

Hitachi Storage Management Software with Cisco UCS for VMware vSphere

Best Practices Guide

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Feedback

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Revision History

Revision	Changes	Date
MK-SL-161-00	Initial release	July 18, 2019

Contents

Product versions	2
Release notes	2
Related Documents	3
Get Help	3
Hitachi Storage Management Software Feature Matrix	3
Cisco and Hitachi Adaptive Solutions for Converged Infrastructure	5
Hitachi Storage Plug-in for VMware vCenter	6
Hitachi Unified Compute Platform Advisor	7
Hitachi Storage Provider for VMware vCenter	10
Hitachi Storage Provider for VMware vCenter Architecture and Components	11
Use Hitachi Storage Plug-in for VMware vCenter	12
Access Hitachi Storage Plug-in for VMware vCenter	12
Add a Hitachi Virtual Storage Platform F350, VSP F370, VSP F700, VSP F900, VSP G350, VSP G370, VSP G700, or VSP G900 Storage System	12
Add a Hitachi Virtual Storage Platform F400, VSP F600, VSP F800, VSP F1500, VSP G200, VSP G400, VSP G600, VSP G800, VSP G1000, or VSP G1500 Storage System	13
Create VMFS Datastores	15
Delete VMFS Datastores and Logical Units	18
Remove a Storage System	19
Information Display	19
Use Hitachi Unified Compute Platform Advisor	21
Add a Storage System	21
Create a Parity Group	23
Create a Storage Pool	24
Create a Host Group	26
Create a Logical Unit	27
Add a WWN to a Host Group	28
Add LUN Paths to a Host Group	29
Provision a Datastore	29
Expand a Storage Pool	31

Expand an LDEV Backing a Datastore	32
Expand a Datastore	33
Delete a Logical Unit	35
Delete a Storage Pool	36
Delete a Host Group	37
Delete a Parity Group	37
Detach a Datastore	38
Delete a Datastore	40
Delete LUN Paths	41
Remove a Host WWN from a Host Group	42
View Inventories	42

Use Hitachi Storage Provider for Virtual Volumes (VVols) 44

Configure the Protocol Endpoint (ALU)	44
Register the VASA Provider in VMware vSphere	46
Configure Hitachi Storage Provider	47
Register the Storage System in VASA	55
Create a Storage Container and Define a Capability Profile	56
Define a Virtual Machine Storage Profile	59
Deploy a Virtual Volume (VVol) Datastore	61
Deploy a Virtual Machine Using Virtual Volumes	63

Use Hitachi Storage Provider for VMware vCenter with Logical Devices (LDEVs) 65

Configure Storage System Resources (LDEVs)	65
Define a Capability Profile (LDEV)	70
Deploy an LDEV Datastore	72
Verify Auto-Storage Capability (LDEV)	75
Define Virtual Machine Storage Profile (LDEV)	75
Deploy a Virtual Machine on Storage Policy Based Management (SPBM)	77

Hitachi Storage Management Software with Cisco for VMware vSphere

Best Practices Guide

Simplify management of converged infrastructure components using VMware vSphere Web Client plug-ins developed for management of vendor-specific elements, such as compute, network, and storage.

Also, VMware storage vendors develop VMware APIs for Storage Awareness (VASA). These APIs reveal specific capabilities of the underlying storage to you to use through native virtual machine storage policies.

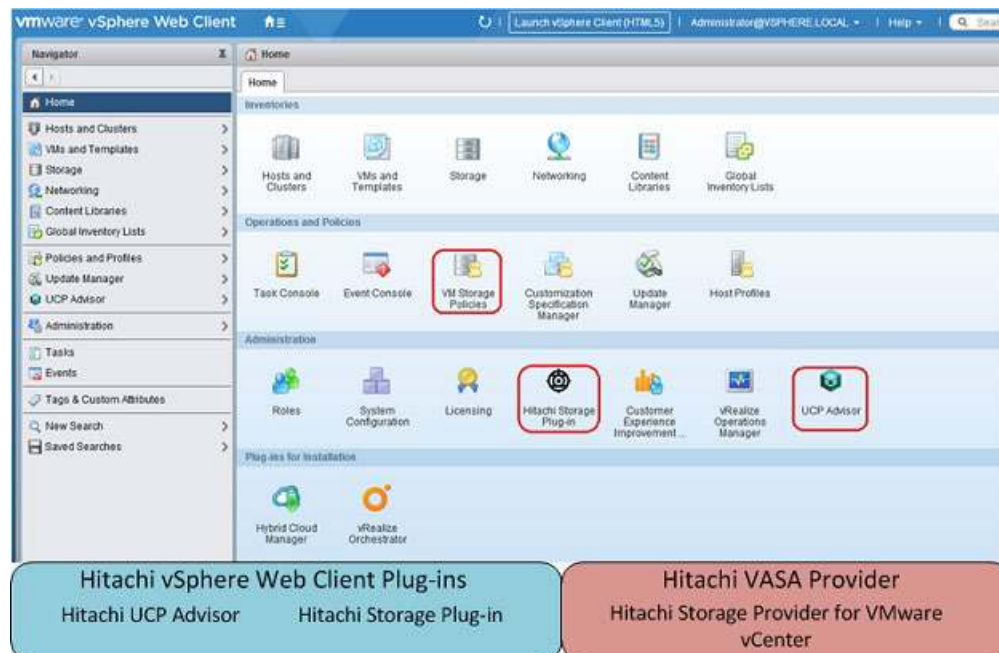
Hitachi provides two distinct plug-ins for native storage management operations within the VMware vSphere Web Client user interface. Also, Hitachi has developed a VASA provider which supports Hitachi Virtual Storage Platform (VSP).

This describes the storage management operations available to you for converged infrastructure VMware vSphere environments which use Virtual Storage Platform, such as Cisco and Hitachi Adaptive Solutions for Converged Infrastructure. It is limited in scope to address storage management operations only.

For more information about validated solutions using Cisco UCS and Hitachi Virtual Storage Platform storage, see Related documents.

Figure 1 highlights Hitachi Storage Plug-in for VMware vCenter, Hitachi Unified Compute Platform Advisor, and virtual machine storage policies icons in the native VMware vSphere Web Client interface.

Figure 1



This document is intended for the following:

- Storage administrators
- VMware administrators
- Sales engineers
- Field consultants
- Professional services
- Validated Hitachi and Cisco resell partners

The products covered in this manual are the following:

- Hitachi Storage Plug-in for VMware vCenter
- Hitachi Storage Provider for VMware vCenter
- Hitachi Unified Compute Platform Advisor

Readers of this document should have a background in or understanding of the following:

- RAID systems and their functions
- VMware ESXi and VMware vCenter environments
- Converged infrastructure

Product versions

This document applies to the following software versions:

- Hitachi Storage Plug-in v03.10.0
- Hitachi Storage Provider for VMware vCenter v03.5.6
- Hitachi Unified Compute Platform Advisor v02.9.0
- Hitachi Configuration Manager REST API v8.6.3
- VMware ESXi 6.7
- VMware vCenter Standalone (VCSA) v6.7 u1

Release notes

Read the release notes before installing and using any of these products. They may contain requirements or restrictions that are not fully described in this document or updates or corrections to this document. Release notes are available from [Hitachi Vantara Product Documentation](#).

Related Documents

Throughout this document, the following documentation is referenced:

- *Hitachi Storage Plug-in for VMware vCenter User's Guide*, MK-92ADPTR047-17
- *Hitachi Storage Provider for VMware vCenter Deployment Guide*, MK-90ADPTR010-24
- *Hitachi Unified Compute Platform Advisor Deployment Guide*, FE-92UCP098-09
- *Hitachi Unified Compute Platform Advisor Preinstallation Requirements and Configuration Guide*, MK-92UCP104-03
- *Hitachi Command Suite Configuration Manager REST API Reference Guide*, MK-92HM8050-04
- [Hitachi Virtual Storage Platform G130, G/F350, G/F370, G/F700, G/F900 System Administrator Guide](#), MK-97HM85028-03
- [Cisco and Hitachi Adaptive Solutions for Converged Infrastructure Design Guide](#)
- [Cisco and Hitachi Adaptive Solutions for Converged Infrastructure Deployment Guide](#)

Get Help

Support Connect is where you receive technical support of products and solutions sold by Hitachi Vantara.

- To contact technical support, see [Customer Contact Us](#).
- To open a new support case, see [How to Create a New Case on Support Connect](#).

Hitachi Storage Management Software Feature Matrix

These are the use cases and feature sets that relate to Hitachi storage management software for a Hitachi storage-only environment, such as Cisco and Hitachi Adaptive Solutions for Converged Infrastructure.

Depending on your organization and administrative needs, each storage management product provides different values and benefits in a converged infrastructure environment running VMware vSphere:

- Hitachi Storage Plug-in for VMware vCenter provides the you the capability to perform basic storage operations for your VMware vSphere environment. This is beneficial when your organization has distinct operational roles for storage and VMware administrators:
 - A storage administrator performs core Hitachi storage operations
 - A vSphere administrator performs core vSphere storage operations.

The plugin allows easy mapping between Hitachi and VMware elements, enabling better communication between the two administrative groups.

- Hitachi Unified Compute Platform Advisor provides your VMware administrator the capability to perform a larger subset of storage operations on Hitachi Virtual Storage Platform. This benefits an organization for either of the following:
 - There is not a dedicated storage administrator.
 - Storage on Virtual Storage Platform is dedicated to a VMware vSphere environment.

Hitachi Unified Compute Platform Advisor allows performing many of the core storage operations from within the VMware vSphere Web Client interface. This removes the necessity to manage core storage operations from the native Hitachi Storage Navigator interface.

- Hitachi Storage Provider for VMware vCenter allows your storage administrators to relay storage characteristics to a native vSphere environment where a VMware administrator can obtain a clearer understanding of Virtual Storage Platform capabilities. Do this by one of two ways:
 - Set up the environment with virtual volumes (VVols), utilizing native virtual machine storage policies.
 - Use traditional LDEVs as VMFS volumes.

Table 1 covers the capabilities of Hitachi storage management software within a VMware vSphere environment. For more information on these separate products, refer to Related Documents.

Table 1. Hitachi Storage Management Software Capabilities

	Function	Hitachi Storage Plug-in for VMware vCenter	Hitachi Unified Compute Platform Advisor	Hitachi Storage Provider for VMware vCenter (VASA)
Storage Creation	Create Datastore	x	x	
	Create a Logical Unit (LDEV)	x	x	
	Create Storage Pools (HDP/HDT)		x	
	Create Parity Groups		x	
	Create Host Groups		x	
Storage Deletion	Delete Datastore	x	x	
	Delete Logical Unit (LDEV)	x	x	
	Delete Storage Pools (HDP/HDT)		x	
	Delete Parity Groups		x	
	Delete Host Groups		x	
Storage Expansion	Expand Storage Pool (HDP/HDT)		x	
	Expand Logical Unit (LDEV)		x	
	Expand Datastore		x	

	Function	Hitachi Storage Plug-in for VMware vCenter	Hitachi Unified Compute Platform Advisor	Hitachi Storage Provider for VMware vCenter (VASA)
Storage Mapping	Add LUN Path	x	x	
	Delete LUN Path	x	x	
	Storage View			
	View VM Storage Info	x		
	View Host Storage Info	x		
	View Datastore Info	x (Native UI)	x (Plug-in UI)	
	View Storage System Info		x	
	View Storage Ports Info		x	
	View Storage Resource Group Info		x	
	Storage Provider Capabilities			
	Provide VVol Datastore			x
	Provide LDEV Datastore			x

Cisco and Hitachi Adaptive Solutions for Converged Infrastructure

Cisco and Hitachi Adaptive Solutions for Converged Infrastructure, as a virtual server infrastructure (VSI), is a best-practice data center architecture built on collaboration between Hitachi Vantara and Cisco to meet the needs of enterprise customers using virtual server workloads.

This architecture is composed of Hitachi Virtual Storage Platform connecting to Cisco MDS multilayer switches that link to the Cisco UCS Fabric Interconnects and Cisco Unified Computing System (UCS) chassis. Northbound networking is enabled through the Cisco Nexus 9000 family of switches.

For more information about Cisco UCS hardware and software versions, refer to the [Cisco and Hitachi Adaptive Solutions for Converged Infrastructure Design Guide](#).

Hitachi Storage Plug-in for VMware vCenter

Hitachi Storage Plug-in for VMware vCenter integrates Hitachi storage information and provisioning operations with the VMware vSphere Web Client. This integration allows VMware administrators to provision and mount VMFS datastores in their native vSphere environment without having to engage storage administrators. This provides the additional value of being able to perform storage operations within the same interface (VMware vCenter) that VMware administrators use to perform typical virtual infrastructure operations in a single pane of glass.

Hitachi Storage Plug-in for VMware vCenter provides these functions to view storage information, provision datastores, and delete datastores.

- **View**

The View function displays the storage system information registered in the storage plug-in, the datastore on the ESXi host using the storage system, and virtual machine information.

- **Provision Datastore**

The Provision Datastore function creates a Logical Device used as a datastore for a Virtual Machine File System (VMFS) and Raw Device Mapping objects (RDMs) by a storage system registered with the Hitachi Storage Plug-in.

- **Delete Datastore (or LDEV)**

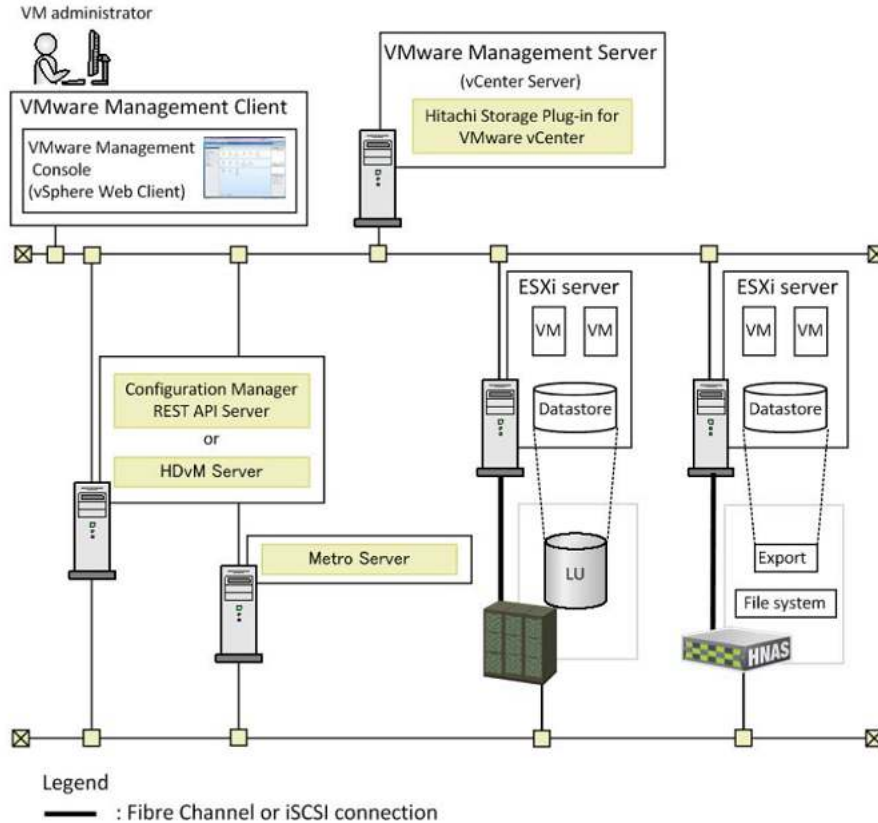
The Delete Datastore function is a one-step operation that removes datastores or logical devices from storage systems registered with the storage plug-in. It does not remove datastores or logical devices that were created without using the storage plugin.

Hitachi Storage Plug-in is used within VMware-based virtual environments through the native vCenter interface. The software requires access to RAID storage system controllers using TCP/IP, while VMware ESXi servers must include TCP/IP or Fibre Channel connectivity to the storage systems.

The examples in this guide are only representative of a Fibre Channel block-based storage configuration. Hitachi Storage Plug-in for VMware vCenter also supports network file system (NFS) provisioning on the Hitachi NAS Platform.

Refer to Figure 2 for a diagram of an example network.

Figure 2



Depending on the storage system being used, you will need to create a Hitachi Configuration Manager server and onboard the storage system to be used within Hitachi Storage Plugin for provisioning. For more information on how to deploy a Configuration Manager server and register a storage system using REST APIs, refer to Related Documents.

Hitachi Unified Compute Platform Advisor

Hitachi Unified Compute Platform Advisor provides features that automate and simplify deployment and management of Hitachi Unified Compute Platform systems within a native VMware vSphere web client environment. Unified Compute Platform Advisor allows you to perform storage-based operations on Hitachi enterprise storage. Ultimately, VMware administrators can manage and deploy their storage from a native VMware environment.

This document only focuses on storage-related functions associated with Unified Compute Platform Advisor and Hitachi enterprise storage.

Hitachi Unified Compute Platform Advisor has features that allow VMware administrators to manage native Hitachi storage in their vSphere environments and provides the capability to manage multiple VSP storage systems with a single instance of Unified Compute Platform Advisor.

View

With Hitachi Unified Compute Platform Advisor, VMware administrators are given greater insight into Hitachi storage system capacity metrics, along with an insight into the following native to the RAID subsystem:

- Datastore
- Parity groups
- Logical units
- Storage pools
- Ports
- Host groups
- Replication pairs
- Resource groups

View this information directly from the Unified Compute Platform Advisor plugin, within the VMware vSphere web client.

Provisioning

Hitachi Unified Compute Platform Advisor allows various storage management operations to be performed from the native VMware vCenter Web Client user interface. The storage provisioning operations include the following:

- **Datastore Provisioning**
This creates a backend logical unit (LU), mounts the LU to host groups, and mounts VMFS datastores to your virtual environment. This can be done in a single operation using Unified Compute Platform Advisor.
- **Parity Group Provisioning**
This gives insight to available parity group resources within a RAID system. It enables the creation of a parity group based on drive type and RAID level directly from the Unified Compute Platform Advisor plug-in.
- **Logical Unit Provisioning**
Administrators can view all created logical units on the RAID subsystem, even though they may have been provisioned by another storage management product. With Unified Compute Platform Advisor, you can provision a new LU directly from the pools available on the storage system.
- **Storage Pool Provisioning**
With Unified Compute Platform Advisor, administrators have the ability to carve various storage pools which include pools created with Hitachi Dynamic Provisioning, Hitachi Dynamic Tiering, and Hitachi Thin Image .
- **Host Group Provisioning**
Unified Compute Platform Advisor allows administrators to create host groups directly from the plug-in user interface.

Deletion

With Hitachi Unified Compute Platform Advisor, you can delete or rollback storage system settings directly from the plugin within the VMware vCenter Web Client. These operations include the following:

- **Deletion of Logical Devices (LUs)**
Unified Compute Platform Advisor removes a logical device on the RAID subsystem.

- **Deletion of Storage Pools**

Unified Compute Platform Advisor allows the removal of dynamic provisioning, dynamic tiering, and thin image pools.

- **Deletion of Host Groups**

Use Unified Compute Platform Advisor to clear logical containers on the RAID system, which correlates logical units to WWN initiators and targets.

- **Deletion of Datastores**

This unmounts or deletes VMFS datastores and removes back end logical units on a RAID system.

- **Removal of hosts and LUN paths from Host Groups**

With Unified Compute Platform Advisor, administrators can remove host WWNs and logical unit LUN paths associated with a host group all from the native VMware vCenter web client.

Expansion

Hitachi Unified Compute Platform Advisor provides administrators the ability to expand storage resources directly from the native VMware vSphere Web Client user interface:

- **Expansion of Storage Pools**

Expand a backend storage pool by adding available pool volumes to the pool with Unified Compute Platform Advisor.

- **Expansion of Logical Unit backing datastore**

Expand a logical unit on the backend RAID subsystem supporting the VMFS datastore with Unified Compute Platform Advisor.

- **Expansion of Existing Datastore**

Unified Compute Platform Advisor automates the expansion of an existing datastore once the backend logical unit has been allocated additional capacity.

Architecture

Hitachi Unified Compute Platform Advisor is used within VMware-based virtual environments through the native web client. Unified Compute Platform Advisor is provided using an installation image file media bundle that consists of two Unified Compute Platform Advisor virtual machines.

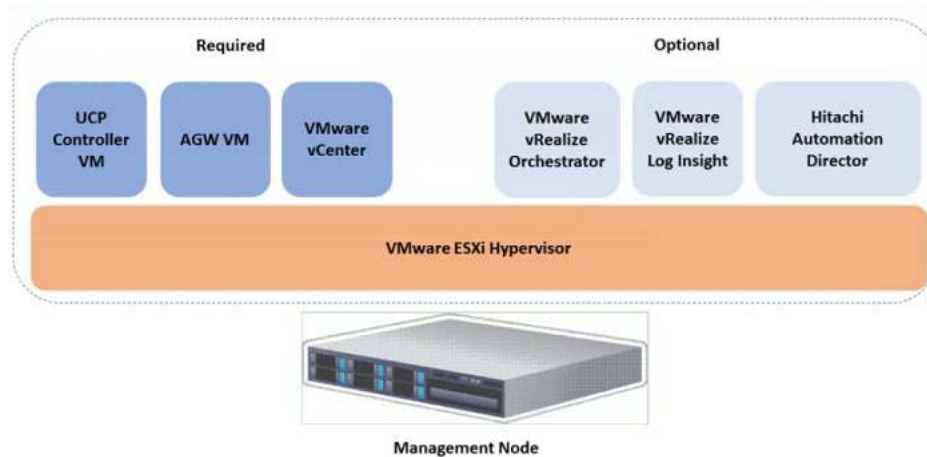
- Unified Compute Platform Advisor Management Controller VM
- Unified Compute Platform Advisor Gateway OVA (AGW VM)

Note — Command devices from the RAID system must be a RAW device mapped to Unified Compute Platform Advisor Gateway OVA for system onboarding.

