Dell PowerStore: Migration Technologies

May 2023

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White Paper

Abstract

This white paper provides an overview of technologies that are used to migrate to the Dell PowerStore platform.

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Executive summary

Overview

This white paper provides an overview of technologies that are used to migrate to the Dell PowerStore platform. The platform includes PowerStore X models and PowerStore T models.

Migration requires moving data and changing host connectivity from one storage device to another. The type of data varies—between file, block, or both—which is critical when deciding which tools to use for the migration.

This paper describes the native import feature that you can use to move storage resources into PowerStore from other Dell or third-party storage systems. The paper also provides an overview of other tools for migrating to PowerStore. These tools are described in the following sections (grouped by the purpose of the tools):

Migrate block data:

- Dell PowerPath Migration Enabler
- Dell VPLEX
- Metro node
- Host-based LVM migration

Migrate file data:

- EMCOPY
- Robocopy
- Rsync
- Dell Select Datadobi DobiMigrate

Migrate virtualized environments:

- RecoverPoint for VMs
- VMware vSphere vMotion

Audience

This white paper is intended for IT administrators, storage architects, partners, and Dell Technologies employees. It is also intended for any other individuals that are involved in the evaluation, acquisition, management, operation, or design of a Dell networked storage environment using PowerStore.

Revisions

Date	Part number/ revision	Description
April 2020	H18154	Initial release: PowerStoreOS 1.0
December 2020	H18154.1	PowerStoreOS 1.0.3 release updates: Agentless import support including compatibility with XtremIO X1 and X2 as a source system
January 2021	H18154.2	Metro node updates

Date	Part number/ revision	Description
April 2021	H18154.3	PowerStoreOS 2.0 updates
November 2021	H18154.4	Template update
December 2021	H18154.5	Minor updates
June 2022	H18154.6	PowerStoreOS 3.0 updates
May 2023	H18165.7	Minor update to prepare VNX instructions in file import workflow

We value your feedback

Dell Technologies and the authors of this document welcome your feedback on this document. Contact the Dell Technologies team by email.

Author: Andrew Sirpis

Note: For links to other documentation for this topic, see the PowerStore Info Hub.

Introduction

Introduction to PowerStore

PowerStore achieves new levels of operational simplicity and agility. It uses a container-based microservices architecture, advanced storage technologies, and integrated machine learning to unlock the power of your data. PowerStore is a versatile platform with a performance-centric design that delivers multidimensional scale, always-on data reduction, and support for next-generation media.

PowerStore brings the simplicity of public cloud to on-premises infrastructure, streamlining operations with an integrated machine-learning engine and seamless automation. It also offers predictive analytics to easily monitor, analyze, and troubleshoot the environment. PowerStore is highly adaptable, providing the flexibility to host specialized workloads directly on the appliance and modernize infrastructure without disruption. It also offers investment protection through flexible payment solutions and data-in-place upgrades.

Terminology

The following table provides definitions for some of the terms that are used in this document.

Table 1. Terminology

Term	Definition
Fibre Channel (FC) protocol	Protocol used to perform SCSI commands over a Fibre Channel network.
File system	A storage resource that can be accessed using file sharing protocols such as SMB or NFS.
Import	Process of moving data from one storage system to another storage system.
Internet SCSI (iSCSI)	Mechanism for accessing block-level data storage over network connections.
Logical unit number (LUN)	Block-level storage device that can be shared using a protocol such as iSCSI.
Network File System (NFS)	An access protocol that enables users to access files and folders on a network. NFS is typically used by Linux or UNIX hosts.
Server Message Block (SMB)	A network access protocol that allows clients remote file data access to hosts on a network. SMB is typically used in Microsoft Windows environments.
Volume	A block-level storage device that can be shared out using a protocol such as iSCSI or Fibre Channel.

Native import of external storage

Introduction

This section provides an overview about migrating from Dell and third-party storage systems to PowerStore. The existing environment should have clients that are attached to the storage system that contains the client application data. After the migration, the environment application data is moved to a new PowerStore cluster. This process allows for a native migration of data from the existing storage system to PowerStore. The PowerStoreOS 1.0.3 release added support for agentless import. See Non-disruptive block import for details about non-disruptive import and Agentless block import for details about agentless import.

Migration support

PowerStore has a native migration capability known as the orchestrator that can be used to import storage resources. This capability is integrated in the PowerStore system without requiring an external appliance.

Supported source block-only storage resources:

- LUNs or volumes
- Thick and thin clones
- Consistency groups
- VMFS datastores (Dell EqualLogic only)
- Windows RDM (Dell EqualLogic only)

Supported source systems:

- Dell VNX2
- Dell Unity
- PS Series (Dell EqualLogic)
- SC Series (Dell Compellent)

Source systems added with PowerStoreOS 1.0.3 as part of the agentless import:

- XtremIO X1 and X2

Source systems added with PowerStoreOS 3.0 as part of the agentless import:

- NetApp AFF and A Series
- VMAX3
- PowerMax

PowerStoreOS 3.0 and later versions expand the native migration capability to support importing file system resources, known as file import throughout this document.

Supported source-file storage resources:

- NFS file system
- SMB file system

Supported source systems for file import:

- Dell VNX2

The following sections review the three type of native import: Non-disruptive block import, Agentless block import, and File import.

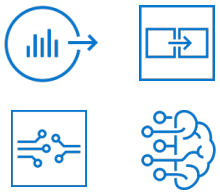
For the details about supported storage resources, source systems, and system versions, see the document *Importing External Storage to PowerStore Guide* on Dell.com/powerstoredocs.

Native import benefits

The following benefits are available through native import:

Data and application migration: Move your data and applications to PowerStore.

Competitive advantage: Get broad support for source system types and operating systems.



Connectivity prerequisites

PowerStore support two types of back-end connectivity for the data transfer from the source system to PowerStore.

iSCSI back-end connectivity

PowerStore uses the replication tagged ports for the import traffic over iSCSI. We can use one storage network for replication and import. By enabling the Available/Current Usages column, we can see which ports will be used for replication import, as shown in the following figure.

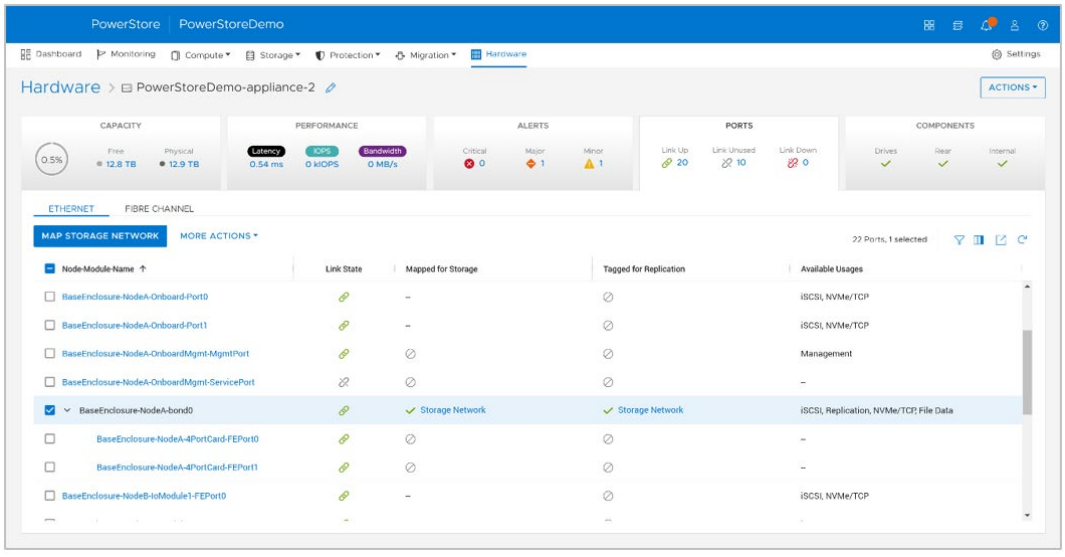


Figure 1. Hardware > [Appliance] > Ports > Replication Tagged Ports

Fibre Channel (FC) back-end connectivity

With PowerStoreOS 3.0, every Fibre Channel (FC) port now has a **SCSI Mode** and **Import Capable** attributes.

- SCSI Modes:
  - **Dual**: A port in dual mode can be used as both initiator (for front-end traffic) and target (for import traffic). See Figure 2 for an example.
  - **Target**: A port as target can be used for front-end traffic only.

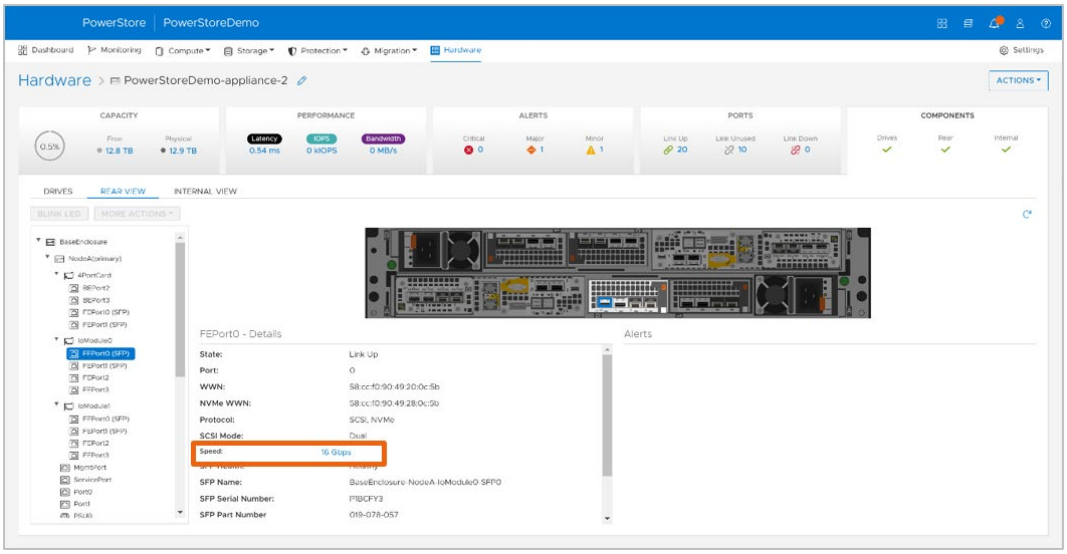


Figure 2. Hardware > [Appliance] > Components > Rear View

- Import capable:
  - **Yes**: This port can be used to import data. A PowerStore system has two ports per node, for a total of four ports that can be used for importing data over FC, as shown in the following figure.
  - **No:** This port does not support import data
- The dual mode is only supported on the Fibre Channel (FC) **IO Module 0 Port 0** and **Port 1**
  - These ports can have both front-end and back-end (import) traffic.
  - There is no support for direct connect.
  - If you plan to use FC as the back-end connectivity for the import, ensure that the zoning between the source storage system and these two ports, IO Module 0 Port 0 and Port 1, is established before starting the import.

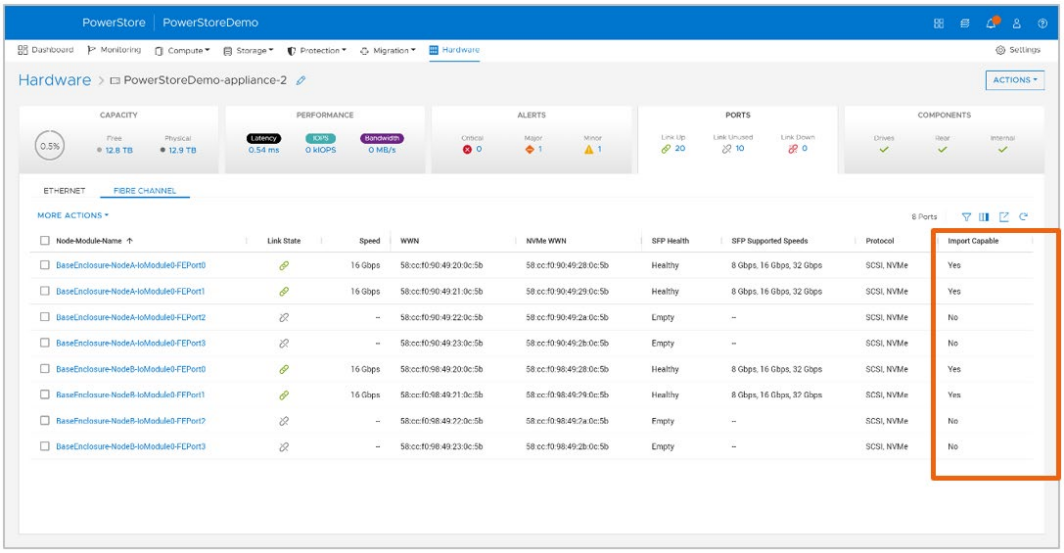


Figure 3. Hardware > [Appliance] > Ports > Import Capable Ports

Non-disruptive block import

The non-disruptive block import requires installing a host plug-in for a seamless import to PowerStore. The host plug-in enables the orchestrator to communicate with the host multipath software to perform import operations. The combination of native functionality with the host plug-in automates many manual operations that take place during migration. For example, the system automatically completes mapping the hosts, creating the storage resources, and checking the validation.

