec** and **Write MB/sec**.

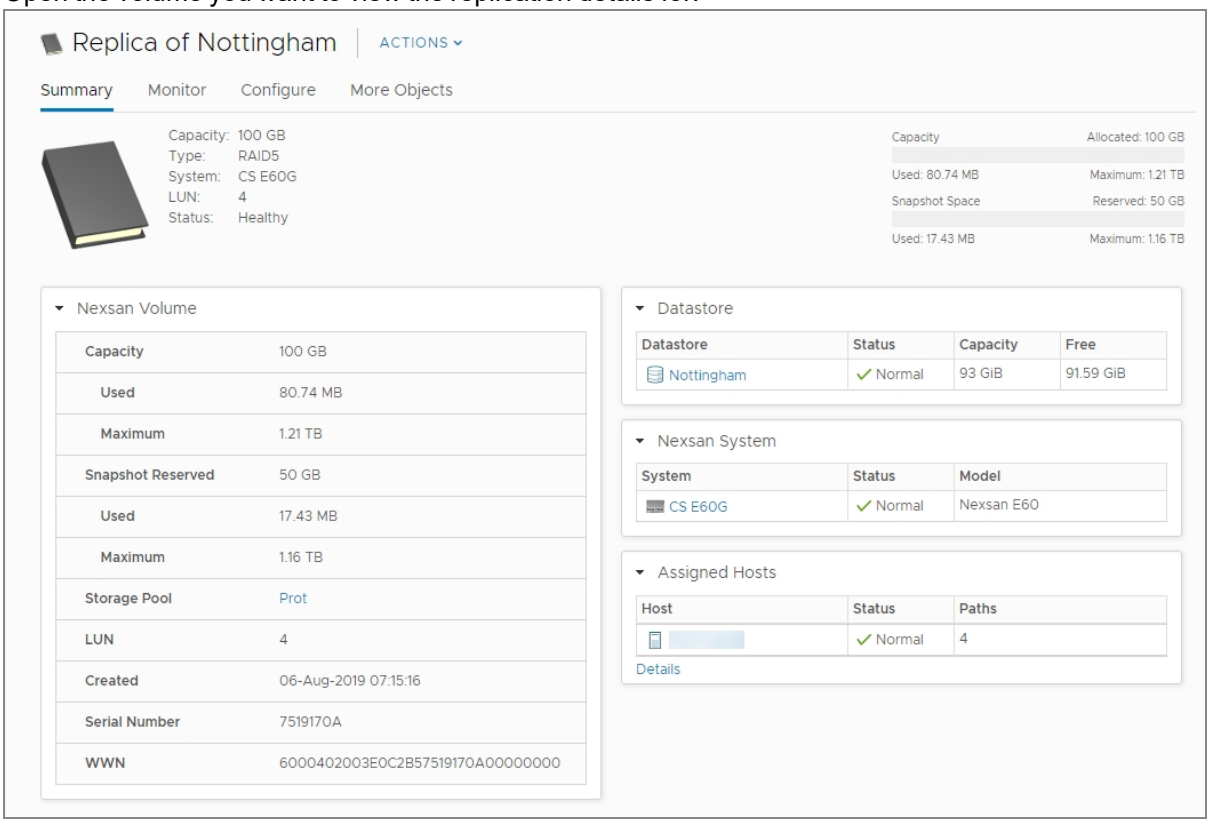


Viewing replication in the Volume workspace

Use the **Volume Replication** workspace to view replication details.

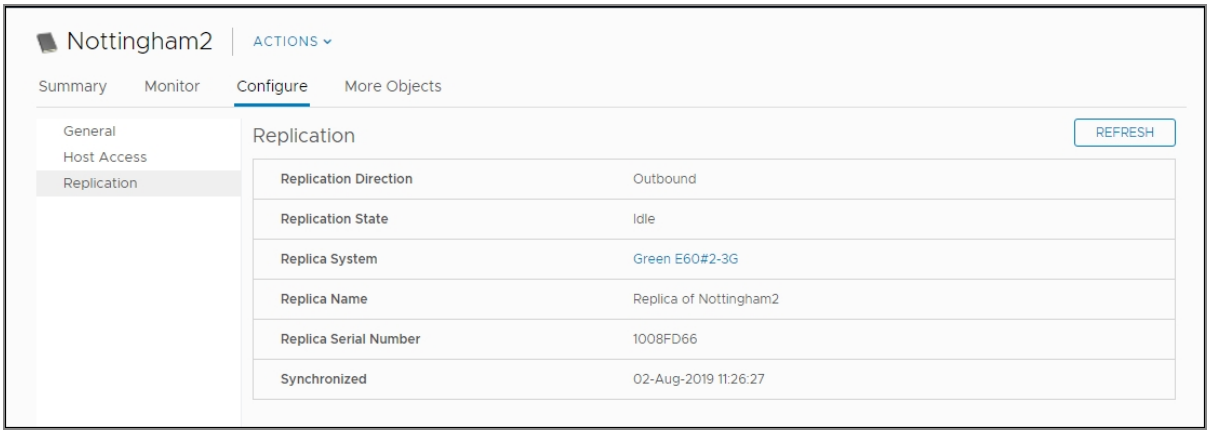
► To open the Volume Replication workspace:

1. Open the volume you want to view the replication details for.



2. On the tab bar, select **Configure**.

3. Select **Replication** from the sub menu.



Use this table for details about the Volume Replication workspace fields:

Column	Description
Replication Direction	Displays the direction of the replication: Outbound or Inbound.
Replication State	Displays the state of any ongoing replication. Click **Refresh** for the current state when a replication is in progress.
Replica System	Displays the name of the Nexsan System to which the volume is being replicated.
Replica Name	Displays the name of the volume being replicated.
Replica Serial Number	Displays the serial number of the replica volume.
Synchronized	Displays the time and date of the last replication.

Chapter 5

Managing Nexsan Storage

This chapter provides the following sections and topics for help with managing Nexsan Storage:

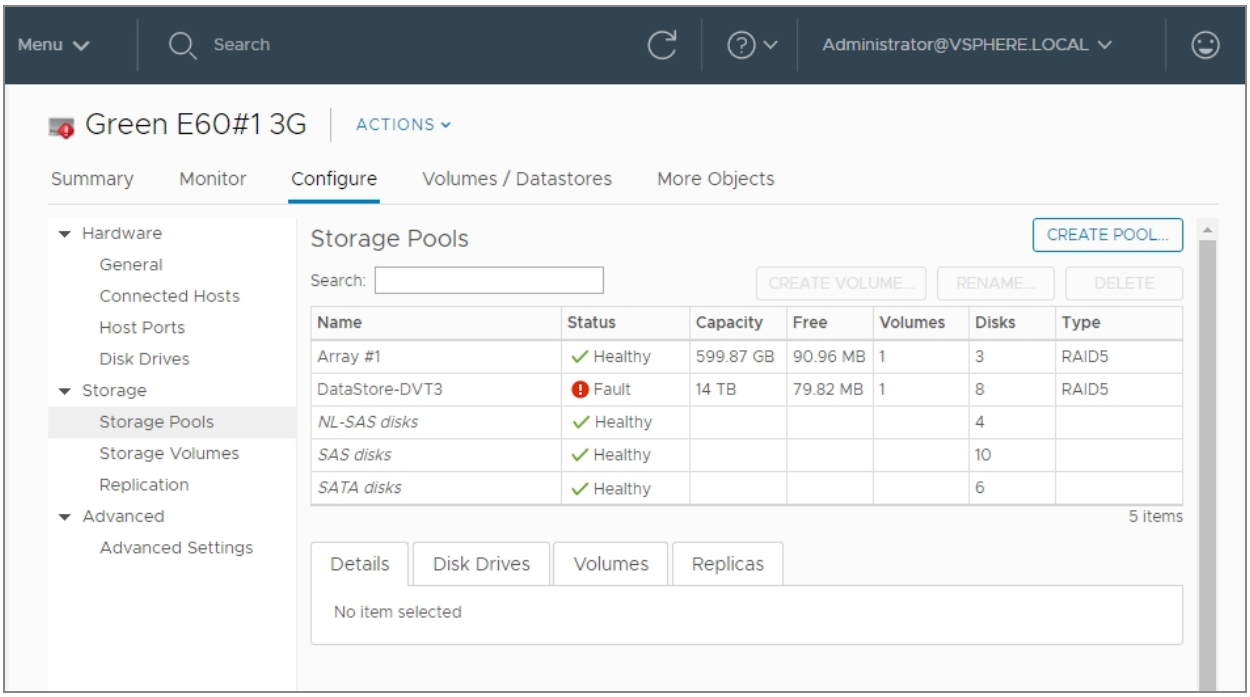
Accessing Storage Pools 54
Creating a Storage Pool / Array 56
Renaming a Storage Pool / Array 59
Deleting a Storage Pool / Array 61
Adding a hot spare disk 63
Removing a hot spare disk 64
Working with Nexsan Volumes and VMware datastores 66
Working with hosts 80
Renaming a Nexsan Storage System 91
Restarting a Nexsan Storage System 92
Shutting down a Nexsan Storage System 95
Setting a beacon on an enclosure 96

Accessing Storage Pools

Use this procedure for help with accessing Storage Pools (Nexsan arrays).

To access Storage Pools:

1. Open the **Nexsan Storage System**.
2. Select **Storage Pools > Details** to display a list of pools and their statuses, capacities, free space, and the number of related volumes, disks, and their RAID types.



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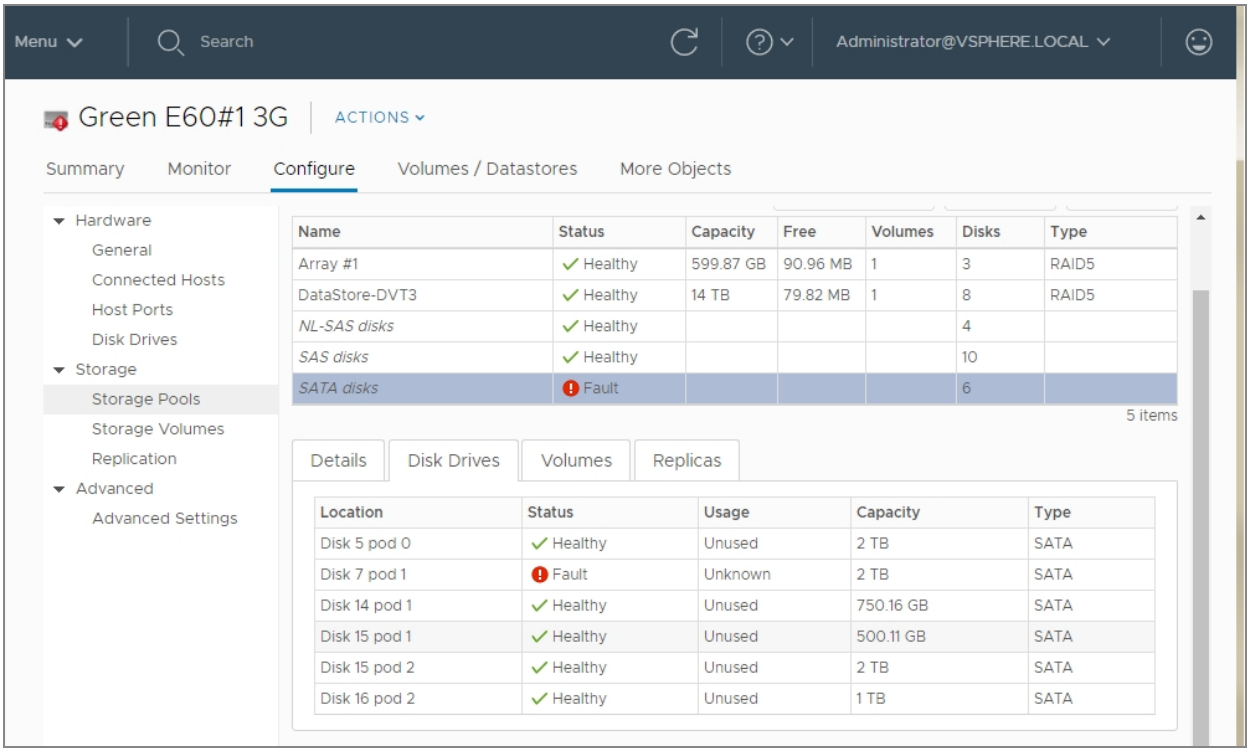
3. Select any pool in the list for **Details**, as well as information about associated **Disk Drives** and **Volumes**.



Creating a Storage Pool / Array

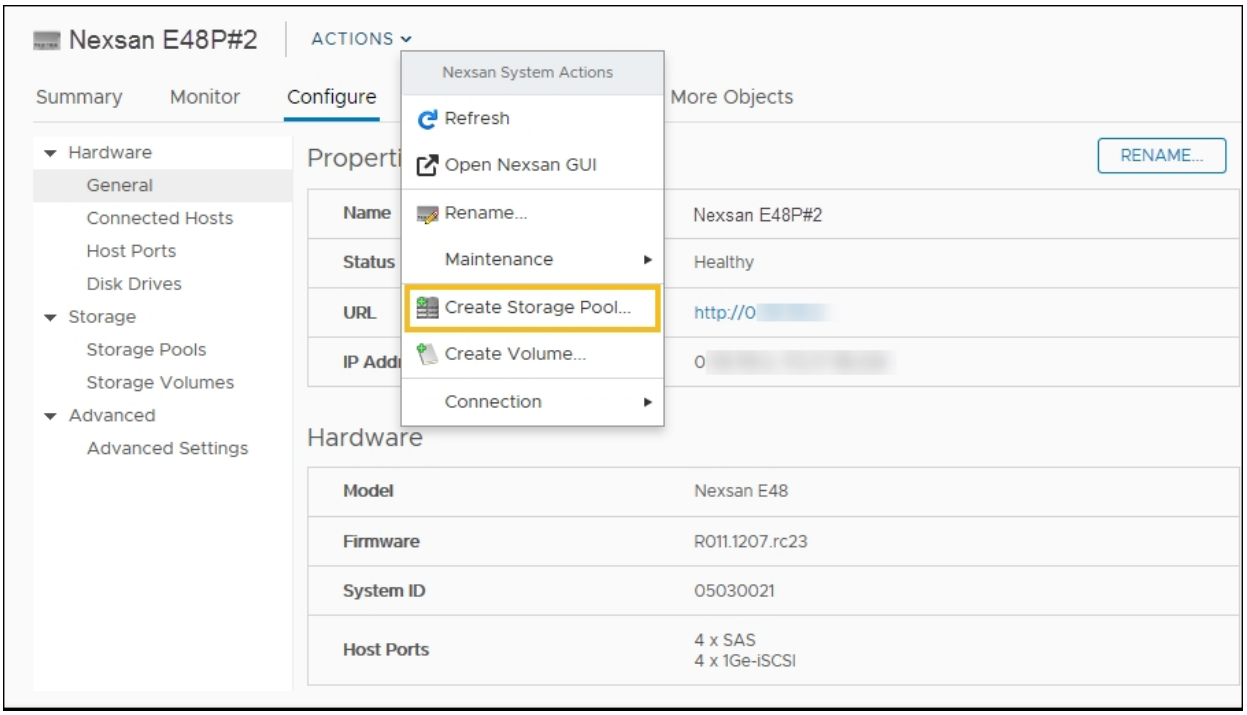
Use these steps for help with creating a Storage Pool / Array.

Prerequisite

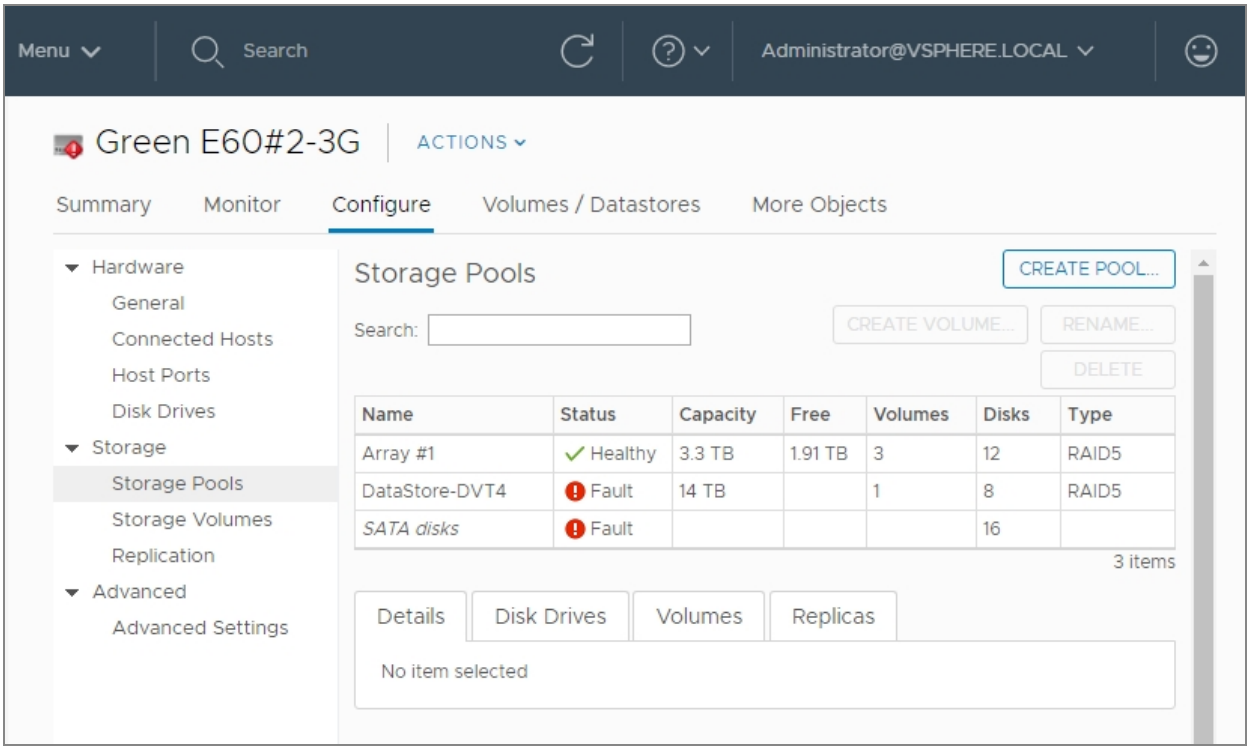
- Ensure that sufficient unassigned disks are available for the new storage pool. See "The Disk Drives workspace" (page 41)

To create a Storage Pool / Array:

1. Open the **Nexsan Storage System** workspace.
2. Select **Actions > Create Storage Pool**.

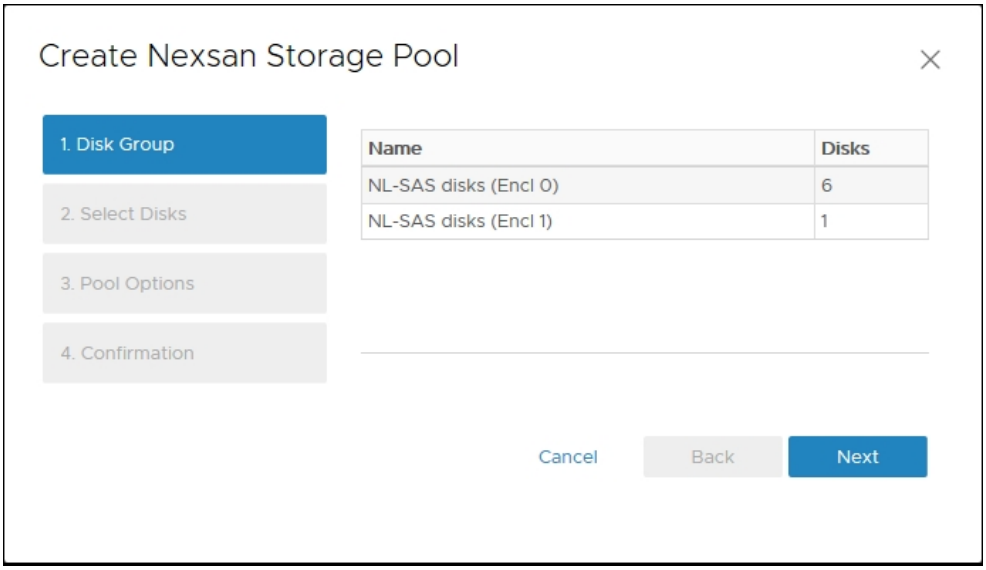


Alternatively, select the **Configure** tab (**Manage** in Flash), then click **Storage Pools** > **Create Pool**.