Once you deploy these machines within your virtual environment, register the Unified Compute Platform Advisor plugin to your VMware vCenter using the Unified Compute Platform Advisor ToolBox available on the Unified Compute Platform Advisor management virtual machine.

Figure 3 shows the system configuration of Unified Compute Platform Advisor.

Figure 3



For more information regarding the deployment of Unified Compute Platform Advisor or RAID system command devices, refer to Related documents.

Hitachi Storage Provider for VMware vCenter

Hitachi Storage Provider for VMware vCenter allows VMware APIs for Storage Awareness (VASA) features to be used with Hitachi storage systems. VASA Provider allows policies to be made by making the storage attribute information available to be seen in vSphere. Hitachi VASA Provider makes this possible in two ways:

- **VMware vSphere Virtual Volumes (VVols)**

This function constitutes the VASA Provider (VP) component of VMware Virtual Volumes (VVols), which allows VVols to be used with supported Hitachi storage systems in a 1:1 mapping enabling greater insight into virtual machine performance.

- **VMware Virtual Machine File System (VMFS)**

VASA allows storage capability information and alert notifications related to VMFS file systems to be generated automatically and displayed in vCenter Server.

VMware Storage Policy Based Management (SPBM) tags for devices backing VMFS file systems are provided, which associate the VMFS file systems with storage profiles and capabilities. These profiles allow storage policies to be configured in vSphere for VMFS file systems in addition to VMware VVols based on underlying storage capabilities. For example, in vCenter, a datastore can be assigned tags, such as "Encryption: Yes" which indicates the underlying storage system can provision VVols or LDEVs with encryption capabilities.

See Related Documents for more VASA Provider information.

Hitachi Storage Provider for VMware vCenter provides features to give VMware administrators greater insight into the type of storage that has been made available to them by the storage administrator.

Virtual Volumes

Virtual volumes (VVol) is a concept based on a new integration and management framework between VMware vSphere and storage systems. It implements an out-of-band bidirectional control path through the VMware vSphere API for Storage Awareness (VASA)

Before VVols, VMFS was used to create a file system on top of block-based storage. Multiple virtual machines resided along with their files, VMDKs, in a single file system, making administration and analysis difficult.

With the introduction of VVols, the VMware ESXi operating system can talk directly to the storage. Directly create LUNs on the storage in a one-to-one basis, so that each machine has a way of directly communicating with the storage.

In order to support this functionality, Hitachi Vantara has implemented storage policy-based management within its VASA provider. VASA can be used to specify storage attributes that will translate and become available to the VMware administrators inside vSphere. Characteristics can be based on cost, RAID, tier, pool type, and data protection capabilities.

Logical Device (LDEV)

The VASA provider from Hitachi allows traditional VMFS environments to obtain storage attributes passed down by the storage administrator. This is made possible by taking advantage of tagging capabilities where customers can use storage policy-based management (SPBM).

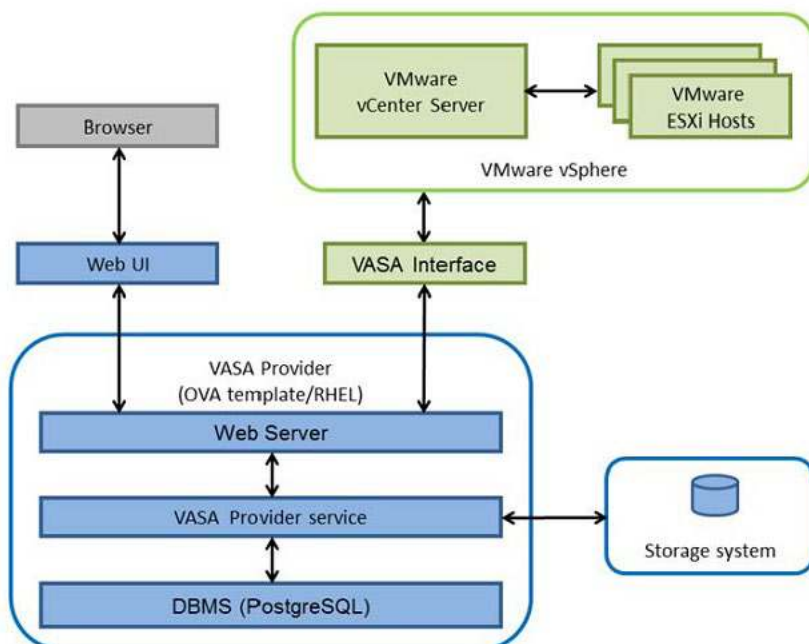
Typically, LDEV capabilities are based on the underlying pool, but when using the provider from Hitachi Vantara, capabilities can be further customized by the administrator to include attributes such as cost, performance, or data location.

This allows VMware administrators to understand what is made available to them within their virtual environments by their storage administrator.

Hitachi Storage Provider for VMware vCenter Architecture and Components

With VVols, you need to present an administrative logical unit, also known as a protocol endpoint (PE) to your VMware ESXi hosts. Figure 4 shows the system configuration for the storage provider.

Figure 4



Distribute the VASA provider as an open virtualization format file (OVF). Once deploy the VASA provider to your virtual environment, begin setting up the VASA provider by onboarding a storage system.

Once you onboard a storage system, setup VVol and LDEV container attributes that are pushed down from the VASA provider to the native VMware vSphere environment for the VMware administrator.

For more information regarding the deployment and configuration of VASA provider from Hitachi, refer to Related Documents.

Use Hitachi Storage Plug-in for VMware vCenter

This is how to use the features related to Hitachi Storage Plug-in for VMware vCenter. For additional configuration information, refer to Related Documents.

Access Hitachi Storage Plug-in for VMware vCenter

When the storage plug-in is installed, the Hitachi Storage Plug-in icon is added to the VMware vSphere Web Client window.

To access the plug-in, do the following.

1. Log on to the vSphere Web Client from a browser.
2. Open the vSphere Web Client home screen.
3. Click **Hitachi Storage Plug-in**.

Figure 5



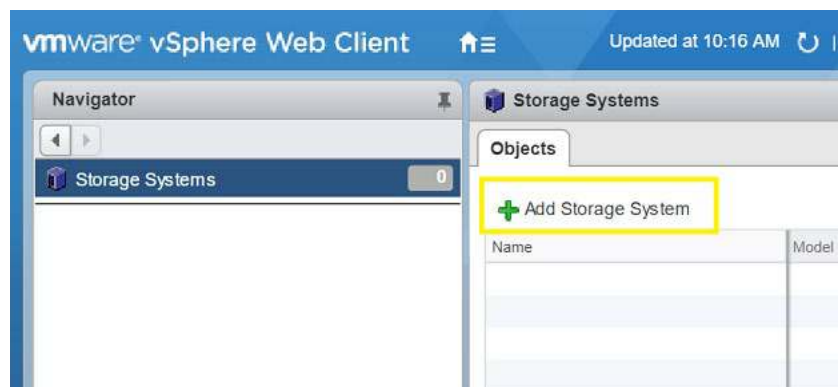
Add a Hitachi Virtual Storage Platform F350, VSP F370, VSP F700, VSP F900, VSP G350, VSP G370, VSP G700, or VSP G900 Storage System

If this is the first time you open Hitachi Storage Plug-in, you must onboard a storage system.

To onboard a Hitachi storage system, do the following.

1. In the **Web Client** window, on the **Objects** tab, click **Add Storage System**.

Figure 6



- For **Model**, click the **VSP F350, F370, F700, F900 and VSP G350, G370, G700, G900** option and click **Next**.

Figure 7

The screenshot shows the 'Add Storage System' wizard with the 'Model' step selected. On the left is a sidebar with tabs: Model, Information, Physical Storage Discovery, Authorization, Virtual Storage Discovery, and Summary. The main area is titled 'Select a storage system model' and contains four radio button options: 'VSP and HUS VM', 'VSP F400, F600, F800, F1500 and VSP G200, G400, G600, G800, G1000, G1500', 'VSP F350, F370, F700, F900 and VSP G350, G370, G700, G900' (which is selected), and 'VSP Gx00 NAS module / VSP Fx00 NAS module / HNAs'. Below these is a 'Select an API' section with a dropdown menu showing 'REST'.

- For **Information**, enter the following for the configuration manager server and then click **Next**:
 - IP Address
 - Port Number

Note — In a VMware vSphere 6.5 or 6.7 environment, if you want to use SSL communication between Hitachi Storage Plug-in and the Configuration Manager server, click **Use SSL**.

- For **Physical Storage Discovery**, select all physical storage systems to be registered and all physical storage systems on which the virtual storage systems to be registered exist and then click **Next**. You can select multiple physical storage systems at the same time.
- For **Authorization**, enter the user ID and password for each of the selected physical storage systems and then click **Next**.
- For **Virtual Storage Discovery**, select all physical storage systems and virtual storage systems to be registered and then click **Next**. You can select multiple storage systems at the same time.
- For **Summary**, confirm the model and other information for the storage system you selected and then click **Next**.
- To complete onboarding, click **Finish**.

Note — If the connection fails, troubleshoot the issue or contact your storage system administrator to verify that your user account settings are correct. Failure examples include a communication error, the required storage systems are not displayed, or the user ID or password is incorrect. Also, confirm that the Configuration Manager (CM) rest services are running on the Hitachi Configuration Manager REST API server.

Add a Hitachi Virtual Storage Platform F400, VSP F600, VSP F800, VSP F1500, VSP G200, VSP G400, VSP G600, VSP G800, VSP G1000, or VSP G1500 Storage System

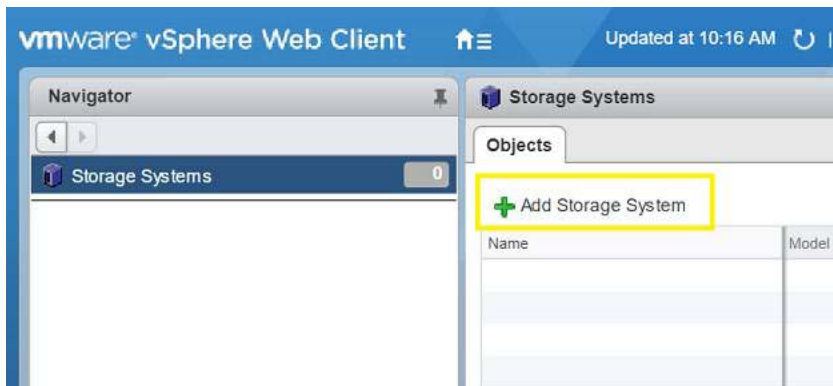
With the Hitachi Storage Plug-in, you can onboard multiple generations of Hitachi storage systems. This covers how to onboard Hitachi Virtual Storage Platform F400, VSP F600, VSP F800, VSP F1500, VSP G200, VSP G400, VSP G800, VSP G1000, and VSP G1500.

If this is the first time you open Hitachi Storage Plug-in, you must onboard a storage system.

To onboard a Hitachi storage system, do the following.

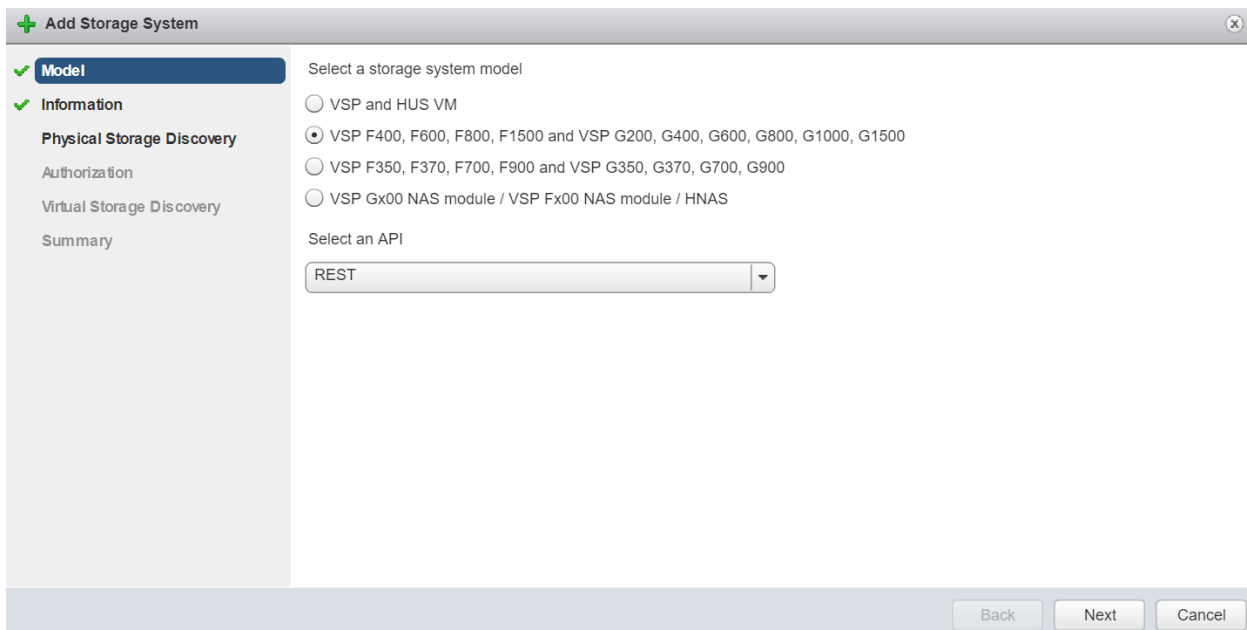
1. In the Web Client window, on the **Objects** tab, click **Add Storage System**.

Figure 8



2. For **Model**, do the following:
 1. Select the **VSP F400, F600, F800, F1500, and VSP G200, G400, G600, G800, G1000, G1500** option.
 2. From the **Select and API** list, click **REST**.
 3. Click **Next**.

Figure 9



3. For **Information**, enter the following for the Configuration Manager server and then click **Next**:

- IP Address
- Port Number

Note — When onboarding Hitachi Virtual Storage Platform F400, VSP F600, VSP F800, VSP F1500, VSP G200, VSP G400, VSP G600, VSP G800, VSP G1000 or VSP G1500, you have the option of onboarding with Hitachi Device Manager (HDVM) as well as Hitachi Configuration Manager Rest API.

4. For **Physical Storage Discovery**, select all physical storage systems to be registered and all physical storage systems on which the virtual storage systems to be registered exist, and then click **Next**. You can select multiple physical storage systems at the same time.
5. For **Authorization**, enter the user ID and password for each of the selected physical storage systems and then click **Next**.
6. For **Virtual Storage Discovery**, select all physical storage systems and virtual storage systems to be registered and then click **Next**. You can select multiple storage systems at the same time.
7. For **Summary**, confirm the model and other information for the storage system you selected, and then click **Next..**
8. To complete onboarding, click **Finish**.

Create VMFS Datastores

Once you have added a storage system to Hitachi Storage Plug-in for vCenter, you can begin creating VMFS datastores for your virtual environment.

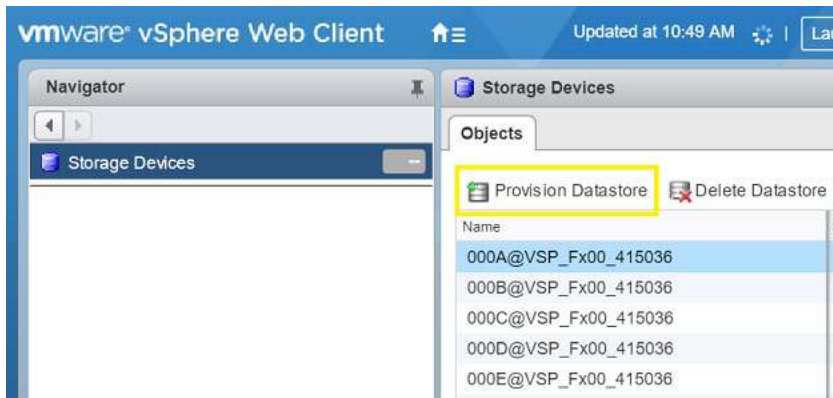
Before you begin, do the following:

- Verify that all involved VMware ESXi hosts have Fibre Channel physical connectivity and are zoned to the storage system.
- Choose a storage system upon which to create an LU.
- Verify the host group or iSCSI target of the storage system in which the WWN or iSCSI name of the storage adapter (HBA ESXi host) is set.
- Make sure that the storage system information and VMware vSphere environment information are current. If the information is not up to date, run **Refresh Storage System**.

To deploy a VMFS datastore, do the following.

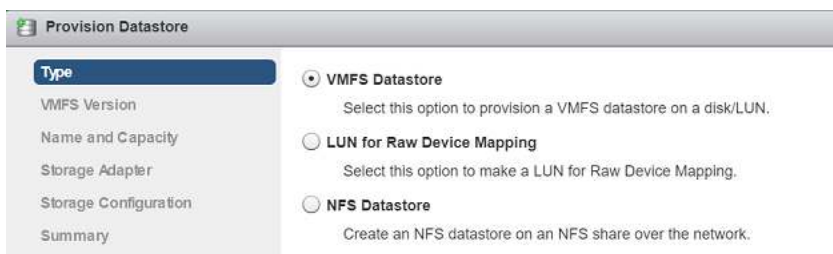
1. In Web Client, under **Navigator**, click **Storage Devices**.
2. On the **Objects** tab, click **Provision Datastore**.

Figure 10



3. For **Type**, click the **VMFS datastore** option and then click **Next**.

Figure 11



4. For **VMFS version**, click the VMFS version and then click **Next**.
5. For **Name and Capacity**, do the following:
 - (1) Determine how many datastores you want to create (single or multiple).
 - (2) Define a datastore name and datastore capacity.
 - (3) Click **Next**.

6. For **Storage Adapter**, do the following:
 - (1) Under **Select Cluster or Host**, select the cluster or ESXi host.
 - (2) Under **Storage Adapter(s)**, select the check box of the storage adapter.
 - (3) Click **Next**.

Figure 12



7. For **Storage Configuration**, do the following:
 - (1) Click Storage System.
 - (2) Click Storage Pool/RAID Group.
 - (3) If the storage system is Hitachi Virtual Storage Platform F350, VSP F370, VSP F700, VSP F900, VSP G350, VSP G370, VSP G700, or VSP G900, click Capacity Saving
 - (4) Specify the LUN ID.
 - (5) Click Host Group/Target.
 - (6) Click **Next**.
8. For Summary, confirm the settings for the datastore and then click **Next**. To modify any settings, click a screen name.
9. Click **Finish**. The datastore creation progress and results can be viewed in vSphere Web Client Recent Tasks.

Note — You can cancel the Create Datastore operation after the process has started. However, rollback is not enabled. Any LUs already created remain on the storage system and must be deleted manually through Hitachi Storage Navigator, Hitachi Storage Advisor, or using API access.

Delete VMFS Datastores and Logical Units

Once you have deployed a VMFS datastore using the Hitachi Storage Plug-in for VMware vCenter, use Delete Datastore to remove datastores or LUs on storage systems that are registered with Storage Plug-in for VMware vCenter.

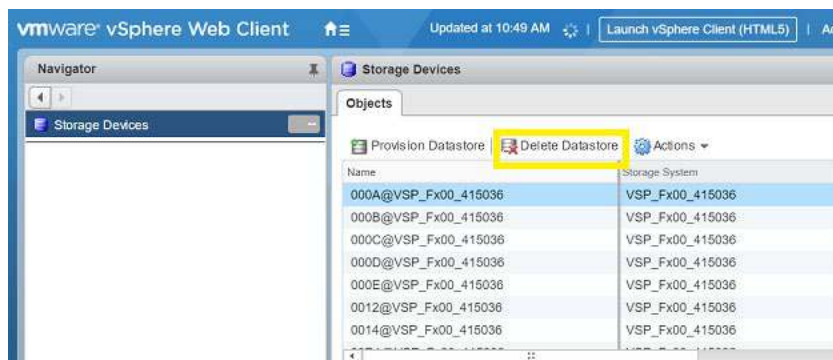
Some datastores cannot be removed using Delete Datastore. Use VMware vSphere Web Client to delete the following:

- Virtual volume (VVOL) datastore
- Datastores with a virtual machine or virtual machine template
- Datastores with multiple LUs
- Datastores with pair-configured LUs
- Datastores with LUs used in a raw device mapping (RDM)

To delete a VMFS datastore, do the following.

1. In Web Client, under **Navigator**, click **Storage Devices**.

Figure 13



2. On the **Objects** tab, click the datastore or LU you want to delete. You can delete only one datastore at a time.
3. Click **Delete Datastore**.
4. To confirm, click **Yes**.

Note — You can cancel the task execution by clicking **Cancel**. When you cancel Delete Datastore, the LUN that is not deleted remains. You should delete unnecessary LUNs. The results of Delete Datastore appear in the vSphere Web Client task. When you click **Refresh**, the **Recent Tasks** pane displays the Delete Datastore task.

Remove a Storage System

Use Remove Storage System to remove a storage system from being monitored by the storage plug-in.

To remove a storage system from monitoring, do the following.

1. In Web Client, under **Navigator**, click **Storage Systems**.
2. On the **Objects** tab, select the storage system you want to remove from the list.



3. Click **Remove Storage System**.
4. Click **Yes**.

Note — Even if you remove storage systems using Remove Storage System, datastores or LUs created using Hitachi Storage Plug-in for VMware vCenter remain. If you want to remove those datastores or LUs, register the storage systems again, and then use Delete Datastores.

Information Display

Hitachi Storage Plug-in for VMware vCenter displays Hitachi storage system information in the VMware vSphere Web Client. This information includes views of storage system properties, related objects, lists of storage devices, VMware ESXi hosts, and virtual machines.