Non-disruptive import requirements

The following requirements must be met before migrating to PowerStore:

- The source system must be in a good state and not running a software upgrade.
- The software or operating environment (OE) version for the source system must be supported.
  - See the document *Importing External Storage to PowerStore Guide* on Dell.com/powerstoredocs.
  - A software upgrade may be required before starting the import.
- Front-end connectivity:
  - Connectivity between the client and source system, and the client and PowerStore, can be either iSCSI or Fibre Channel (FC).
  - For FC, zoning may be required.
  - The protocols **must** match between the source and destination.
- Back-end connectivity:
  - Before PowerStoreOS 3.0, only iSCSI was available for the data transfer between the source storage system and PowerStore.
  - PowerStoreOS 3.0 adds Fibre Channel (FC) support for the data transfer between the source and PowerStore system.

- MPIO and host plug-in:
  - Multipath IO (MPIO) software—either EqualLogic Multipath I/O (EQL MPIO) or native MPIO—must be configured on the source LUNs, volumes, or consistency group. Once the MPIO is set, a host plug-in must be installed (or upgraded if using EQL MPIO). A reboot might be required. We recommend performing the installation along with any required software upgrade of the client operating system.

Non-disruptive terminology

The following table provides definitions for some of the terms that are used in the non-disruptive import section.

Table 2. Non-disruptive block import terminology

Term	Definition
Cutover	Final step in setting the destination system as the primary with no option to cancel (rollback) to the source system
Cancel	Action of stopping the import, removing any progress that has been completed, and rolling back to the primary storage system
Path flip	Action of changing the active paths from the client to the source system to the PowerStore system

Non-disruptive import workflow

This section describes a high-level overview of the import workflow.

Step 1: Setup

Perform the following actions before importing storage resources:

1. Configure zoning for the front-end connectivity between the client and the PowerStore system (if required).
2. Configure the back-end connectivity:
   a. If using iSCSI, add iSCSI connectivity between the source system and PowerStore system (if not present).
   b. If using Fibre Channel (FC), configure connectivity and zoning between the source system and the PowerStore system.
3. Install the host plug-in in each of the clients that requires access to the data during the import. This ensures that the import is non-disruptive. A reboot might be required as part of the installation of the host plug-in. PowerStore supports three types of host operating systems for the host plug-in: Linux, Microsoft Windows, and VMware.

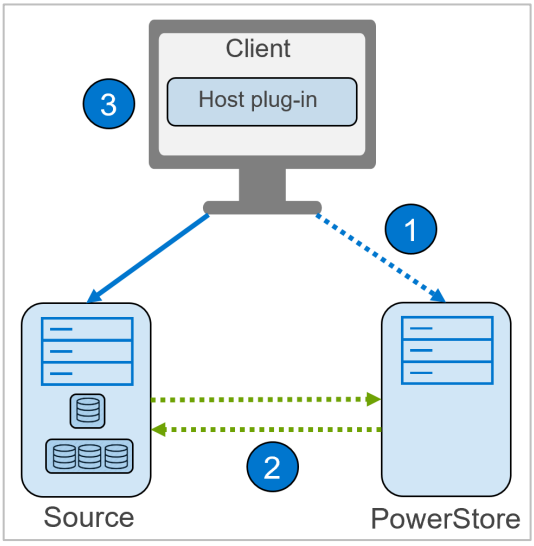


Figure 4. Non-disruptive setup

Step 2: Import

Perform the following actions to run the import process:

1. Add the source system to PowerStore Manager.
2. To create an import session, select the added source system and click the **Import Storage** button, which steps through the following:
    a. Overview: Provides details of the two import types.
    b. Select Volumes: Enables selecting the source resources, either as volumes or volume groups, to be imported.
    c. Add to Volume Group (Optional): Enables grouping the source resources into an existing volume group or to a new volume group.
    d. Map Hosts: Allows selection of the **Add hosts (with the Host Plugin configured) for non-disruptive import** option to enable adding the clients in which the user has already configured the host plug-in.
    e. Verify Host Mapping: Validates the host mapping between the selected source resources and the added hosts.
    f. Set Import Schedule: Sets when the import begins, either immediately or at a set date and time. This step includes the option to set an automatic cutover.
    g. Assign Protection Policy (Optional): Assigns the existing protection policy in PowerStore to the source resource after the import completes.
    h. Review: Shows a summary of the selected options, gives the option to review the source array assigned policies, and shows the Import button to start or schedule the import.

3. Click the **Import** button, and the system performs the following actions:
    a. An import session is created.
    b. The system requests to the host plug-in a path flip, making the paths from the client to the source system inactive. The system also activates the paths from the client to the PowerStore system.
    c. A background copy of the data from the source system to the PowerStore system starts. Any new writes from the clients are made to PowerStore and forwarded to the source system to ensure rollback.

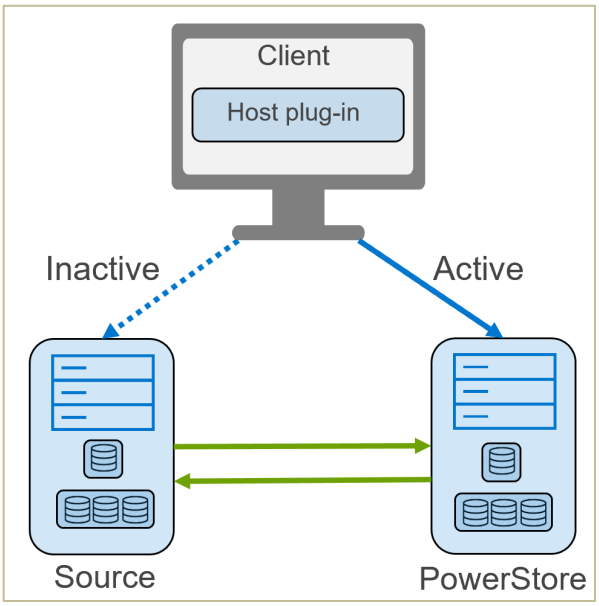


Figure 5. Non-disruptive import

Step 3: Cutover

A cutover is allowed when the import session is in a **Ready to Cutover** state (the source system and PowerStore are synchronized), which completes the following steps:

1. The paths from the client to the source system are removed.
2. The background copy and the forwarding of writes stops.
3. Once the systems cut over, there is no rollback.

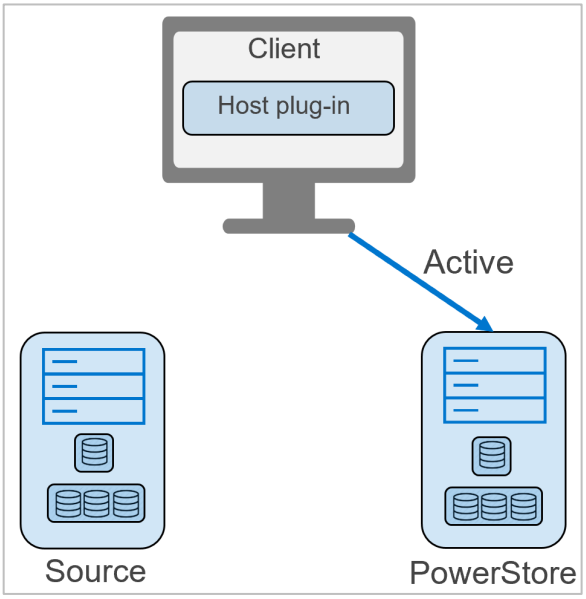


Figure 6. Non-disruptive cutover

Host plug-ins

There are different operating systems on which the host plug-in can be installed. The following table shows the supported combinations between the host plug-in operating system, multipath software, front-end connectivity, and source storage system.

Table 3. Native import support matrix

Host operating system	Source system	Front-end connectivity	Back-end connectivity	Multipath software
Microsoft Windows	VNX2	iSCSI, FC	iSCSI	Native MPIO (import kit)
	Dell Unity	iSCSI, FC	iSCSI, FC	
	SC Series	iSCSI, FC	iSCSI, FC	
	PS Series	iSCSI	iSCSI	EqualLogic MPIO (EqualLogic HIT kit)
VMware	PS Series	iSCSI	iSCSI	Native MPIO (EqualLogic MEM kit)
Linux	VNX2	iSCSI, FC	iSCSI, FC	Native MPIO (import kit)
	PS Series	iSCSI	iSCSI	
	Dell Unity	iSCSI, FC	iSCSI, FC	
	SC Series	iSCSI, FC	iSCSI, FC	
	PS Series	iSCSI		EqualLogic MPIO (EqualLogic HIT kit)

For details about installing the host plug-in and the full list of supported operating systems and versions, see the document *Importing External Storage to PowerStore Guide*. The host plug-in installation files are available on Dell Support.

Agentless block import

PowerStoreOS 1.0.3 added support for agentless block import. The agentless import does not require installing a host plug-in. The orchestrator communicates with the source storage system to coordinate and manage the host mappings. This import type requires a disruptive window as part of the path flip to PowerStore.

Agentless import requirements

The following requirements must be met before migrating to PowerStore:

- The source system must be in a good state and not running a software upgrade.
- The software or operating environment (OE) version for the source system must be supported.
  - See the document *Importing External Storage to PowerStore Guide* on Dell.com/powerstoredocs.
  - A software upgrade may be required before starting the import.
- The following front-end connectivity is required:
  - Connectivity between the client and source system, and the client and PowerStore can be either iSCSI or Fibre Channel (FC).
  - For FC, zoning may be required.
  - The protocols **must** match between the source and destination.
- The following back-end connectivity is required:
  - Before PowerStoreOS 3.0, only iSCSI was available for the data transfer between the source storage system and PowerStore.
  - PowerStoreOS 3.0 adds Fibre Channel (FC) support for the data transfer between the source and PowerStore system.

- MPIO and host plug-in:
  - A host plug-in is not required.

Agentless import terminology

The following table provides definitions for some of the terms that are used in the non-disruptive import section.

Table 4. Agentless block import terminology

Term	Definition
Cutover	Final step in setting the destination system as the primary with no option to cancel (rollback) to the source system
Cancel	Action of stopping the import, removing any progress that has been completed, and rolling back to the primary storage system
Path flip	Action of changing the active paths from the client to the source system to the PowerStore system

Agentless import workflow

This section describes a high-level overview of the agentless import workflow.

Step 1: Setup

Perform the following actions before importing storage resources:

1. Configure zoning for the front-end connectivity between the client and PowerStore (if required).
2. Add iSCSI connectivity between the source system and PowerStore (if not present). This action enables PowerStore to automatically map itself as an iSCSI host in the source system.

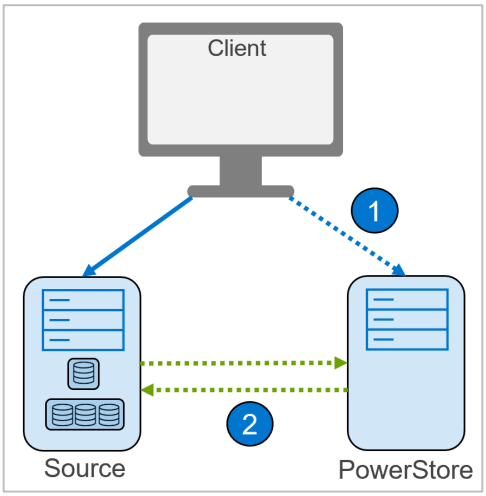


Figure 7. Agentless setup

Step 2: Import

Complete the following steps to perform the import:

1. Add the host clients that are accessing the source data to PowerStore Manager from **Compute** > **Hosts & Host Groups**.
2. Add the source system to PowerStore Manager from **Migration** > **Import External Storage**.
3. To create an import session, select the added source system and click the **Import Storage** button which steps through the following:
    a. Overview: Provides details of the two types of imports available.
    b. Select Volumes: Allows selection of the source storage resources to import: LUNs, volumes, or consistency groups.
    c. Add to Volume Group (Optional): Enables grouping the source resources into an existing volume group or to a new volume group.
    d. Map Hosts: Selecting **Map hosts on PowerStore for agentless import** enables mapping the clients in which the data is being accessed from.
    e. Set Import Schedule: Sets when the import begins, either immediately or at a set date and time. This step includes the option to set an automatic cutover.

f. Assign Protection Policy (Optional): Assigns the existing protection policy in PowerStore to the source resource after the import completes.

g. Review: Shows a summary of the selected options, gives the option to review the source array assigned policies, and shows the **Begin Import** button to start or schedule the import.