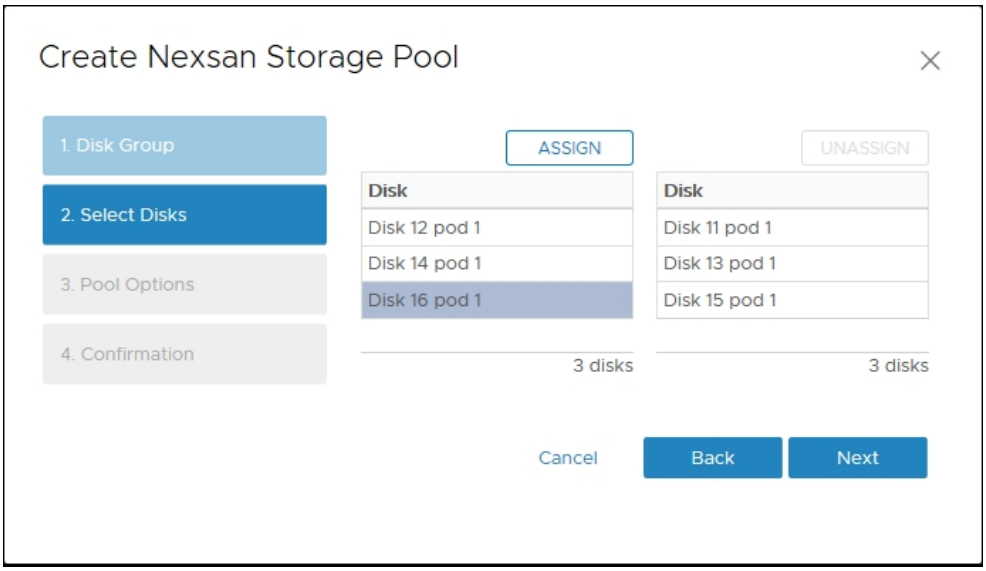


The **Create Nexsan Storage Pool** wizard opens.

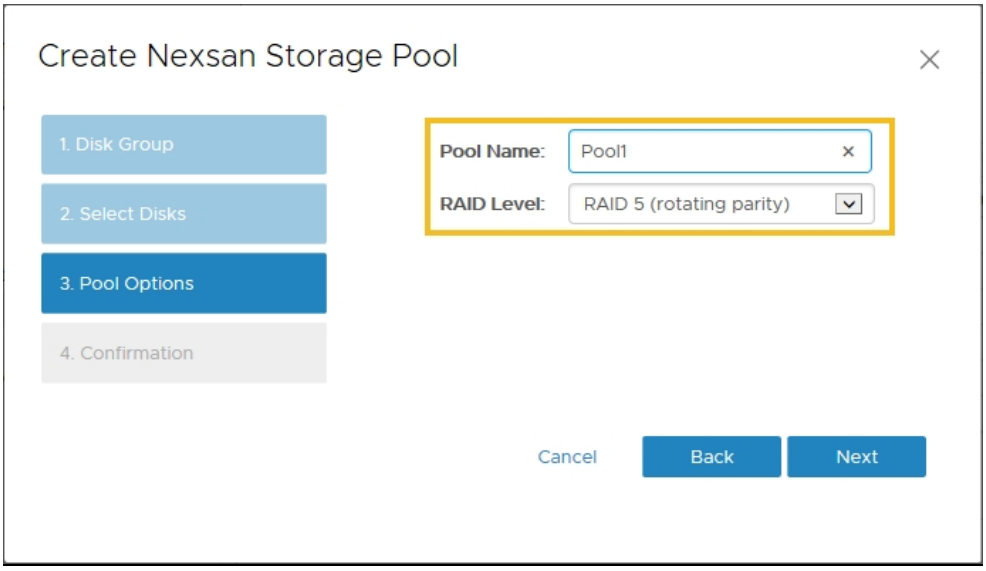
3. Select the **Disk Group** you want to use and click **Next**.



4. Select the disks you want to use, click **Assign**, and then click **Next**.

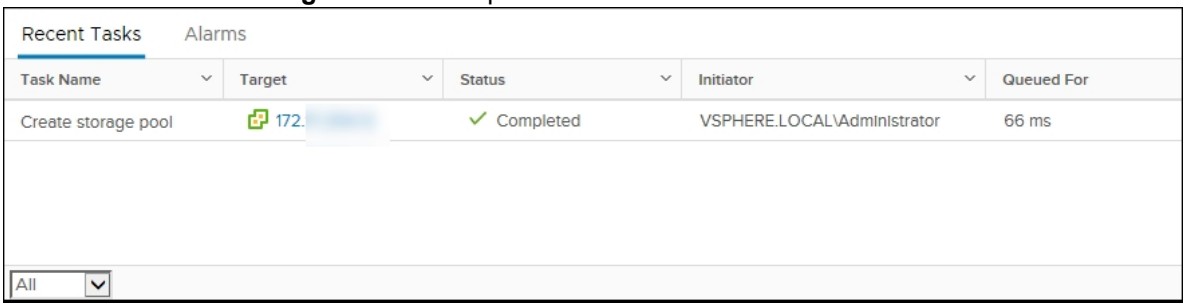


5. Enter a **Pool Name**, select a **RAID level**, and click **Next.**



6. In the **Confirmation** window, review your changes and click **Finish**.

7. To monitor the pool creation progress and related VMware activities, expand the **Recent Tasks** pane at the bottom of the **Storage Pools** workspace.



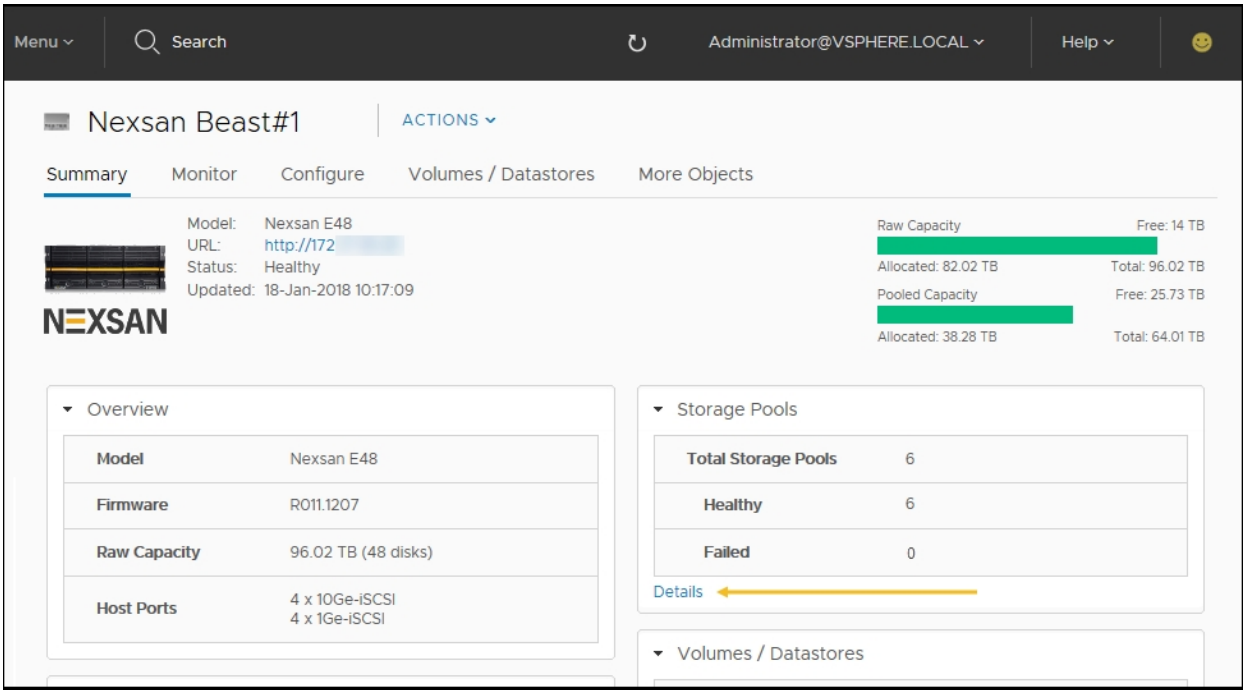
Next, you'll need to create a Nexsan Volume and datastore for the pool.

Renaming a Storage Pool / Array

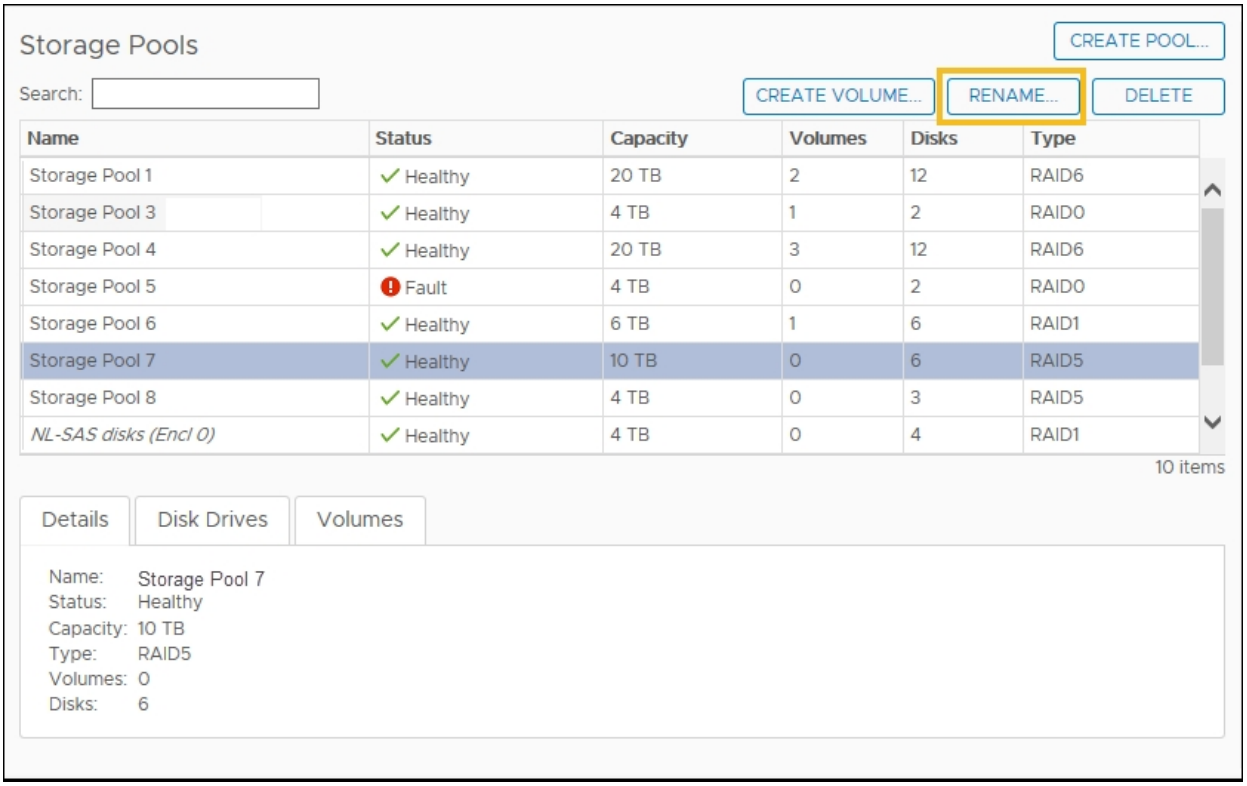
Use this procedure for help with renaming a Storage Pool / Array.

To rename a Storage Pool / Array:

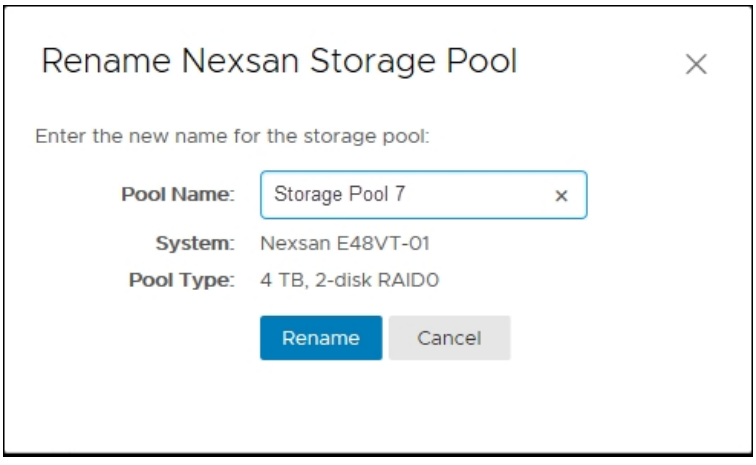
1. Open the **Nexsan Storage System** workspace with the storage pool you need to rename.
2. Under **Storage Pools**, click **Details**. Alternatively, on the tab bar select **Configure** (**Manage** in Flash), and then select **Storage Pools**.



3. In the **Storage Pools** workspace, select the pool you want to rename and click **Rename**.



4. In the **Rename Nexsan Storage Pool** window, first review your selection and when you are ready click **Rename.**



5. Click **Actions > Refresh**.
6. Review the **Recent Tasks** pane to confirm that the storage pool has been renamed.

Deleting a Storage Pool / Array

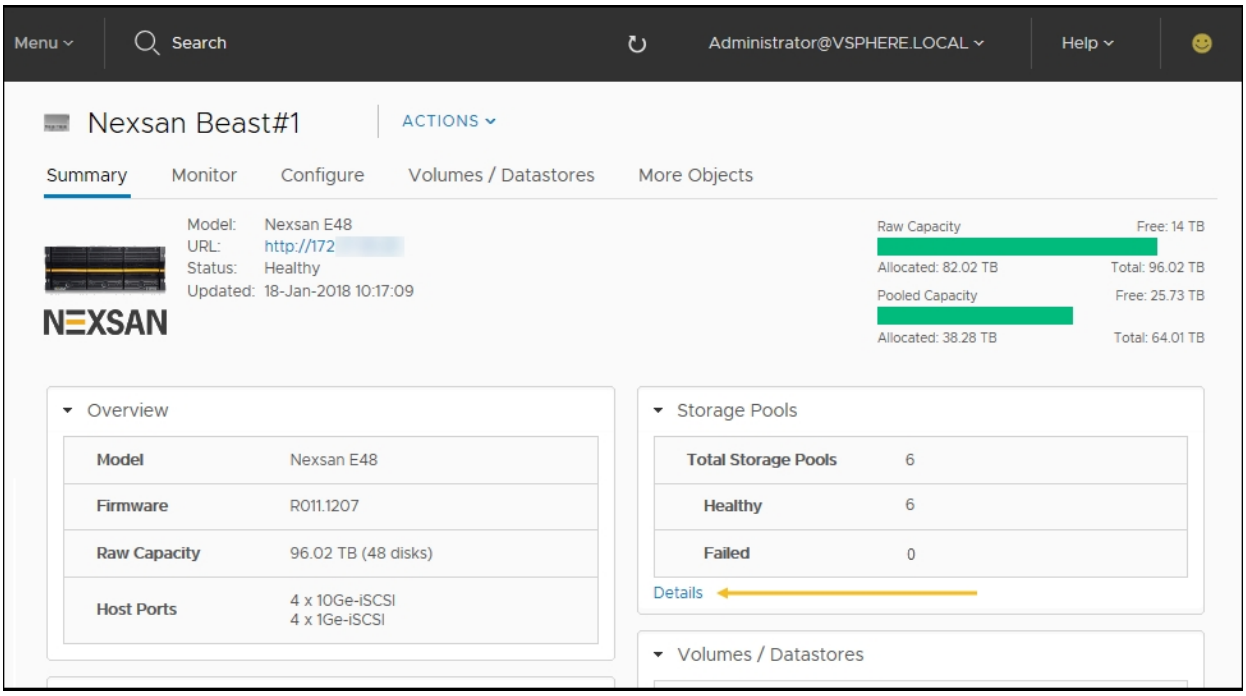
Use this procedure for help with deleting a Storage Pool / Array.

Prerequisite

- You must delete any associated volumes before you can delete a Storage Pool / Array.

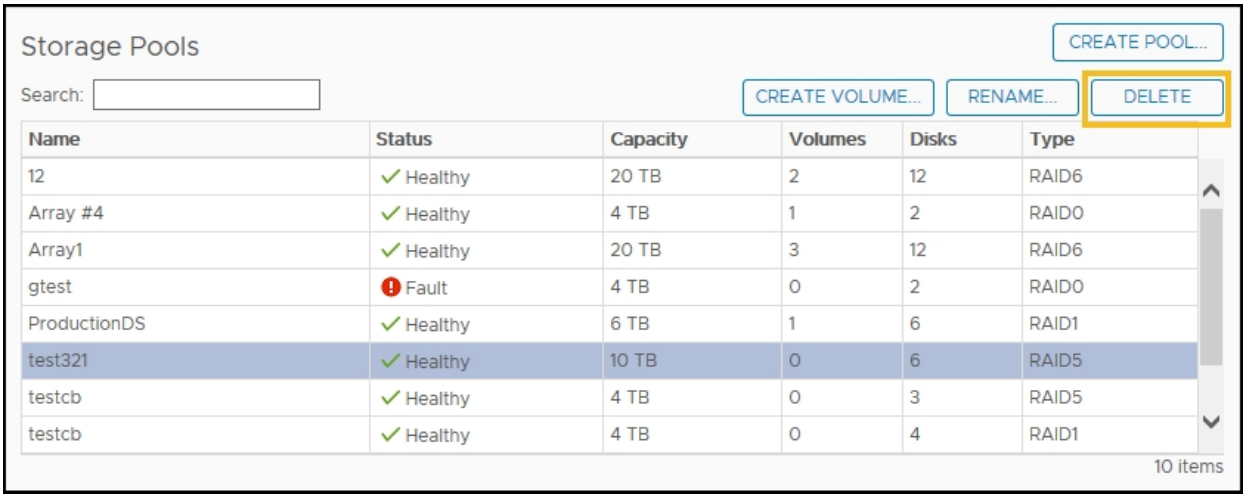
To delete a Storage Pool / Array:

1. Open the **Nexsan Storage System** workspace with the storage pool you want to delete.
2. Under **Storage Pools**, click **Details**. Alternatively, on the tab bar select **Configure** (**Manage** in Flash), and then select **Storage Pools**.

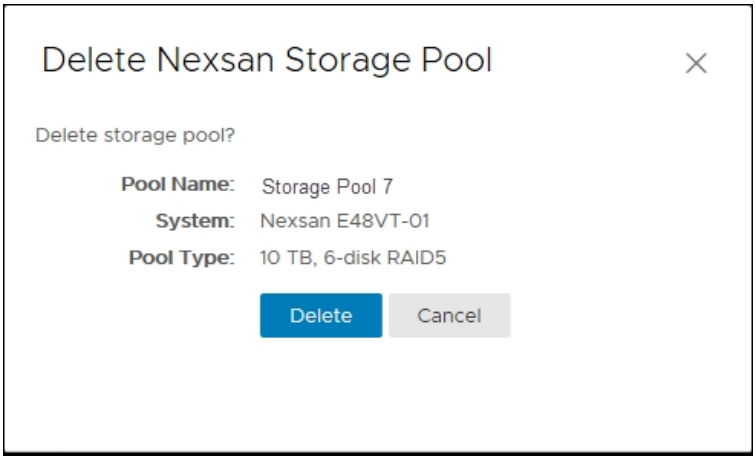


3. In the **Storage Pools** workspace, select the pool you want to delete, and view the **Details** pane to confirm that there are no associated volumes. If there are volumes associated with the pool, see "Deleting a Nexsan Volume" (page 72).