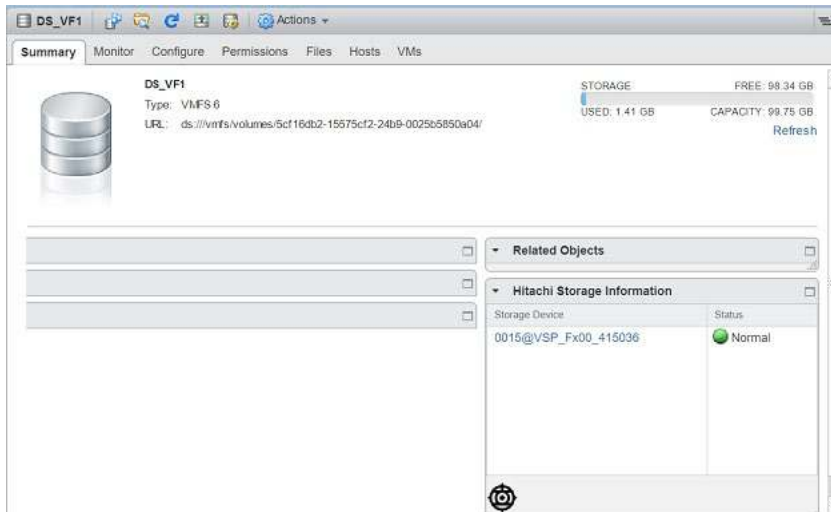
The following information is displayed:

- **Datastores**
If a datastore is backed by a logical unit, information identifying the logical unit's storage system and LUN number appears in this area.
- **Hosts**
When selecting an ESXi host from this screen, a Hitachi Storage Information area appears under **Summary**.
- **Virtual Machines**
Virtual machines that consume resources from the selected storage system appear under **Hitachi Storage Information**.

Datastores Information

To display datastore information, select a datastore and then click **Summary**.

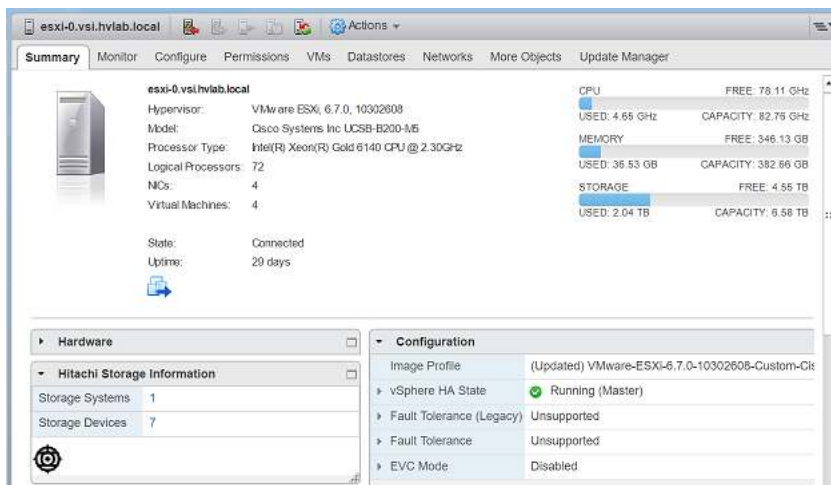
Figure 14



Host Information

To display host information, select a VMware ESXi host and then click **Summary**.

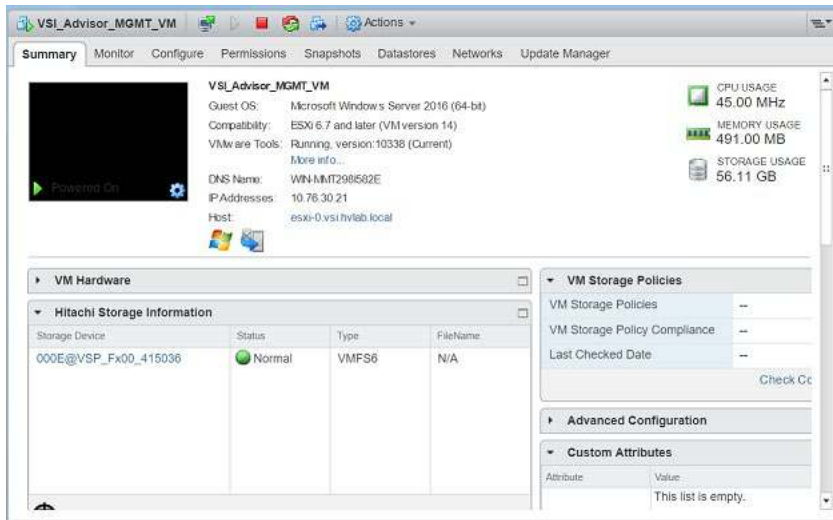
Figure 15



Virtual Machine Information

To display virtual machine information, select a virtual machine and then click **Summary**.

Figure 16



Use Hitachi Unified Compute Platform Advisor

This is how to use the features in Hitachi Unified Compute Platform Advisor. For information on installation, configuration, and registering the storage system, refer to *Hitachi Unified Compute Platform (UCP) Advisor Deployment Guide*.

Add a Storage System

Users with administrator-level permissions can manually add a storage system to be managed by Hitachi Unified Compute Platform Advisor. Users also have the option to onboard systems using a CSV file.

For more information on how to automatically add resources using a CSV file, refer to Related Documents.

To onboard a new storage system, do the following.

1. In the Navigator window, click **Administration**.
2. Click the **Storage** tab.
3. Click **Add Storage System** (plus sign).

Figure 17



4. In the **Add Storage System** dialog box, add the information under **Storage INFO**.
 - (1) **Serial Number** — Type the serial number for the storage system being added.
 - (2) **Management IP Address** — Type the IP address for the storage system being added.

- (3) **Username** — This is the user name of the user adding the storage system. The user must belong to a user group that has administrator privileges to create user accounts.
- (4) **Password** — This is the password for the user adding the storage system. The password can have alphanumeric characters and the following symbols: hyphen (-), period (.), at (@), underscore (_), backslash (\), and comma (,).
5. (VSP G350, VSP F350, VSP G370, VSP F370, VSP G700, VSP F700, VSP G900, VSP F900 storage systems only) In the **Add Storage System** dialog box, add the information under **Controller INFO**.
- (1) Type the IP address for the first controller in Controller 1 IP.
- (2) Type the IP address for the second controller in Controller 2 IP.
6. To complete onboarding the storage system, click **Submit**.

Figure 18

Add Storage System

Storage INFO

Serial Number: * 415036

Management IP Address: * 172.25.43.170

Username: * maintenance

Password: *

☒ **Controller INFO**

Controller 1 IP: * 172.25.43.171

Controller 2 IP: * 172.25.43.172

Submit **Close**

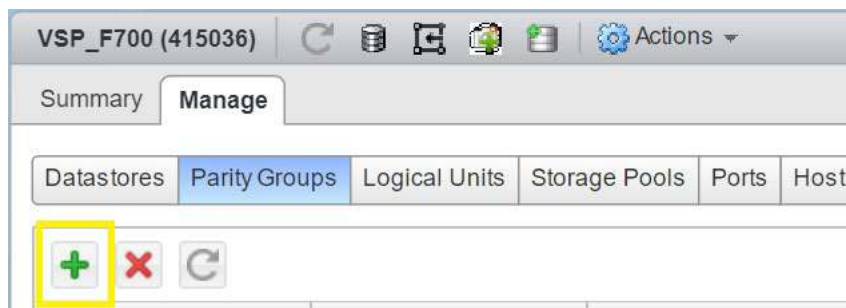
Create a Parity Group

You can create parity groups for a set of physical drives that configure RAID in a storage system. A logical storage area extracted from a parity group is used as an LDEV (basic volume) that is used for allocation to hosts.

To create a new parity group, do the following.

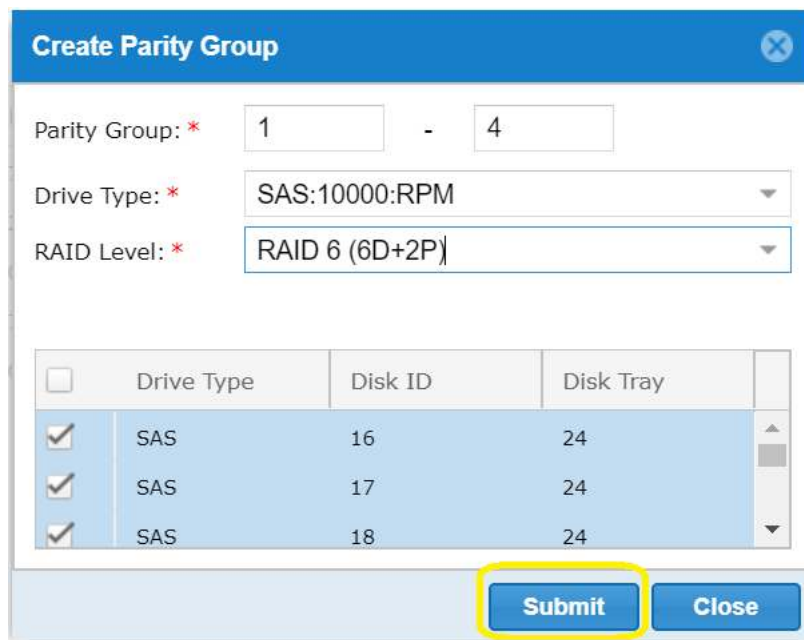
1. From the **Manage** tab, click **Parity Groups**, then click **Create Parity Group** (plus sign).

Figure 19



2. In the **Create Parity Group** dialog box, specify the following:
 - (1) **Parity Group** — Specify a number for the new parity group. For example, if the parity group number is 1 - 4, enter a 1 in the box on the left, and a 4 in the box on the right.
 - (2) **Drive Type** — Click the type of drive from the list.
 - (3) **RAID Level** — Select the RAID level from the list.

Figure 20



<input type="checkbox"/>	Drive Type	Disk ID	Disk Tray
<input checked="" type="checkbox"/>	SAS	16	24
<input checked="" type="checkbox"/>	SAS	17	24
<input checked="" type="checkbox"/>	SAS	18	24

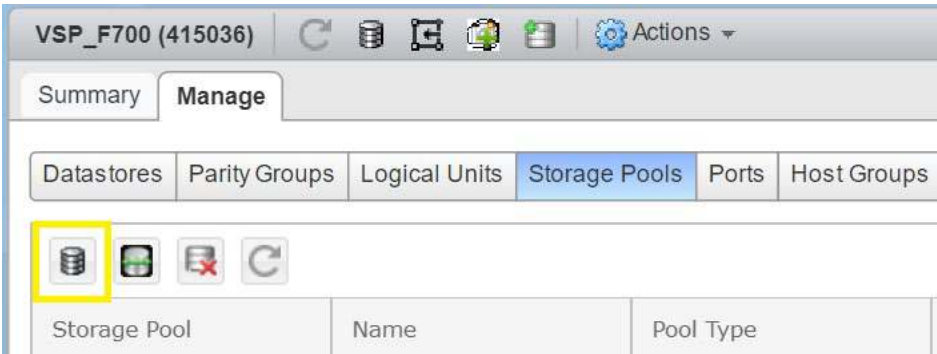
3. To complete creating a parity group, click **Submit**.

Create a Storage Pool

You can create a storage pool with associated parity groups native to the storage system using Hitachi Unified Compute Platform Advisor. To create a new storage pool:

- 1. To create a storage pool for the selected storage system, on the **Manage** tab, click **Storage Pools**, and then click **Create Storage Pool** (disk drives).

Figure 21



2. In the **Create Storage Pool** dialog box, specify the following:
 - (1) **Pool Name** — Type the name of the storage pool for easy identification.
 - (2) **Pool Type** — From the list, click the storage pool type.
 - (3) **Add Pool Volume** — Select the required parity group and specify the size of the allocated capacity (LDEV) that is created in the parity group to be assigned to the pool, and then click **Add Pool Volume**.
 - (4) **Subscription Limit** — Specify the overprovisioning limit.
 - (5) **Warning Limit (%)** — Specify the storage pool warning threshold.
 - (6) **Depletion Limit (%)** — Specify the storage pool depletion threshold.

Figure 22

Create Storage Pool

Pool Name: * Application_Pool

Pool Type: * Dynamic Pool (HDP)

Add Pool Volume Remove Pool Volume

Parity Group	Drive Type	Size(GB)
1-4	SAS	2000

Subscription Limit: Unlimited

Warning Limit(%): * 70

Depletion Limit(%): * 80

Submit Cancel

3. To complete creating a storage pool, click **Submit**.

Create a Host Group

With Hitachi Unified Compute Platform Advisor, you can create host groups native to the storage system. Host groups contain the relations between storage port WWNs, host HBA WWNs and LUN for storage mapping.

To create a host group, do the following.

1. From the **Manage** tab click **Host Groups**, and then click **Create Host Groups** (first one on left).

Figure 23



2. In the Create Host Group dialog box, specify the following:
 - (1) **Name** — Type the name of the host group for easy identification.
 - (2) **Target Port** — Click the target port from the list.
 - (3) **Initiator WWN** — Specify the initiator WWN in the format "xx:xx:xx:xx:xx:xx:xx:xx" (for example, 10:00:00:90:fa:ab:cd:00).
 - (4) **Host Type** — Click the host type option: VMware, Microsoft on VMware, Other.
 - (5) **Host Mode** — Click **VMWARE EXTENSION** from the list and select the check boxes for host mode numbers 54, 63, and 114.

Figure 24

The 'Create Host Group' dialog box is shown. It contains the following fields and options:

- Name:** VSI-00
- Target Port:** CL1-A
- Initiator WWN:** 50:06:0e:80:12:3a:bc:00
- Host Type:** VMware (selected), Microsoft on VMware, Other
- Host Mode:** VMWARE EXTENSION

Below these fields is a table with columns 'Mode No.' and 'Option Description'. The table lists three options: 100 (HITACHI HBA EMULATION CONNECTION ...), 102 (GAD STANDARD INQUIRY EXPANSION HCS), and 105 (TASK SET FULL RESPONSE FOR IO OVER...). At the bottom right, the 'Submit' button is highlighted with a yellow box, next to a 'Cancel' button.

1. To complete creating the host group, click **Submit**.

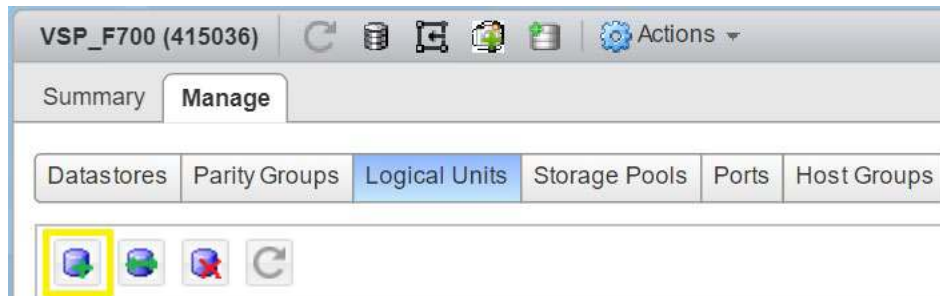
Create a Logical Unit

You can create a logical unit on the storage system that a physical host or virtual machine can use for I/O operations.

To create a logical unit, do the following.

1. From the **Manage** tab, click **Logical Units**, and then click **Create Logical Unit** (first one on left). The **Create Logical Unit** dialog box opens.

Figure 25



2. In the Create Logical Unit dialog box, specify the following:
 - (1) **Name** — Enter the name of the logical unit for easy identification.
 - (2) **Storage Pool** — Click a storage pool to create the logical unit.
 - (3) **Size** — Specify the size of the logical unit.

Figure 26



3. To finalize the logical unit, click **Submit**.

Add a WWN to a Host Group

You can add a host HBA WWN to a new or existing host group.

To add a host WWN to a host group, do the following.

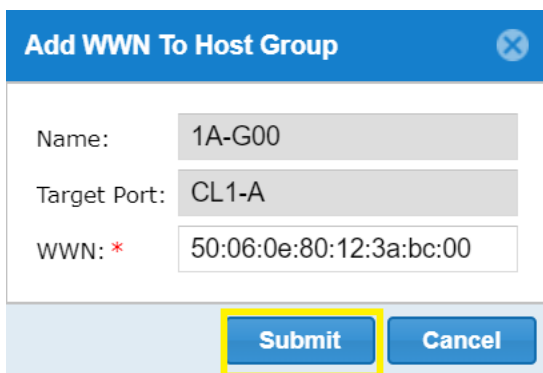
1. From the **Manage** tab, click **Host Groups**, select an existing host group, and then click **Add WWN To Host Group** (fourth one from left).

Figure 27



2. Enter the WWN using the following format: xx:xx:xx:xx:xx:xx:xx:xx (for example, 10:00:00:10:9b:1c:30:49).

Figure 28



3. To complete adding a WWN to a host group, click **Submit**.

Add LUN Paths to a Host Group

With Hitachi Unified Compute Platform Advisor, you can provision LUNs by adding a LUN path to an existing host group.

Note — In boot from SAN environments, such as Cisco UCS, LUN ID 0 is reserved for the boot LUN for the VMware ESXi operating system. Do not use LUN ID 0 for any other purpose.

To add a LUN path, do the following.

1. From the **Manage** tab, click **Host Groups**, select a host group, and then click **Present Logical Unit** (second one from left).

Figure 29



2. Specify the **Logical Unit ID**.

Figure 30

The screenshot shows a dialog box titled 'Present Logical Unit'. It has three input fields: 'Name' with the value '7A-G00', 'Target Port' with the value 'CL7-A', and 'Logical Unit ID' with a red asterisk and the value '15'. At the bottom of the dialog box, there are two buttons: 'Submit' and 'Cancel'. The 'Submit' button is highlighted with a yellow box.

3. To complete adding a LUN path, click **Submit**.

Provision a Datastore

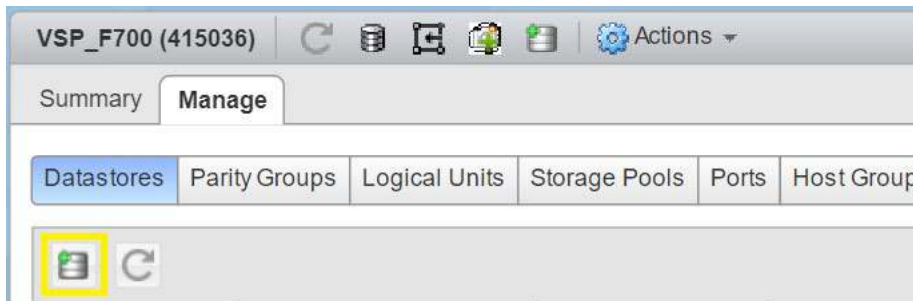
You can provision a new virtual machine file system (VMFS) datastore to create a logical container for virtual machine files. When creating a datastore, Hitachi Unified Compute Platform Advisor automatically creates an associated logical unit that must be removed when a datastore is deleted.

To provision a datastore with Unified Compute Platform Advisor, do the following.

1. From the **Navigator** pane, on the **Objects** tab, double-click to select the storage system with the datastore to be provisioned.

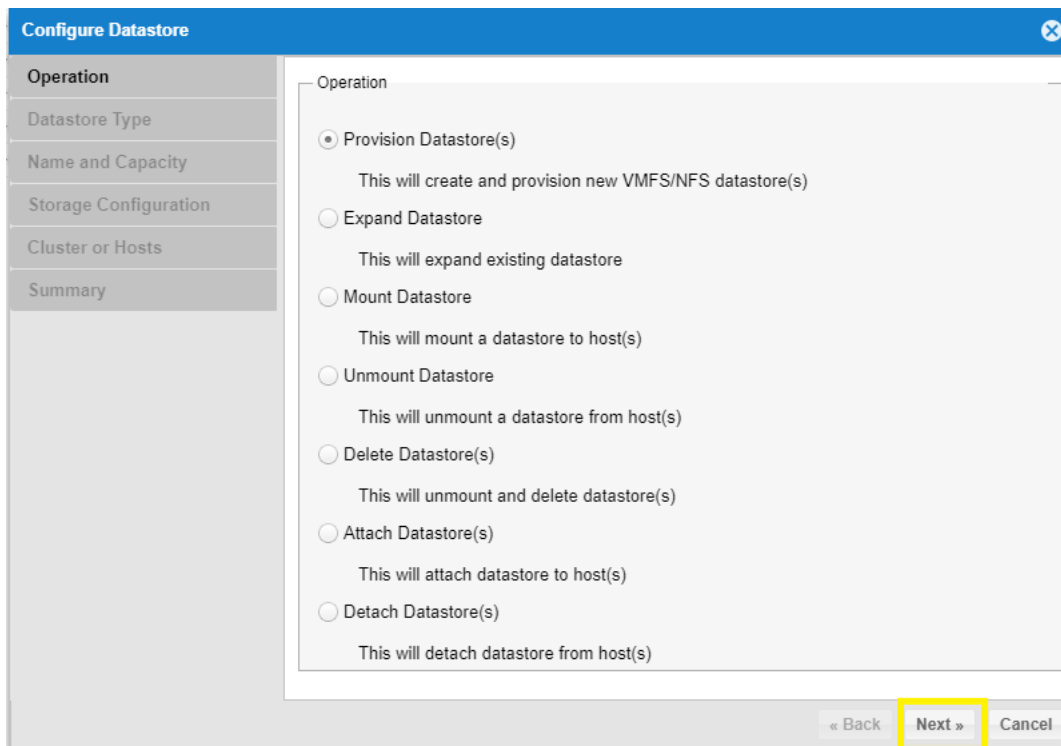
2. Click the **Manage** tab, and then click **Datastores**, and then click **Configure Datastores** (first one on the left).