4. When you click the **Begin import** button, the system takes the following actions:

   a. An import session is created. The state changes from **In Progress** to **Ready to Enable Destination Volume** with the source volume as read/write.

   b. Unmount the source volume on the hosts. The import operation is disruptive to the host I/O access.

   c. Select **More Actions** > **Enable Destination Volume**.

      i Confirm that the host application has been stopped or taken offline.

      ii Either allow the system to remove the mapping between the hosts and the source resource or perform this step manually.

      iii The source volumes go into a read-only state, and hosts are unmapped from the source system.

      iv Click the **Enable Destination Volume** button.

   d. When the import session is in a **Ready to Start Copy** state, select the **Start Copy** option.

      i Rescan the host to discover the destination volume and mount the destination volume on the host, making the volume a read/write state. Now the host I/O access is restored.

      ii A background copy of the data from the source system to the PowerStore system starts.

      iii The import session state changes to **Copy In Progress**.

      iv Any new writes are made to PowerStore and forwarded to the source system to ensure rollback.

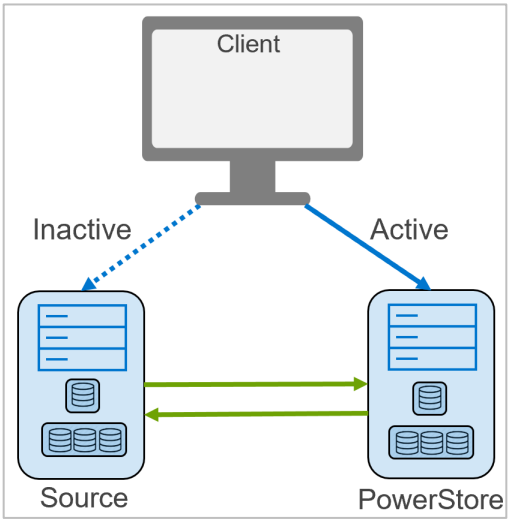


Figure 8. Agentless import

Step 3: Cutover

A cutover is allowed when the import session is in a **Ready to Cutover** state (the source system and PowerStore are synchronized).

1. The paths from the client to the source system are removed.
2. The background copy and the forwarding of writes stops.
3. When the import session is cut over, there is no rollback.

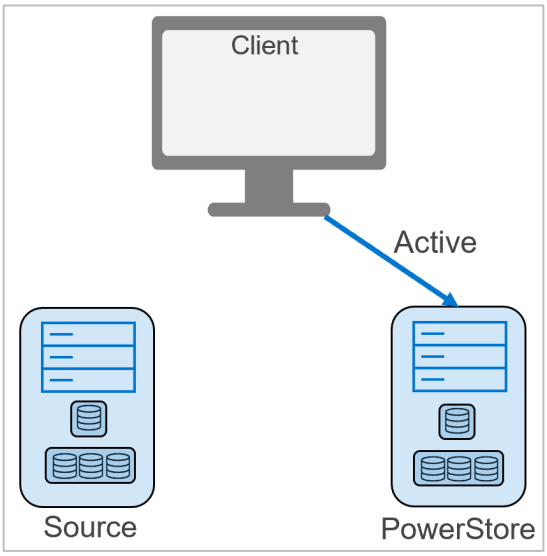


Figure 9. Agentless cutover

File import

PowerStoreOS 3.0 and later add support for native file import. File import supports NFS and SMB file systems. Multiprotocol file systems are not supported.

Requirements

The following requirements must be met before migrating to PowerStore:

- The source system must be in a good state and not running a software upgrade.
- The software or operating environment (OE) version for the source system must be supported.
  - A software upgrade may be required before starting the import. See the document *Importing External Storage to PowerStore Guide* on Dell.com/powerstoredocs.

File import terminology

The following table provides definitions for some of the terms that are used in the non-disruptive import section.

Table 5. Agentless block import terminology

Term	Definition
Cutover	Action of setting the destination PowerStore system as the primary
Cancel	Action of stopping the import, removing any progress that has been completed, and rolling back to the primary storage system.
Commit	Final step in setting the destination system as the primary with no option to cancel (rollback) to the source system

File import workflow

This section describes a high-level overview of the file import workflow.

Perform the following actions before importing storage resources:

Step 1: Prepare VNX

- From the source VNX:
  - Add a migration network interface for IMT:
    - Create migration interface.
    - Interface must be named nas_migration_<name>.
    - Attach the interface to migration VDM.

      ```
      nas_server -vdm vdm_fro2 -attach nas_migration_vdmfro2
      ```
- When importing a CIFS server:
  - Interface must have a different DNS subdomain than CIFS server.
  - Add the interface to CIFS server:

    ```
    server_cifs vdm_fro2 -add
    compname=vnx2compnamefro,domain=windows.emc-
    fr,interface=nas_migration_vdmfro2,dns=migration.windows.e
    mc-fr
    ```
  - Update parameters essential for CIFS import
    - acl.mappingErrorAction
      - Defines the rules for unknown mapping between SID, UID, and GID on ACL settings.

- acl.extacl
  - This parameter is a bit list which enables special capabilities around ACL management.
    - Allows migrating of UNIX ownership necessary for preserving Quota.
- smb1.disabled
  - This parameter must be set to 0 to ensure smb1 is enabled
- Review mandatory parameter values:

```
server_param server_3 -f cifs -info
acl.mappingErrorAction
Server_param server_3 -f cifs -info acl.extacl
Server_param server_3 -f cifs -info smb1.disabled
Set new values
server_param server_3 -f cifs -modify
acl.mappingErrorAction -value 11
server_param server_3 -f cifs -modify acl.extacl -value
28
server_param server_3 -f cifs -modify smb1.disabled -
value 0
```

- Ensure local groups are enabled, and set two options:
  - Set local Administrator password using Computer Management.
  - Create a local admin user using Computer Management.
    - Must be added to Administrators group
- Ensure time is synchronized with destination:
  - Within 5 seconds
  - Recommend using NTP
- Ensure correct version of code:
  - VNX version 8.1.21.266 and newer
- Ensure that all interfaces used by the VDM are attached to the VDM. Use the following command to attach interfaces to the source VDM:

```
nas_server -vdm <vdm name> -attach <interface name>
```

Step 2: Prepare PowerStore

- Verify NTP settings:
  - Ensure same NTP as VNX
- Native File Import requires a File Mobility Network on PowerStore:
  - A public routable network based on the 1 GbE management ports
  - Provides control plane communication between PowerStore SDNAS and source VNX

- File Mobility Network is not used for the import data traffic
- Also used for file asynchronous replication

- PowerStore establishes SSH connection with VNX over the File Mobility Network
- Configure File Mobility Network
  - Configured under Settings > Network IPs > FILE MOBILITY
  - Uses the existing Management Network configuration
    - Requires new IPs on the existing Management Network range
  - Supports IPv4 and IPv6
  - Requires three IPs:
    - Cluster IP Address
    - Node A IP Address
    - Node B IP Address
  - User must manually **MAP NETWORK** after configuring IPs

Step 3: Add Remote System

1. Add the source system to PowerStore Manager from **Migration** > **Import External Storage**.
   a. Type: VNX
   b. Capability: UNIFIED or FILE
   c. SPA or SPB IP Address or FQDN
   d. Data Connection Type: iSCSI or Fibre Channel
   e. Username and password
   f. File Connection Address (control station)
   g. File admin username and password
2. As the remote system is added:
   a. Source system information is validated
   b. Source VDMs are discovered
      i File systems
      ii Network interfaces
      iii Configuration settings
   c. Prechecks identify import capability per VDM
3. The procedure can be repeated on demand for an existing connection.
   a. **Discover**: Discovers resources on source array that can be imported
   b. **Verify and Update**: Verifies connectivity to source and attempts to reconnect

4. Add File Import Interface:
    a. Created under **Migration** > **Import External Storage** > **FILE IMPORT INTERFACE**
    b. Used for data migration from source migration interface
    c. Can optionally be created during Import NAS Server wizard

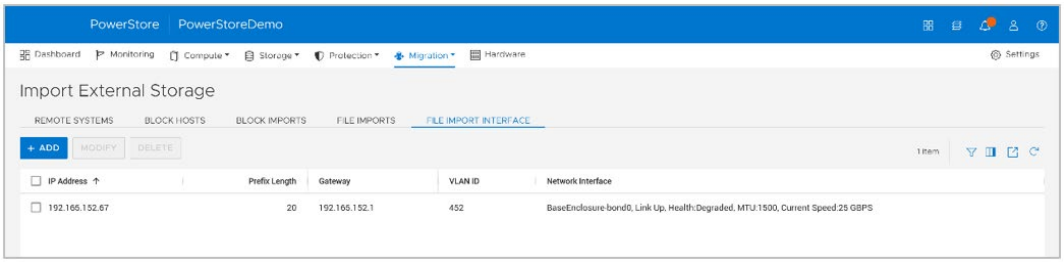


Figure 10. Migration > Import External Storage > File Import Interface

Step 4: Create Import Session

Complete the following steps to perform the file import:

1. To create an import session, select the added source system and click the **Import NAS Server** button, which steps through the following:
    a. Select NAS Servers: Allows selection of the source file resources to import: Virtual Data Mover (VDM) and its NFS and SMB file systems.
    b. Select Product Interface: Set the file interface to be used for production host access.
    c. Configure Import:
        i Set the import session name and description.
        ii Set when the import begins, either immediately or at a set date and time.
        iii Set the file import interface to be used for the import traffic. The file import interface can be added in this step.
    d. Assign Protection Policy (Optional): Assigns the existing protection policy in PowerStore to the source resource after the import completes.
    e. Review: Shows a summary of the selected options and shows the **Begin Import** button to start or schedule the import.

Step 5: Cutover Import Session

When you click the **Begin import** button, the system takes the following actions:

1. An import session is created, with an initial copy step in which:
    a. Host is accessing the data from the source system.
    b. PowerStore automatically creates the destination NAS Server.
    c. Cold data is transferred to PowerStore as part of the background copy.
    d. The import session state changes to **In Progress**.

2. The import session state changes from **In Progress** to **Ready to Cutover** with the source volume as read/write.

   A cutover is allowed when the import session is in a Ready to Cutover state (the source system and PowerStore are synchronized).

3. Select **More Actions** > **Cutover**.

   a. Confirm that the host still has access to the file systems.

   b. Click the **Cutover** button.

   c. Hosts start accessing the data from PowerStore.

   d. The background copy and the forwarding of writes continues.

   e. Any reads for data already copied to PowerStore through the background copy are serviced from PowerStore.

   f. For any reads of data still in the source system, PowerStore recalls the data from the source, copies it to PowerStore and services the request to the host.

Step 6: Commit Import Session

1. After all the data is transferred, the import session goes into a Ready to Commit state.
2. Select the import session, and click the **Commit** action.

   a. The background copy and the forwarding of writes stops.

   b. When the import session is committed, there is no rollback.

   c. The source system is cleaned up.

Management

You can manage the **Import External Storage** action from the PowerStore Manager UI, REST API, and PowerStore CLI (pstcli).

In PowerStore Manager, click **Migration** > **Import External Storage** (see the following figure).

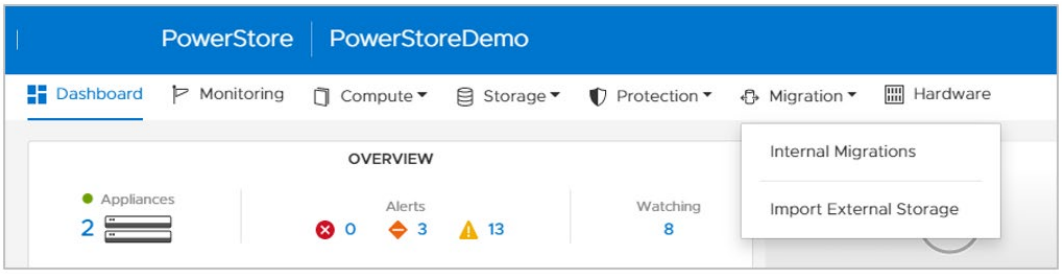


Figure 11. Import External Storage

To add the source storage system as a remote system, click **Add Remote System** as shown in the following figure.