4. Click **Delete**.



5. In the **Delete Nexsan Storage Pool** window, review your selection and click **Delete.**



6. Click **Actions > Refresh**.
7. Review the **Recent Tasks** pane to confirm that the storage pool has been deleted.

Adding a hot spare disk

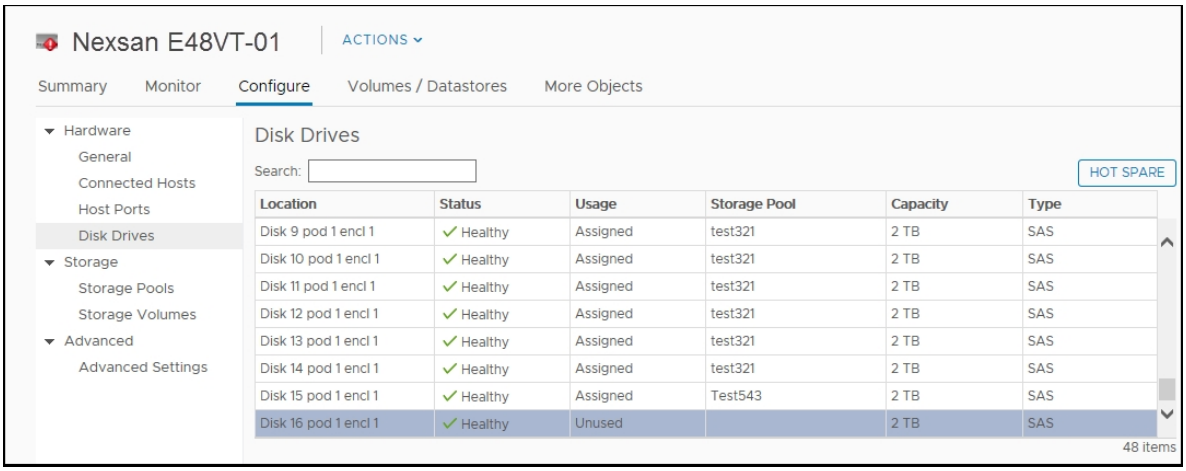
Use this procedure for help with adding a **hot spare**[1] disk.

Prerequisite

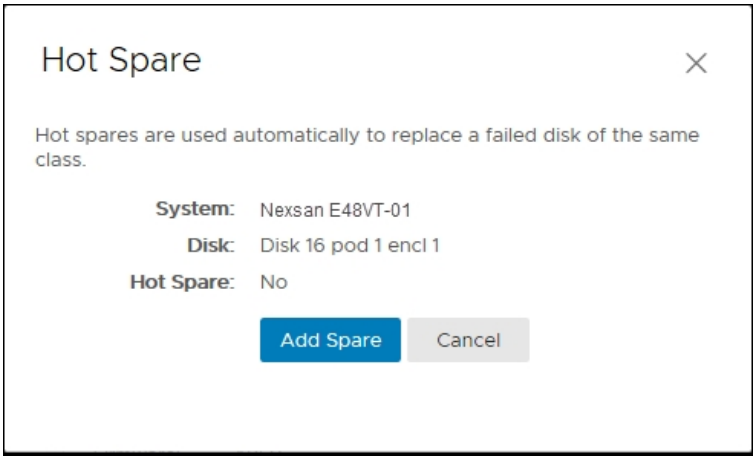
- Make sure you have an unused disk available before you begin this procedure.

To add a hot spare disk:

1. Open the **Nexsan Storage System** workspace where you want to add the hot spare.
2. Select **Configure > Disk Drives**.

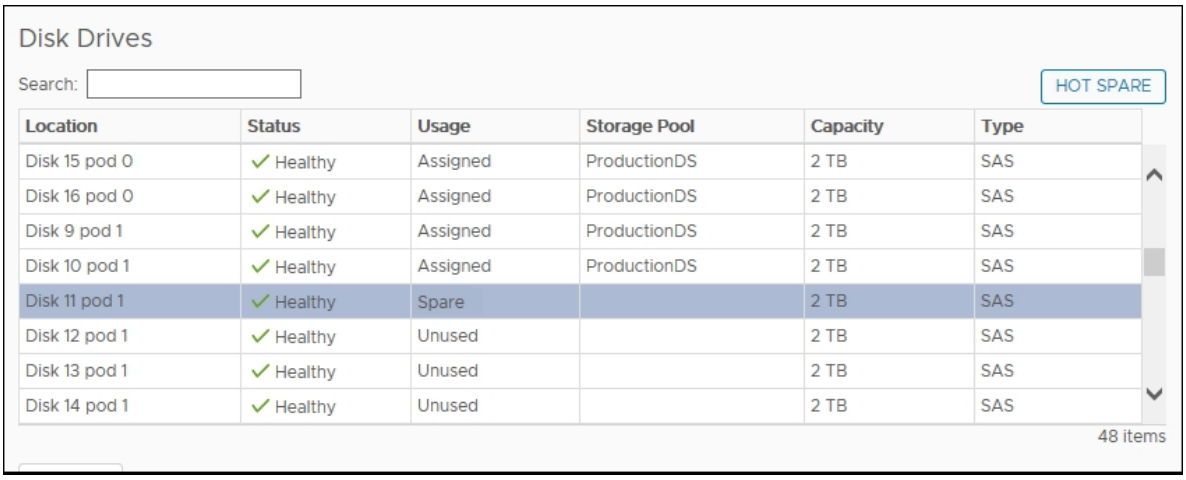


3. Select an available **Unused** disk and click **Hot Spare**.
4. In the **Hot Spare** window, click **Add Spare**.



[1] A spare disk in a RAID array designated as "hot standby", available to replace a failed disk without requiring a system shutdown.

5. Click **Actions > Refresh** to display the hot spare disk status.



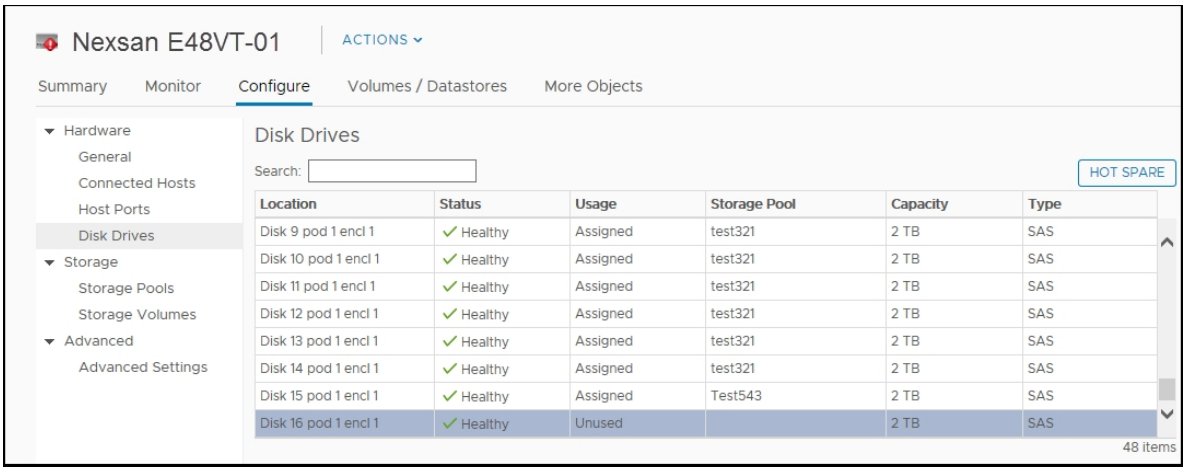
6. Review the **Recent Tasks** pane to confirm.

Removing a hot spare disk

Use this procedure for help with removing a **hot spare**[1] disk.

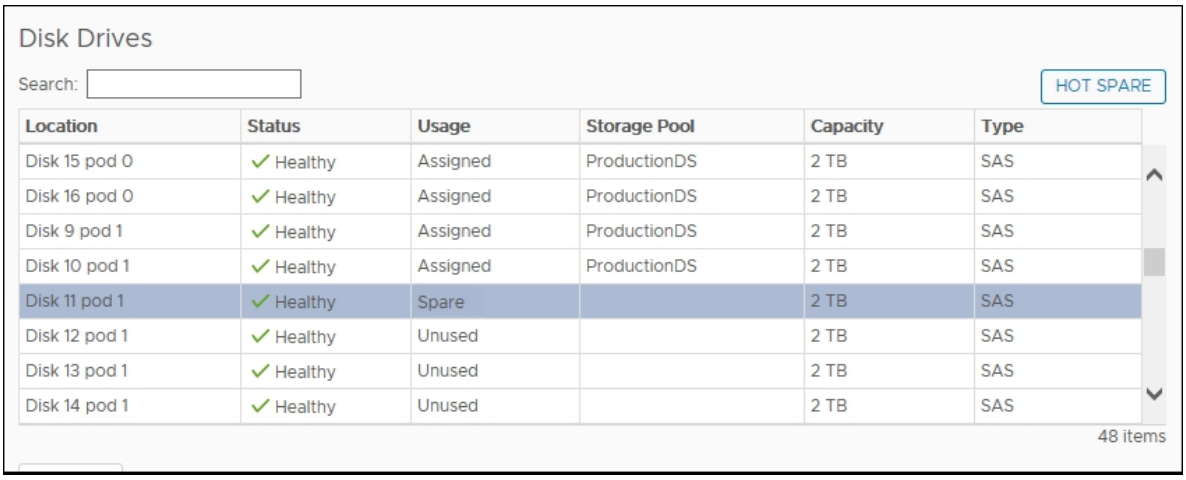
► To remove a hot spare disk:

1. Open the **Nexsan Storage System** workspace where you want to remove the hot spare.
2. Select **Configure > Disk Drives**.

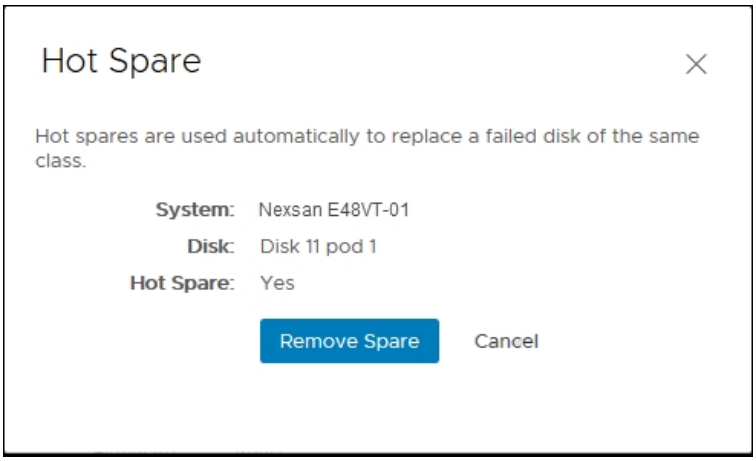


[1] A spare disk in a RAID array designated as "hot standby", available to replace a failed disk without requiring a system shutdown.

3. Select a disk labeled as **Spare** in the **Usage** column, and click **Hot Spare**.



4. In the **Hot Spare** window, click **Remove Spare.**



5. Click **Actions > Refresh** to display the updated disk status.

Working with Nexsan Volumes and VMware datastores

This section provides the following topics for help with working with Nexsan Volumes:

Creating a Nexsan Volume and datastore 67
Renaming a Nexsan Volume 70
Expanding a Nexsan Volume 71
Deleting a Nexsan Volume 72
Creating a datastore 74
Importing a datastore 75
Renaming a datastore 78
Identifying volumes associated with a datastore 79

5

Creating a Nexsan Volume and datastore

Use these steps for help with creating a Nexsan Volume and VMware datastore.

The Create Nexsan Volume wizard

Creating a volume with the wizard used in this procedure follows these basic steps:

1. Creating the volume.
2. Assigning a host (or hosts).
3. Creating a datastore.

Each step in the wizard requires the previous one, but the second and third steps can be done later. If it suits your needs, you can create only the volume, create the volume and assign it to a host, or do everything at once.

See also:

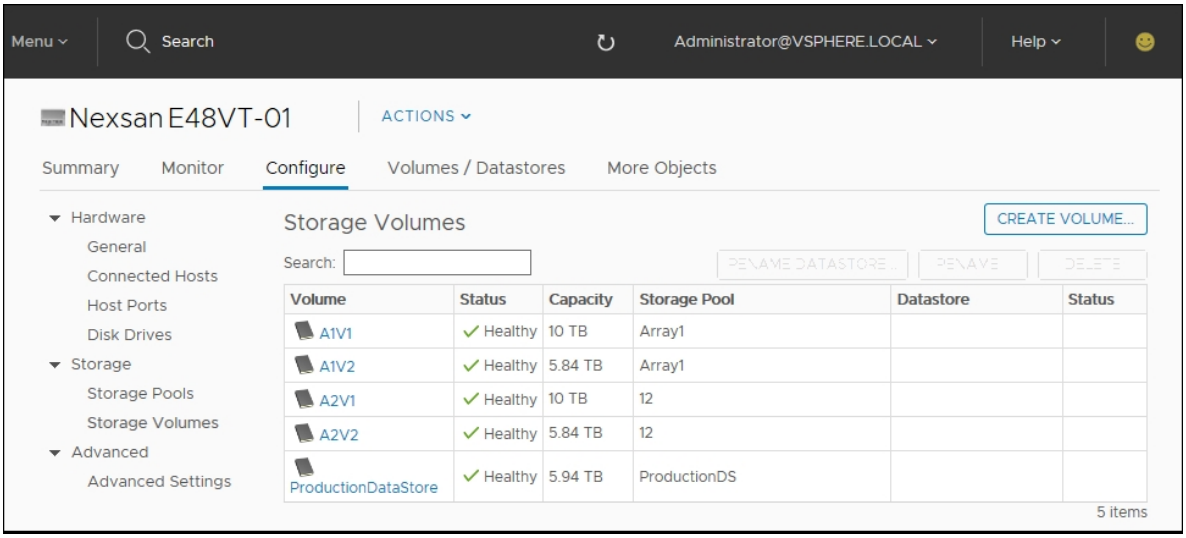
- "Assigning a host to a Nexsan Volume" (page 80)
- "Creating a datastore" (page 74)

Prerequisite

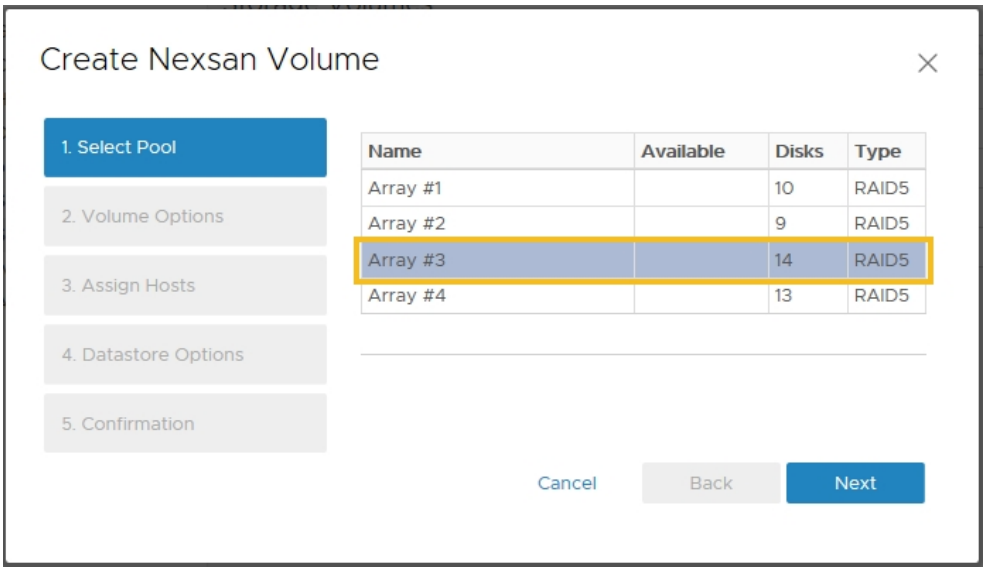
- Before you begin, make sure the storage pool (array) you plan to assign to the volume has enough available disk space. See "The Disk Drives workspace" (page 41).

To create a Nexsan Volume and VMware datastore:

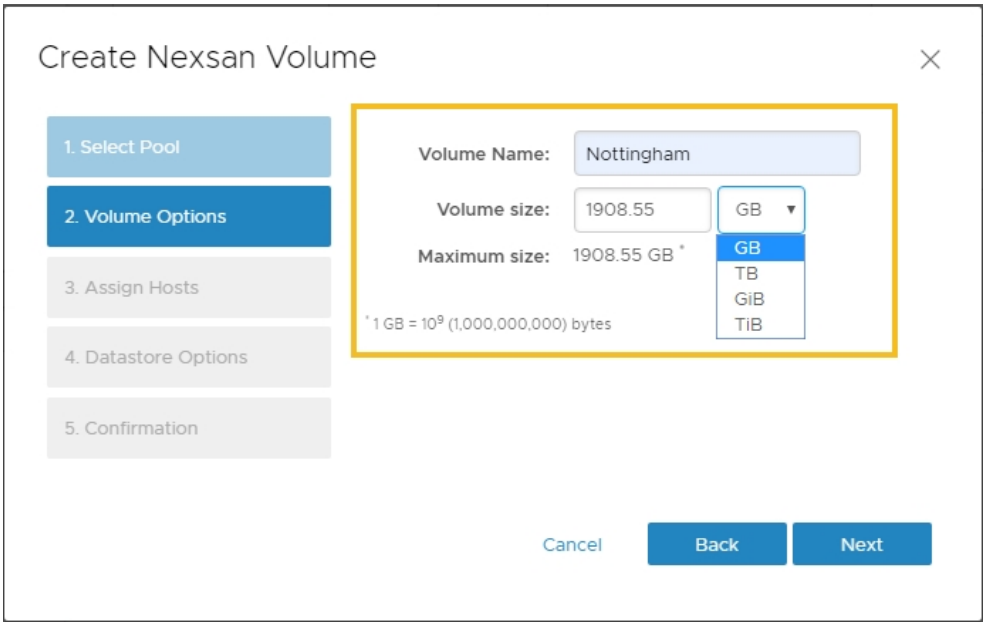
1. Open the **Nexsan Storage System** workspace.
2. On the tab bar, select **Volumes / Datastores**.
3. Click **Create Volume**.



4. In the **Create Nexsan Volume** wizard, select the **Storage Pool (Array)** you want to assign to the volume and click **Next**.