Figure 31



3. For **Operation**, click the **Provision Datastore(s)** option, and then click **Next**.

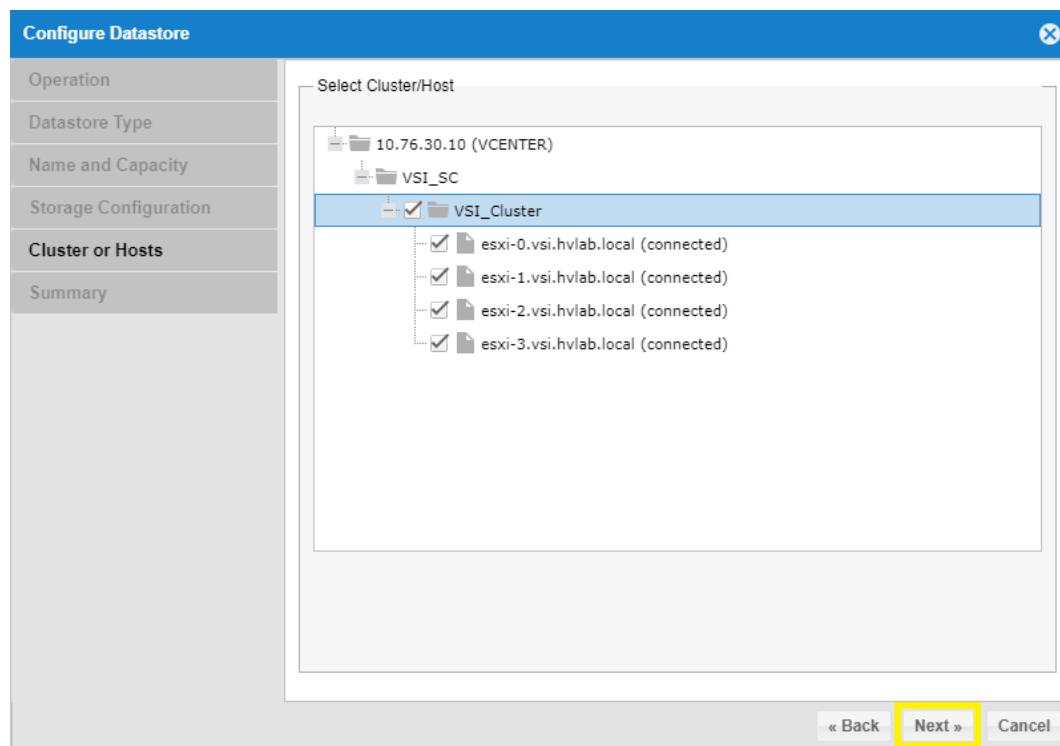
Figure 32



4. For **Datastore Type**, click **VMFS Datastore** and then click **Next**.
5. For **Name and Capacity**, click either **Single Datastore Creation** or **Multiple Datastore Creation**, specify the datastore name and capacity, and then click **Next**.
6. For **Storage Configuration**, click the appropriate storage system and storage pool from the list, and then click **Next**.

7. For **Cluster and Hosts**, click the ESXi cluster or hosts, and then click **Next**.

Figure 33



8. For **Summary**, review the settings and click **Next**.
9. Click **Finish**.

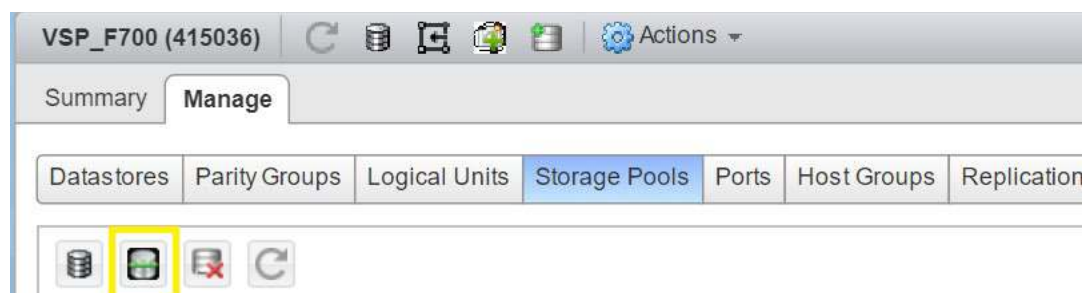
Expand a Storage Pool

You can grow a storage pool and increase its capacity that is native to the RAID storage system using Hitachi Unified Compute Platform Advisor.

To expand a storage pool, do the following.

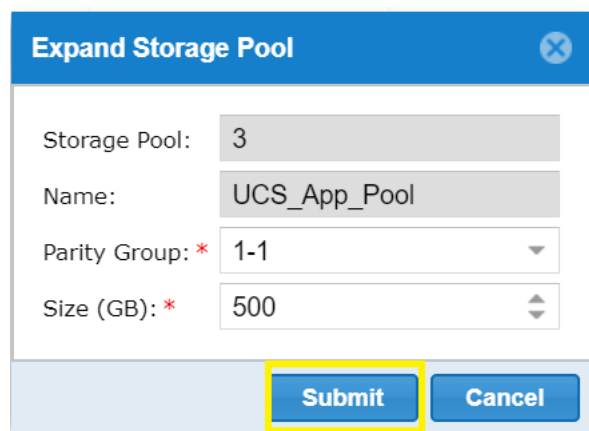
1. From the **Manage** tab, click **Storage Pools**, and then click **Expand Storage Pool** (second on from the left).

Figure 34



2. In the **Expand Storage Pool** dialog box, click a **Parity Group** from the list and enter the additional capacity size for the expansion.

Figure 35



The dialog box titled "Expand Storage Pool" has a blue header with a close button. It contains four input fields: "Storage Pool:" with value "3", "Name:" with value "UCS_App_Pool", "Parity Group: *" with a dropdown menu showing "1-1", and "Size (GB): *" with a spinner set to "500". At the bottom are "Submit" and "Cancel" buttons. The "Submit" button is highlighted with a yellow rectangle.

3. Click **Submit**.

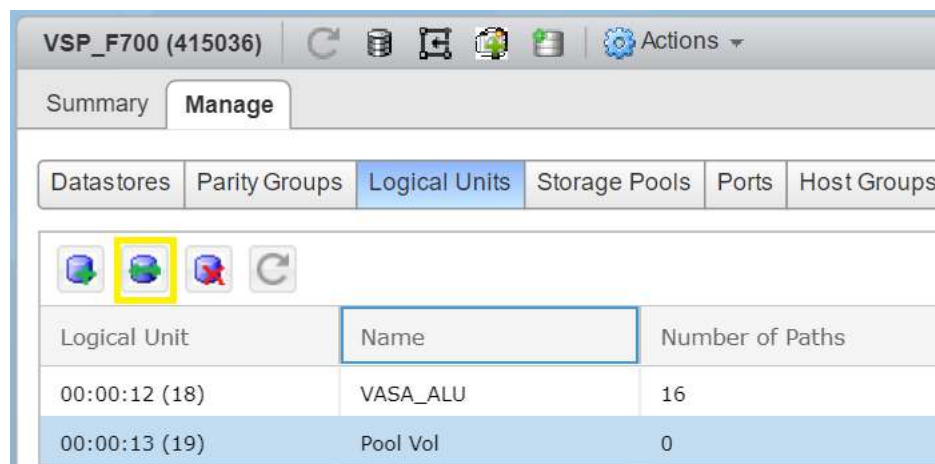
Expand an LDEV Backing a Datastore

You can grow a storage logical device native to the RAID storage system with Hitachi Unified Compute Platform Advisor.

To expand a logical device, do the following.

1. From the **Manage** tab, click **Logical Units**, select a logical unit from the list, and then click Expand Logical Unit (second one from the left).

Figure 36



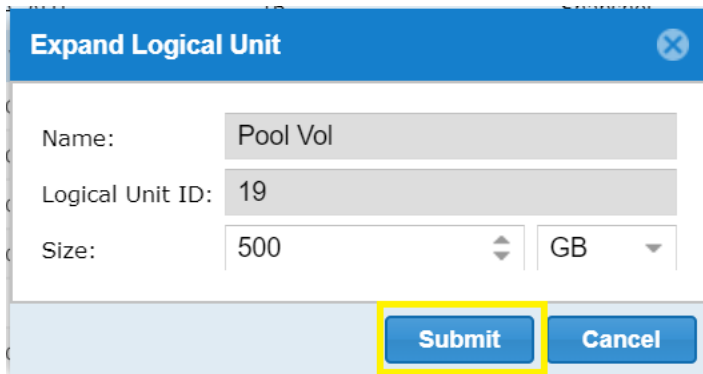
The screenshot shows the "VSP_F700 (415036)" interface with the "Manage" tab selected. Under "Manage", the "Logical Units" tab is active. A table lists logical units. The first row is highlighted with a yellow box, and its "Expand Logical Unit" icon (a green square with a white plus) is also highlighted with a yellow box.

Logical Unit	Name	Number of Paths
00:00:12 (18)	VASA_ALU	16
00:00:13 (19)	Pool Vol	0

2. Verify that the following are filled in correctly:
 1. **Name** — The name of the logical unit.
 2. **Logical Unit ID** — Specifies the logical unit ID.

3. Enter the additional **Size** for the logical unit.

Figure 37



The image shows a dialog box titled "Expand Logical Unit" with a close button (X) in the top right corner. It contains three input fields: "Name:" with the value "Pool Vol", "Logical Unit ID:" with the value "19", and "Size:" with a numeric input of "500" and a unit dropdown menu set to "GB". At the bottom, there are two buttons: "Submit" and "Cancel". The "Submit" button is highlighted with a yellow border.

4. Click **Submit**.

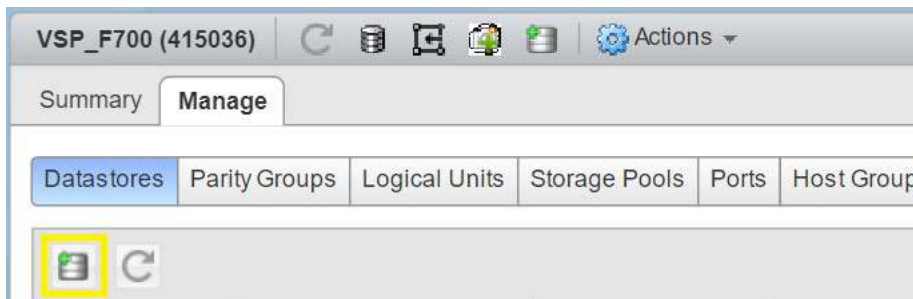
Expand a Datastore

You can expand a VMFS datastore to increase the allocated capacity within your virtual environment. Expanding a datastore using Hitachi Unified Compute Platform Advisor also expands the supporting LUN native to the storage system.

To grow a datastore, do the following.

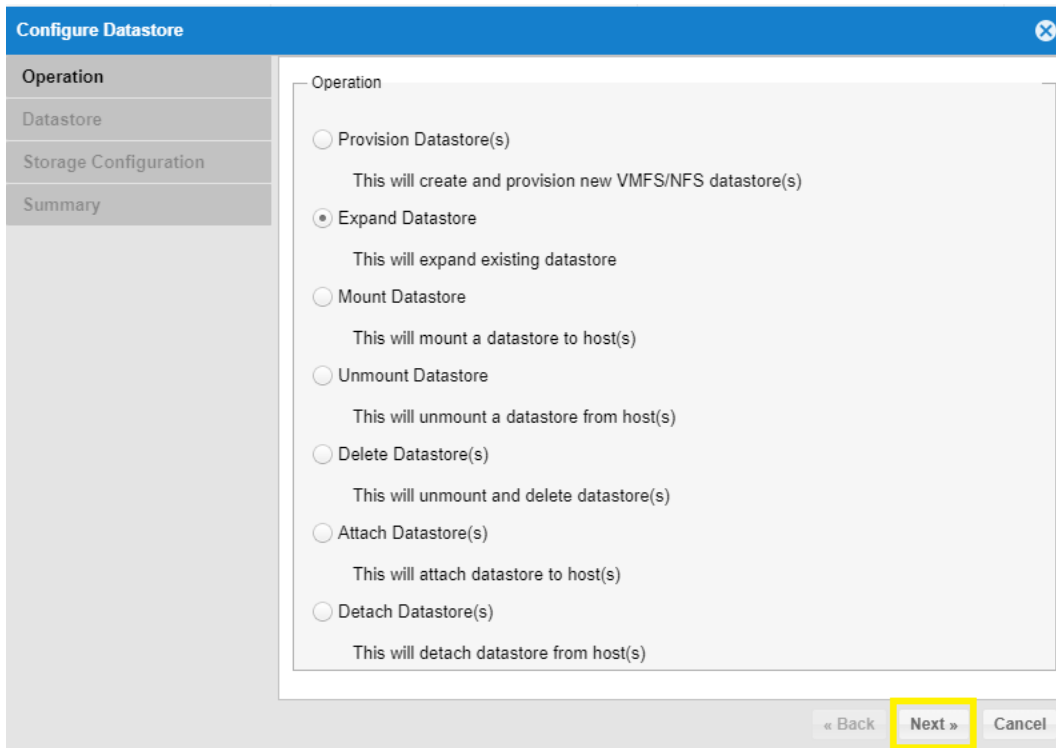
1. In the **Storage Objects** window, double-click the storage system.
2. From the **Manage** tab, click the **Datastores** tab, and then click **Configure Datastore** (first one on left).

Figure 38



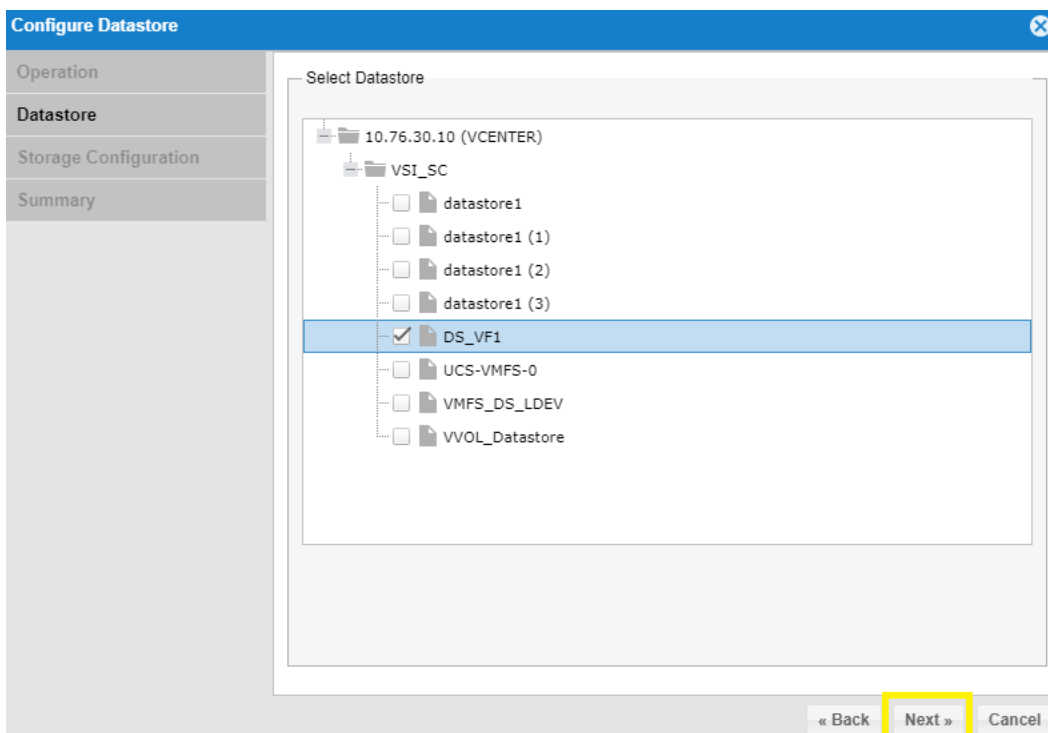
3. For **Operation**, click the **Expand Datastore** option, and then click **Next**.

Figure 39



4. For **Datastore**, select the check box for the datastore from the list, and then click **Next**.

Figure 40



- For **Storage Configuration**, specify the storage configuration details for the datastore, and then click **Next**.

Figure 41

Configure Datastore

Operation
Datastore
Storage Configuration
Summary

Storage Configuration

Current Logical Unit: naa.60060e80123abc0050403abc00000015

Current Datastore Capacity (GB): 100

Additional Datastore Capacity (GB): 100

« Back **Next »** Cancel

- For Summary, review the details to expand the datastore, and then click **Next**.
- To expand the datastore, click **Finish**.

Delete a Logical Unit

You can remove a logical unit native to the storage system using Hitachi Unified Compute Platform Advisor.

To delete a logical unit, do the following.

- From the **Manage** tab, click **Logical Units**, select a logical unit for deletion, and then click **Delete Logical Unit** (third one from the left).

Figure 42

VSP_F700 (415036)

Summary **Manage**

Datstores Parity Groups **Logical Units** Storage Pools Ports Host Groups

Logical Unit Name Number of Paths

00:00:12 (18)	VASA_ALU	16
00:00:13 (19)	Pool Vol	0

2. Verify the chosen logical unit for removal, and then click **Yes**.

Note — You cannot delete LUNs that are part of a replication pair, such as a global-active device pair with Unified Compute Platform Advisor. Any attempt to do so generates an error.

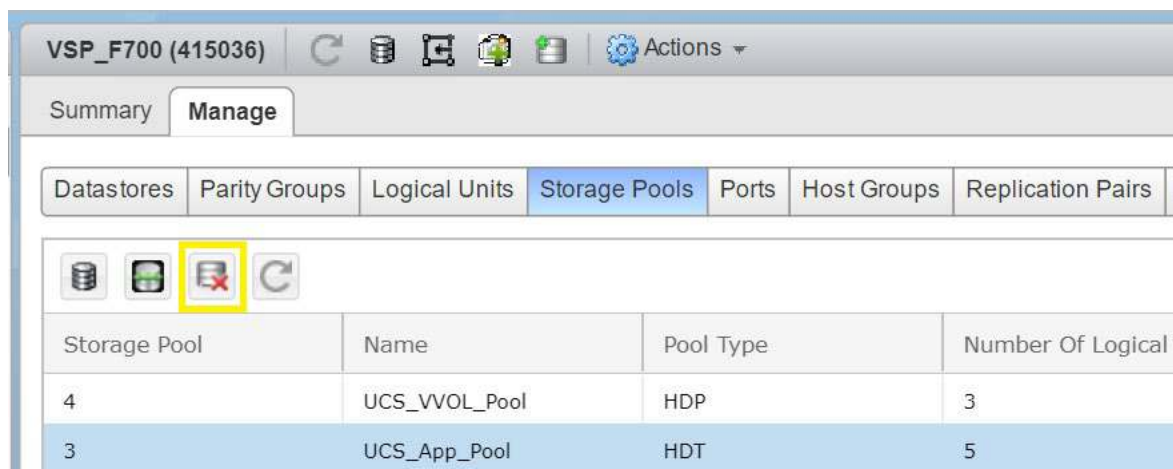
Delete a Storage Pool

You can delete storage pools from a storage system directly from the Hitachi Unified Compute Platform Advisor user interface.

To delete a storage pool, do the following.

1. From the **Manage** tab, click **Storage Pools**, select a storage pool, and click **Delete Storage Pool** (third one from the left).

Figure 43



2. Verify that the correct storage pool is selected, and then click **Yes** to remove the storage pool.

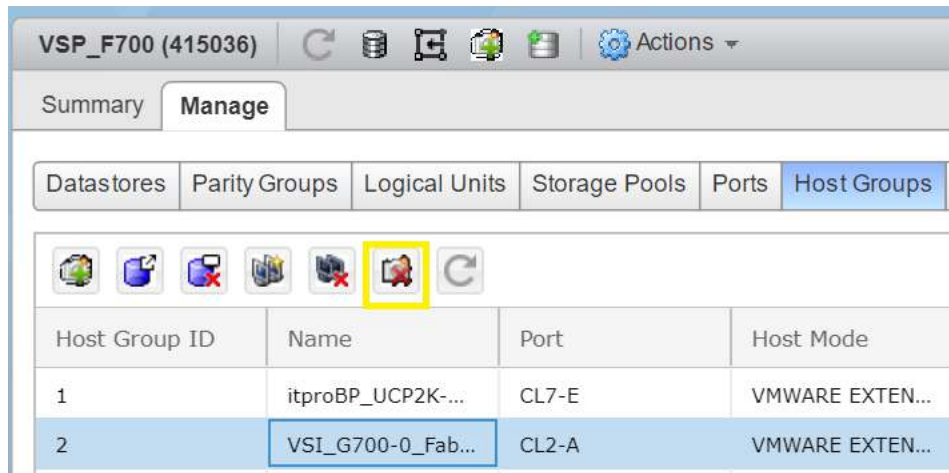
Delete a Host Group

You can delete host groups native to the storage system. Host groups that were manually created and created by Hitachi Unified Compute Platform Advisor are shown.

To delete a host group, do the following.

1. From the **Manage** tab, select **Host Groups**, choose the host group to be removed, and then click **Delete Host Group** (sixth one from the left).

Figure 44



2. Click **Yes** to confirm the deletion.

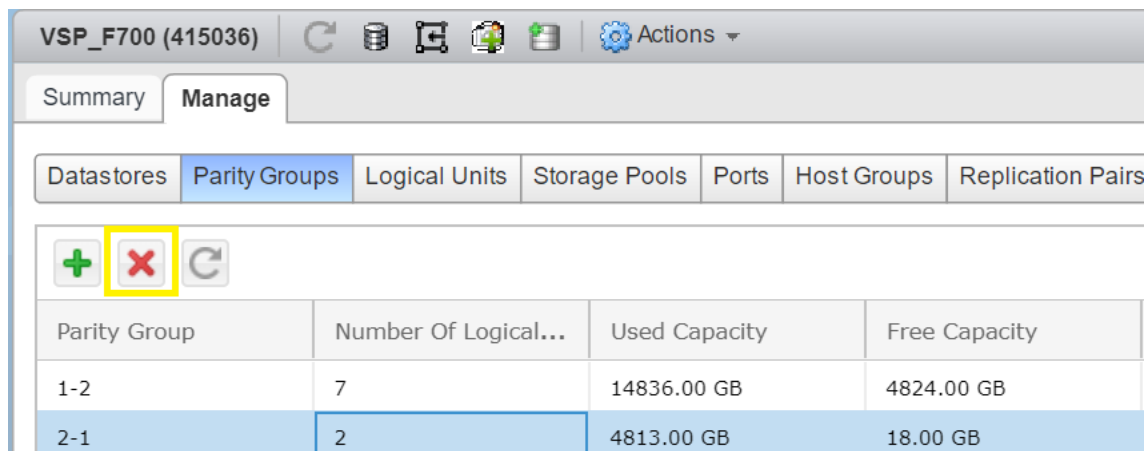
Delete a Parity Group

You can delete parity groups when they are no longer needed. You can administer parity groups that were created outside of Hitachi Unified Compute Platform Advisor.