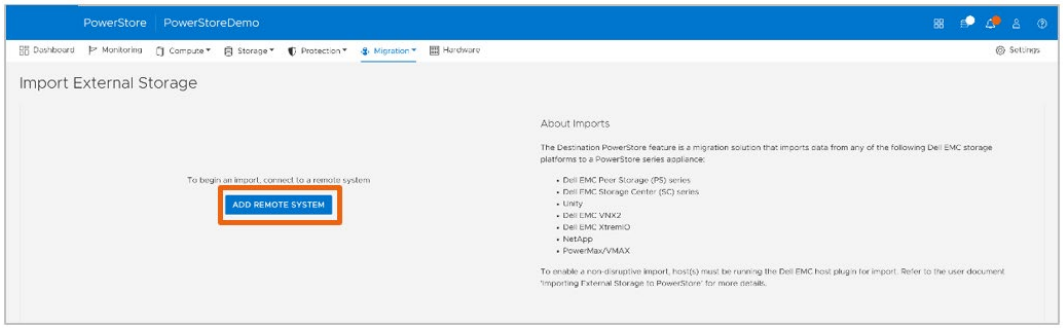


Figure 12. Import External Storage page

When adding the source array, the following fields in the following figure are required.

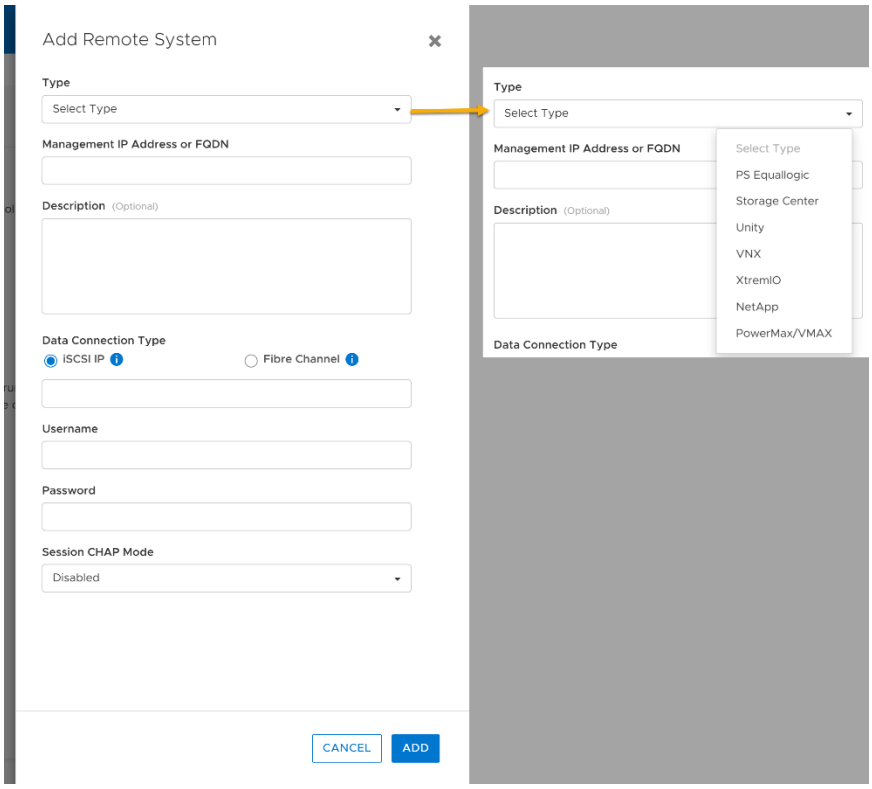


Figure 13. Add Remote System

The required and optional parameters for adding a source array vary depending on the source system, as shown in the following table.

Table 6. Parameters per source system

Source system type	Parameter
PS Series	Group management IP address
	Description (optional)
	Data Connection Type • iSCSI IP address
	Management credentials (username and password)
	Discovery CHAP mode *(optional)*
	Session CHAP mode (optional)
SC Series	Management IP address
	Description (optional)
	Data Connection Type • iSCSI fault domain IP address or • Fibre Channel (FC)
	Management credentials (username and password)
	Session CHAP mode (optional)
Dell Unity	Management IP address (Dell Unisphere IP address)
	Description (optional)
	Data Connection Type • iSCSI interface IP addresses or • Fibre Channel (FC)
	Management credentials (username and password)
	Session CHAP mode (optional)
VNX2	Capability • Block • File • Unified
	Block and Unified parameters
	SPA or SPB IP address or FQDN
	Description (optional)
	Data Connection Type • iSCSI IP addresses • Fibre Channel
	Management credentials (username and password)
	Session CHAP mode (optional)

Source system type	Parameter
	File and Unified parameters
	File Connection Address (Control Station IP Address)
	Description (Optional)
	File Admin Username
	File Admin Password
XtremIO	Cluster Name
	Management IP address or FQDN
	Description (Optional)
	Data Connection Type • iSCSI IP addresses • Fibre Channel (FC)
	Management credentials (username and password)
	Discovery CHAP mode *(optional)*
	Session CHAP mode (optional)
NetApp	Name
	Management IP address or FQDN
	Description (Optional)
	Data Connection Type • iSCSI IP addresses
	Management credentials (username and password)
	Session CHAP mode *(optional)*
PowerMax VMAX	Name
	Management IP address or FQDN
	Port
	Description (Optional)
	Data Connection Type • Fibre Channel (FC)
	Management credentials (username and password)

The following pages are under **Import External Storage** as shown in the following figure:

- Remote Systems
  - List of all the remote systems for block and file imports
- Block Hosts
  - Applies to non-disruptive imports
  - Hosts with the host plug-in installed

- Block Imports
  - Lists of import sessions for block resources
- File Imports
  - Lists of import sessions for file resources
- File Import Interfaces
  - Interfaces to be used by file import

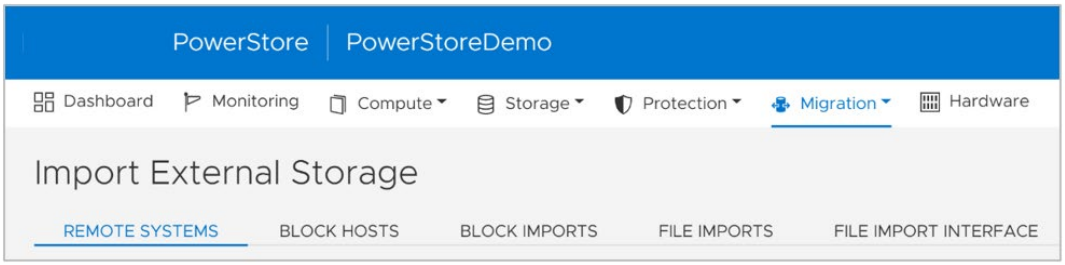


Figure 14. Import External Storage tabs

When you add the source system, you can import storage resources by selecting the source system and clicking **Import Volume** or **Import NAS Server**, depending on the resource to be imported (see Figure 15).

Import Volume

The following steps show the workflow of importing block resources. Once a source system is selected, click **Import Volume**.

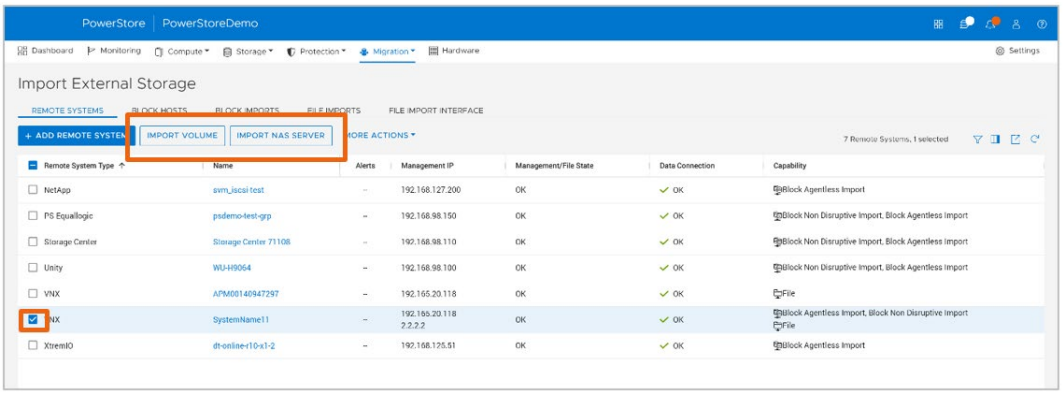


Figure 15. Import Volume and Import NAS Server

The following figure shows the **Import Volumes from Source Array** wizard.

In the **Overview** step, review the description for the two types of imports and click **Next**.

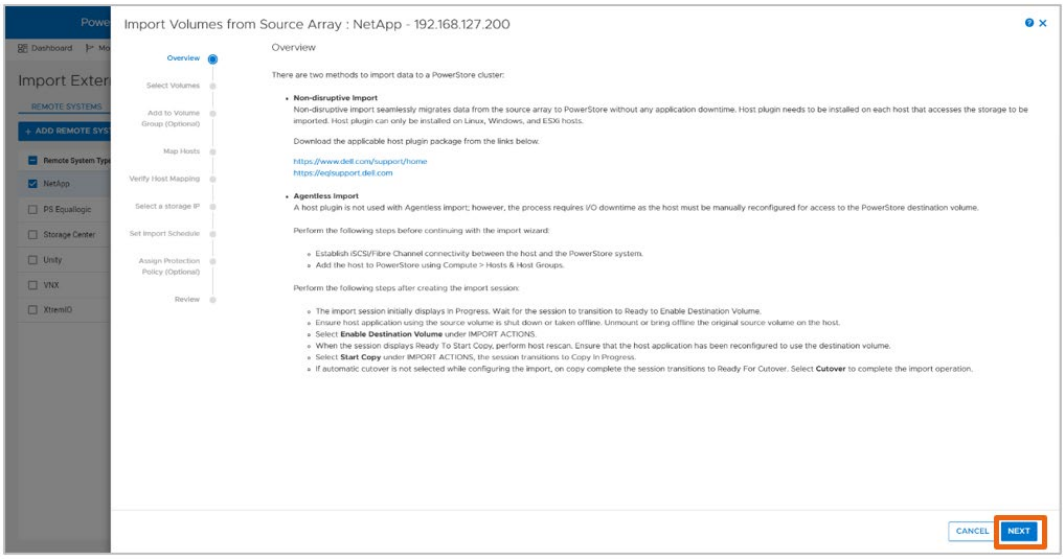


Figure 16. Overview step

In the **Select Volumes** step, select the source resources to import.

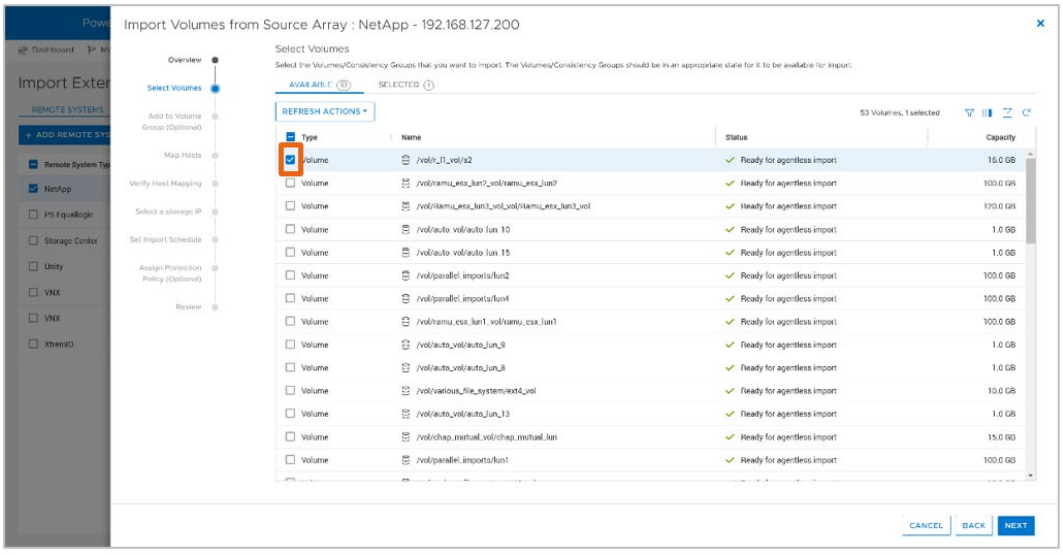


Figure 17. Select Volumes step

In the same step, as shown in the following figure, you can refresh the status of hosts (for non-disruptive import) and the volumes to reflect any recent changes. These changes could include the addition of new volumes in the source or the change in the mapping to the hosts.

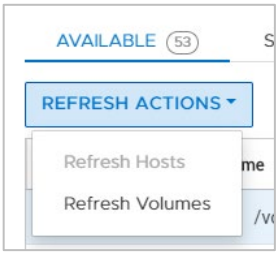


Figure 18. Refresh Actions under the Select Volumes step

In the **Add to Volume Group (Optional)** step, you can add the selected source resources into a PowerStore volume group as shown in the following figure.