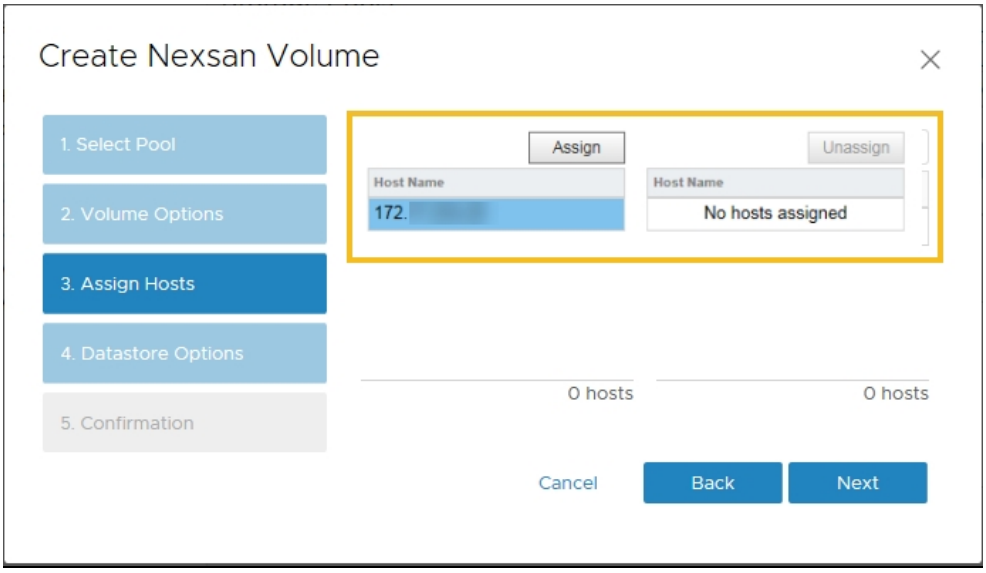


5. Enter a **Volume Name** and **Volume Size** and units (GB, TB, GiB, or TiB) and click **Next**.

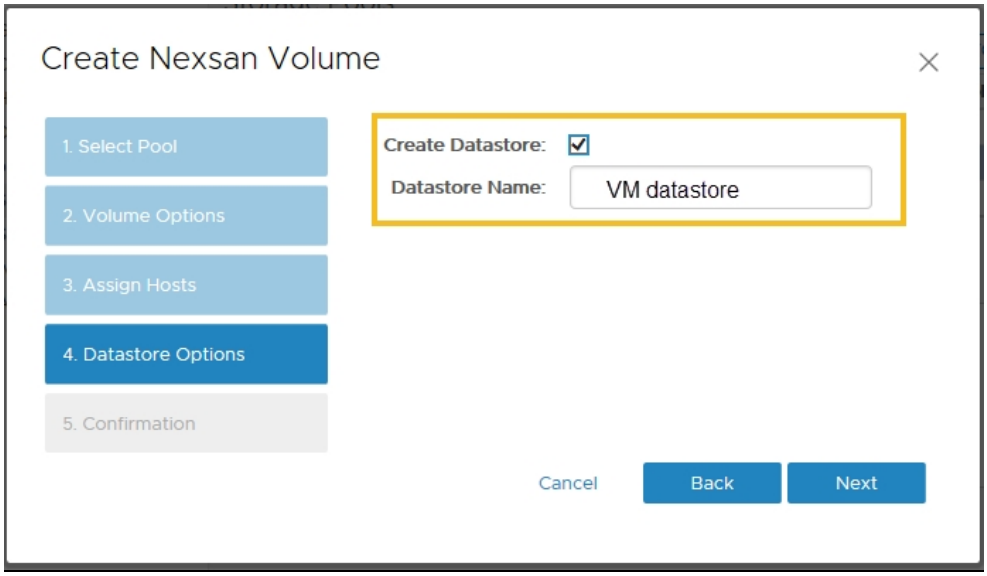


6. Select an unassigned host, then click **Assign > Next**.

   Note You can skip this step and assign a host later, but assigning a host to a volume is necessary before you can add a datastore.

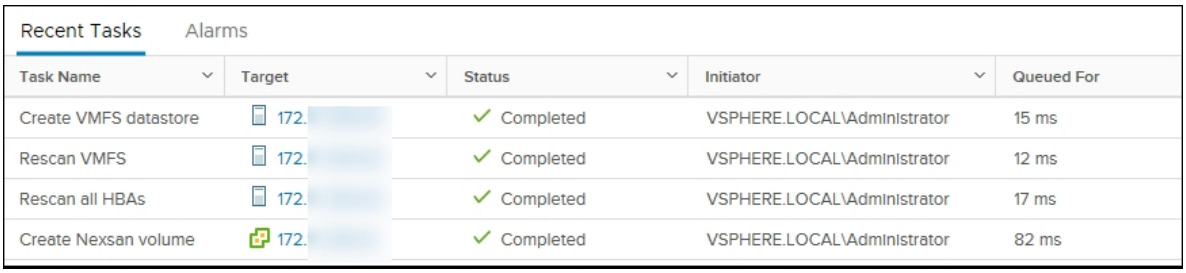


7. Do either of the following:
   a. Type a name to create a new VMware datastore (requires that a host be assigned. See the previous step.) Click **Next**.
   b. To skip creating a datastore, leave the **Create Datastore** check box unchecked and click **Next**.



8. In the **Confirmation** window, review your changes and click **Finish**.

9. In **Recent Tasks**, confirm that the volume is created. Volume creation is complete only when all VMware subtasks are complete.

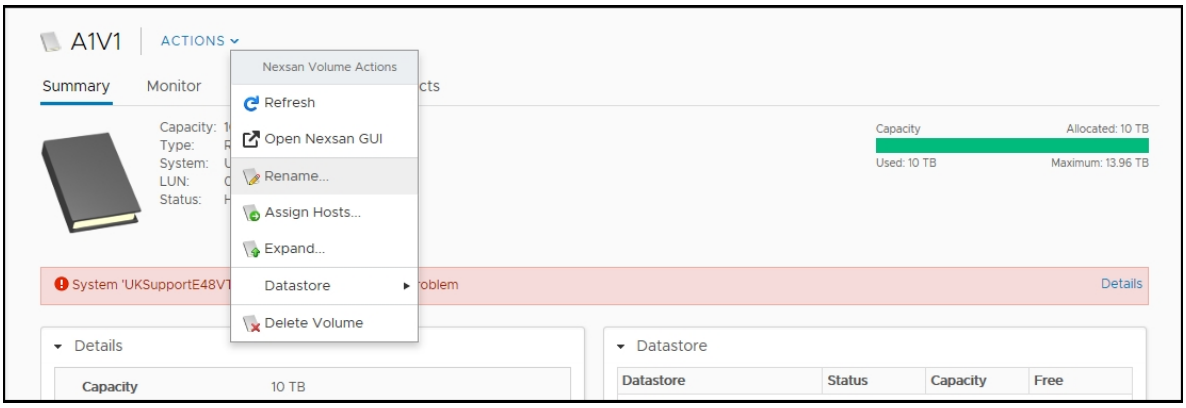


Renaming a Nexsan Volume

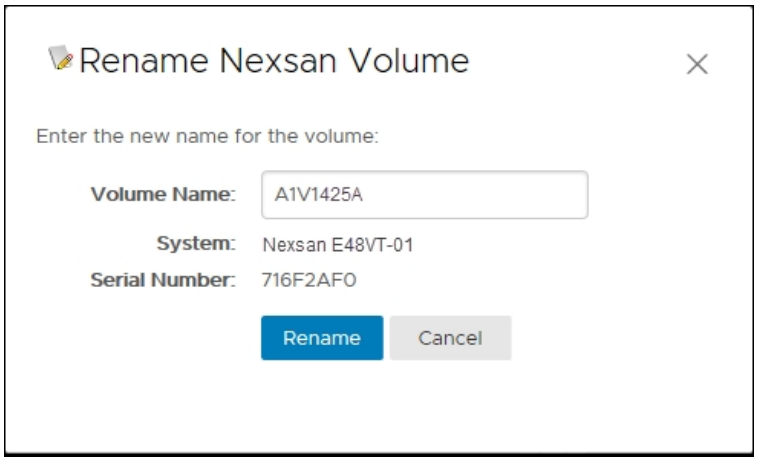
Use this procedure for help with renaming a Nexsan Volume.

To rename a Nexsan Volume:

1. Open the **Nexsan Volume** you want to rename.
2. Click **Actions > Rename**.



3. Enter a new volume name.



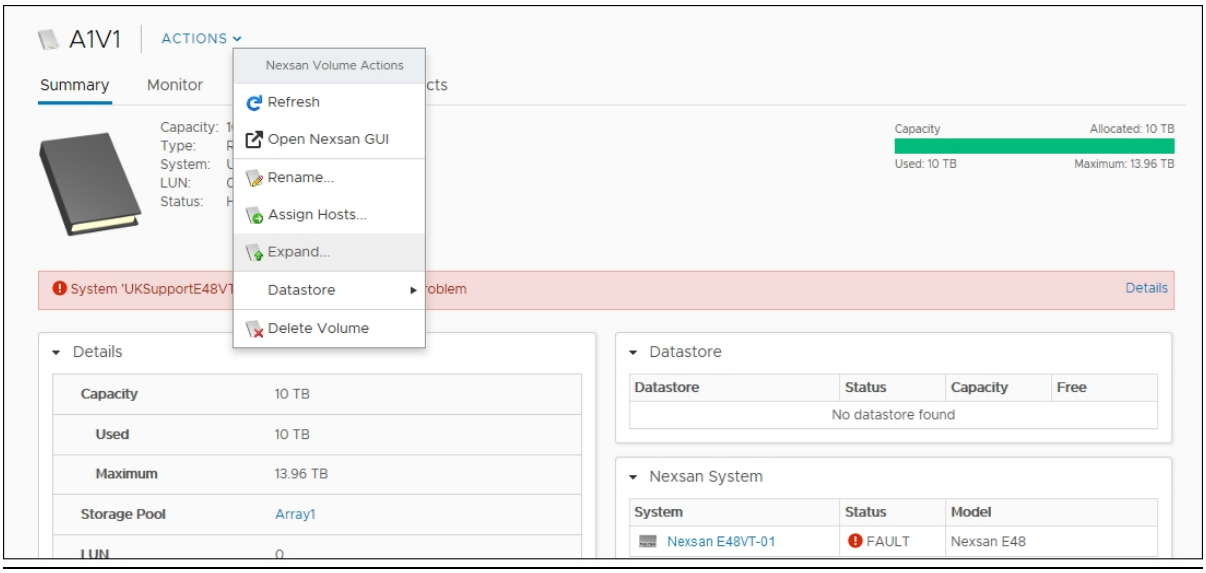
4. Click **Rename**.
5. View **Recent Tasks** to confirm that the process has completed.

Expanding a Nexsan Volume

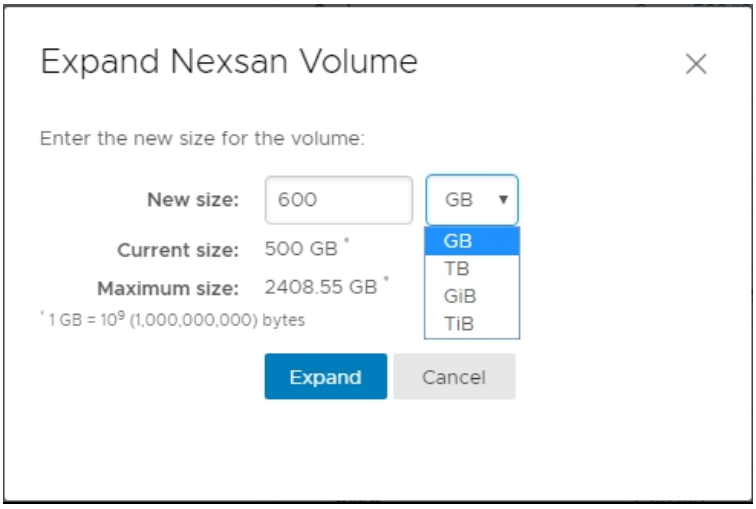
Use this procedure for help with expanding a Nexsan Volume and any associated datastore using available storage pool space.

To expand a Nexsan Volume:

1. Open the **Nexsan Volume** you want to expand.
2. Click **Actions > Expand**.



3. Enter a new size for the volume and units (GB, TB, GiB, or TiB).



4. Click **Expand**.

5. View **Recent Tasks** to confirm that the process has completed. Volume expansion is only marked as completed once all subtasks have finished.

Deleting a Nexsan Volume

Use this procedure to cleanly unmount a Nexsan Volume and any associated datastore.

CAUTION: LOSS OF DATA

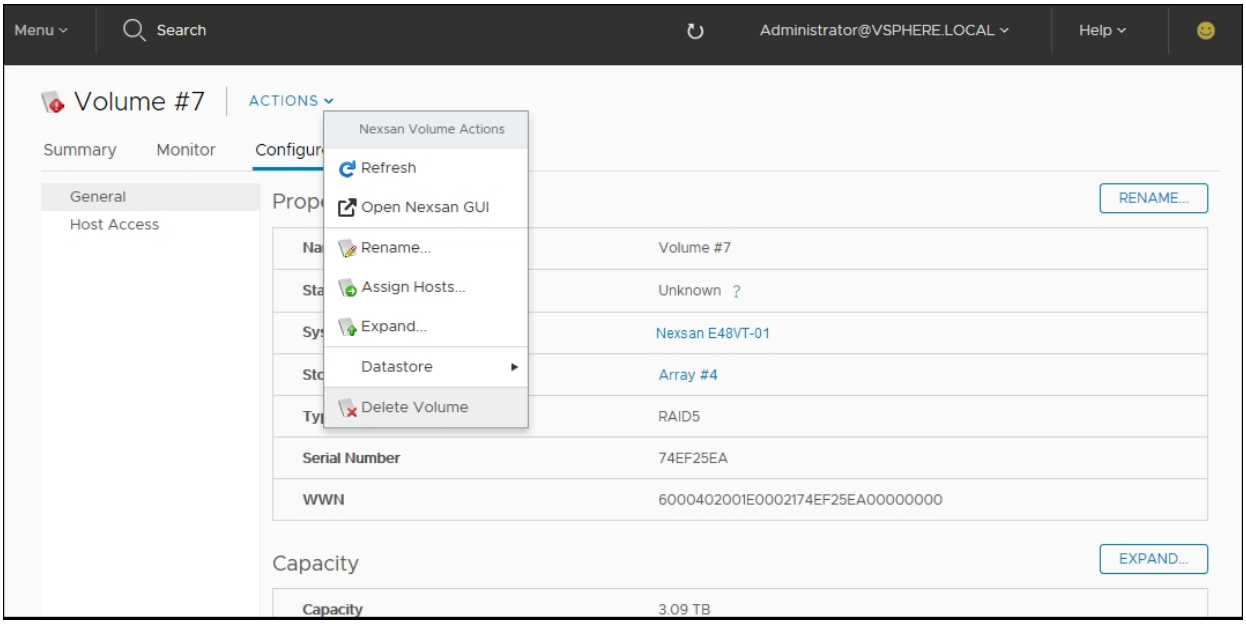
Before you complete this procedure, ensure that the data is either replicated elsewhere or no longer required.

Prerequisite

- Remove any associated virtual machines before you delete a Nexsan Volume. Otherwise deletion will be blocked.

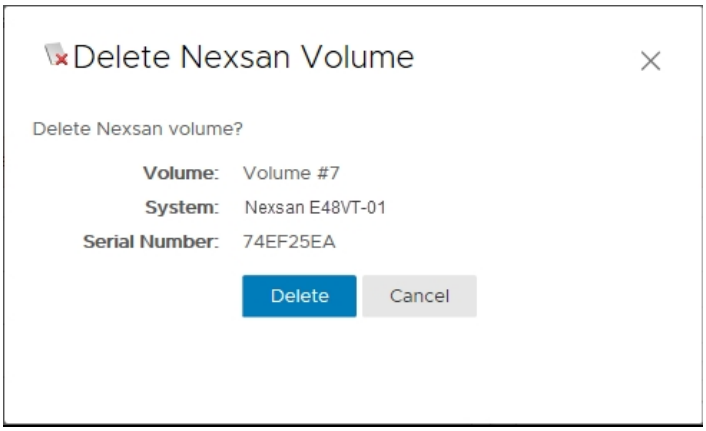
To delete a Nexsan Volume:

1. Open the **Nexsan Volume** you want to delete.
2. In the **Volume** window, select **Actions > Delete Volume**.

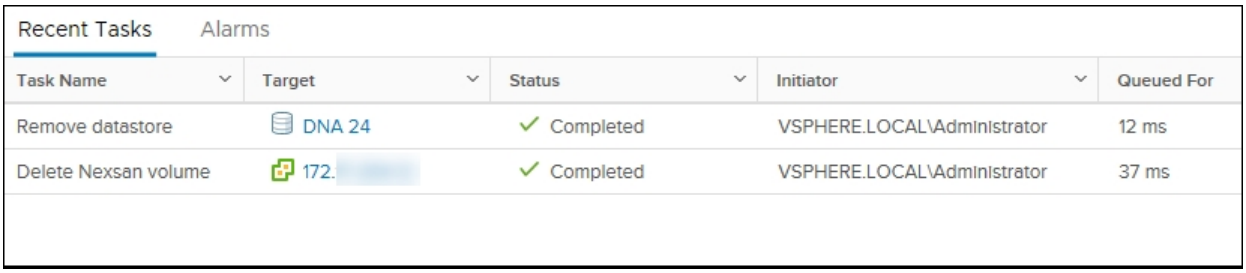


5

3. In the **Delete Nexsan Volume** window, confirm that you have the right volume, and click **Delete**.



4. View **Recent Tasks** to confirm that the process has completed. Volume deletion is only marked as completed once all subtasks have finished. For example:



Creating a datastore

Use this procedure for help with adding a **datastore**[1] to a Nexsan Volume if not already done so when the volume was created. *See also:* "Creating a Nexsan Volume and datastore" (page 67).

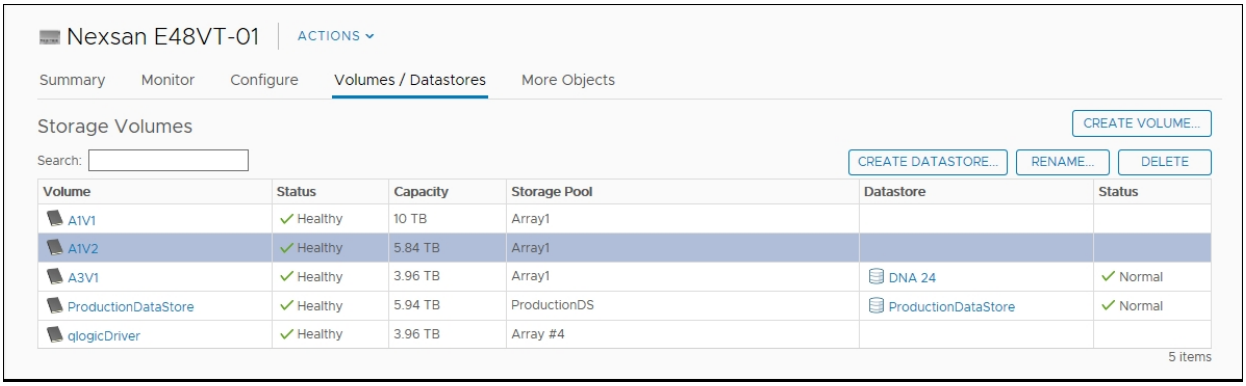
Prerequisite

- The volume must be assigned to the VMware host to have a datastore assigned to it.

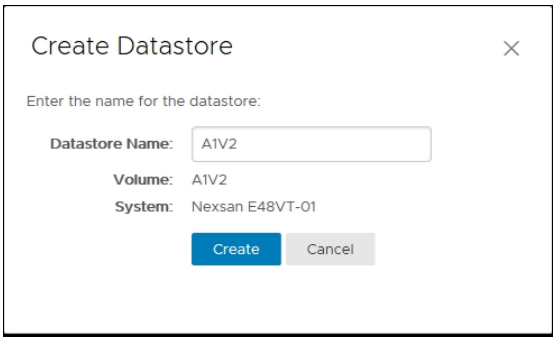
See "Assigning a host to a Nexsan Volume" (page 80)

To create a datastore:

1. Open the **Nexsan Storage System** workspace.
2. Select **Volumes / Datastores** from the tab bar. (Alternatively, you can select a volume and then select **Actions > Create Datastore**.)
3. Select the volume you want to add the datastore to.



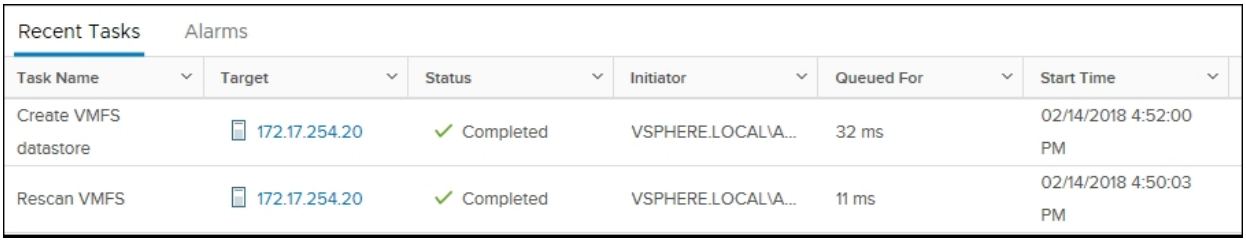
4. Click **Create Datastore**.