To delete a parity group, do the following.

1. From the **Objects** tab, double-click the storage system to be deleted.
2. From the **Manage** tab, click **Parity Groups**, select the parity group to be deleted, and then click **Delete Parity Group** (second one from the left).

Figure 45



3. Click **Yes** to confirm deletion of the selected parity group.

Detach a Datastore

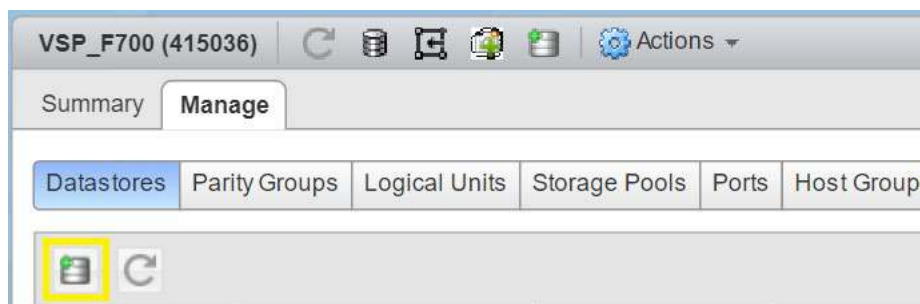
You can disconnect a datastore from one or more hosts with Hitachi Unified Compute Platform Advisor. After separating a datastore from a host, the storage is no longer available to that host.

Note — If you detach a datastore from all hosts, it will not be available for reattaching. You might need to present the LU to the host group on the storage system and remount it on the VMware ESXi host before you can attach it again. Make sure you migrate all virtual machines from the datastore before detaching it.

To detach a datastore, do the following.

1. From the **Navigator** pane, double-click the storage system with the datastore to be disconnected.
2. From the **Manage** tab, click **Datastores**, and then click **Configure Datastores** (first one on left).

Figure 46



3. Click the **Configure Datastore** icon.

4. From **Operation**, click the **Detach Datastore(s)** option, and then click **Next**.

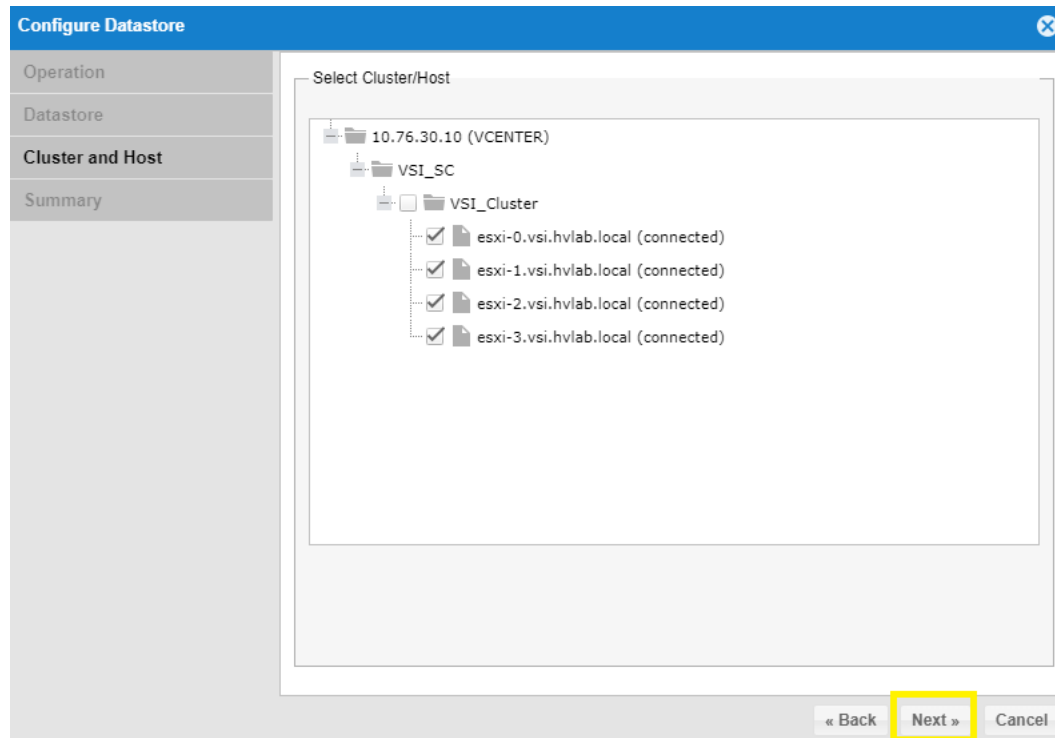
Figure 47



5. From **Datastore**, select the datastore that you want to detach (only clusters and hosts where the datastore is attached are displayed), and then click **Next**.

6. From **Cluster and Host**, Select the check box of the cluster or host, and then click **Next**.

Figure 48



7. From **Summary**, review the detachment details, and then click **Next**.
8. To detach the datastore, click **Finish**.

Delete a Datastore

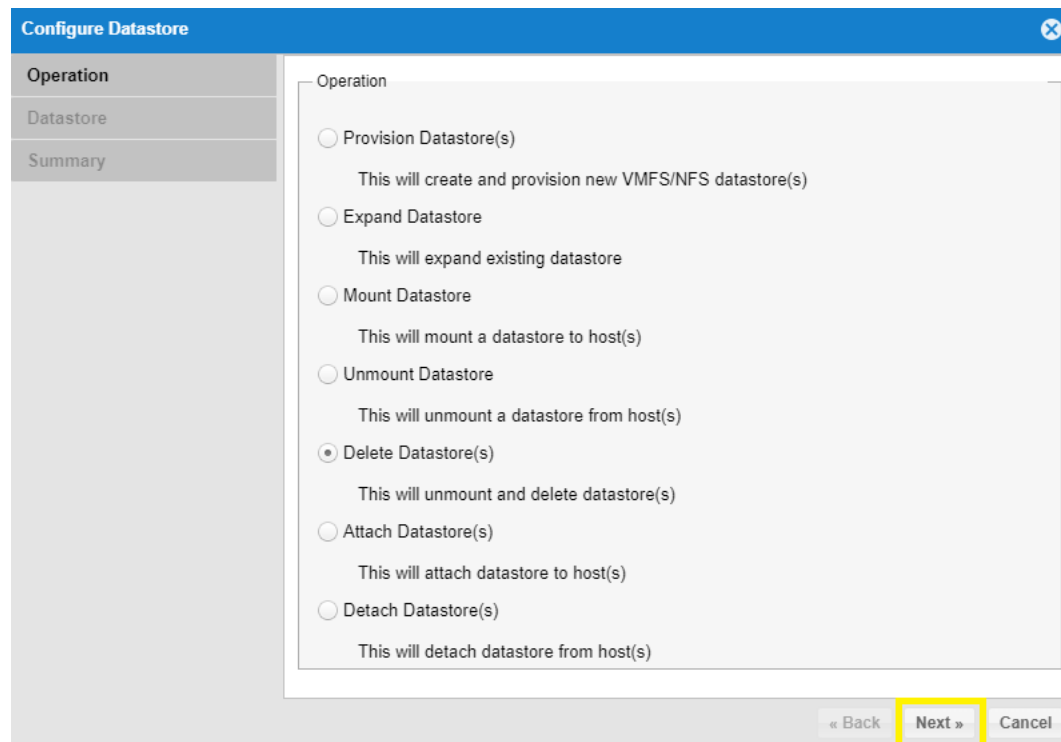
You can delete a datastore to remove it from a VMware ESXi host or cluster. This operation also gives the administrator the ability to delete the corresponding logical unit native to the storage system.

To delete a datastore with Unified Compute Platform Advisor, do the following.

1. From the Navigator pane, on the **Objects** tab, double-click the storage system with the datastore to be deleted.
2. From the **Manage** tab, click **Datastores**, and then click **Configure Datastores** (first one on left).

- From **Operation**, click the **Delete Datastore** option, and then click **Next**.

Figure 49



- From **Datastore**, select the datastores to delete from the tree. If necessary, select the **Delete Datastore Logical Unit** check box to remove the logical unit associated with the datastore from storage. When finished, click **Next**.
- From **Summary**, review the deletion details, and then click **Next**.
- To delete the datastore, click **Finish**.

Delete LUN Paths

You can remove a LUN from an existing host group using Hitachi Unified Compute Platform Advisor.

To delete a LUN path, do the following.

- From the **Manage** tab, click **Host groups**, and then click **Unpresent Logical Unit** (third one from the left).

Figure 50



2. In the **Unpresent Logical Unit** dialog box, specify the following:

- **Name** — The name of the host group
- **Target Port** — The name of the target port.
- **Logical Unit ID** — Select the logical unit ID

3. To complete deleting a LUN path, click **Submit**.

Remove a Host WWN from a Host Group

You can remove a host WWN from an existing host group using Hitachi Unified Compute Platform Advisor.

To remove a host WWN, do the following.

1. From the **Manage** tab, click **Host Groups**, select the host group you want to delete, and then click **Remove WWN From Host Group** (fifth one from the left).

Figure 51



2. In the **Remove WWN From Host Group** dialog box, select the WWN from the list that you want to delete.
3. To complete removing a host WWN from a host group, click **Submit**.

View Inventories

You can view summaries of storage systems components within the native Hitachi Unified Compute Platform Advisor user interface. These are a subset of the vantage points Unified Compute Platform Advisor provides for your VMware environment.

For additional inventory views that Unified Compute Platform Advisor provides, refer to Related Documents.

View Storage System Summary

The following details are provided on the **Summary** tab:

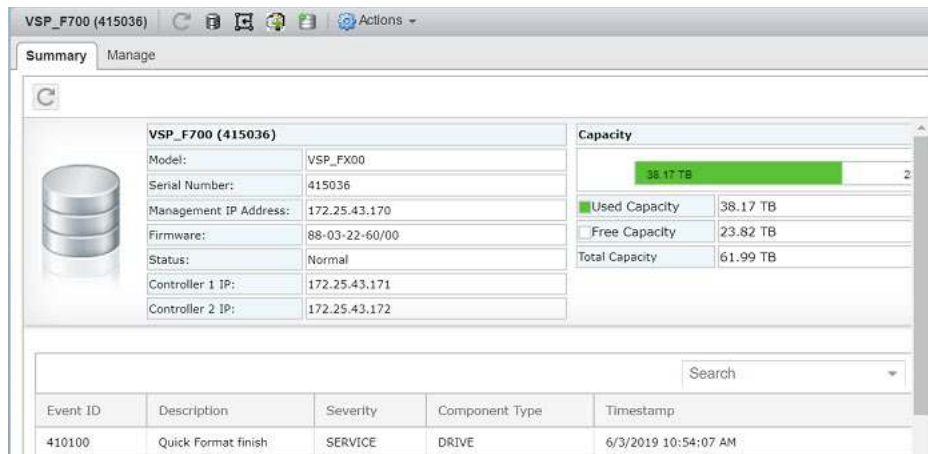
- **Model** — This identifies the model number of the storage system.
- **Serial Number** — This is the serial number for the selected storage system.
- **Management IP Address** — This is the management IP address.
- **Firmware** — This is the current firmware level for the storage system.
- **Status** — This provides the current situation for the storage system.
- **Capacity** — This displays the used, free, and total capacity for the storage system.

Below the summary details is a list of events for the selected storage system that you can use to determine how the storage system is functioning and to see if any errors have occurred.

To view the storage system summary in Hitachi Unified Compute Platform Advisor, do the following.

1. In the **Navigator** window, click **Storage**, and then select a storage system.
2. Click the **Summary** tab to see the information about the storage system.

Figure 52



View Storage Ports

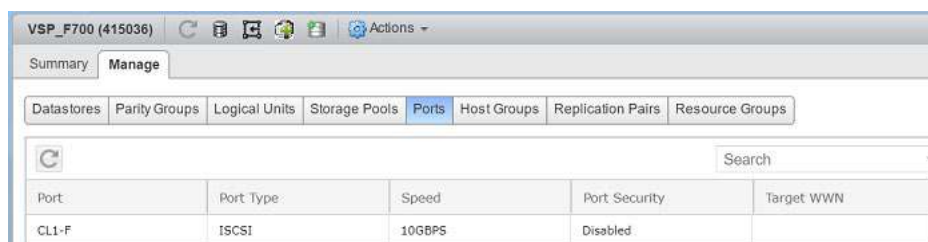
You can display ports and their current status when managing storage systems.

From the Summary pane, you see information regarding port name, type, speed, security, and target WWN.

To view storage ports using Hitachi Unified Compute Platform Advisor, do the following.

- From the **Manage** tab, click **Ports**.

Figure 53



For port administration, you must use Hitachi Device Manager or Hitachi Storage Navigator.

View Resource Groups

You can review a list of resource groups for a selected storage system. A resource group is a collection of resources that are grouped by one or more system resource types that include storage system, parity groups, pools, LDEV IDs, and storage ports.

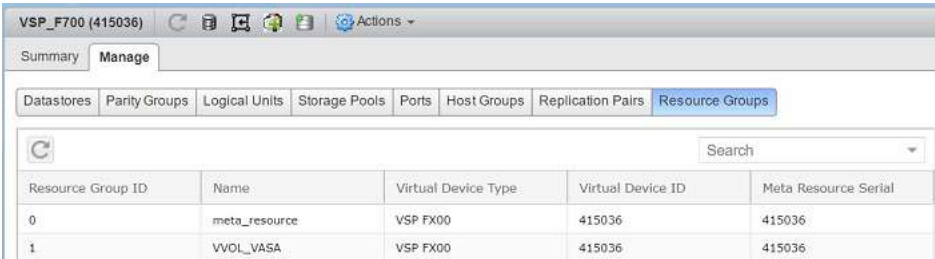
From the Resource Groups summary pane, you can obtain information regarding the following:

- Resource group ID
- Virtual device type
- Virtual device ID
- Meta resource serial, which refers to your storage systems serial number

To view resource groups with Hitachi Unified Compute Platform Advisor, do the following.

- On the **Manage** tab, click **Resource Groups**.

Figure 54



The screenshot shows the Hitachi Unified Compute Platform Advisor interface. At the top, there's a header bar with 'VSP_F700 (415036)' and an 'Actions' dropdown. Below this is a 'Summary' and 'Manage' tab bar. Under the 'Manage' tab, there's a sub-menu with 'Datastores', 'Parity Groups', 'Logical Units', 'Storage Pools', 'Ports', 'Host Groups', 'Replication Pairs', and 'Resource Groups'. The 'Resource Groups' tab is selected. Below the sub-menu is a search bar and a table with the following data:

Resource Group ID	Name	Virtual Device Type	Virtual Device ID	Meta Resource Serial
0	meta_resource	VSP FX00	415036	415036
1	VVOL_VASA	VSP FX00	415036	415036

Use Hitachi Storage Provider for Virtual Volumes (VVols)

This is how to configure and use Hitachi Storage Provider for VMware vCenter.

For additional configuration information, refer to Related Documents.

Configure the Protocol Endpoint (ALU)

The protocol endpoint (a VVol term) is an LDEV used by a VMware ESXi host to access a storage system.

On the storage system, the protocol endpoint is known as the administrative logical unit (ALU).

A protocol endpoint must be attached to an ESXi host in order to use VVols. Creating protocol endpoints and assigning them to a VMware ESXi host is done using Hitachi Device Manager - Storage Navigator.

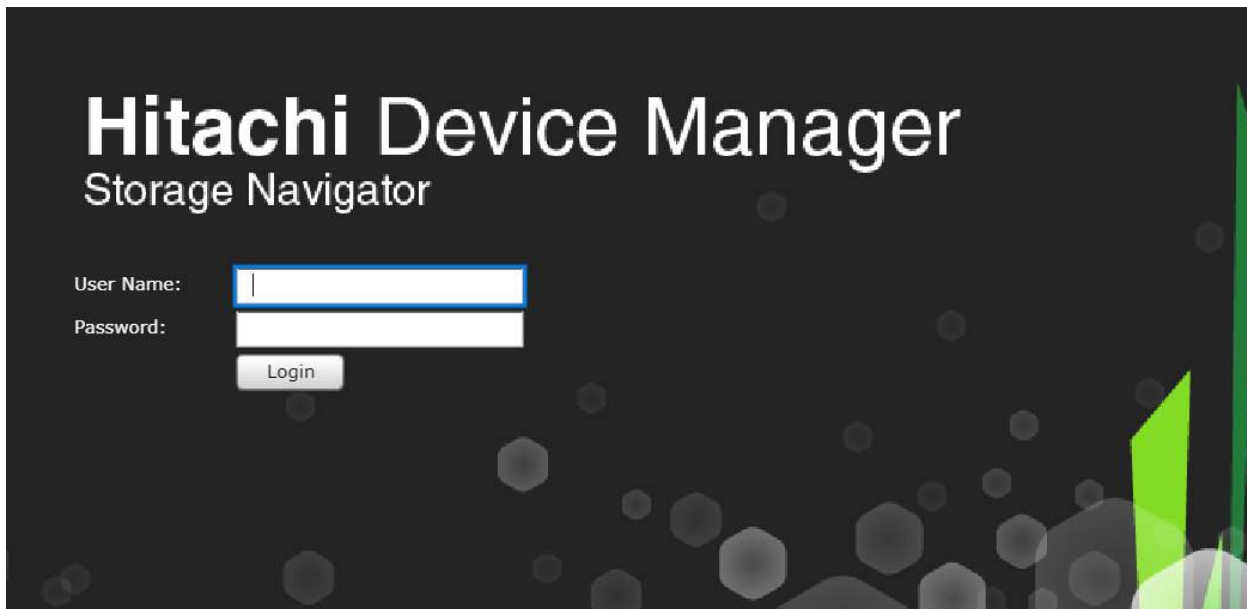
Once an ALU has been assigned, you must register the VASA storage provider within the VMware vSphere Web Client.

Note — A protocol endpoint (ALU) must be assigned to each ESXi host within a VVol environment.

To create an ALU, do the following.

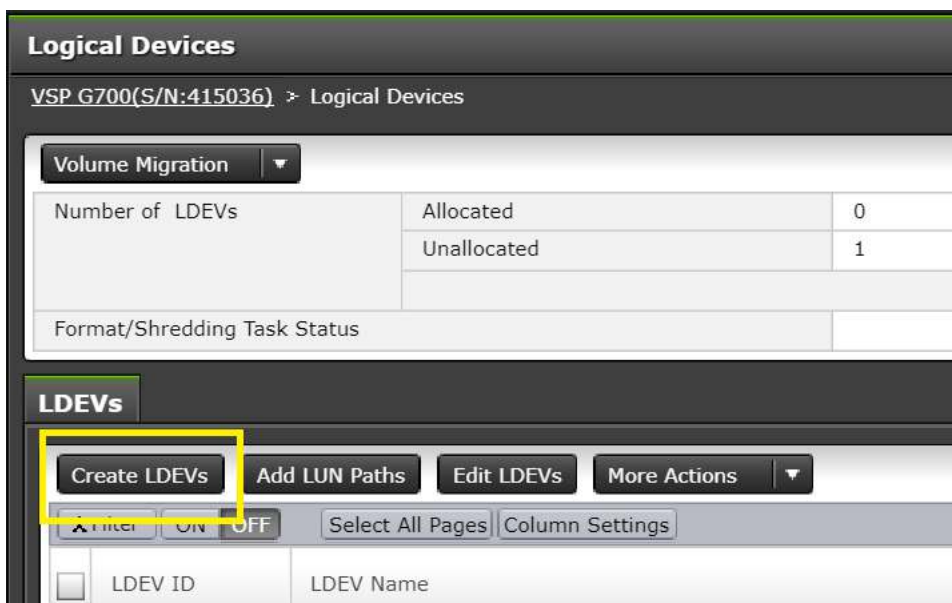
1. Enter your storage system's SVP IP address to open Hitachi Storage Navigator.
2. Enter system credentials and click **Login**.

Figure 55



3. From the navigation tree on the left, click **Logical Devices**.
4. Click **Create LDEVs**.

Figure 56



5. Create the LDEV.
 - (1) For Provisioning Type, click **ALU**.
 - (2) In Number of LDEVs, type the number of ALUs.
 - (3) For LDEV Number, type the Prefix and Initial Number.
 - (4) Click **Add**.

Figure 57

Create LDEVs

1.Create LDEVs > 2.Confirm

This wizard lets you create and provision LDEVs enter the information for LDEVs you want to create, and then Click Finish to confirm the creation, or click Next if you want to add LUN paths for the LDEVs.

Provisioning Type: ALU

Number of LDEVs: 1 (1-63)

LDEV Name:

Prefix	Initial Number
ALU	

(Max. 32 characters total including max. 9-digit number, or blank)

Options

6. Click **Finish**.

Register the VASA Provider in VMware vSphere

Once you have created and mapped the ALU to your respective VMware ESXi hosts, you must register Hitachi Storage Provider for Virtual Volumes within your VMware vSphere environment.

To register the VASA provider, do the following.

1. Log on to VMware vSphere Web Client.
2. From **Navigator**, click **Storage**.
3. In the right pane, click the **Configure** tab, and then click **Storage Providers**.
4. To register a new storage provider, click the **+** button.

5. In the **New Storage Provider** dialog box, enter values in Table 2.

Table 2. Register VASA Provider

For This	Use This
Name	Any name. For example, VASA Provider for block.
URL	The VASA Provider URL; <ul style="list-style-type: none">▪ If a FQDN is not supplied, go to this URL: https://VASA-Provider-IP-Address:50001/version.xml▪ If a FQDN was supplied, go to this URL: https://VASA-Provider-FQDN:50001/version.xml
User name	vCenter account name. For example, vsphere.local\Administrator <hr/> Note — When you use the SPBM tag, Taggin Admin must be available in the vCenter SSO account. <hr/>
Password	vCenter SSO password

6. Click **OK**. If a security alert window opens, click **Yes**.
7. Confirm that the registration was successful by viewing the following:
- The **Storage Providers** section in the VMware vSphere Web Client displays the newly added storage provider.
 - The Storage Provider indicates the storage system name with which it is communicating.