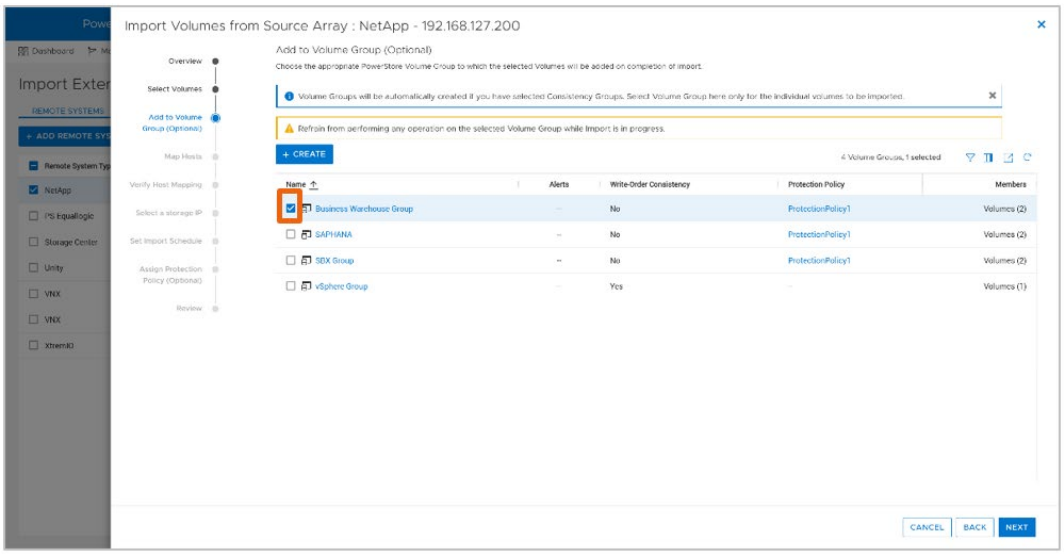


Figure 19. Add to Volume Group (Optional) step

In the **Map Hosts** step, use the **Add hosts (with Host Plugin configured) for non-disruptive import** option to add the clients in which the host plug-in has been installed and configured.

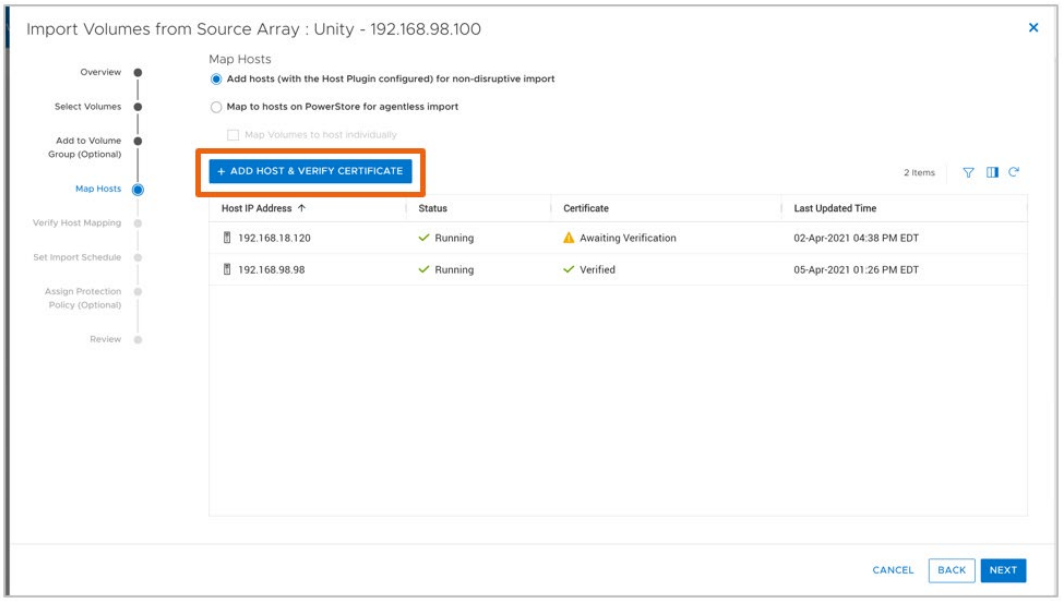


Figure 20. Map Hosts step: Non-disruptive import

When adding the clients as host, you must provide the client IP address, the port that was configured to be used for the import, and the operating system (OS) type.

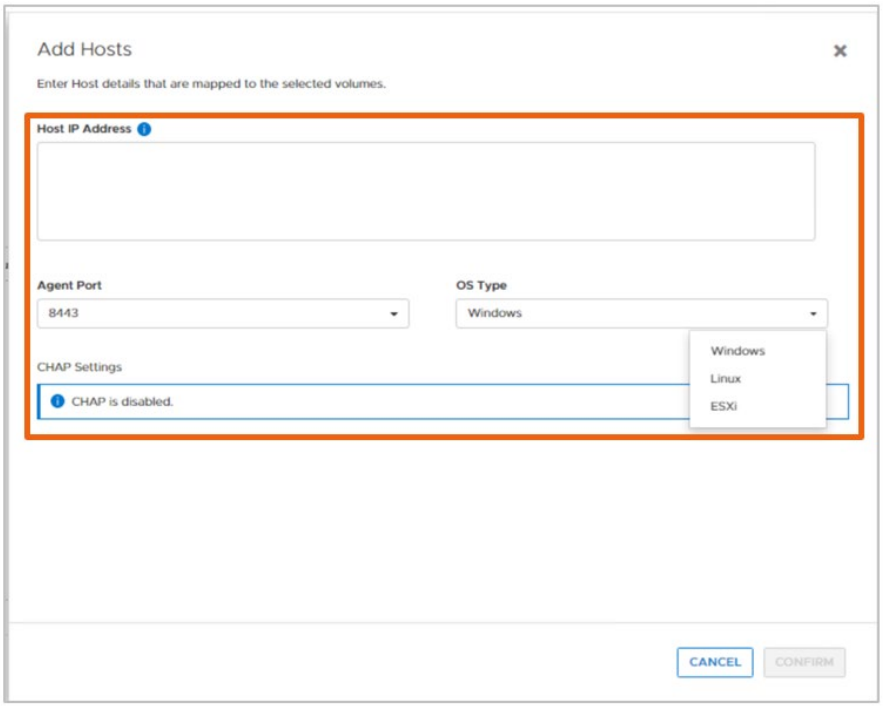


Figure 21. Add Hosts side panel

When the hosts are added, the system verifies the mapping of the hosts to the selected source resources, as shown in the following figure.

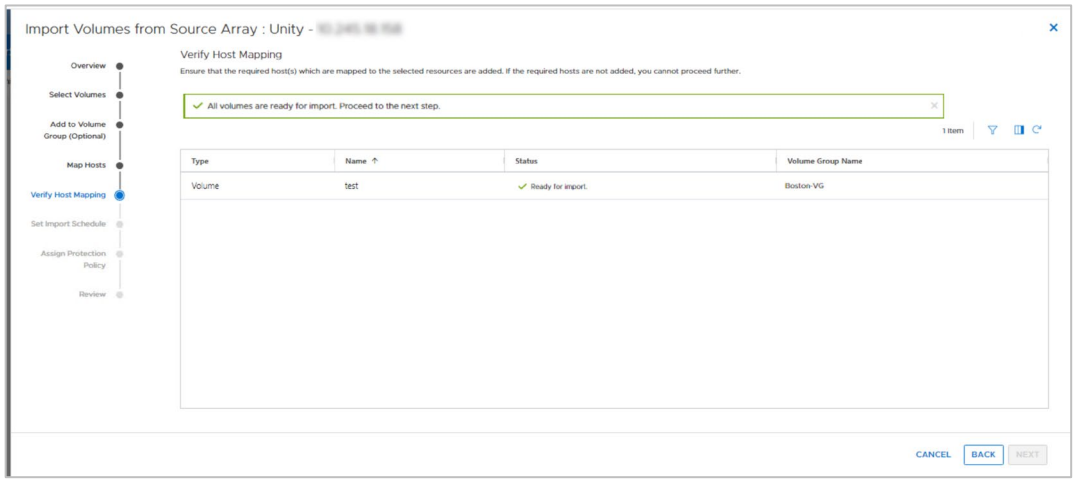


Figure 22. Verify Host Mapping step

In the **Map Hosts** step, with the **Map to hosts on PowerStore for agentless import** option you can map the resources to be imported to hosts already added to the PowerStore.

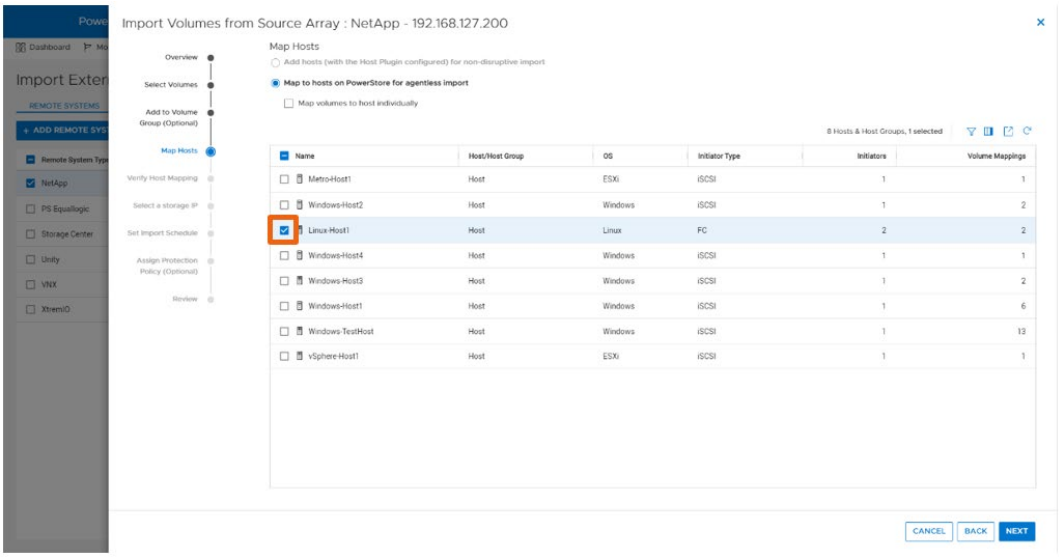


Figure 23. Map Hosts step – Agentless import

In the **Set Import Schedule** step (Figure 24), you can choose to start the import immediately or at a specific date and time, or you can choose automatic cutover.

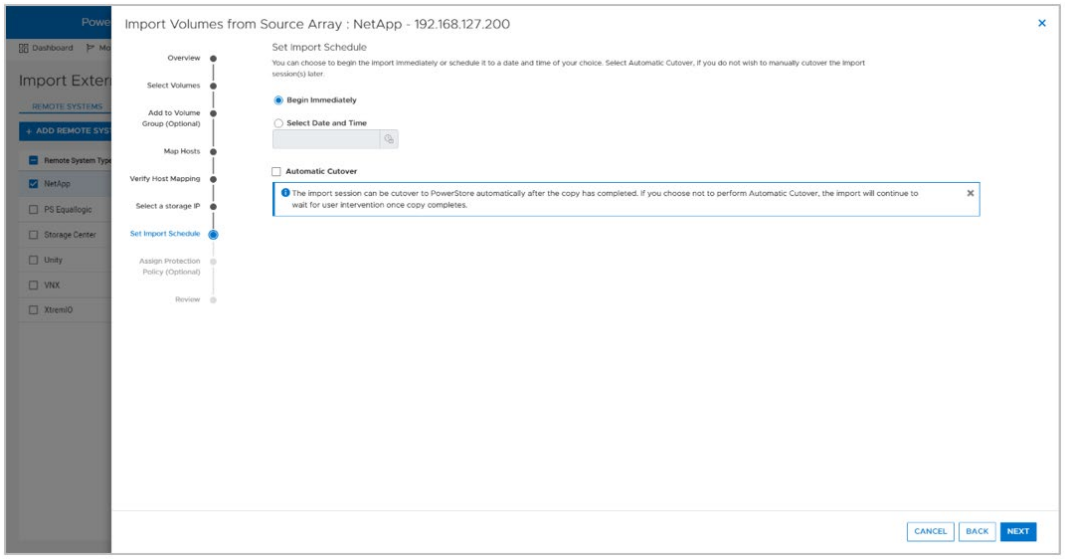


Figure 24. Set Import Schedule step

In the **Assign Protection Policy** step (Figure 25), you can apply a protection policy to the storage resource once it is in PowerStore.