5. In the **Create Datastore** window, enter a datastore name and click **Create**.

[1] In VMware, datastores are virtual containers for files. Datastores contain structures used to store virtual machine files and hide the details about each storage device. Datastores can also store VM templates, ISO images, and floppy images. See https://pubs.vmware.com

6. Review the **Related Tasks** pane to confirm that the datastore has been created.



The new datastore also displays with the volume in the **Nexsan Storage System** and **Nexsan Volumes** workspaces.

Importing a datastore

Use this procedure for help with:

- Importing an existing **datastore**[1] from a Nexsan replica, snapshot, or clone volume
- Importing datastores not automatically recognized by VMware, or to register missing virtual machines or templates on a datastore.

See also: "Creating a Nexsan Volume and datastore" (page 67).

Prerequisite

- The volume must be assigned to the VMware host to have a datastore assigned to it.

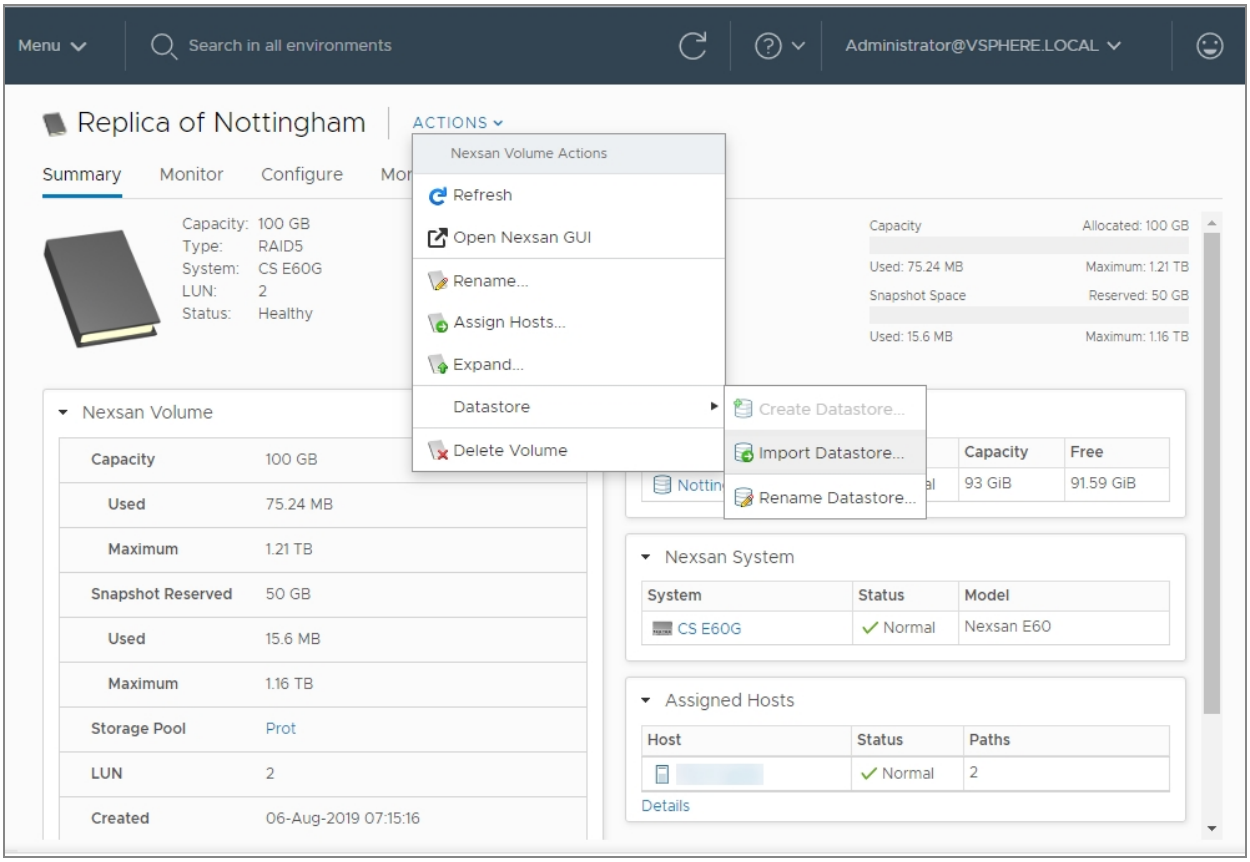
See "Assigning a host to a Nexsan Volume" (page 80)

To import a datastore:

1. Open the **Nexsan Storage System** workspace.
2. Select the replica, snapshot, or clone volume containing the datastore you want to import.

[1] In VMware, datastores are virtual containers for files. Datastores contain structures used to store virtual machine files and hide the details about each storage device. Datastores can also store VM templates, ISO images, and floppy images. See https://pubs.vmware.com

3. On the **Actions** menu, select **Datastore > Import Datastore**.The **Import Datastore** wizard opens.



4. In **Datastore Options**, select your preferred name for the datastore (either using the original name or the Nexsan volume name, optionally appended with " (Imported)" to make it easier to find). Click **Next**.
5. In the **VM Options** window, select from the following options and click **Next**:

Option	Description
Register VMs	Select these options (the default) to have the VMs and templates registered automatically.
Register Templates	
VM Names	Select your preferred naming convention from the drop-down menu: • [VM] - Use the existing virtual machine name. • [VM] (Imported) - Use the existing virtual machine name and append the text " (Imported)". • [VM] - [Datastore] - Use the existing virtual machine name and append the datastore name.

Option	Description
VM Identity	Select from the following options for the MAC address associated with the VM: • Ask at power on • Moved (keep existing MAC address) • Copied (generate new MAC address)

6. In the **Confirmation** window, review your choices and click **Finish**.
7. Review the **Related Tasks** pane to confirm that the datastore has been imported.

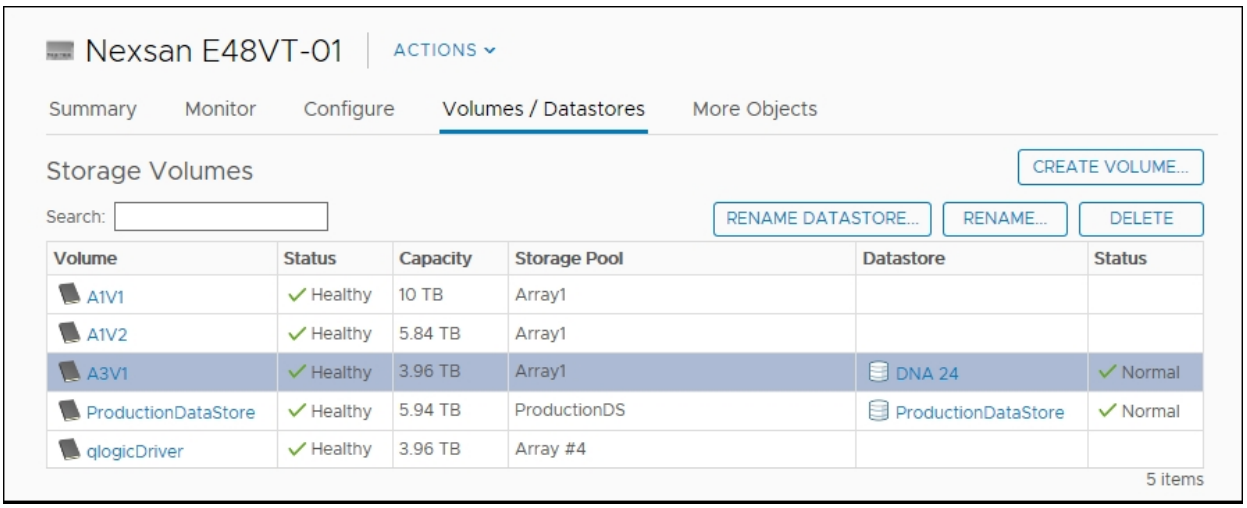
The newly imported datastore also displays with the volume in the **Nexsan Storage System** and **Nexsan Volumes** workspaces.

Renaming a datastore

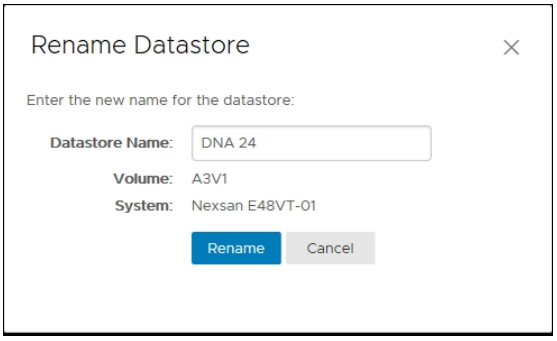
Use this procedure for help with renaming a datastore.

To rename a datastore:

1. Open the **Nexsan Storage System** workspace.
2. On the tab bar, select **Volumes / Datastores**



3. Select the volume with the datastore that you want to rename.
4. Click **Rename Datastore**.



5. In the **Rename Datastore** window, enter a datastore name and click **Rename**.
6. Review the **Related Tasks** pane to confirm that datastore has been renamed.

Identifying volumes associated with a datastore

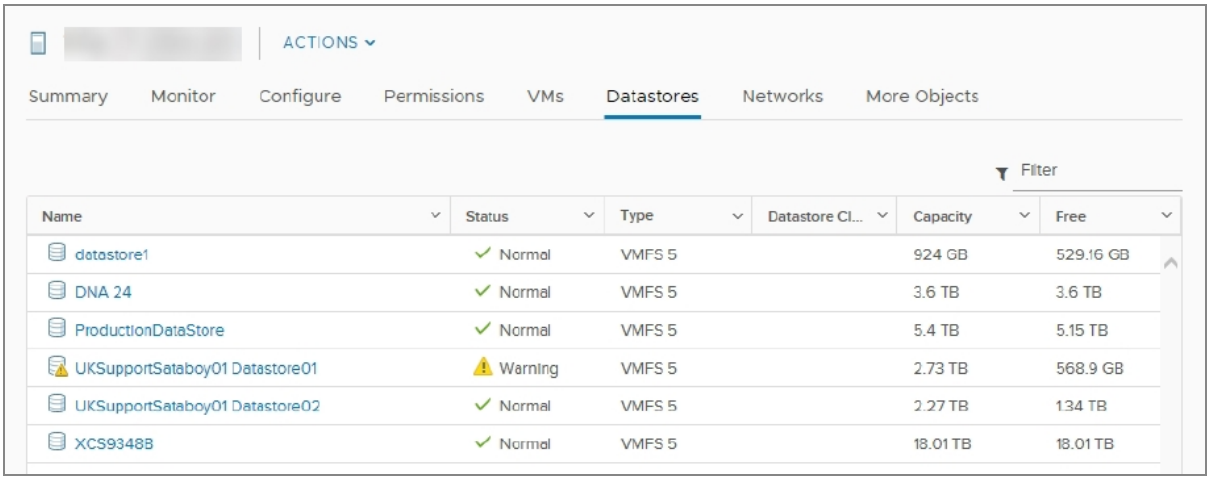
Use this procedure for help with identifying Nexsan Volumes associated with a VMware datastore starting from the VMware **Hosts and Clusters** workspace.

Prerequisite

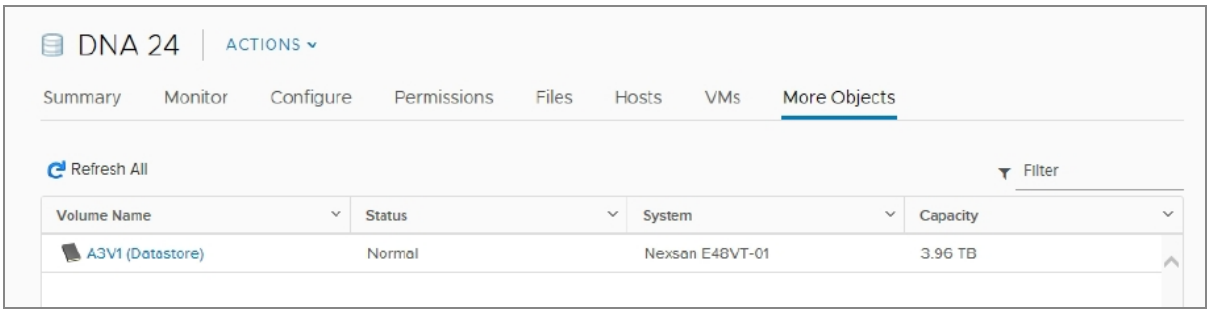
- You'll need to know the name of the datastore that you want to find volumes for.

To identify Nexsan Volumes associated with a VMware datastore:

1. Open the vSphere client **Hosts and Clusters** workspace.
2. On the tab bar, select **Configure**.



3. In the navigation pane, select **Nexsan Storage**. Volumes and associated datastores display.



5

Working with hosts

This section provides the following topics for help with working hosts:

Assigning a host to a Nexsan Volume 80
Unassigning a host 83
Viewing hosts assigned to Nexsan Volumes 85
Viewing connected hosts 87
Renaming an initiator 88
Deleting an initiator 89

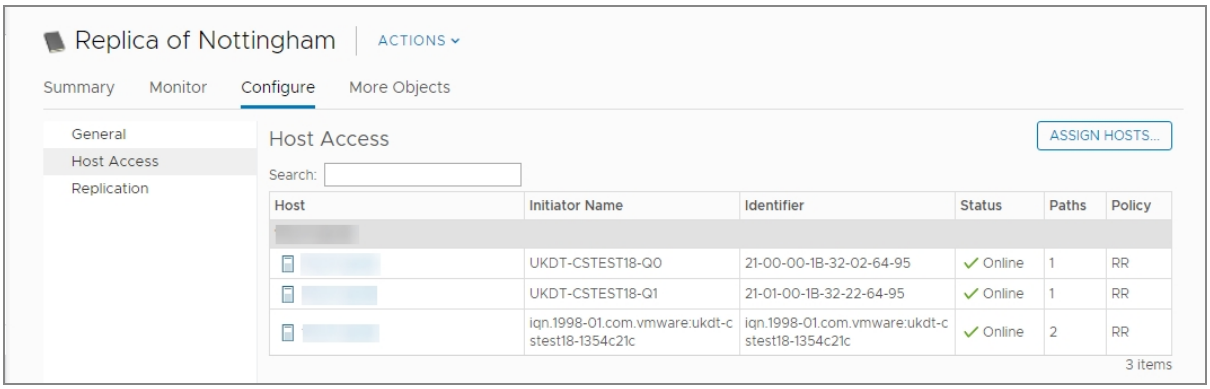
Assigning a host to a Nexsan Volume

Use this procedure for help with assigning a **host**[1] to a Nexsan Volume. The **Assign Hosts** window displays unassigned **initiator**[2] names and identifiers.

A volume must be assigned to a host running ESXi to be able to create or access a VMware datastore on it.

To assign a host to a Nexsan Volume:

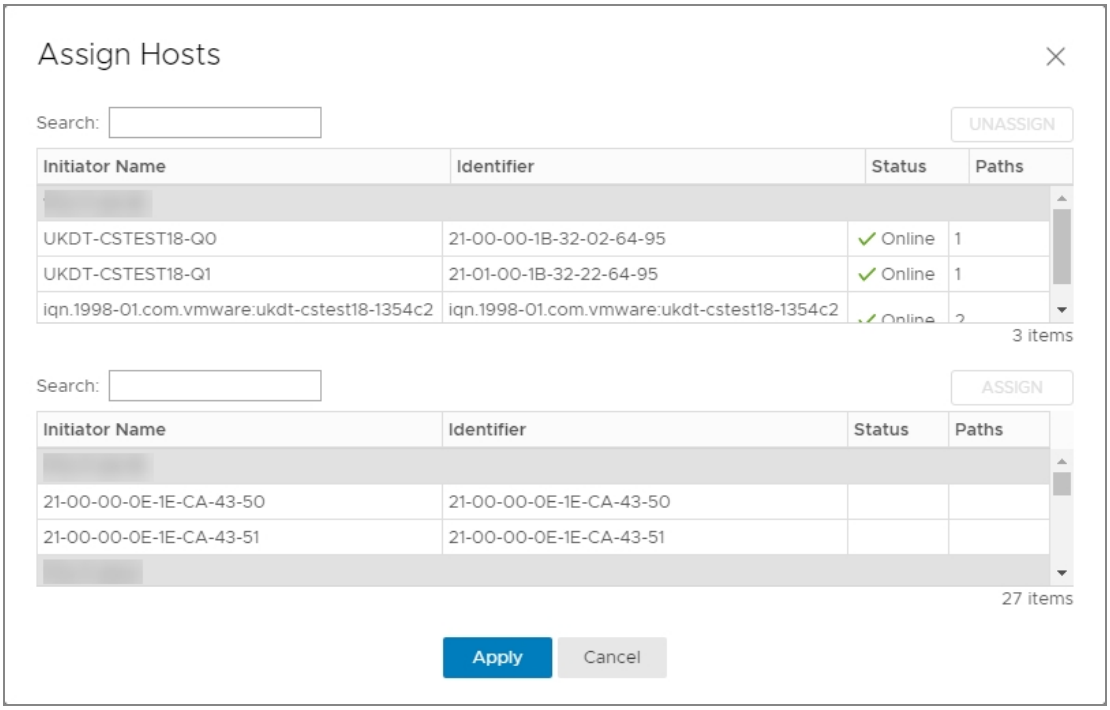
1. Open a **Nexsan Volume**.
2. On the tab bar, click **Configure**.
3. Click **Host Access** in the navigation pane. You can view **Host** IP addresses, **Initiator Name**, **Identifier**, **Status**, number of **Paths**, and multipathing **Policy**: either **RR** (Round Robin), **MRU** (Most Recently Used), or **Fixed**.



[1]A physical computer, server, or other device which accesses the volumes in a Nexsan Storage System. The host can be connected to the Nexsan Storage System with a Fibre Channel connection, an iSCSI connection, or a SAS connection. A VMware host computer runs virtual machines.

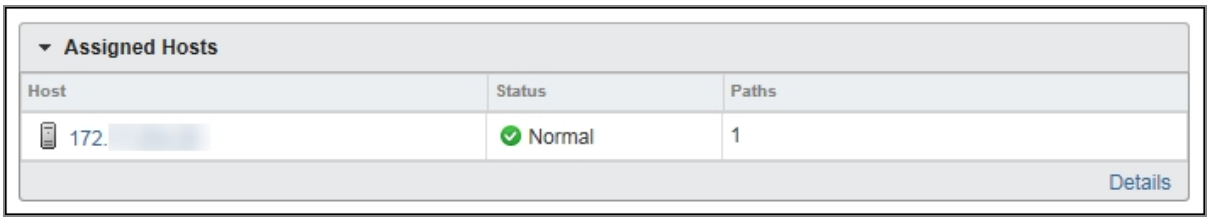
[2]In storage networks, initiators are typically software or hardware Fibre Channel, iSCSI, or SAS adapters accessing information on disk storage systems, the targets.

4. Click **Assign Hosts**. Unassigned initiators display, grouped by VMware host. Unmanaged initiators are listed under **Other**.