Note — When the VASA Provider is registered for the first time, the following error is displayed by VMware vSphere: *A problem was encountered while registering the provider. The certificate is not trusted.* If the VASA Provider registration completes and goes online, the message can be ignored.

Configure Hitachi Storage Provider

You must set the required storage system resources and resource groups before you can use virtual volumes (VVols). VVols use dynamic provisioning pools to store virtual machine data and use pools created by Hitachi Thin Image to store snapshot data.

A VVol virtual machine configuration file uses multiple LDEV IDs in order to create a 1:1 correspondence with the LUNs. These resources are collected and made available as a single logical resource group.

VVols can also use meta-resources on the storage system. If you use meta-resources, you must configure the VASA Provider.

There is a 1:1 correspondence between a resource group on the storage system and a VASA Provider storage container. When you create a virtual machine, use the resource group as the VVol datastore. Use Hitachi Device Manager - Storage Navigator to create the following:

- Dynamic provisioning pools
- Hitachi Thin Image pools
- Resource groups
- Set up LDEV IDs

In these procedures, you will do the following:

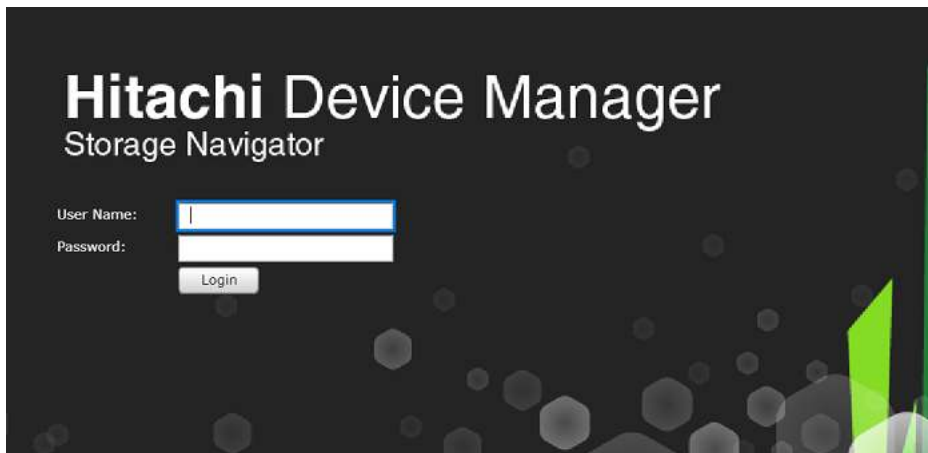
1. Create pool volumes to create a dynamic provisioning pool
2. Create a resource group.
3. Add the pool volumes and available LDEV IDs to the resource group to be used by the VASA Provider.

Create a Pool Volume

To create a pool volume with Hitachi Storage Provider, do the following.

1. Navigate to your storage system's SVP IP address to open Hitachi Storage Navigator.
2. Enter system credentials and click **Login**.

Figure 58



3. Click **Logical Devices** from the navigation tree on the left.

4. Click **Create LDEVs**.

Figure 59

The screenshot displays the 'Logical Devices' management interface for a VSP G700(S/N:415036). The interface includes a 'Volume Migration' dropdown menu and a table showing the status of LDEVs. Below this, the 'LDEVs' section contains a row of action buttons: 'Create LDEVs', 'Add LUN Paths', 'Edit LDEVs', and 'More Actions'. The 'Create LDEVs' button is highlighted with a yellow rectangular box. Below the buttons are tabs for 'Filter', 'ON', 'OFF', 'Select All Pages', and 'Column Settings'. At the bottom, a table header is visible with columns for 'LDEV ID' and 'LDEV Name'.

Logical Devices		
VSP G700(S/N:415036) > Logical Devices		
Volume Migration ▼		
Number of LDEVs	Allocated	0
	Unallocated	1
Format/Shredding Task Status		
LDEVs		
Create LDEVs Add LUN Paths Edit LDEVs More Actions ▼		
Filter ON OFF Select All Pages Column Settings		
<input type="checkbox"/>	LDEV ID	LDEV Name

5. From **Create LDEVs**, do the following:
 - (1) For Provisioning Type, click **Basic**.
 - (2) In Parity Groups Selection, click **Select Free Spaces**.
 - (3) For LDEV Capacity, type the size and click the units.
 - (4) For LDEV Name, type the Prefix and Initial Number.
 - (5) To finalize LDEV creation, click **Add**.

Figure 60

6. To complete creating an LDEV that will be used as a pool volume, click **Finish**.

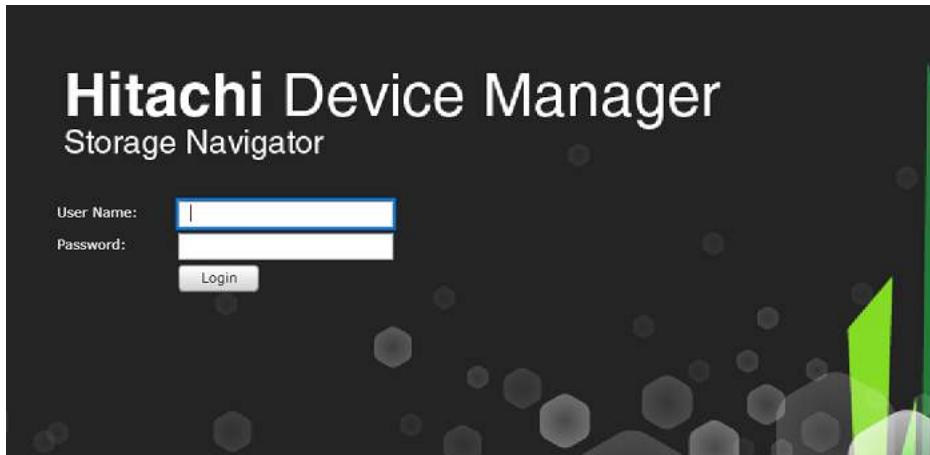
Create a Dynamic Provisioning Pool

Once you have created your respective pool volumes, you can now add those volumes to a dynamic provisioning pool.

To create a dynamic provisioning pool, do the following.

1. Navigate to your storage system's SVP IP address to open Hitachi Storage Navigator.
2. Enter system credentials and click **Login**.

Figure 61



3. From the Storage Navigator container tree, select **Pools**.

Figure 62



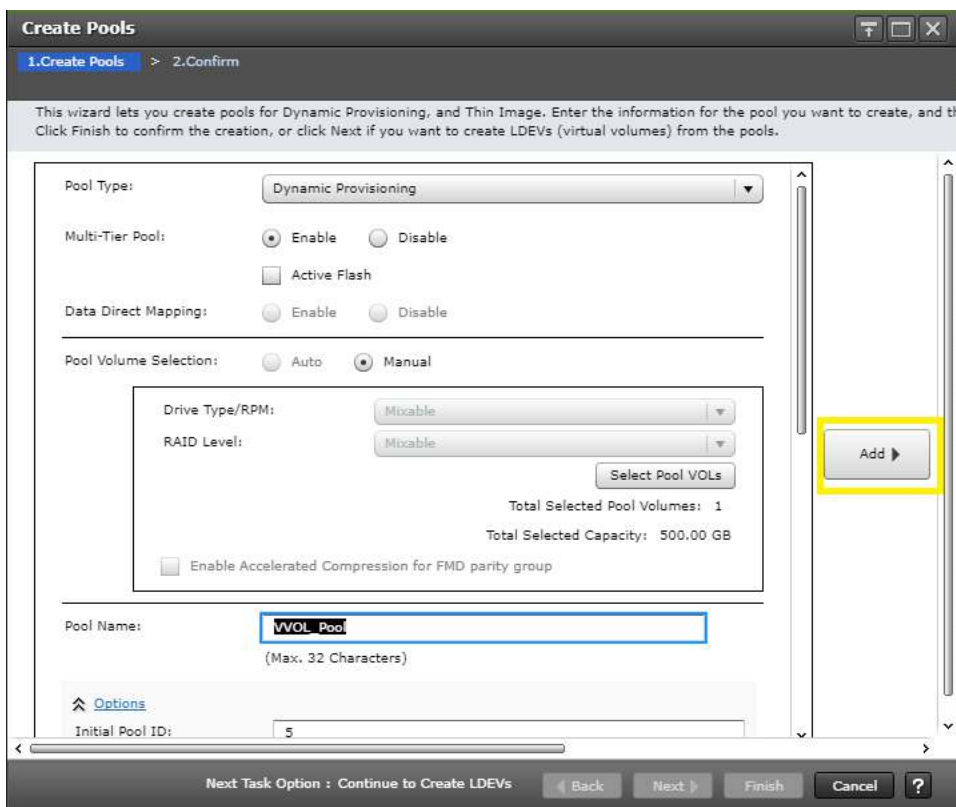
4. Click **Create Pools**.

Figure 63



4. From **Create Pools**, do the following:
 - (1) For Pool Type, click **Dynamic Provisioning**.
 - (2) Click **Select Pool VOLs**.
 - (3) In **Pool Name**, type the name.
 - (4) To add the available pool volumes to the selected pools volume list, click **Add**

Figure 64



5. Click **Finish**.

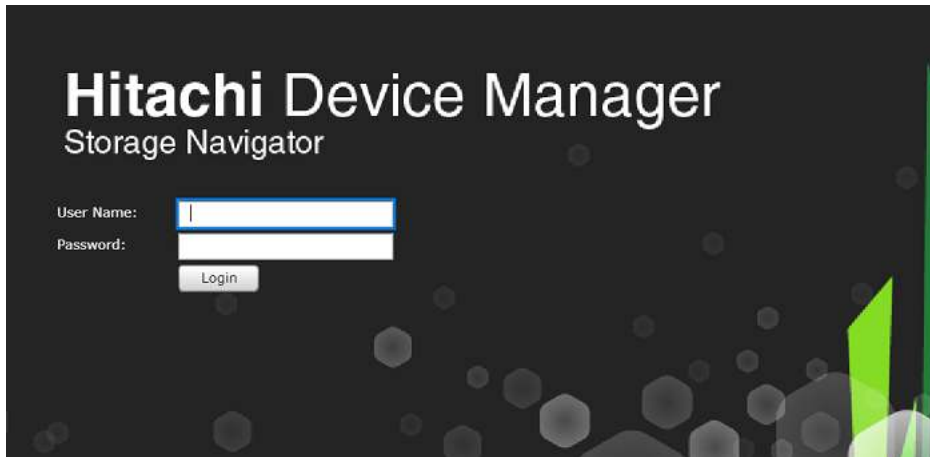
Create a Resource Group

Once you have created your pool volumes, you can set up the resource group and add applicable pool volumes and available LDEV IDs to be used by Hitachi Storage Provider.

To create a resource group, do the following.

1. Navigate to your storage system's SVP IP address to open Hitachi Storage Navigator.
2. Enter system credentials and click **Login**.

Figure 65



3. From the navigation tree on the left, click **Administration** and then click **Resource Groups**.

Figure 66



4. Click **Create Resource Group**.
5. Once the resource group has been created, select the resource group, and then click the **LDEVs** tab.

6. Click **Add Resources**.

Figure 67



7. Click **Select LDEVs** and add the created pool volumes and available unused LDEV IDs to a resource group.

Figure 68

LDEV Selection:

Total Selected LDEVs: 0		<div>Select LDEVs</div>
-------------------------	--	-------------------------

8. Click **OK**.
9. To complete onboarding resources click **Finish**.

Register the Storage System in VASA

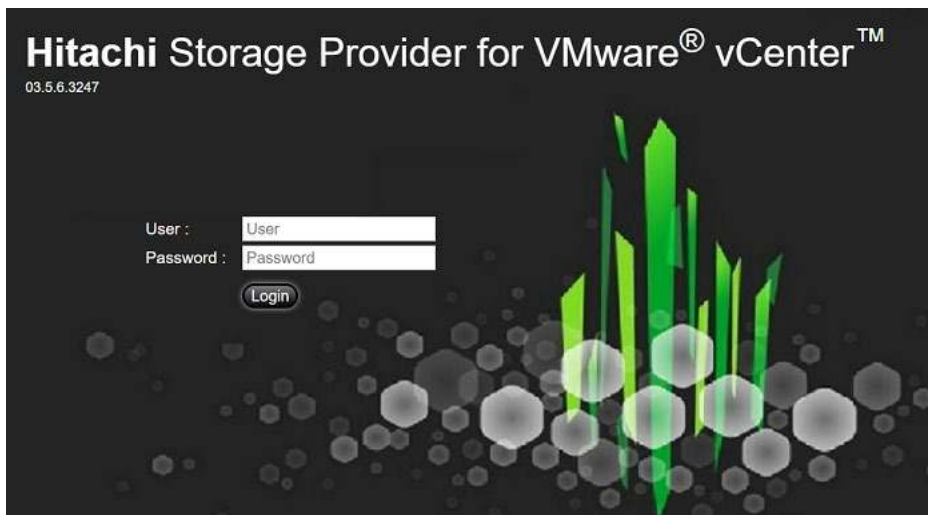
Once you have deployed the VASA provider within your virtual environment, you need to onboard the storage system that will provide the backend storage to VASA.

For more information on how to deploy and setup VASA, refer to Related Documents.

To register a storage system within VASA provider, do the following.

1. Go to your VASA provider IP address (<https://VASA-IP:50001>) and log on using your VMware vCenter or SSO credentials. Click **Login**.

Figure 69



2. From the navigation tree on the left, click **Manage Storage Systems**.

Figure 70



3. From the **Physical Storage** tab, click **Add Storage System**.
4. From **Add Storage Systems**, do the following:
 - (1) From the **Storage System Type** list, click the system model.
 - (2) Click the **SVP** option.
 - (3) Type the **SVP IP address/Host Name** of the storage system.

- (4) , Leave the RMI Registry Port at 1099.
- (5) , The **User ID** and **Password** of the storage system.
- (6) Click **Discover**.

Figure 71

5. Select the check box next to the discovered storage system and click **OK**.

Create a Storage Container and Define a Capability Profile

With VASA, each VVol storage container corresponds to a storage system resource group containing dynamic provisioning pools, pools made with Hitachi Thin Image, and LDEV IDs.

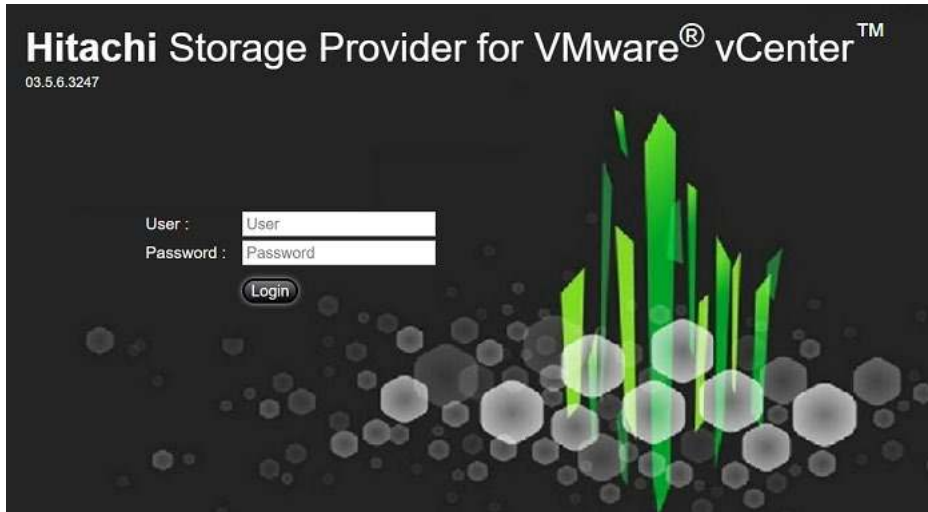
To use VVols, you must create a storage container corresponding to the storage system's resource group and set capability profiles for each dynamic provisioning pool in the group. Profiles for storage containers push storage attributes to the VMware administrator to view within VMware vSphere.

For more information regarding resource groups or storage containers, refer to Related Documents.

To create a storage container and define a capability profile, do the following.

1. Go to your VASA provider IP address and log on using your VMware vCenter or SSO credentials. Click **Login**.

Figure 72



2. From the navigation tree on the left, click **Manage Storage Containers**.

Figure 73



3. Click **Create Storage Container**.
4. Give your container a name.
5. Click **Define Profile**.

6. From **Define Capability Profile**, do the following.
 - (1) In **Name**, type the profile name.
 - (2) Assign managed storage capabilities to your profile. The characteristics need to relate to your VVol resource group native to the registered storage subsystem.
 - (3) Click **OK**.

Figure 74

7. After setting the storage system attributes, click **Submit**.

Figure 75

	Name	Description	Pool	Pool Name	Pool Type	Capacity		Logical Capacity	
						Total	Free	Total	Free
<input checked="" type="checkbox"/>	Performance_Profile		DP 4	UCS_VVOL_Pool	HDP	4.00TB	3.99TB	∞	∞

Define a Virtual Machine Storage Profile

Once configuring the VASA Provider, VMware administrators must create a virtual machine storage policy based on the capabilities that are pushed down from the VASA Provider. These attributes can be based on cost, RAID level, pool type, tiers, and data protection capabilities.

To create virtual machine storage policies within VMware vSphere, do the following.

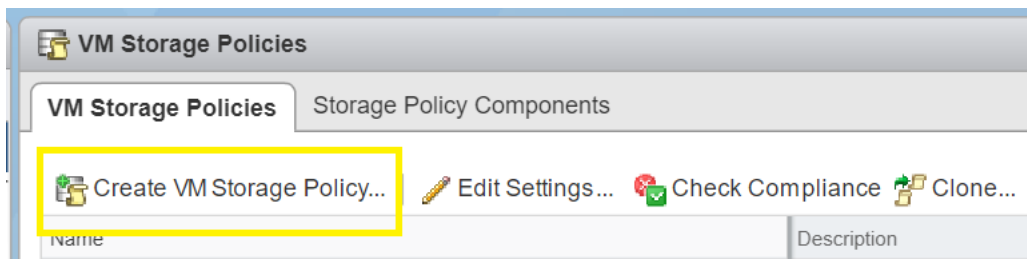
1. Navigate to and log on to VMware vSphere Web Client.
2. From the home directory, click **VM Storage Policies**.

Figure 76



3. Click **Create VM Storage Policy**.

Figure 77



4. From Create New VM Storage Policy, do the following:
 - (1) Select your vCenter and assign a policy name.
 - (2) From **Placement**, for **Storage Type**, click **com.hitachi.storageprovider.vvol**.
 - (3) Select the check boxes for storage rules that identify capabilities passed down by the storage administrator.
 - (4) Click **Next**.

Figure 78

The screenshot shows the 'Create New VM Storage Policy' wizard. The left sidebar indicates the current step is '2b Rule-set 1'. The main area is titled 'Rule-set 1' and contains the following elements:

- Use rule-sets in the storage policy:** A checkbox that is checked.
- Placement section:**
 - Storage Type:** A dropdown menu showing 'com.hitachi.storageprovider.vvol'.
 - Performance IOPS - Class:** A list of checkboxes with 'Tier1_IOPS' selected.
 - Pool Type:** A list of checkboxes with 'HDP' selected.
- Buttons:** 'Add another rule set', 'Remove this rule set', 'Back', 'Next' (highlighted with a yellow box), 'Finish', and 'Cancel'.

- From **Storage Compatibility**, select any compatible storage and click **Finish**.

Figure 79

Create New VM Storage Policy

✓ 1 Name and description
 ✓ 2 Policy structure
 ✓ 2a Common rules
 ✓ 2b Rule-set 1
 ✓ **3 Storage compatibility**
 ✓ 4 Ready to complete

Storage compatibility
 As defined, this VM storage policy is compatible with the following storage:

Storage Compatibility	Total Capacity	vSAN Capacity	Virtual Volumes Capac...	VMFS Capacity	NFS Capacity
Compatible	4.00 TB	0.00 B	4.00 TB	0.00 B	0.00 B
Incompatible	2.59 TB	0.00 B	0.00 B	2.59 TB	0.00 B

Compatible storage

Name	Datacenter	Type	Free Space	Capacity	Warnings
VVOL_Datastore	VSI_SC	VVol	3.99 TB	4.00 TB	

Back Next **Finish** Cancel

Once you have created a virtual machine storage policy within the vSphere Web Client, you can select the policy when creating a new virtual machine in your environment to correlate it to applicable storage.