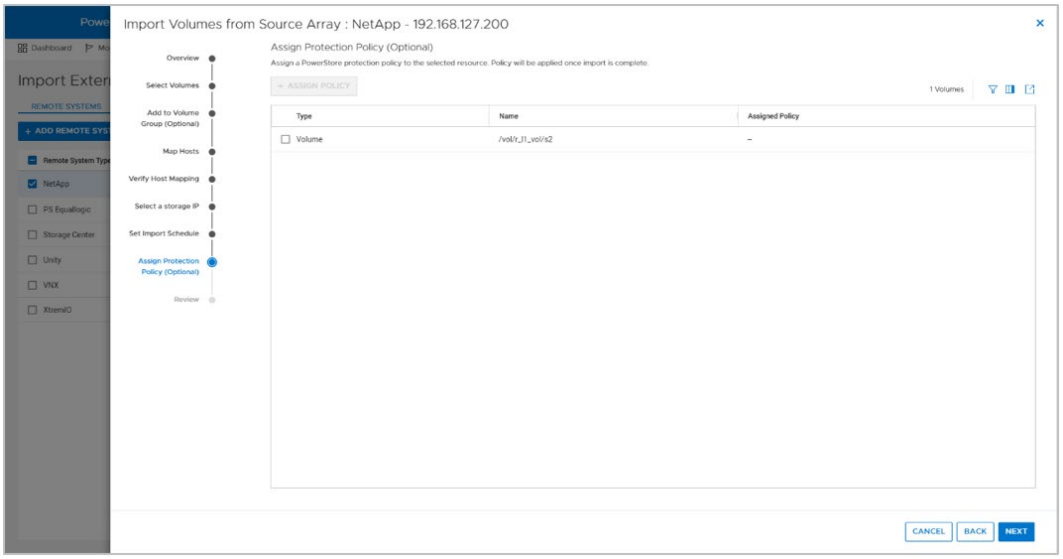


Figure 25. Assign Protection Policy step

The **Review** step shows a summary of all the options that are selected and provides the option to view the assigned policies in the source system.

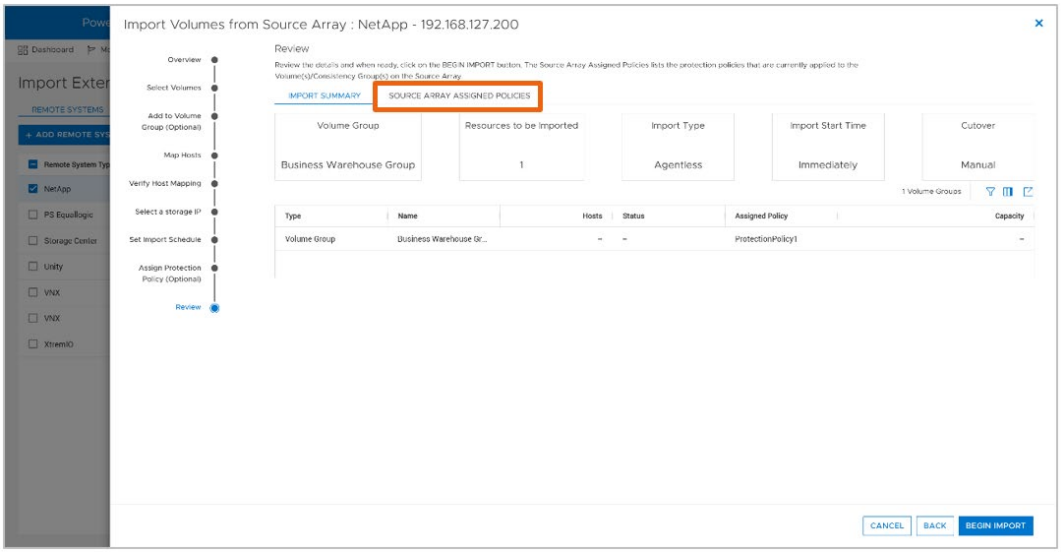


Figure 26. Review step

The **Source Array Assigned Policies** tab shows the source system's protection policies applied on the resources that are to be imported. The protection policies shown would not be imported but the user can export them as a CSV or XLSX file for reference as shown below.

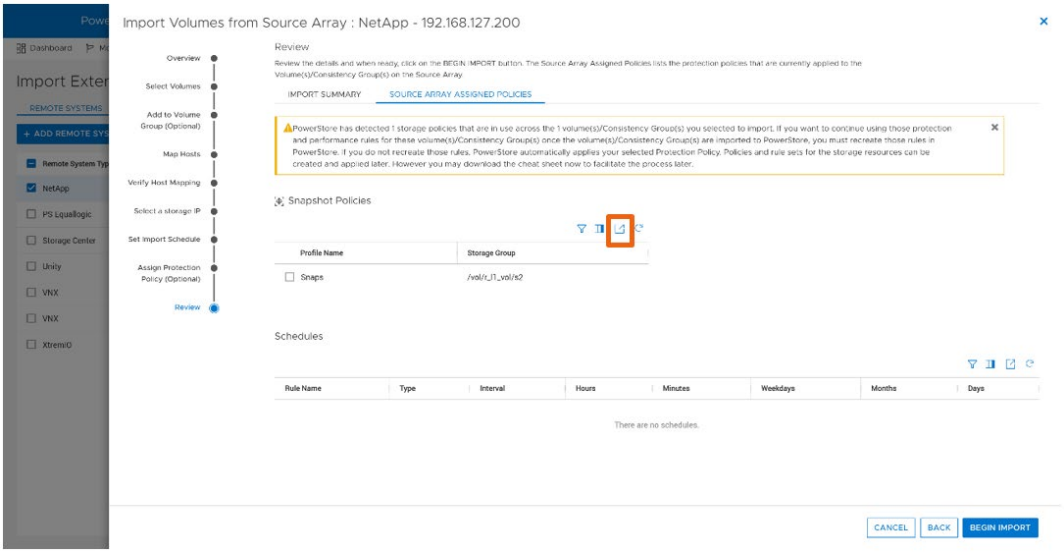


Figure 27. Source Array Assigned Policies tab

When a storage resource is set to be imported, click the **Begin Import**, as shown in Figure 27, to create an import session. The import session enables managing and monitoring the life cycle of the import.

The following table shows the actions that are allowed in an import session. Actions are enabled depending on their current state.

Table 7. Import actions

Action	Description
Cancel	• Cancels import session and goes back to source • Terminates a session that has not been cutover • Disables access to the destination volume • Deletes the destination volume or volume group associated with the import session
Cutover	• Cuts over the resource in PowerStore • Stops background copy and removes host mappings from source **Note**: After a cutover has been completed, it cannot be canceled and it is not possible to revert to the source resource.
Pause	• Suspends a copy-in-progress import session • Only pauses the background copy; host I/O is still mirrored
Resume	• Resumes a paused session • Starts the background copy again from where it was paused and continues the host I/O mirroring
Cleanup	• Removes an import session in clean-up-required state • Removes an import session that had a failure
Actions applicable to agentless import	
Enable Destination Volume	**Note:** Before you select this action, ensure the host application accessing the source volume or volumes is shut down. Also, ensure the host mappings are removed from the volume or volumes in the source system. • Enables destination resource for writes • Connectivity with the source system goes into inactive state For each import session that is in the **Ready To Enable Destination Volume** state, select the import session, and select **Import Actions** > **Enable Destination Volume** to progress each import session to the **Ready to Start Copy** state.
Start Copy	**Note:** Ensure the host application is reconfigured to access and use the destination volume or volumes in PowerStore. • Starts the background copy and continues the host I/O mirroring For each import session that is in the **Ready to Start Copy** state, select the import session, and select **Import Actions** > **Start Copy** to progress each import session to the **Copy In Progress** state

When an import session is in the state **Copy In Progress**, click the **State** column to view more details about the import session.

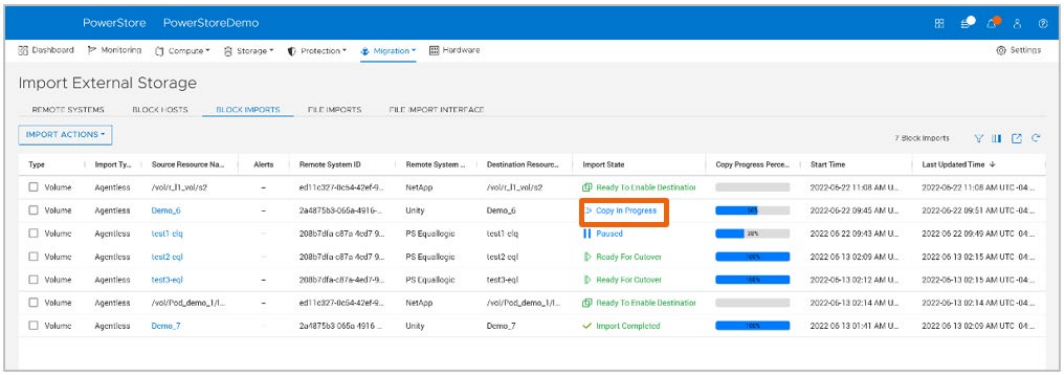


Figure 28. Copy in Progress import session

Click **Copy In Progress** in the **Import State** column to see the details, as shown in the following figure. The details window shows the import progress and lists the percentages of the completed data and remaining data to be imported.

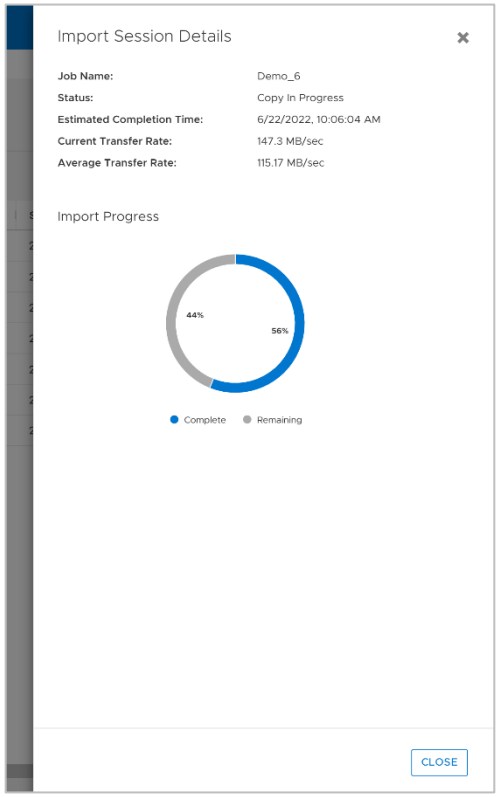


Figure 29. Import Session Details window

The following figure shows the actions available for an import session in the **Copy In Progress** state.

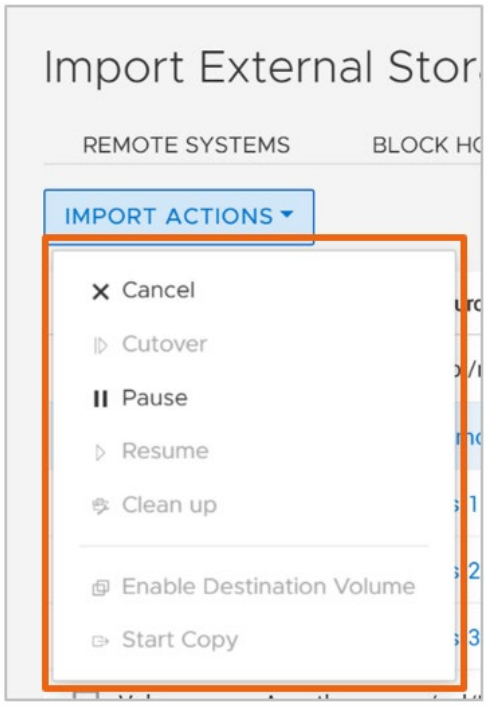


Figure 30. Import Actions menu

Import NAS Server

The following steps show the workflow of importing file resources. Once a source system is selected, select the **Import NAS Server** button.

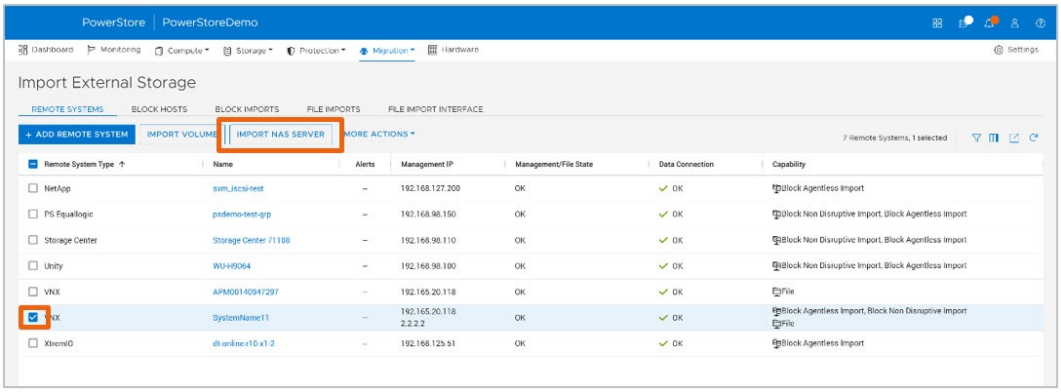


Figure 31. Import NAS Server

Figure 32 shows the **Import NAS Servers from Source Array** wizard.