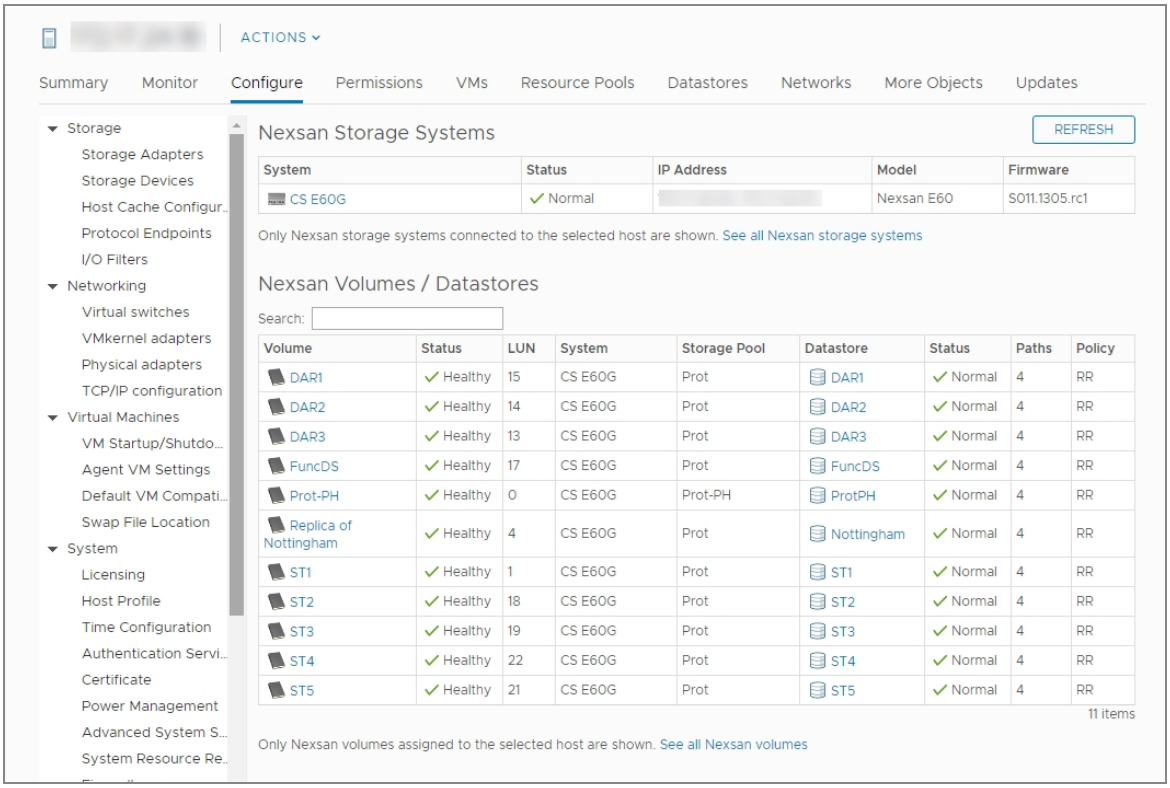


5. Select the **Initiator** you need, and click **Assign**.
6. Check **Recent Tasks** to confirm that the operation has completed.

   After you assign a host to a Nexsan Volume with a datastore, you can follow the **Assign Hosts** link from the **Volume** workspace.



7. Click the link to the **Assigned Host** to open the VMware **Hosts and Clusters** workspace.



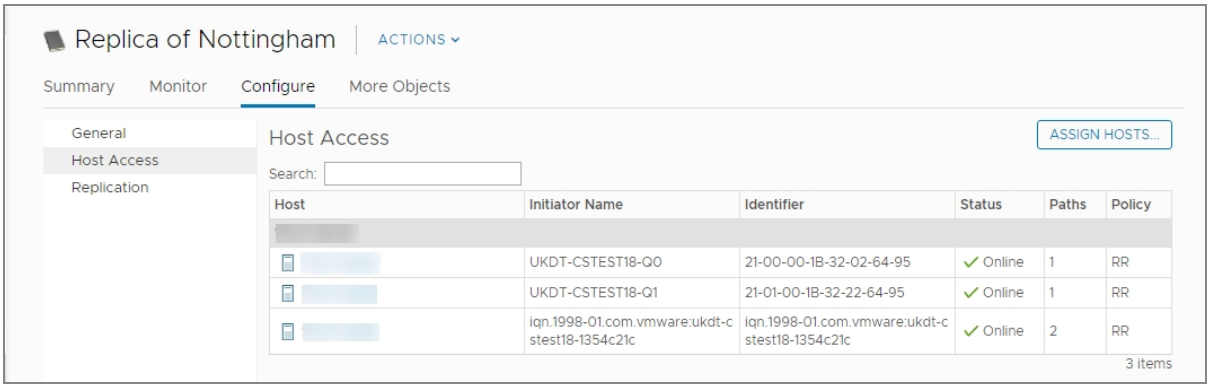
Unassigning a host

Use this procedure for help with unassigning a host from a Nexsan Volume.

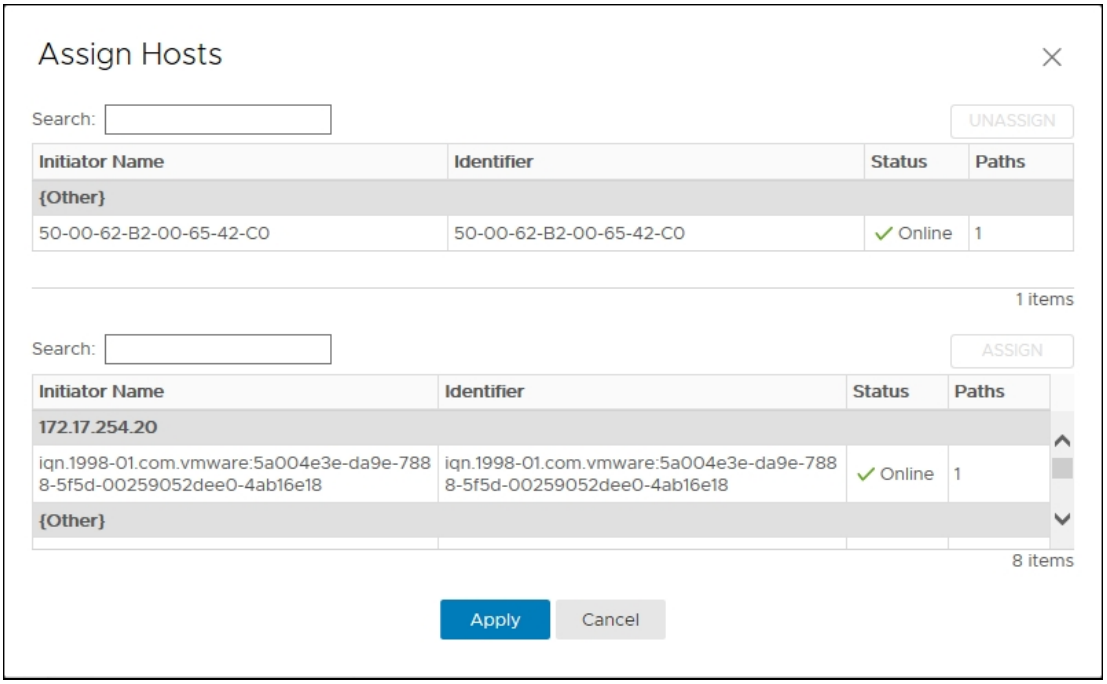
CAUTION: Before you begin, make sure the host being removed does not have any virtual machines running on the volume.

► To unassign a host from a volume:

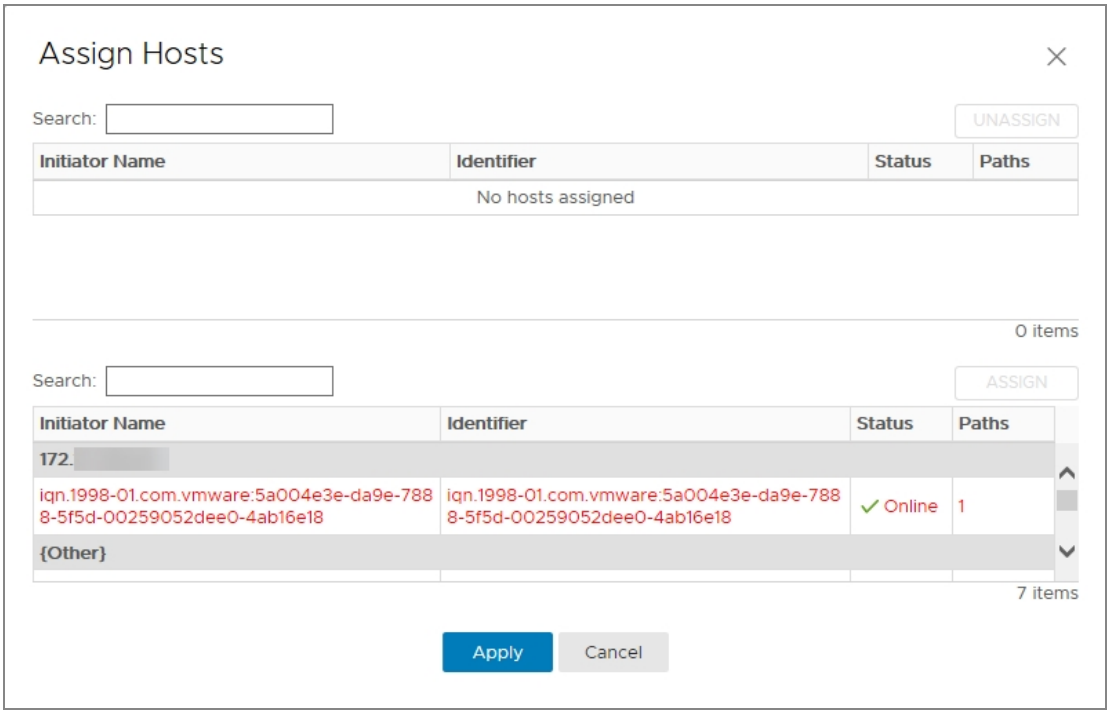
1. Open the **Nexsan Volume** you want to unassign host access for.
2. On the tab bar, click **Configure**.
3. Click **Host Access** in the navigation pane.
4. Click **Assign Hosts**. You can view **Host** IP addresses, **Initiator Name**, **Identifier**, **Status**, number of **Paths**, and multipathing **Policy**: either **RR** (Round Robin), **MRU** (Most Recently Used), or **Fixed**.



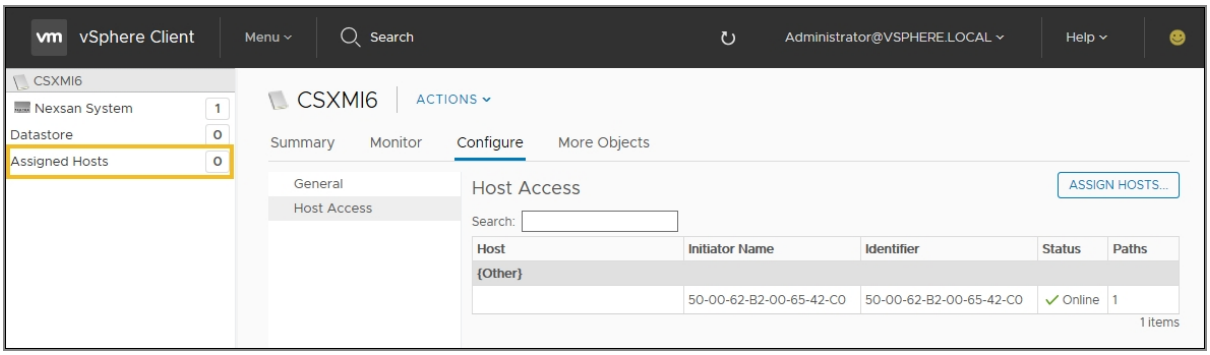
5. Select an assigned host and click **Assign Hosts**. The **Assigned Hosts** window opens.



6. Click **Unassign**, then **Apply**. The unassigned host initiator appears in red text in the bottom area of the window.



7. Click **Actions > Refresh**. The Assigned Hosts should now update.



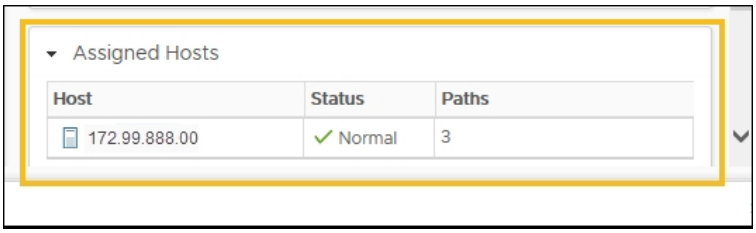
8. Review the **Recent Tasks** pane to confirm.

Viewing hosts assigned to Nexsan Volumes

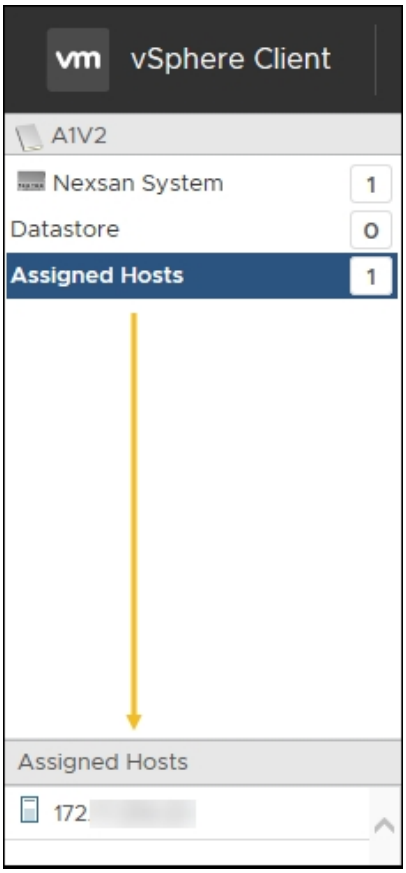
Use this procedure for help with viewing hosts assigned to Nexsan Volumes. If no hosts are currently assigned, see "Assigning a host to a Nexsan Volume" (page 80).

To view hosts assigned to Nexsan Volumes:

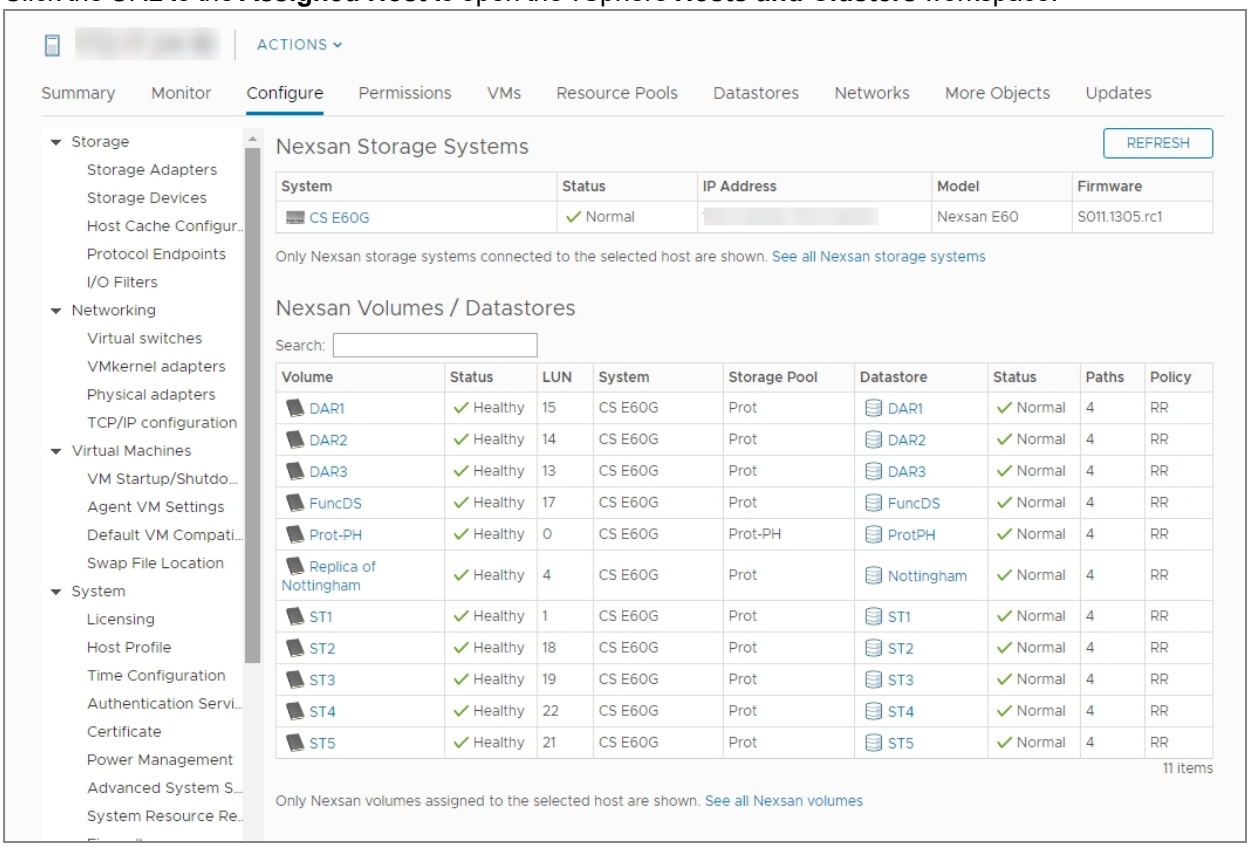
1. Open the Volume you want to view host assignments for. View **Assigned Hosts, status, and paths** in the bottom right section of the **Volume** workspace.



2. Click **Assigned Hosts** in the object navigator (top left). The Assigned Host appears bottom left.



3. Click the URL to the **Assigned Host** to open the vSphere **Hosts and Clusters** workspace.

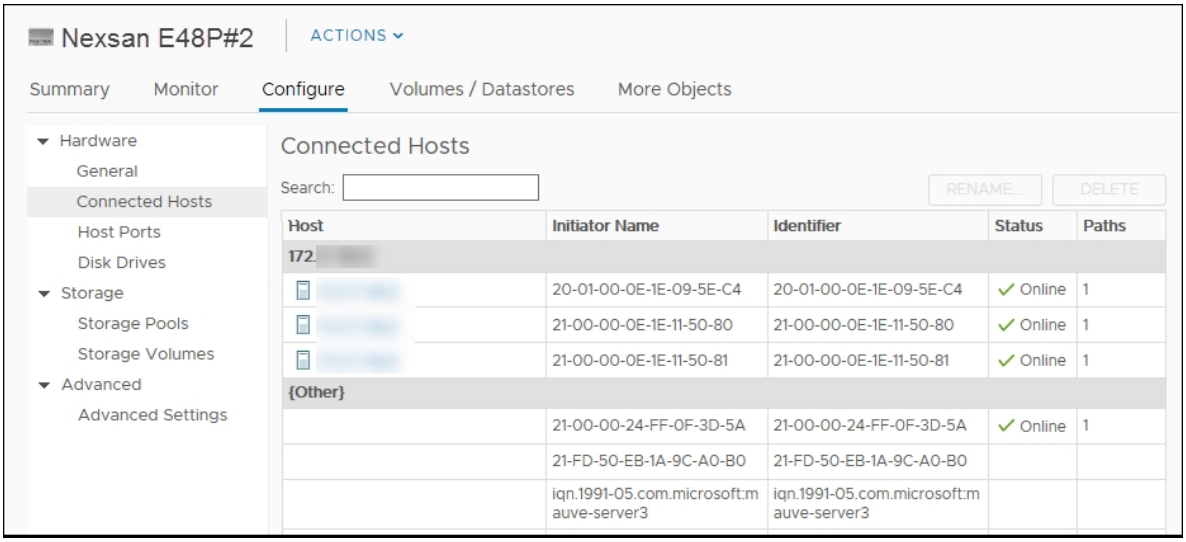


Viewing connected hosts

Use this procedure for help with viewing connected hosts.