Deploy a Virtual Volume (VVOL) Datastore

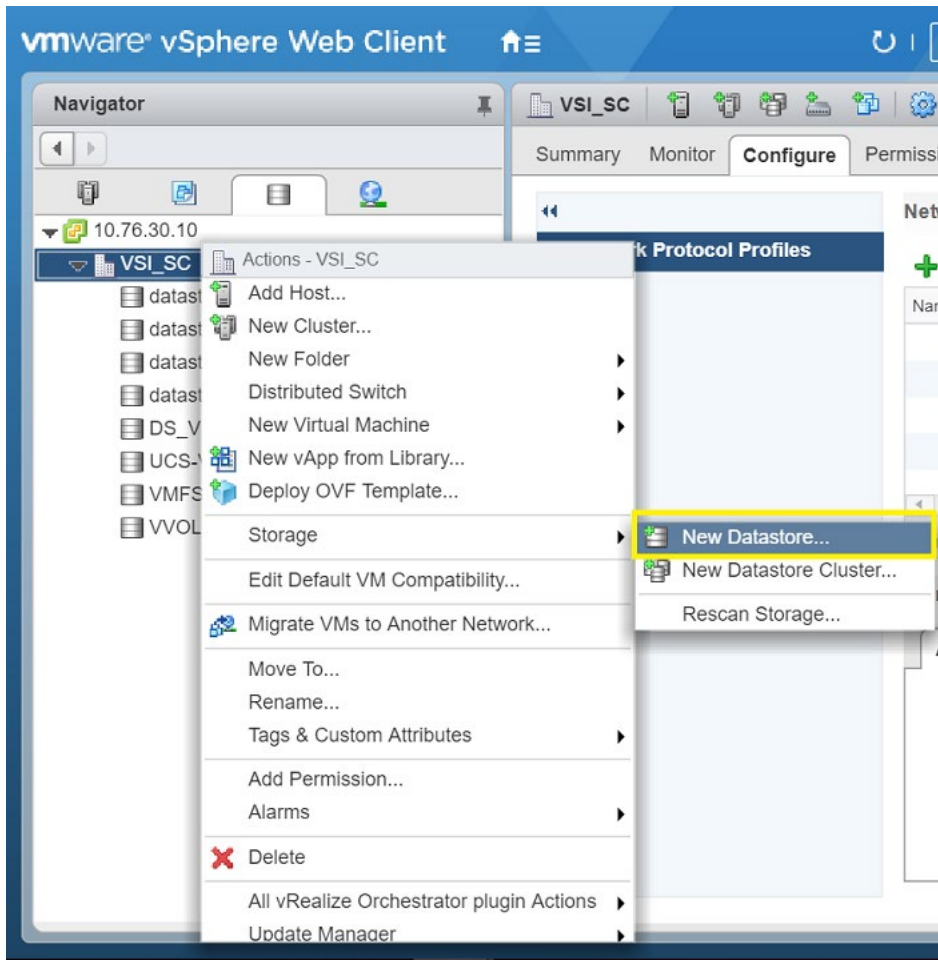
After you have successfully registered the VASA Provider, you can implement a virtual volume (VVOL) datastore.

To deploy a VVOL datastore, do the following.

- Log on to VMware vSphere Web Client and select **Home** in the Navigator area.
- Under the **Inventory List**, select the datacenter where you want to deploy the VVOL datastore.

3. Right-click the datacenter, click **Storage**, and then click **New Datastore**.

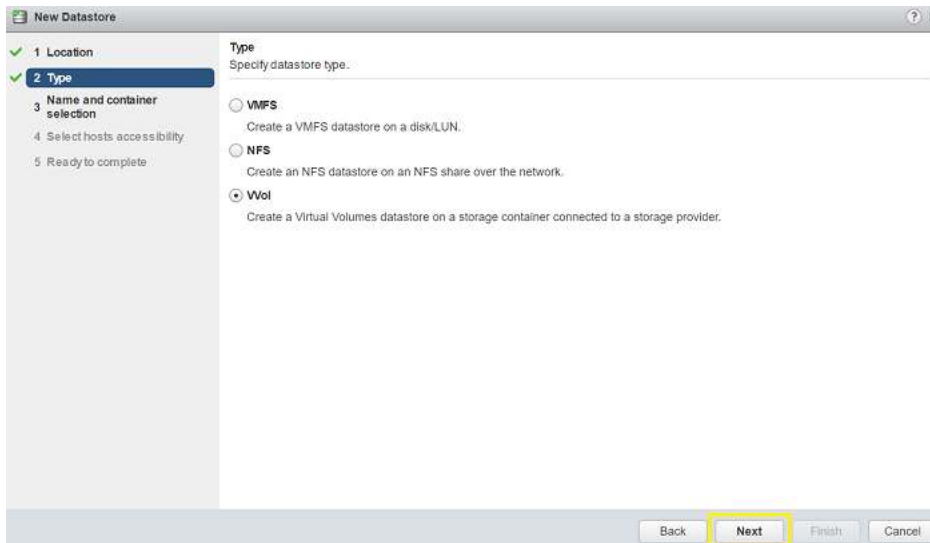
Figure 80



4. From **Location**, click **Next**.

5. From **Type**, click the **VVol** option, and then click **Next**.

Figure 81



6. From **Name and container selection**, select your datastore and then click **Next**.
7. From **Select hosts accessibility**, select the check boxes to add the hosts that you want to associate with your datastore, and then click **Next**.
8. From **Ready to complete screen**, review your settings, and then click **Finish**.

You are returned to the Home screen, where the new VVol datastore now displays under your datacenter in the inventory list.

Deploy a Virtual Machine Using Virtual Volumes

Once you have configured your VASA Provider and have onboarded the protocol endpoint (PE) onto VMware vSphere along with creating virtual machine storage policies, you will be able to create a virtual machine.

This procedure covers how to deploy a virtual machine using virtual volumes (VVols), if you need information about how to configure VASA, the storage system, or VMware vSphere, refer to Related Documents.

To deploy a virtual machine with VVols, do the following.

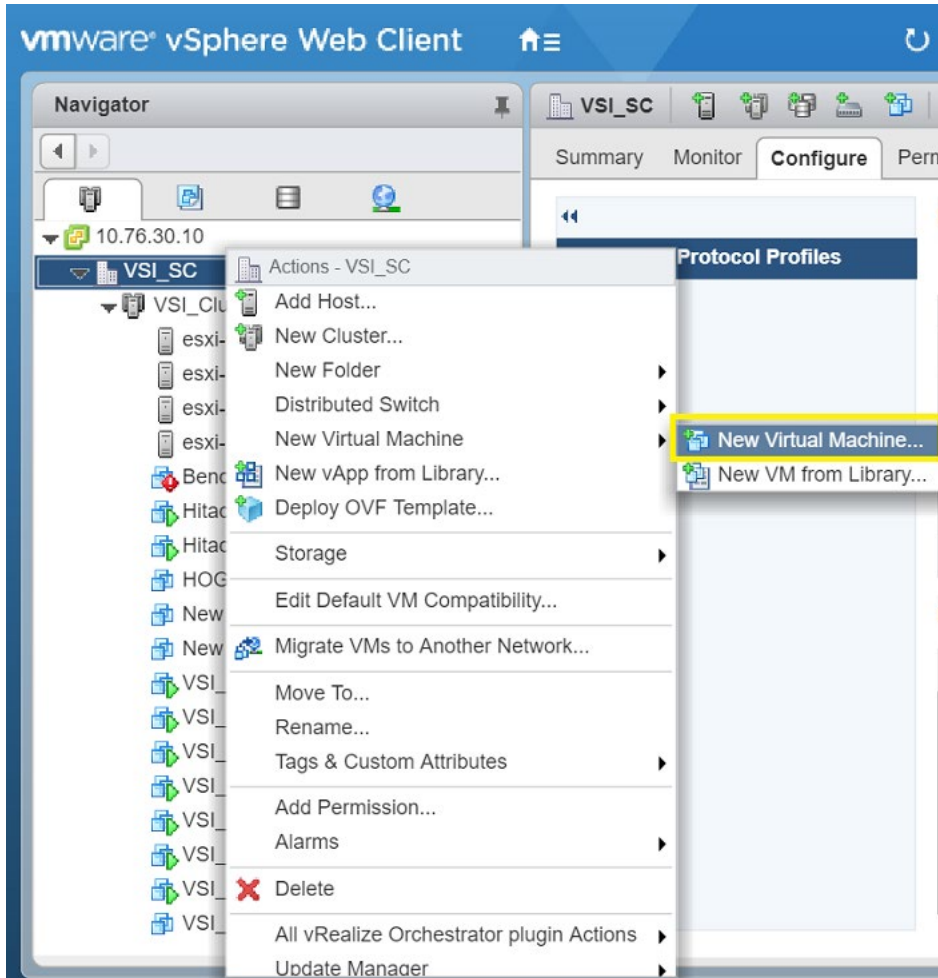
1. Navigate to and log on to VMware vSphere Web Client.

Figure 82



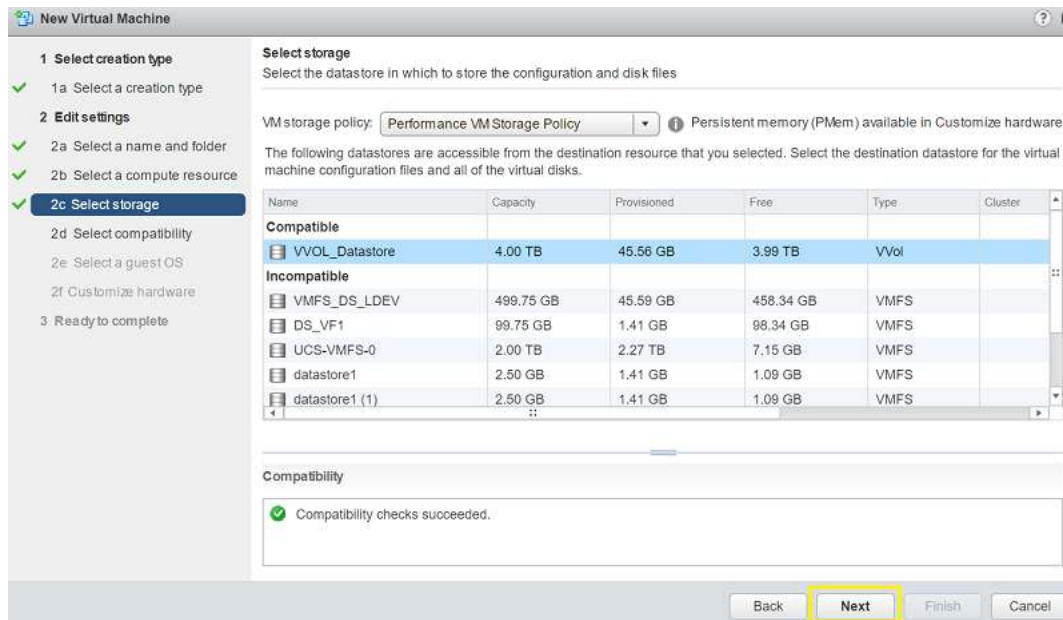
2. From the home directory, click **Hosts and Clusters**.
3. Right click your selected datacenter and click **New Virtual Machine**. From **Select a Creation Type**, click **New Virtual Machine**.

Figure 83



4. On New Virtual Machine, do the following:
 - (1) From **Select a Creation Type**, click **New Virtual Machine**.
 - (2) From **Select6** a name and folder, type a virtual machine name and select your datacenter.
 - (3) From **Select Compute Resource**, select the host or cluster.
 - (4) From **Select Storage**, for VM storage policy, click the policy for this virtual machine that was created by the VMware administrator regarding VVol capabilities within your virtual environment. Figure 82 shows Performance VM Storage Policy. Your policy may be different.
 - (5) Click **Next**.

Figure 84



5. From **Ready to Complete**, review your settings and click **Finish**.

Use Hitachi Storage Provider for VMware vCenter with Logical Devices (LDEVs)

This covers the configuration and how to use Hitachi Storage Provider for VMware vCenter with LDEVs.

For additional configuration information, see Related Documents.

Configure Storage System Resources (LDEVs)

You must set the required storage system resources and resource groups before you can use VMFS LDEVs with storage policy-based management (SPBM) tagging. VMFS LDEVs can use meta-resources on the storage system. Use Hitachi Device Manager - Storage Navigator to create dynamic provisioning pools and allocate LDEVs to VMware ESXi hosts.

- Make sure the storage system has been onboarded to the VASA Provider. Refer to page 55 on how to register your storage system to VASA.
- You must also onboard the VASA Provider to VMware vCenter. Refer to page 46 on how to register the VASA provider in VMware vSphere.

In the following procedures, do the following:

1. Create a pool volume.
2. Create a dynamic provisioned pool.
3. Allocate an LDEV to VMware ESXi hosts.

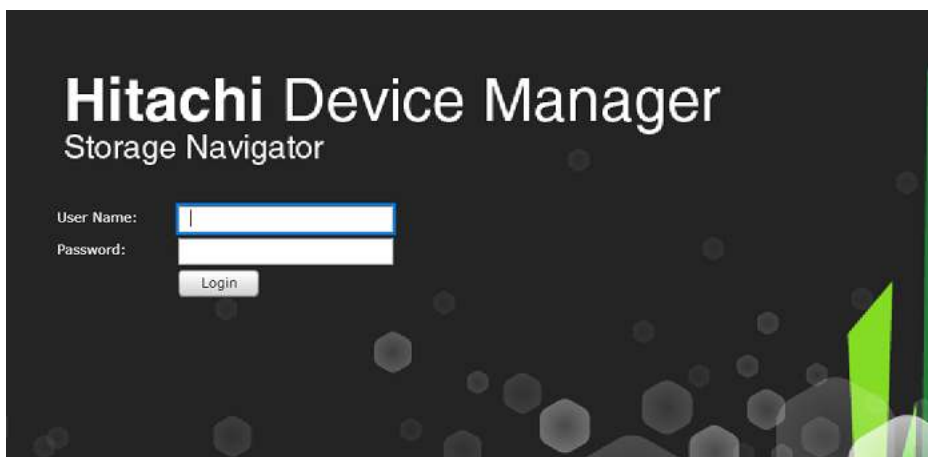
For more information regarding VASA and LDEV capabilities, see Related Documents.

Create a Pool Volume

To create a pool volume, do the following.

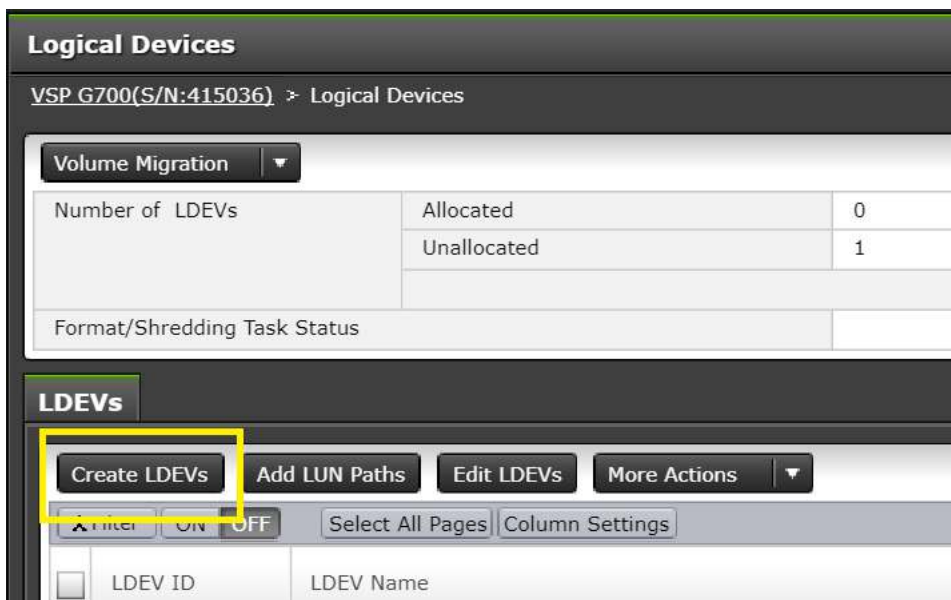
1. Navigate to your storage system's SVP IP address to open Hitachi Storage Navigator and log on.

Figure 85



2. From the navigation tree on the left, click **Logical Devices**.
3. Click **Create LDEVs**.

Figure 86



4. To create the LDEV, do the following:
 - (1) From **Create LDEV**, for **Provisioning Type**, click **Basic**. Select available parity groups by clicking **Select Free Spaces**.
 - (2) To finalize LDEV creation, assign the LDEV capacity and name, and then click **Add**.
5. Click **Finish**.

Keep Hitachi Storage Navigator running for the next procedure.

Create a Dynamic Provisioning Pool

Once you have created your pool volumes, you can now create a dynamic provisioning pool using the Hitachi Storage Navigator session used for Create a Pool Volume.

To create a pool, do the following.

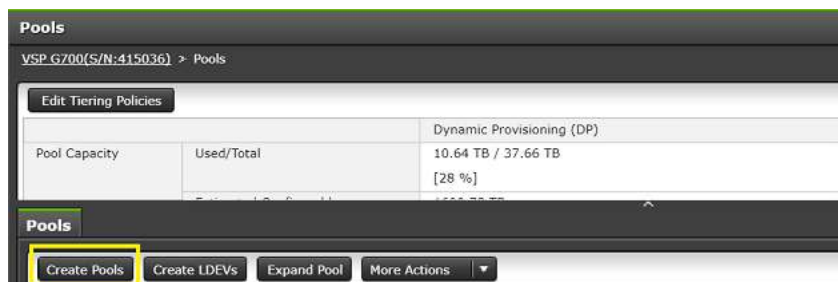
1. From the Storage Navigator container tree, click **Pools**.

Figure 87



2. Click **Create Pools**.

Figure 88



3. From **Create Pool**, do the following:
 - (1) For Pool Type, click **Dynamic Provisioning**.
 - (2) Click **Select Pool VOLs** to add available pool volumes to the selected pools volume list, and then click **OK**.
 - (3) For Pool Name, type the name of the dynamic provisioning pool.
 - (4) To finalize the selection, click **Add**.

Figure 89

4. Click **Finish**.

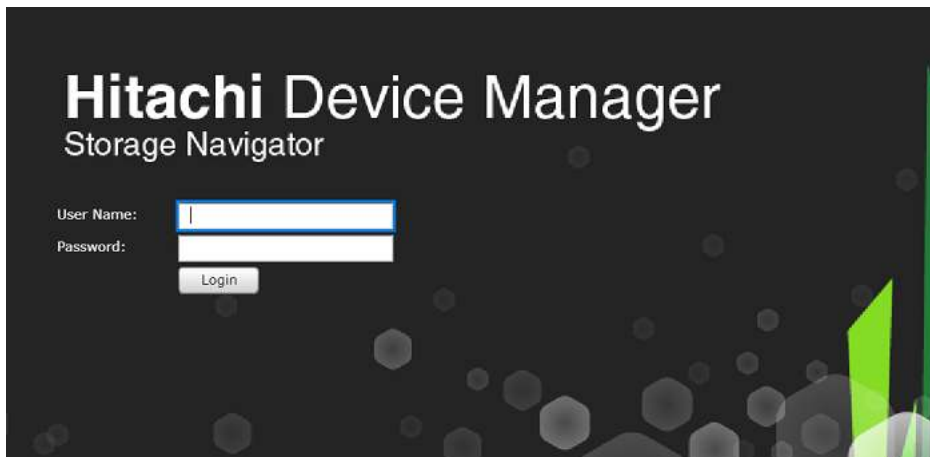
Provision a LUN to VMware ESXi Hosts

Once you have created your dynamic provisioning pool, you can carve your LUN and present it among your VMware ESXi hosts.

To present a LUN to your host, do the following:

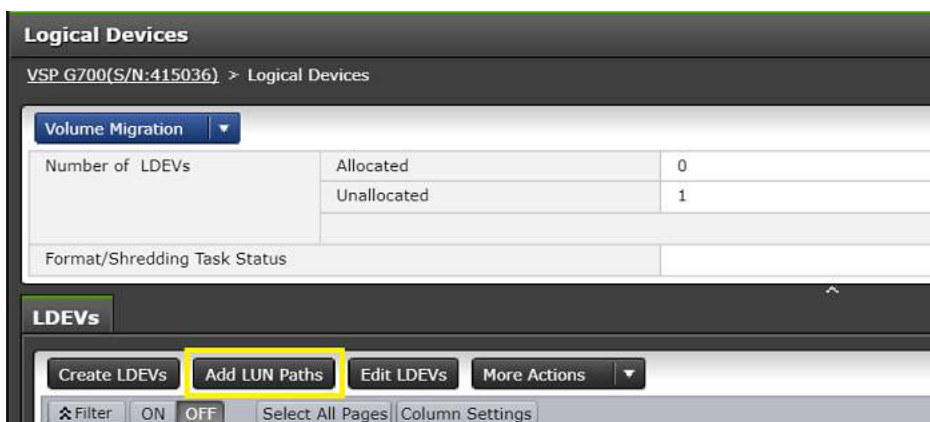
1. Navigate to your storage system's SVP IP address to access Hitachi Storage Navigator.
2. Log on using system credentials.

Figure 90



3. Click **Logical Devices** and then click **Create LDEVs**.
4. From **Logical Devices**, do the following:
 1. From the **Provisioning Type** list, click **Dynamic Provisioning**.
 2. Select an available pool and define capacity for the LDEV.
 3. To complete creating the LDEV, click **Finish**.
5. Once the LDEV has been created, select the LDEV and click **Add LUN Paths**.

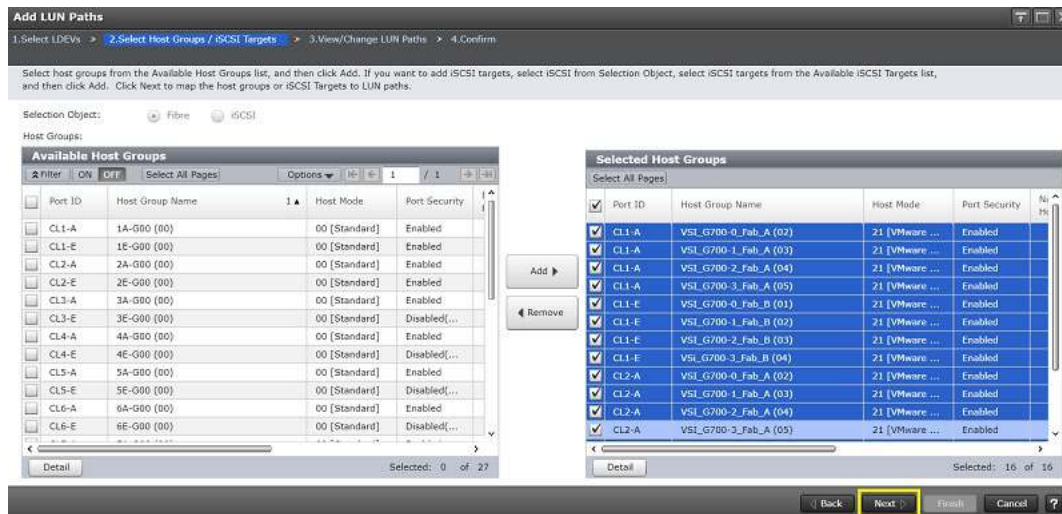
Figure 91



6. Click **Next** and select the host groups for virtual environment allocation.

Note — Within the Cisco UCS environment, LUN ID 0 is reserved for the boot LUN of the VMware ESXi operating system. Do not use LUN ID 0 to avoid LUN ID conflicts.