In the **Select NAS Servers** step, select the source resources to import and click **Next**.

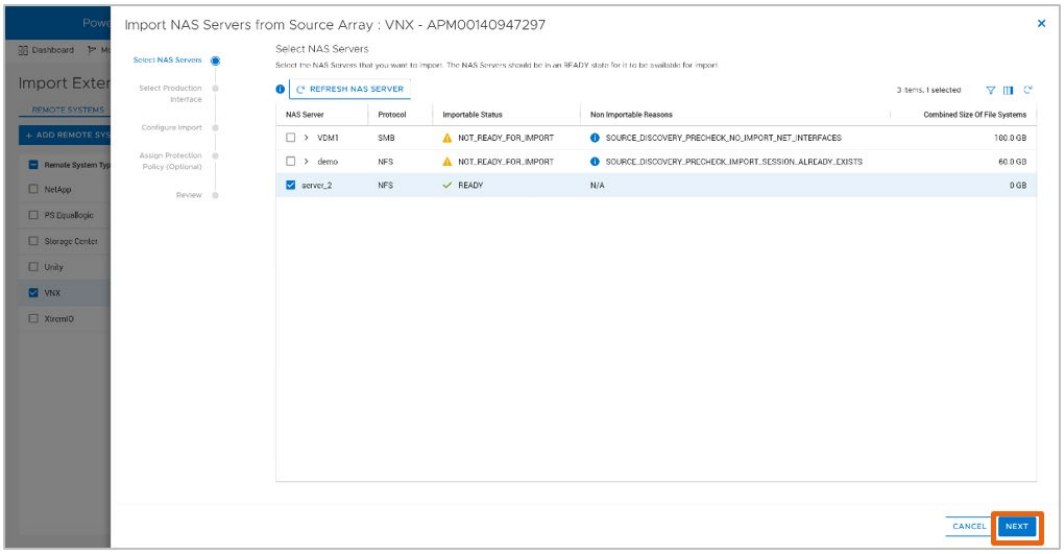


Figure 32. Select NAS Servers step

In the **Select Product Interface** step, select the file production interface and click **Next**.

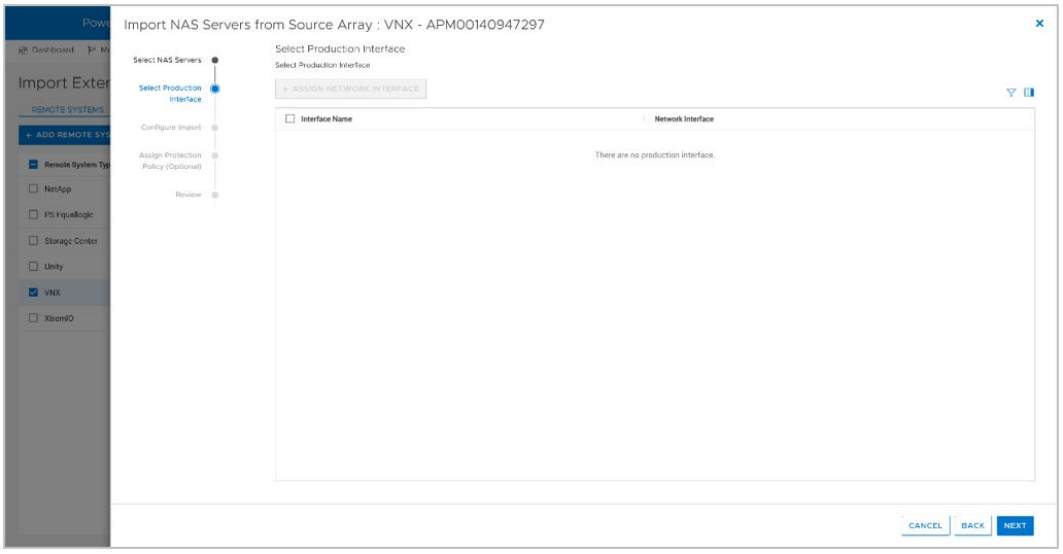


Figure 33. Select Product Interface step

In the **Configure Import** step, you provide a name and description for the file import session, set when the file import will begin, and specify the interface that will be used for the import traffic.

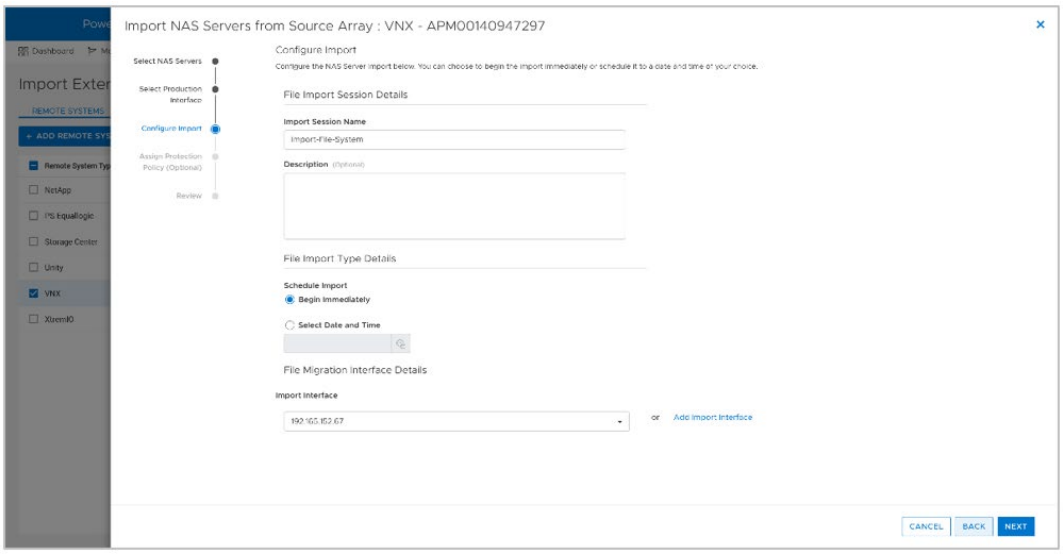


Figure 34. Configure Import step

In the **Assign Protection Policy** step, you can apply a protection policy to the storage resource once it is in PowerStore.

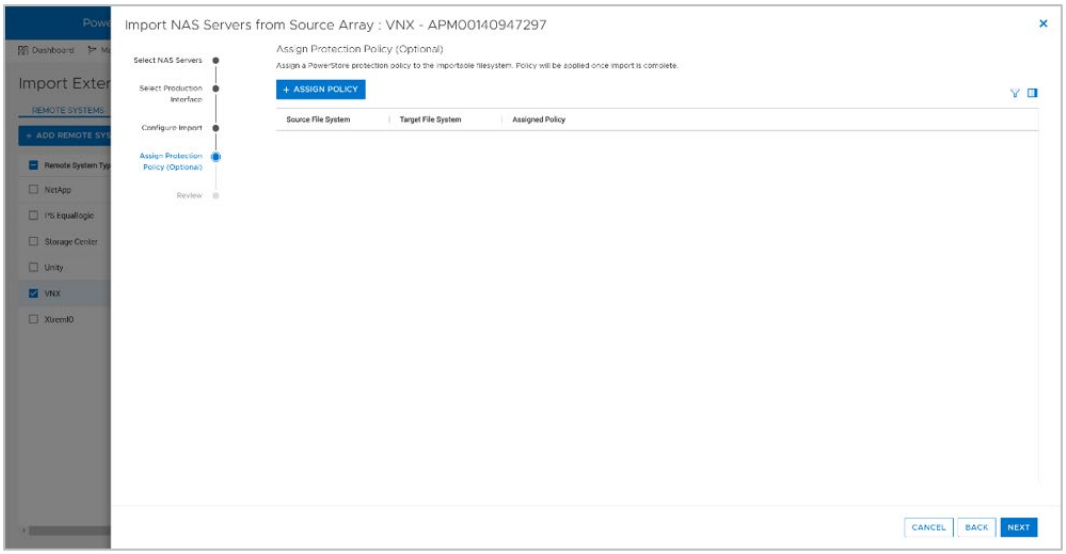


Figure 35. Assign Protection Policy (Optional) step

The **Review** step shows a summary of all the options that are selected.

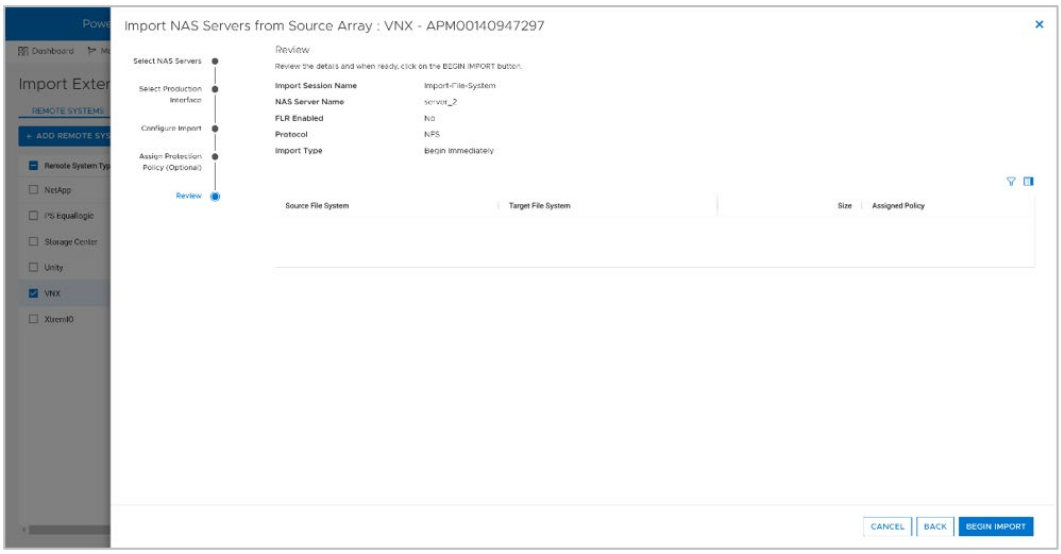


Figure 36. Review step

Click **Begin Import**, which displays **File Imports**, where you can manage and monitor the life cycle of the file import.

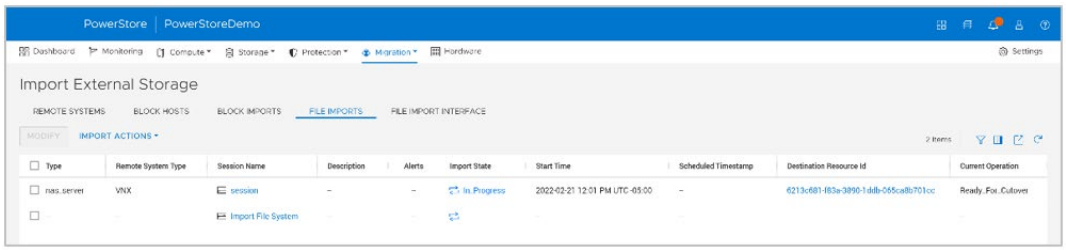


Figure 37. File Import sessions

The following table shows the actions that are allowed in an import session. Actions are enabled depending on their current state.

Table 8. File Import actions

Action	Description
Cancel	• Cancels import session and goes back to source • Terminates a session that has not been cutover • Disables access to the destination volume • Deletes the destination volume or volume group associated with the import session
Cutover	**Note:** Before you select this action, ensure the host application has access to the source file systems. • Enables destination resource for host access • Connectivity with the source system goes into inactive state • Cuts over the resource in PowerStore
Pause	• Suspends a copy-in-progress import session • Only pauses the background copy; host I/O is still mirrored
Resume	• Resumes a paused session • Starts the background copy again from where it was paused and continues the host I/O mirroring
Commit	• Stops background copy and cleans up source **Note**: After a commit has been completed, it cannot be canceled, and it is not possible to revert to the source resource.

The following figure shows the actions available for an import session in the **Ready to Cutover** state.