To view hosts connected to a Nexsan Storage System:

1. Open the **Nexsan Storage System** workspace.
2. Select **Configure** > **Connected Hosts**.



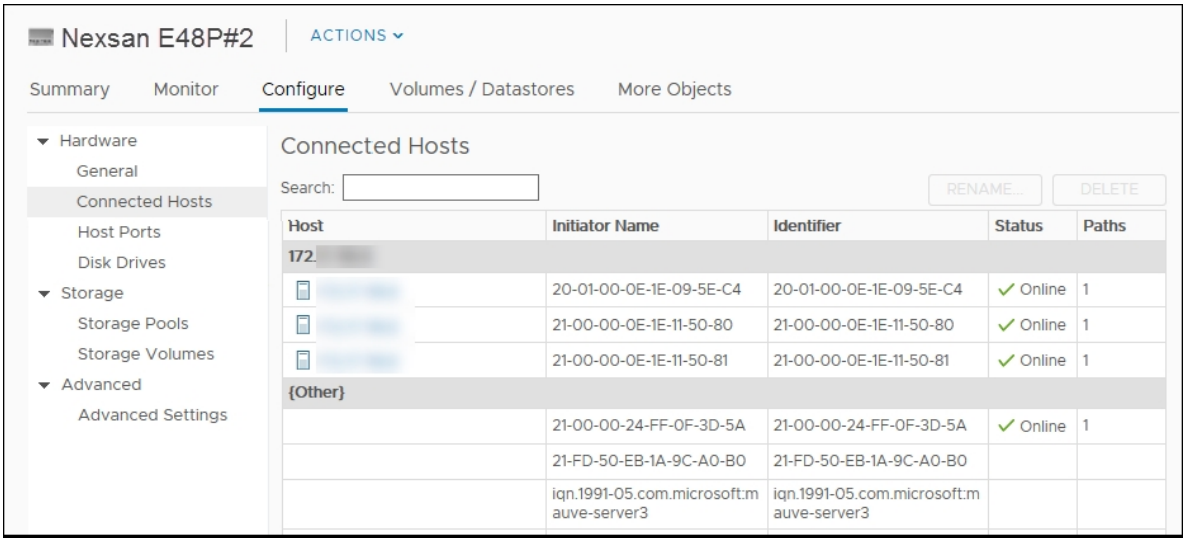
5

Renaming an initiator

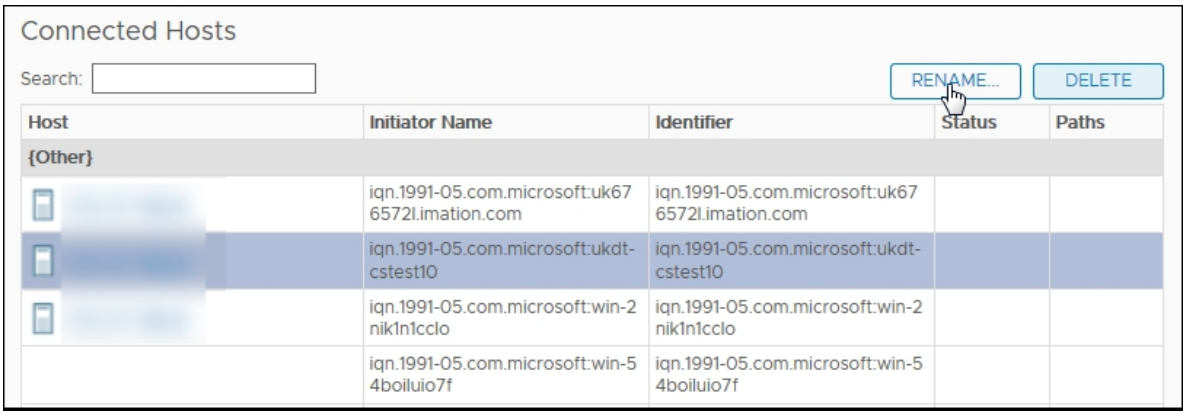
Use this procedure for help with renaming an initiator.

To rename an initiator:

1. Open the **Nexsan Storage System** workspace.
2. Select **Configure** > **Connected Hosts**.

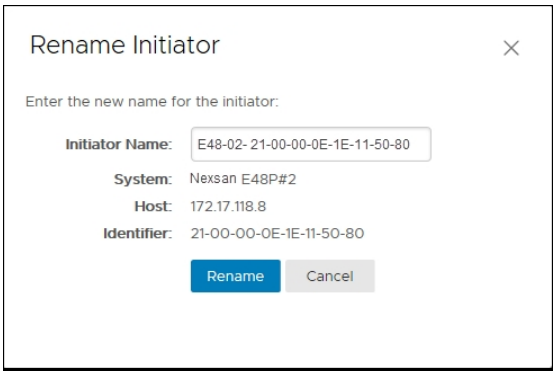


3. Select the initiator you want to rename (select the **Initiator Name** or another part of the row, but not the link to the host).



4. Click **Rename**.

5. In the **Rename Initiator** window, enter a new name.



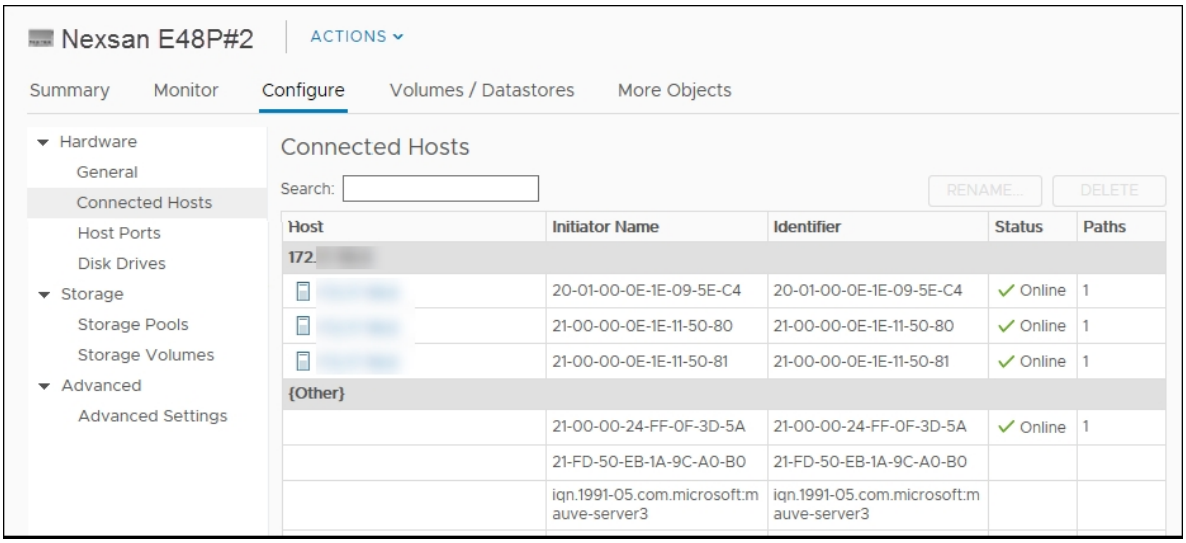
6. Click **Actions > Refresh**.
7. Review the **Recent Tasks** pane to confirm.

Deleting an initiator

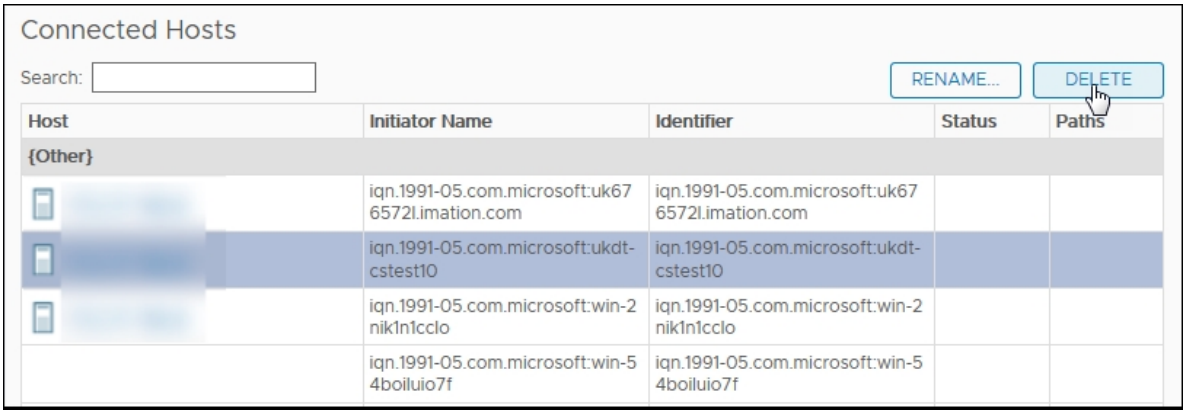
Use this procedure for help with deleting an initiator.

To delete an initiator:

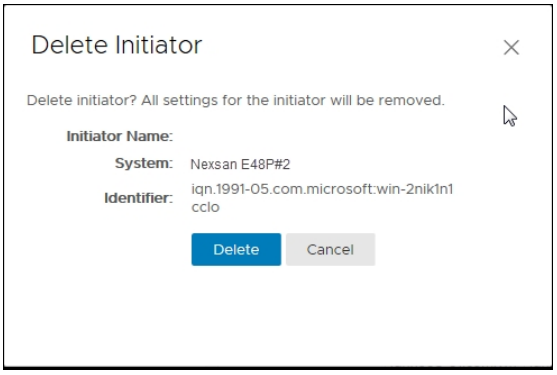
1. Open the **Nexsan Storage System** workspace.
2. Select **Configure** > **Connected Hosts**.



3. Select the initiator you want to delete (select the **Initiator Name** or another part of the row, but not the link to the host).



4. Click **Delete**.
5. In the **Delete Initiator** window, verify your choice and click **Delete**.



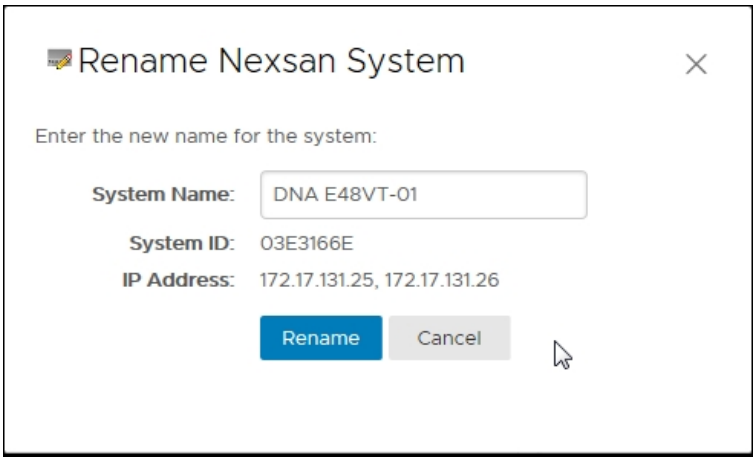
6. Click **Actions > Refresh**.
7. Review the **Recent Tasks** pane to confirm.

Renaming a Nexsan Storage System

Use this procedure for help with renaming a Nexsan Storage System.

To rename a Nexsan Storage System:

1. Open the **Nexsan Storage System** workspace you want to rename.
2. Click **Actions > Rename**.
3. Enter a new **System Name**.



4. Click **Rename**.
5. Click **Actions > Refresh**.
6. Review the **Recent Tasks** pane to confirm.

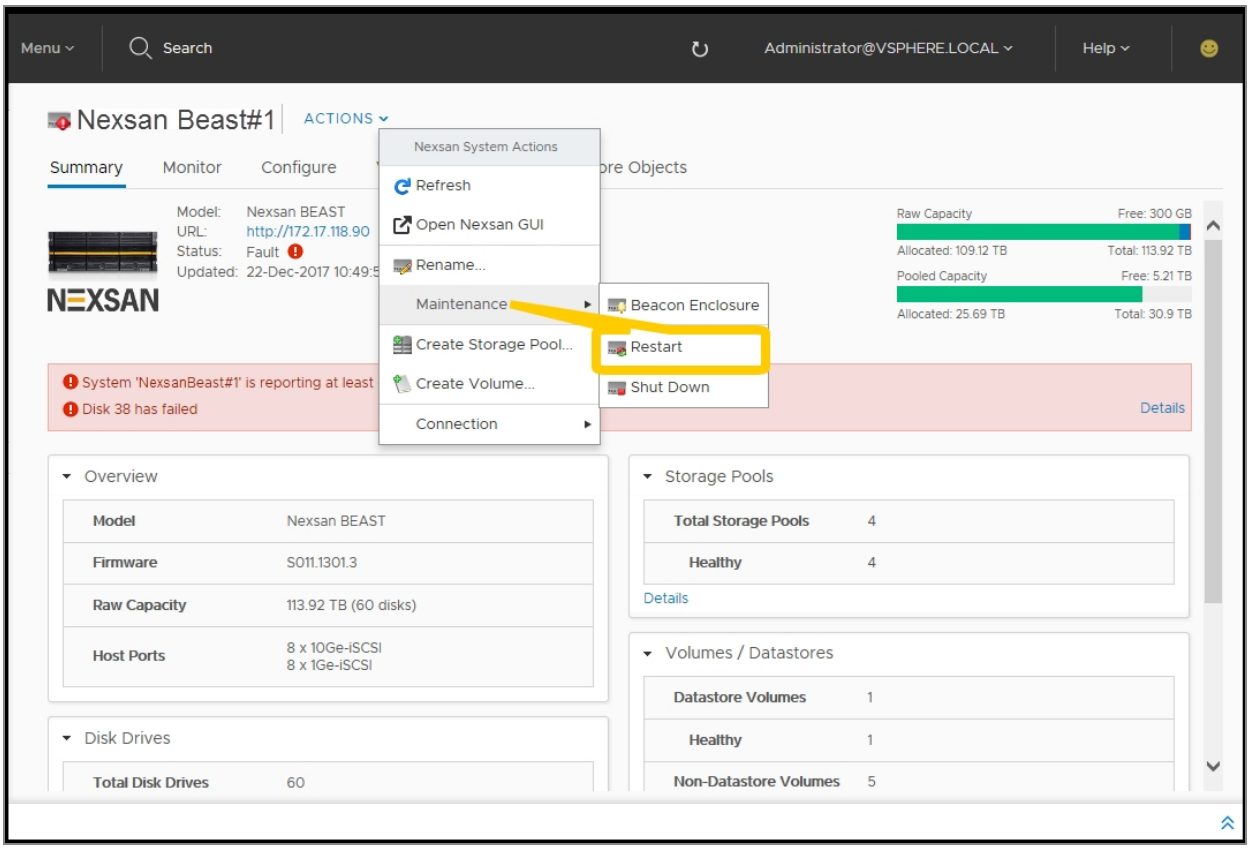
Restarting a Nexsan Storage System

Use this procedure for help with restarting a Nexsan Storage System from the plugin.

CAUTION: Ensure that this action is performed during a maintenance window so that no data is lost while the storage system is restarting.

To restart a Nexsan Storage System:

1. Open the **Nexsan Storage System** workspace.
2. Select **Actions > Maintenance > Restart**.



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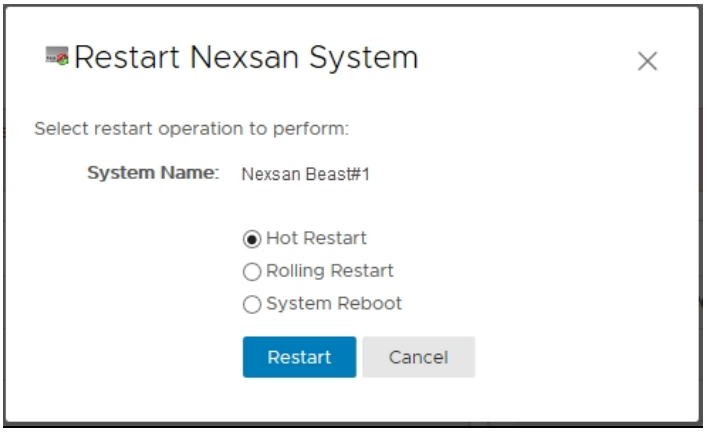
3. In the **Restart Nexsan System** window, select **Hot Restart**, **Rolling Restart**, or **System Reboot.** For details, refer to the table below.



Restart option	Description
Hot Restart	For dual-controller storage systems with certain configurations, this enables you to restart the RAID Controllers without losing host connectivity or data transfer capability. During a hot restart, each RAID Controller reboots individually. For a hot restart to be performed, both RAID Controllers must be fully operational and have the same firmware version , and the storage system must be in a mode that supports controller failover (**Active-Active** or **All Ports All LUNs**). If one or more of these conditions is not met, and on single-controller storage systems, the **Hot Restart** option is grayed out.
	Note System settings requiring a reboot will not be applied by a hot restart.
Rolling Restart	For dual-controller storage systems with certain configurations, this enables you to restart the RAID Controllers with only a brief loss of host connectivity and data transfer capability. During a rolling restart, each RAID Controller reboots individually. For a rolling restart to be performed, both RAID Controllers must be fully operational and have the same firmware version, and the storage system must be in a mode that supports controller failover (**Active-Active** or **All Ports All LUNs**). If one or more of these conditions is not met, and on single-controller storage systems, the **Rolling Restart** option is grayed out.
	Note To avoid host connection timeout during a rolling restart, disk timeouts for all hardware and virtual servers should be set to 150 seconds or more.

Restart option	Description
System Reboot (default)	This option executes a full restart of the storage system. While the storage system is rebooting, the system is offline, and arrays and volumes are inaccessible. Therefore, hosts should be safely shut down or disconnected before performing a **System Reboot**. After the system has finished rebooting, the arrays and volumes are once again accessible and hosts can be restarted or reconnected.
System Shutdown	This option flushes the cache data to the disks and shuts down the system. Therefore, hosts should be safely shut down or disconnected before performing a **System Shutdown**. **System Shutdown** does NOT turn the system completely off; the power supply units (PSUs) are still active, and fans may still run. To completely power off the system, or to bring the system back on line after a shutdown, follow the instructions in the system's *Installation Guide*.

4. Click **Restart**.

Shutting down a Nexsan Storage System

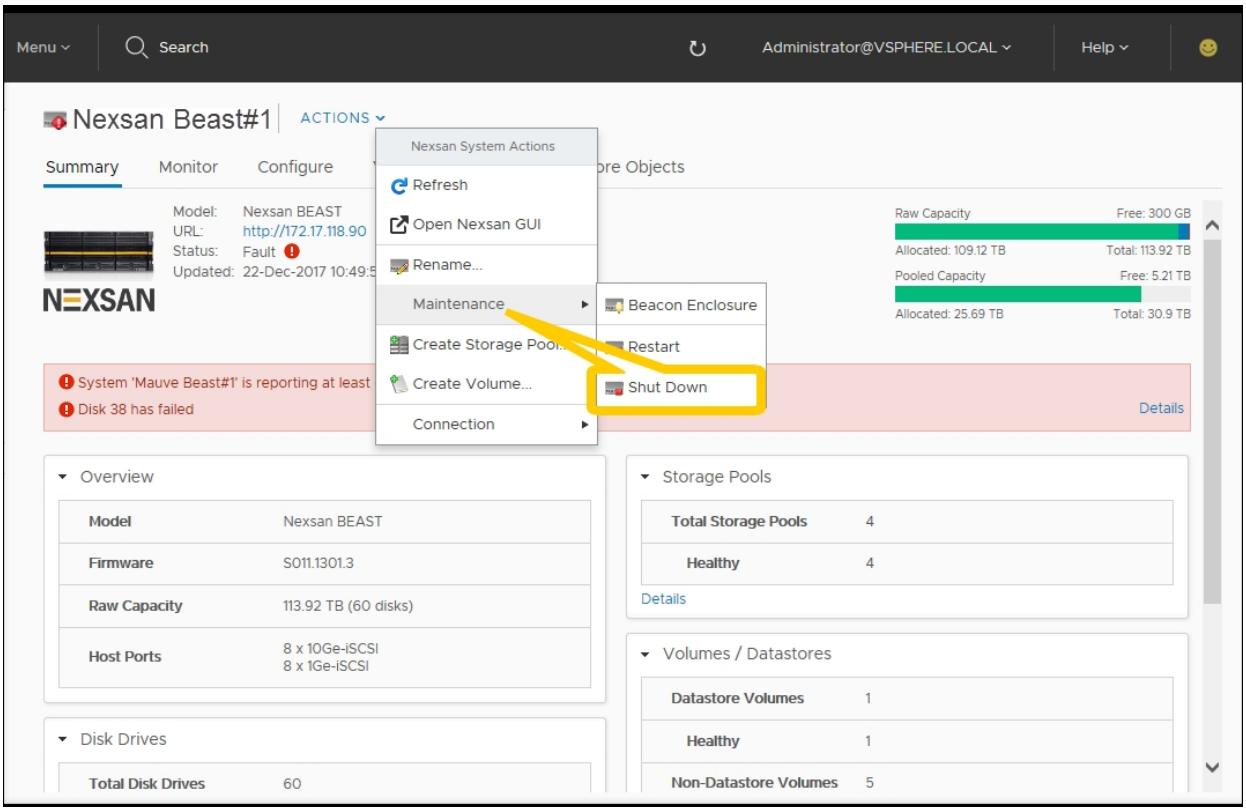
Use this procedure to shut down a Nexsan Storage System from the plugin.