Figure 92



7. To verify the host LUN ID assignment, click **Next**.

8. To submit the job, click **Finish**.

Now the VMware administrator can use the VMFS datastore within the virtual environment.

Define a Capability Profile (LDEV)

With VASA, attributes of the logical unit supporting the VMFS datastores are passed down to VMware vSphere.

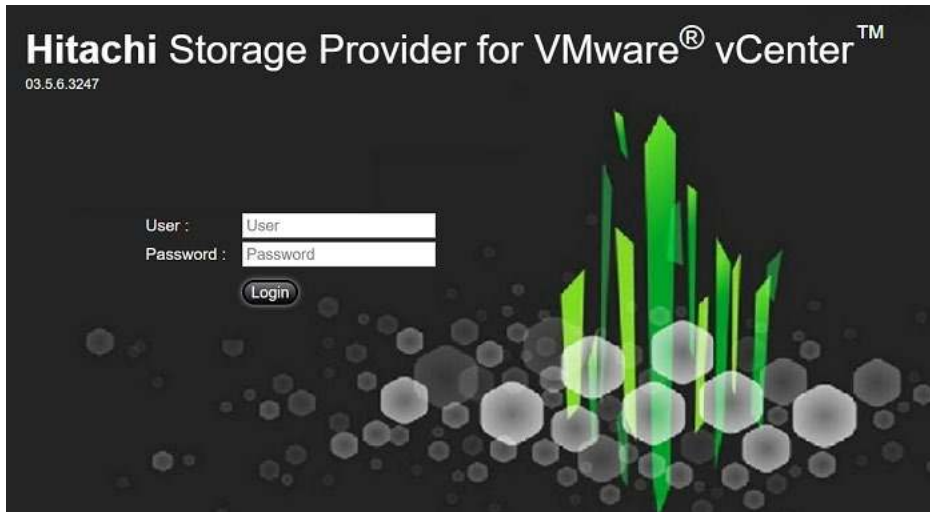
To make the passing down of this information possible, you must create a storage container and an associated capability profile. Prior to defining your storage container and capability profile, you need to set your storage system resources.

For more information regarding resource groups or storage containers, see Related documents.

To define a cabability profile, do the following.

1. Navigate to your VASA Provider IP address and log on using your VMware vCenter or SSO credentials.

Figure 93



2. From the navigation tree on the left, click **Manage Storage Containers**.

Figure 94



3. Click **Create Storage Container**.
4. Give your container a name.
5. Click **Define Profile**.

- From **Define Capability Profile**, assign a profile name and begin assigning managed storage capabilities to your profile. Characteristics need to relate to your LDEVs capabilities within your resource group native to the subsystem.

Figure 95

Define Capability Profile
Specify the name and provide a description of the capability profile, and then select the capabilities to be registered.

Name :

Description :

Managed Capabilities | **User Defined**

☒ Performance IOPS - class

☐ Performance Latency - class

☐ Availability - class

☐ Cost - class

Recovery by Virtual Infrastructure Integrator.

☐ Snapshot Backup Importance - Class

Auto-generated Capabilities

☒ Drive Type/Drive Speed ☐ Deduplication

☒ Pool Type ☐ Compression

☒ RAID Level

☒ Encryption

☒ Snapshot

- Click **OK**.
- Once storage system attributes are set, click Submit **Container**.

Deploy an LDEV Datastore

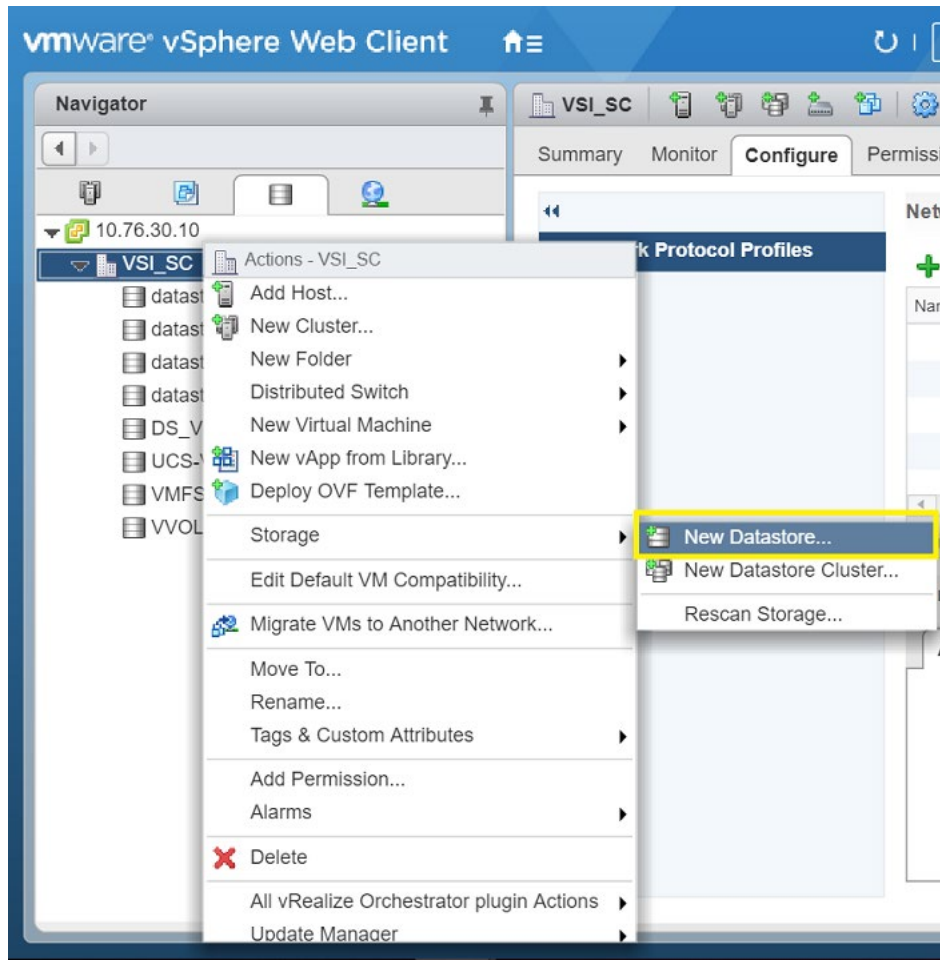
After you have successfully registered the VASA Provider, you can deploy an LDEV datastore.

To deploy an LDEV datastore, do the following.

- Log on to the VMware vSphere Web Client and, in the **Navigator** area, click **Home**.
- Under **Inventory List**, select the datacenter where you want to deploy the VMFS datastore.

3. Right-click the datastore, click **Storage** and then click **New Datastore**.

Figure 96



4. From **New Datastores**, do the following:
 - (1) From **Location**, click **Next**.
 - (2) From **Type**, click the **VMFS** option and then click **Next**.

Figure 97

New Datastore

1 Location

2 Type

3 Name and device selection

4 Partition configuration

5 Ready to complete

Type

Specify datastore type.

☒ **VMFS**
Create a VMFS datastore on a disk/LUN.

☐ **NFS**
Create an NFS datastore on an NFS share over the network.

☐ **VVol**
Create a Virtual Volumes datastore on a storage container connected to a storage provider.

Back Next Finish Cancel

- (3) From **Name and device selection**, select your datastore from those listed and then click **Next**.

Figure 98

New Datastore

1 Location

2 Type

3 Name and device selection

4 VMFS version

5 Partition configuration

6 Ready to complete

Name and device selection

Select a name and a disk/LUN for provisioning the datastore.

Datastore name: VMFS_DS_LDEV

The datastore will be accessible to all the hosts that are configured with access to the selected disk/LUN. If you do not find the disk/LUN that you are interested in, it might not be accessible to that host. Try changing the host or configure accessibility of that disk/LUN.

Select a host to view its accessible disks/LUNs: esxi-0.vsi.hvlab.local

Filter

Name	LUN	Capacity	Hardware Accel...	Drive Type	Sector format	Snap...
HITACHI Fibre Channel Disk (naa.60060e80123abc0...	3	500.00 GB	Supported	HDD	512n	

1 items Copy

Back Next Finish Cancel

- (4) From **VMFS version**, select your VMFS version and partition configuration.
7. To view your new datastore within your storage inventory, click **Finish**.

Verify Auto-Storage Capability (LDEV)

Once storage systems and LDEVs have been registered with the VASA Provider, storage, alert, and capability information are automatically detected and sent to VMware vSphere. The VASA Provider uses version 1.0 of VASA (the VMware API) to implement this feature.

For information on storage capabilities, see the documentation provided by VMware.

Though it is not necessary to manually configure storage capability information, automatically detected capabilities can be verified.

To verify auto-storage capability, do the following.

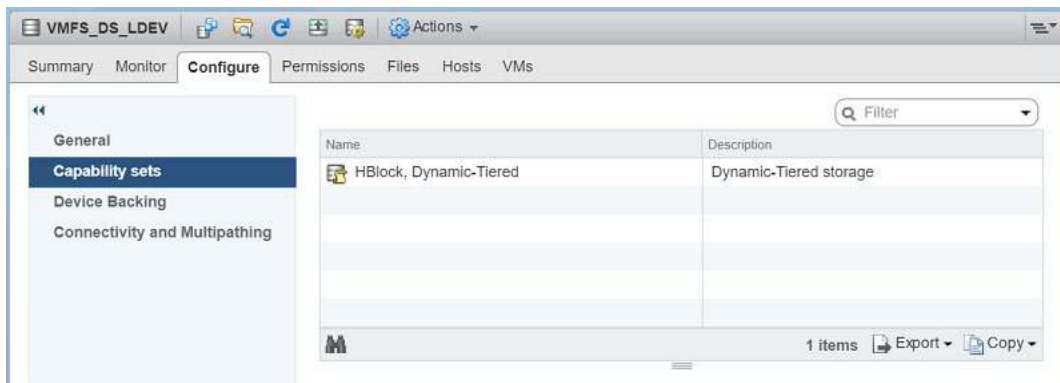
1. Log on to VMware vSphere Web Client.

Figure 99



2. Click **Storage**.
3. Select a **Datastore**.
4. On the **Manage** tab, click **Configure**. Click **Capability sets**.

Figure 100



Define Virtual Machine Storage Profile (LDEV)

Once the VASA Provider has been deployed, VMware administrators must create a virtual machine storage policy that is based on the capabilities that are pushed down from the VASA Provider. These attributes can be based on cost, RAID level, pool type, tiers, and data protection capabilities.

Aside from 1:1 mapping for virtual volumes, VASA allows you to use traditional VMFS environments to have additional insight into storage capabilities.

To create virtual machine storage policy within VMware vSphere, do the following.

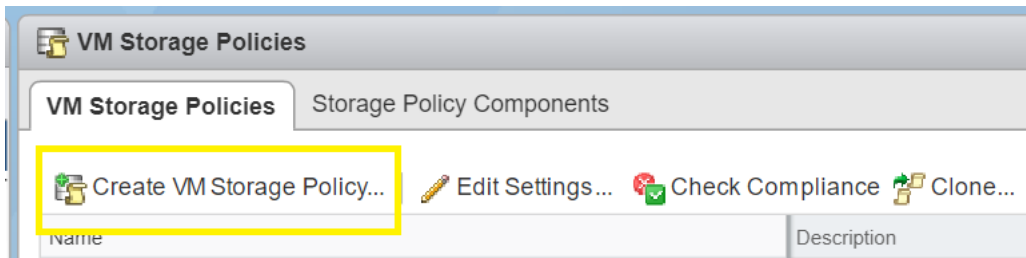
1. Navigate to and log on to the VMware vSphere Web Client.
2. From the home directory, select **VM Storage Policies**.

Figure 101



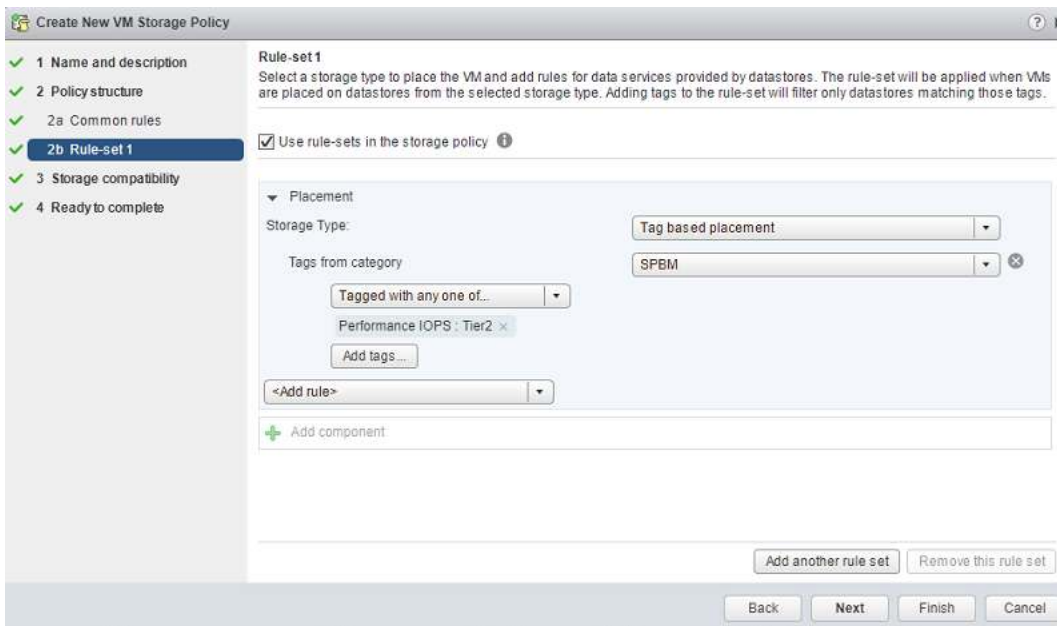
3. Click **Create VM Storage Policy**.

Figure 102



4. From **Create New VM Storage Policy**, do the following:
 - (1) Select the vCenter and assign a policy name.
 - (2) From **Rule-set 1**, under **Placement**, for **Storage Type**, click **Tag Based Placement**.

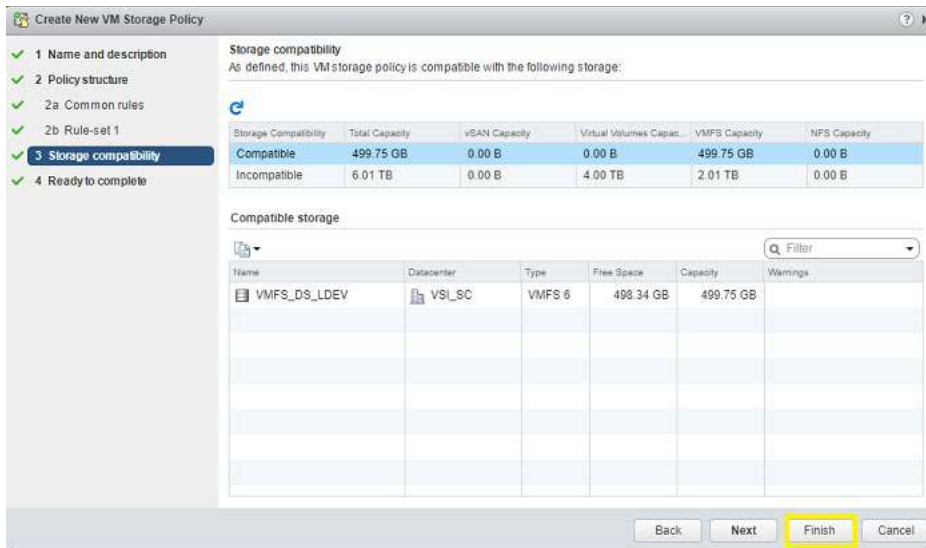
Figure 103



- (3) Select storage tags that identify the capabilities of VMFS storage passed down by the storage administrator.

- (4) From **Storage compatibility**, select any compatible storage that you have.
- (5) To finalize, click **Finish**.

Figure 104



You can now use this storage policy when creating a virtual machine to correlate storage and its capabilities within your virtual environment.

Deploy a Virtual Machine on Storage Policy Based Management (SPBM)

Once you have configured your VASA Provider and have onboarded a protocol endpoint (PE) onto VMware vSphere, along with creating virtual machine storage policies, you are ready to deploy a virtual machine.

This procedure covers how to implement a virtual machine using storage policy-based management (SBPM).

For information about how to configure VASA, the storage system, or vSphere, see [Related documents](#).

To deploy a virtual machine on SPBM, do the following.

1. Navigate to and log on to VMware vSphere Web Client.

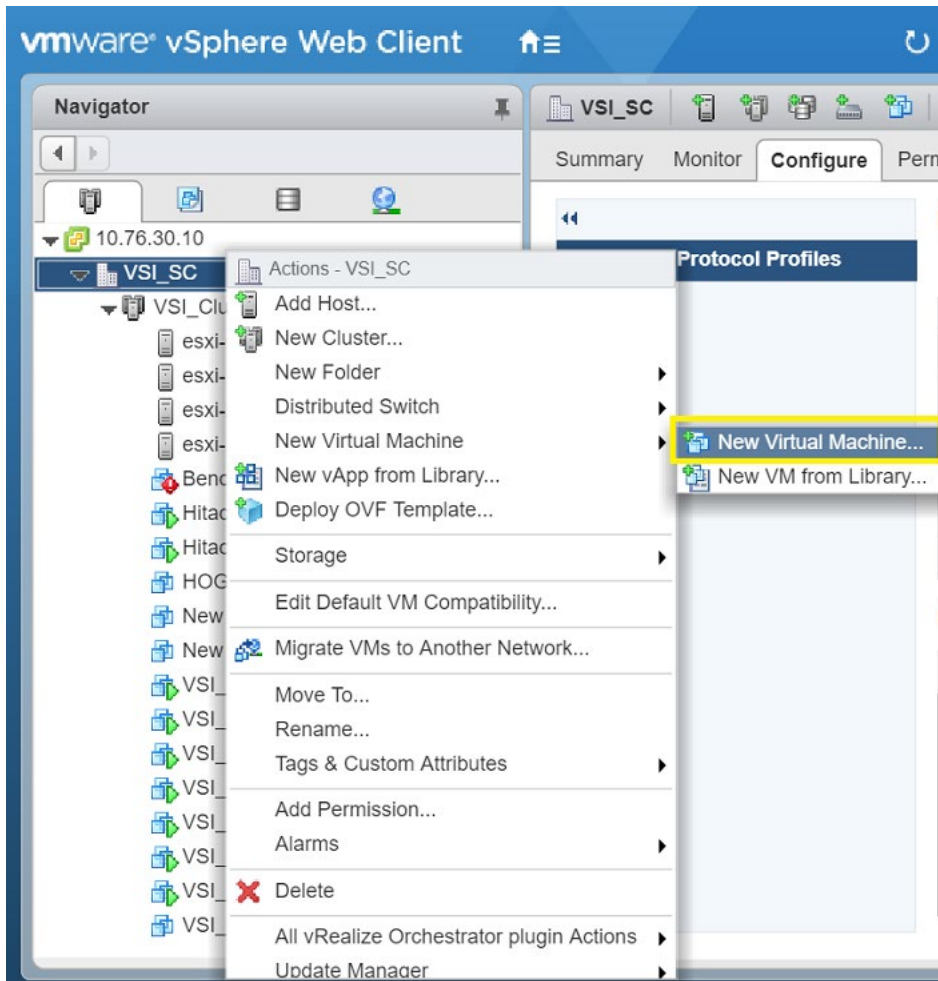
Figure 105



2. From the home directory, click **Hosts and Clusters**.

3. Right-click your selected datacenter and click **New Virtual Machine**.

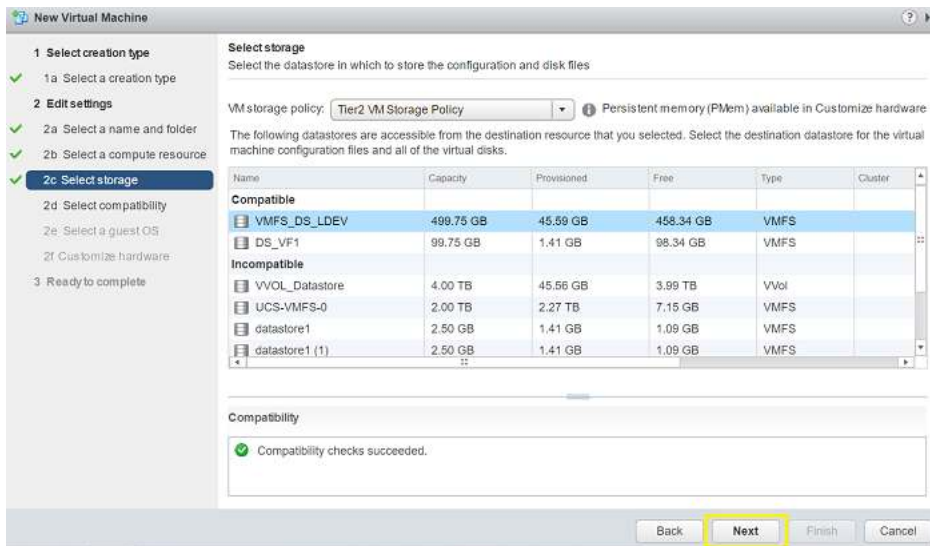
Figure 106



4. From **Select a creation type**, click **Create a New Virtual Machine**.

5. From **New Virtual Machine**, do the following:
 - (1) Enter a virtual machine name and select your datacenter.
 - (2) From **Select compute resource**, select the host or cluster.
 - (3) From **Select storage**, for the **VM storage policy** list, click the policy created for the LDEV capabilities within your virtual environment.

Figure 107



4. From **Ready to complete**, review your settings and click **Finish**.

You have now deployed a virtual machine on a VMFS datastore that is utilizing SPBM tagging which passes on capabilities from Hitachi Storage Provider to the VMware administrator.

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