CAUTION: Physical access is required to restart the system.

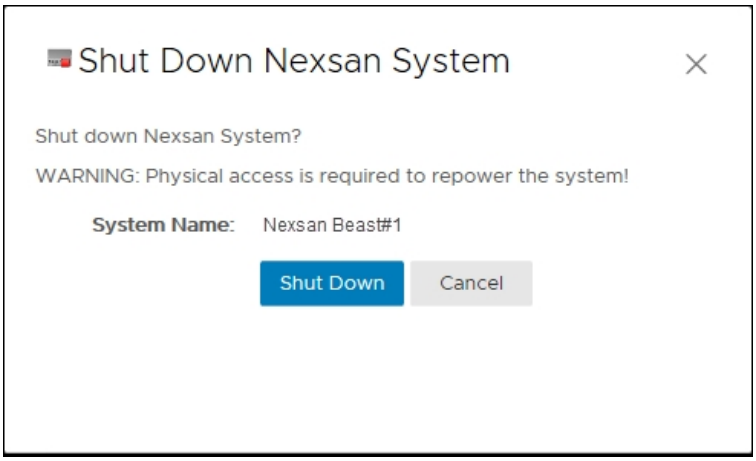
Ensure that this action is performed during a maintenance window, so that no data can be lost during the shutdown period.

To shut down the system:

1. Open the **Nexsan Storage System** workspace.
2. Select **Actions > Maintenance > Shut Down**.



3. In the **Shut Down Nexsan System** window, click **Shut Down**.

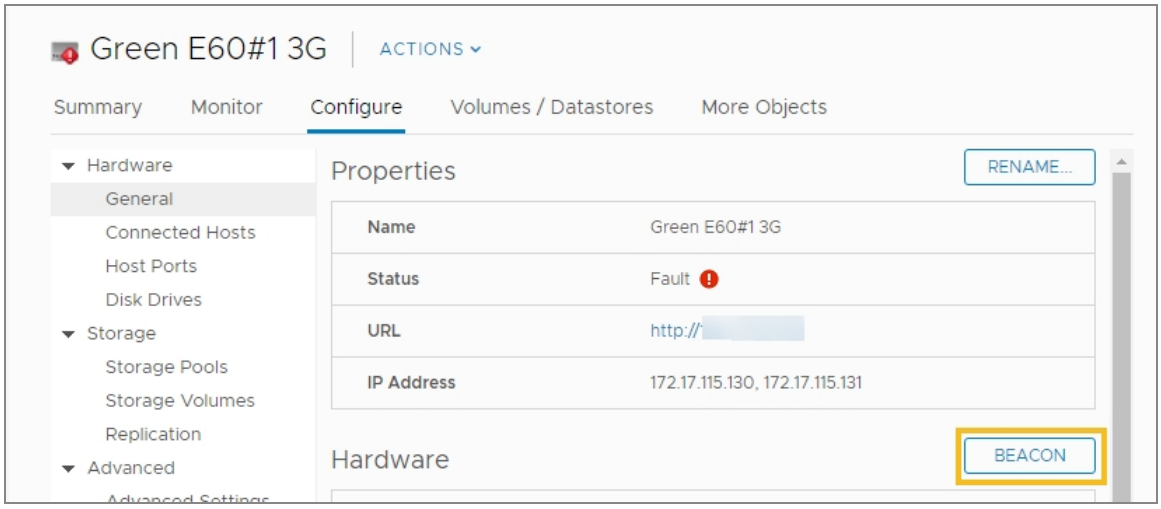


Setting a beacon on an enclosure

Use this procedure for help with setting a beacon on an enclosure to help locate it in a rack.

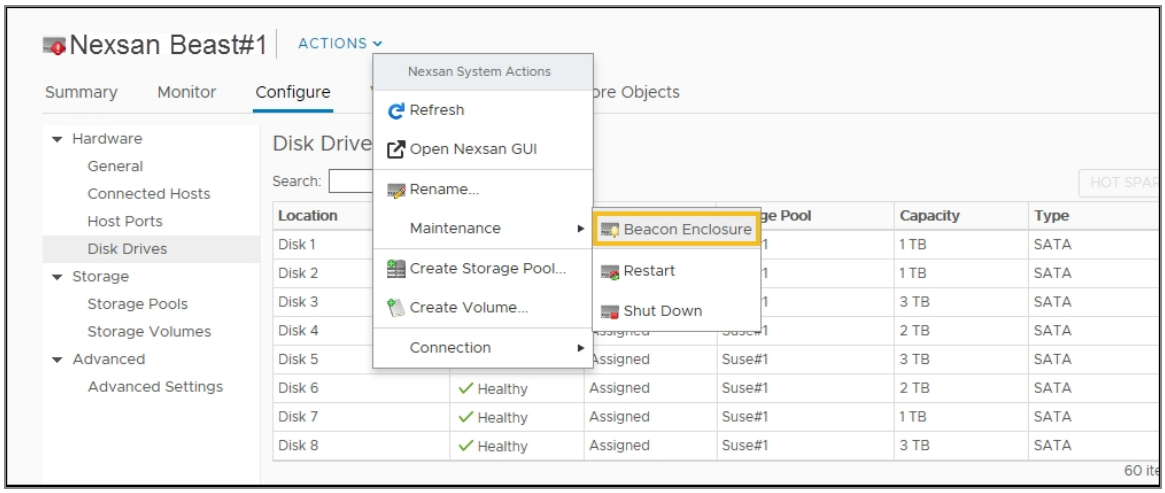
To set a beacon to an enclosure:

1. On the Nexsan High-Density Storage Plugin for VMware vCenter plugin main page, open a **Nexsan Storage System** workspace.
2. Do either of the following:
   - Select **Configure**, and under **Hardware** click the **Beacon** button.

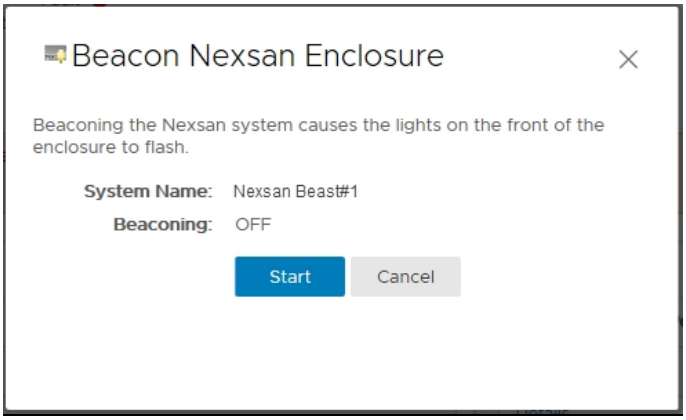


5

- Select **Actions > Maintenance > Beacon Enclosure**.



3. In the **Beacon Nexsan Enclosure** window, click **Start**.



4. Review **Recent Tasks** or look at the physical system to confirm.
5. To stop the beacon, reopen the Beacon popup window and click **Stop**.

Glossary

1

10Gb Ethernet
: A 10 gigabit per second (Gb/s) Ethernet connection using either fibre-optic cables or twisted-pair copper wires.

10Gb iSCSI
: An iSCSI connection that runs on a 10Gb Ethernet network.

10GbE
: See “10Gb Ethernet” and “10Gb iSCSI”.

A

Active Directory
: Microsoft’s directory service, used by all supported Windows operating systems. Abbreviated “AD”.

All Ports All LUNs (APAL) mode
: A system mode for Nexsan Storage Systems. In this mode, the entire system operates as a single node. The volumes can be mapped to any or all ports on both RAID controllers. When a controller fails, the ports on that controller become inaccessible. However, if the volumes are mapped to ports on the other controller as well (which requires the host to be configured for multipathing), they remain accessible to the host, which sees the storage become active through its second path.

array
: In Nexsan storage terms, an array is a linked group of one or more physical, independent hard disk drives. In VMware, a storage pool is equivalent to an array. See also “RAID”.

B

bit
: The smallest unit of digital data, representing a 0 or a 1. Abbreviated “b”.

boot drive
: The device from which a computer’s operating system is loaded. Typically, an internal hard disk drive (or one of several partitions on such a drive) is used for this purpose, but any attached storage device—such as an optical disc drive, a USB flash drive, or other attached storage—can be used.

byte
: A unit of data that is 8 bits long. Often used for alphanumeric characters. Abbreviated “B”.

C

Controller
: See RAID Controller

D

Datastore
: In VMware, datastores are virtual containers for files. Datastores contain structures used to store virtual machine files and hide the details about each storage device. Datastores can also store VM templates, ISO images, and floppy images. See https://pubs.vmware.com

DNS
: See “Domain Name System”.

Domain Name System
: A program or computer server that implements a name-service protocol. It maps a human-recognizable identifier to a system-internal, often numeric, identification or addressing component (usually an IP address).

E

E-Series
: The series of Nexsan units that includes the Nexsan E18, E48, and E60 storage units (and their V and VT variants), the Nexsan E32V, the Nexsan E18X, E48X, and E60X expansion units (and their XV variants), and the Nexsan E32XV. Nexsan E-Series units feature Active Drawer Technology, Anti-Vibration Design, and CoolDrive Technology.

Ethernet
: A system for connecting a number of computer systems to form a local area network (LAN), with protocols to control the passing of information and to avoid simultaneous transmission by two or more systems. Supports data transfer rates of 10, 100, 1,000, and 10,000 megabits per second (Mb/s). 10, 100, and 1,000Mb/s networks are often referred to as 10BASE-T, 100BASE-T, and 1000BASE-T, respectively. 10,000Mb/s networks are usually referred to as 10Gb Ethernet or 10GbE.

F

failover
: The capability of a system to switch over automatically to a redundant or standby system upon the failure or abnormal termination of the previously active system. In Nexsan Storage Systems, failover describes one RAID controller taking over the host connections and RAID set control of the other RAID Controller when that controller fails.

Fibre Channel
: A gigabit (Gb) speed network technology primarily used for storage networking and the current standard connection type for storage area networks (SANs). Despite its name, Fibre Channel signaling can run on both twisted-pair copper wire and fibre-optic cables.

Fibre Channel port
: Any entity that actively communicates over a Fibre Channel network. Usually implemented in a device such as disk storage or a Fibre Channel switch. Depending on the system, the Fibre Channel ports on Nexsan Storage Expansions can support 2Gb/s, 4Gb/s, or 8Gb/s connections.

Fibre Channel switch
: A network switch compatible with the Fibre Channel protocol. Allows the creation of a Fibre Channel network, which is currently the core component of most storage area networks (SANs).

firmware
: Small, fixed software applications, stored in read-only memory (ROM) or programmable read-only memory (PROM), that internally control various electronic devices. In Nexsan E-Series, and SATABeast/SASBeast storage systems, each RAID controller is loaded with firmware to control its functionality. Occasionally, this firmware must be updated using the Update Firmware page in the graphical user interface.

frame

A data packet on an Ethernet or Fibre Channel link. Each frame encapsulates a piece of data with sender and destination information, along with a data integrity check routine. Normal frames can contain data up to 1,500 bytes in length. Jumbo frames can contain larger data payloads (9,000 bytes on Nexsan Storage Systems) and are supported on 1Gb/s and 10Gb/s Ethernet (10GbE) networks. Jumbo frames are typically used to boost performance of iSCSI traffic.

G

GB

Gigabyte. Approximately one billion (1,000,000,000) bytes. Used to describe the storage capacity of hard disk drives. A gigabyte is usually computed as 10^9 (1,000,000,000) bytes, but can also be computed as 2^30 (1,073,741,824) bytes (often called a “binary gigabyte” and abbreviated GiB).

GB/s

Gigabytes (GB) per second. Used to describe the speed of network data transmission. 1 GB/s is eight times faster than 1Gb/s.

GiB

Gibibyte. A binary gigabyte, computed as 2^30 (1,073,741,824) bytes. See “GB”.

gigabit interface converter

A standard for transceivers, commonly used with Gigabit (Gb) Ethernet and Fibre Channel, with a hot-swappable electrical interface. Gigabit interface converter ports can support a wide range of physical media, from copper to optical fibre, at lengths of up to hundreds of kilometers.

graphical user interface

A type of user interface that allows users to interact with electronic devices using images rather than text commands. Nexsan Storage Systems use a graphical user interface for system configuration.

GUI

See “graphical user interface”.

H

host

A physical computer, server, or other device which accesses the volumes in a Nexsan Storage System. The host can be connected to the Nexsan Storage System with a Fibre Channel connection, an iSCSI connection, or a SAS connection. A VMware host computer runs virtual machines.

hot spare

A spare disk in a RAID array designated as "hot standby", available to replace a failed disk without requiring a system shutdown.

HTTPS

(HTTP Secure) Communications protocol for secure communication over a computer network, with especially wide deployment on the Internet. Technically, it is not a protocol in itself; rather, it is the result of simply layering the Hypertext Transfer Protocol (HTTP) on top of the SSL/TLS protocol, thus adding the security capabilities of SSL/TLS to standard HTTP communications.

I

I/O

Input/Output. The communication between an information processing system (such as a computer or a Nexsan Storage System’s RAID controller), and the outside world (either an operator or another information processing system). Inputs are the signals or data received by the system, and outputs are the signals or data sent from it.

IP address
: Internet Protocol address. A numerical label assigned to each device (such as a computer, printer, or Nexsan Storage System) on a computer network that uses TCP/IP for communication.

IP Configuration Tool
: One of six Nexsan Storage Tools. Allows users to configure the IP address of a Nexsan Storage System on the local subnet.

iSCSI
: Internet Small Computer System Interface. A transport protocol that provides for the SCSI protocol to be carried over a TCP/IP network.

iSCSI initiator
: In storage networks, initiators are typically software or hardware Fibre Channel, iSCSI, or SAS adapters accessing information on disk storage systems, the targets.

J

jumbo frame
: See “frame”.

K

KB
: Kilobyte. Approximately one thousand (1,000) bytes. Used to describe the storage capacity of hard disk drives and the stripe size in RAIDs. A kilobyte is usually computed as 10^3 (1,000) bytes, but can also be computed as 2^10 (1,024) bytes (often called a “binary kilobyte” and abbreviated KiB).

Kbit
: Kilobit. Approximately one thousand (1,000) bits.

KiB
: Kibibyte. A binary kilobyte. Computer as 2^10 (1,024) bytes. See “KB”.

L

load balance policy
: In multipathing, a set of instructions for the multipathing software to follow in order to ensure that I/O transfers through host paths are optimally routed and that no one path gets overloaded with data.

logical unit
: See “volume”.

LUN
: Logical Unit Number. An identification scheme for storage disks that supports a small number of logical units. On Nexsan Storage Systems, LUNs are assigned to volumes and are addressed as LUN 0 through 254.

M

MB
: Megabyte. Approximately one million (1,000,000) bytes. Used to describe the storage capacity of hard disk drives. A megabyte is usually computed as 10^6 (1,000,000) bytes, but can also be computed as 2^20 (1,048,576) bytes (often called a “binary megabyte” and abbreviated MiB).

MB/s
: Megabytes (MByte) per second. Used to describe the speed of network data transmission. 1 MB/s is eight times faster than 1Mb/s.

Mbit
: Megabit. Approximately one million (1,000,000) bits.

Mbit/s
: Megabits (Mb) per second. Used to describe the speed of network data transmission.

MiB
: Mibibyte. A binary megabyte. Computed as 2^20 (1,048,576) bytes. See MByte.

multipathing

A means of presenting volumes to a particular host or hosts via redundant data paths. The intent is to maintain I/O in the event of a path failure. Multipathing may also be used to increase performance. If not configured properly, multipathing may lead to data corruption, as an operating system may not inherently realize that the redundant paths are of the same volume and thus could treat them as different volumes.

P

PSC

Platform Services Controller (PSC) "is a component of the VMware Cloud Infrastructure Suite. PSC deals with identity management for administrators and applications that interact with the vSphere platform." See http://-docs.vmware.com

R

RAID

Redundant Array of Independent Disks. A system using multiple hard drives organized into a single logical unit for the sharing or replication of data in order to increase data integrity, fault-tolerance, and throughput. Also referred to as a RAID set. RAIDs are organized into RAID levels, which describe their architecture and configuration.

RAID 5

RAID 5 provides redundancy by writing data and parity information across three or more drives, thereby increasing performance. You need at least three disk drives for a RAID 5 implementation. RAID 5 can withstand a single disk failure without losing data or access to data. It is ideally suited for transaction processing, database applications, file and print servers.

RAID 6

RAID 6 is similar to RAID 5, but with better fault tolerance. RAID 6 stripes blocks of data and parity across an array of drives like RAID 5, except that it calculates two sets of parity information for each parcel of data. This significantly improves fault tolerance: RAID 6 can withstand the failure of any two drives in the array without losing data or access to data. You need at least four disk drives for a RAID 6 implementation. RAID 6 is ideally suited for the same applications as RAID 5, but in situations where additional fault tolerance is required. We recommend adding Nexsan FASTier cache devices to a RAID 6 implementation to improve write performance.

RAID Controller

A hardware device, software program, or combination of the two which manages the physical disk drives in a RAID and presents them as a single logical unit to attached devices. The RAID Controllers in Nexsan Storage Systems are hardware modules. Nexsan RAID Controllers also provide connections for system administration and configuration.

RDM

RDM is "a mapping file in a separate VMFS volume that acts as a proxy for a raw physical storage device. The RDM allows a virtual machine to directly access and use the storage device. The RDM contains metadata for managing and redirecting disk access to the physical device." See About Raw DEvice Mapping, in http://docs.vmware.com

reboot

To restart a computer or computerized electronic device. See also system reboot.

S

SAS

Serial Attached SCSI. A serial version of the SCSI interface. A point-to-point architecture that uses a disk controller with four or more

channels that operate simultaneously. Each full-duplex channel, known as a SAS port, transfers data at 1.5Gb/s, 3Gb/s, or 6Gb/s in each direction. SAS also supports Serial ATA (SATA) drives, which can be mixed with SAS drives in a variety of configurations.

SATA
Serial Advanced Technology Attachment. A connection standard for fixed and removable hard disk drives.

SCSI
Small Computer System Interface. A collection of standards and proposed standards for input/output (I/O) communication, primarily intended for connecting storage subsystems or devices to hosts.

Storage Pool
See "Array"

T

TB
Terabyte. Approximately one trillion (1,000,000,000,000) bytes. Used to describe the storage capacity of hard disk drives. A terabyte is usually computed as 10^12 (1,000,000,000,000) bytes, but can also be computed as 2^40 (1,099,511,627,776) bytes (often called a “binary terabyte” and abbreviated TiB).

TiB
Tibibyte. A binary terabyte. Computed as 2^40 (1,099,511,627,776) bytes. See TB.

V

VAAI
vStorage APIs for Array Integration is a plugin that provides hardware acceleration in VMware ESX and ESXi environments.

vCSA
The vCenter Server Appliance is a pre-configured Linux virtual machine, which is optimized for running VMware vCenter Server® and the associated services on Linux. See http://-docs.vmware.com

VMFS
Virtual machine file system, a clustered file system used by VMware vSphere to store virtual machine disk images and snapshots.

volume
An area of usable storage that is addressed as a single unit as if it were a separate, physical disk drive. Volumes can exist on a single disk drive or on a RAID that spans multiple disk drives.

W

WWN
A World Wide Name (WWN) "or World Wide Identifier (WWID) is a unique identifier used in storage technologies including Fibre Channel, Advanced Technology Attachment (ATA) or Serial Attached SCSI (SAS)." See http://www.wikipedia.org

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