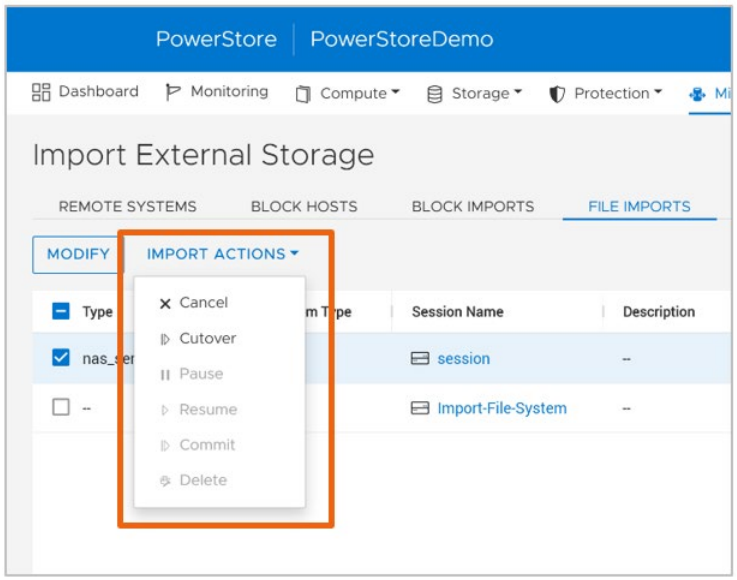


Figure 38. File Import actions

As previously stated, you can also manage an import session from the REST API and the PowerStore CLI (pstcli). The following figure shows the different REST API queries that you can use for managing an import session from the REST API. For more details, see the document *Dell PowerStore REST API Guide* on Dell.com/powerstoredocs.

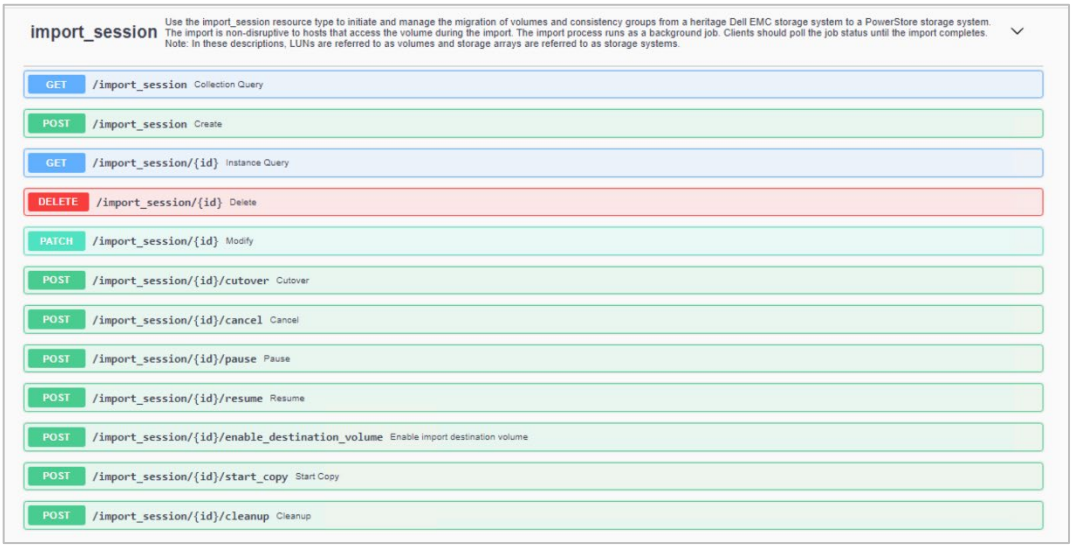


Figure 39. REST API import session queries

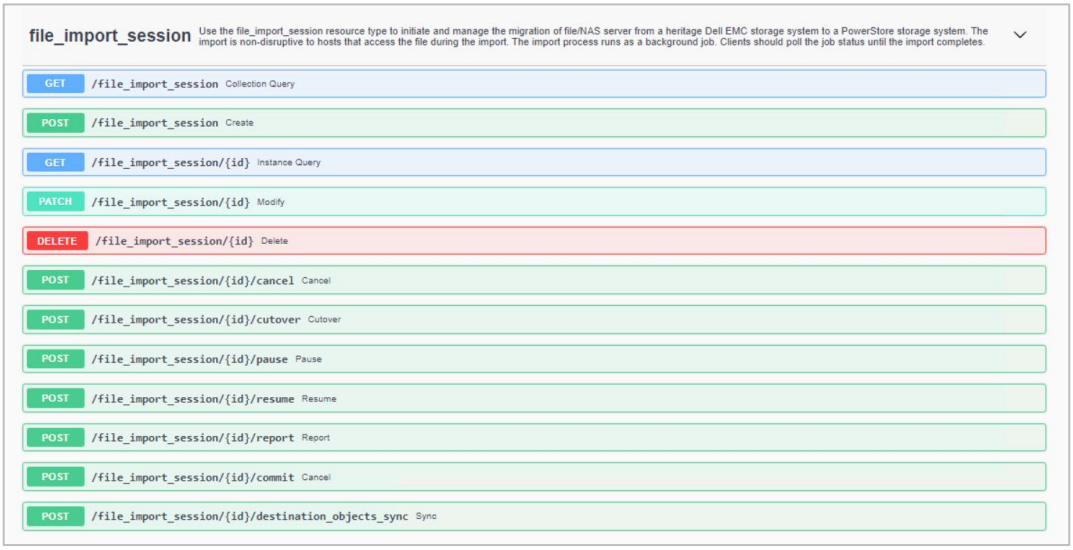


Figure 40. REST API file import session queries

You can use the following PowerStore CLI commands to manage an import session from the PowerStore CLI (pstcli). For more details about the PowerStore CLI, see the document *Dell PowerStore CLI Guide* on Dell.com/powerstoredocs.

```
C:\Windows\system32>pstcli - help all
…
Migration - Manage data import and data migration from remote systems
file_import_interface                          file_import_session
import_host_system                             import_netapp
import_psgroup                                 import_session
import_storage_center_consistency_group        import_unity
import_unity_volume                            import_vmax_storage_group
import_vnx_array                               import_vnx_volume
import_xtremio_consistency_group               migration_recommendation
file_import_nas_server                         import_host_initiator
import_host_volume                             import_netapp_volume
import_psgroup_volume                          import_storage_center
import_storage_center_volume                   import_unity_consistency_group
import_vmax                                    import_vmax_volume
import_vnx_consistency_group                   import_xtremio
import_xtremio_volume                          migration_session
```

Interoperability

Interoperability considerations for the import function include:

- Import is supported by both PowerStore T models and PowerStore X models.
- Import is supported in multi-appliance PowerStore clusters.
- Replication:
  - A source resource can be participating in a replication session, but the destination resource of the replication is not eligible to be imported.
  - The native asynchronous block replication can be used to migrate block resources between PowerStore clusters.
  - The imported storage resource cannot be replicated until it is cut over.
- Snapshots in the source resource are not imported.
- No imports are allowed in the following scenarios:
  - Network configuration is in progress.
  - A PowerStore non-disruptive upgrade (NDU) is in progress.

Limitations

The following table shows the limits for the import external storage feature.

Table 9. Import maximum values

Description	Maximum value
Volumes in Ready to Cutover state for non-disruptive import	16
Volumes in Ready to Cutover state for agentless import	75
Import sessions copying on-parallel	8
Remote systems for import	6
Hosts (with host plug-in installed) for import	64
Volumes in a source consistency group	16

Note: Be aware of system-wide limits. See the document *PowerStore Support Matrix* on Dell.com/powerstoredocs.

Best practices

Consider the following recommendations when using the import feature:

- Back-end iSCSI connections might be new in the environment
- If possible, enable NTP in the source and PowerStore systems
- Simulate the import with a dummy resource before starting the import
- Avoid configuration changes during import
- Anticipate performance impacts during import

For details about restrictions and fault handling, see the document *Importing External Storage to PowerStore Guide* on Dell.com/powerstoredocs.

Migrating block data

Introduction

This section provides an overview of the various tools that are used to migrate block data.

Dell PowerPath Migration Enabler

PowerPath Migration Enabler is a migration tool that is packaged with Dell PowerPath software. It offers various migration options that enable compatibility between many storage systems. For PowerStore, PowerPath Migration Enabler host copy is used. It is a host-based migration operation that uses host-based resources to copy data from the source system to the destination system. A direct connection between the source storage system and destination PowerStore is not required. Host access to the block resource is maintained during the migration initial copy and can be configured to be non-disruptive during cutover to the PowerStore.

For more information about the systems that are supported with PowerPath Migration Enabler, go to the E-Lab Navigator. For more information about using PowerPath Migration Enabler, go to Dell Support.

Dell VPLEX

Performing a migration using Dell VPLEX supports the expanded use case that VPLEX addresses—continuous availability and geographical distribution of storage systems across data centers. For Fibre Channel environments, VPLEX can be employed to deliver distributed storage and enable hosts in different locations to access the same data.

Because VPLEX is a continuous-availability solution, migrations are performed non-disruptively. A PowerStore system is added to a VPLEX cluster that contains a supported Dell storage system. Data is copied to the PowerStore system in a transparent manner. Once the migration is complete, the source storage system can remain in the cluster (to maintain continuous availability and provide archiving benefits) or be decommissioned.

In an environment that already uses a VPLEX cluster, integrating the PowerStore system into the cluster is an attractive solution for migration. VPLEX is an appliance-based solution that requires a license. For more information about VPLEX, go to Dell Support.

Metro node

Metro node is an external hardware and software add-on feature for PowerStore for which it provides active/active synchronous replication, and standard local use cases. It also provides a solution locally with the local mirror feature to protect data from a potential array failure. Both use cases provide solutions for true continuous availability with zero downtime.

PowerStore is viewed by metro node as ALUA array based on SCSI response data and therefore is required to follow the four active, four passive path connectivity rules. This rule states that both nodes of the metro node must each have four active and four passive paths to all volumes provisioned from the array. For more information about metro node, see the white paper VPLEX: Leveraging Array Based and Native Copy Technologies.

Host-based LVM migration

Logical volume management (LVM) migration is performed on a Linux host. It supports block devices that have been presented to the Linux host as logical devices. LVM migration may be performed from any Dell storage product or third-party storage system. LVM migration can be performed over iSCSI or Fibre Channel and is an included service with most standard Linux distributions.

Depending on the method of LVM migration that is used, host access to the block devices can continue while the migration transfer takes place. Once complete, the migration session can be cut over so that host access can resume on the volumes that are presented by the PowerStore system. At this point, the source storage resources may be decommissioned, or they may be kept if a rollback operation is required.

Since LVM migration is a host-based operation, supporting material for LVM migration is on the associated Linux distribution of the Linux host that is used for LVM migration.

Migrating file data

Introduction

File data can be migrated using various tools that fit specific requirements. This section provides an overview of the tools that can be used to import data into a PowerStore T model cluster. The cluster is configured with a unified storage configuration.

EMCOPY

EMCOPY is a command-line Windows tool that was developed by Dell Technologies to aid the migration of data between file systems. It can be used to migrate data to PowerStore from any supported Dell storage system or third-party storage system. EMCOPY is available as a free download from Dell Support.

EMCOPY supports the SMB protocol and has awareness for file-system-access-control settings. This support allows this information to be migrated along with the files themselves. EMCOPY can be configured to run regularly on the same file systems to establish an asynchronous host-based replication session. Only modified file system data is transferred when EMCOPY is run on the same file system multiple times. The functions and use of EMCOPY are like Robocopy. However, EMCOPY is supported by Dell Technologies and can be completed on an entire environment that runs on Dell storage.

For more information about EMCOPY, including details about downloading and running the tool, go to Dell Support.

Robocopy

Robocopy is a free Microsoft tool for performing Windows-host-based file system replication. It can serve as a migration tool for environments with SMB file systems. Robocopy can be used to migrate SMB file systems in Dell storage systems or third-party storage systems.

Most modern Windows operating systems are preloaded with Robocopy, but this tool may also be downloaded from Microsoft. Robocopy is published as a command-line tool, but alternative versions exist which offer a user interface. The UI-driven Robocopy variants may be easier to configure and manage for newer users.

For more information about Robocopy, including download links and documentation, see the Microsoft technical documentation.

Rsync

Linux users can use rsync as a host-based migration solution for PowerStore. Rsync is a free command-line tool that is packaged in most major Linux distributions. It can be used to transfer data to PowerStore from NFS file systems that exist on a Dell storage systems or third-party storage system.

Placed in the Linux command shell, rsync makes it easy to work with when writing scripts or cron jobs to automate the migration process. These automations can also perform regular rsync operations over time to create a host-based asynchronous file system replication session. File system metadata, user permissions, and timestamps are preserved when rsync is used to transfer file-system data.

For more information about rsync, see the applicable Linux distribution manual.

Dell Select Datadobi DobiMigrate

Datadobi, a Dell Select partner, offers the migration software DobiMigrate to perform file system migrations to the PowerStore platform. DobiMigrate is compatible with many different source storage systems, including Dell storage systems and a set of third-party storage arrays. For more details, see the DobiMigrate support matrix.

DobiMigrate is run on a hypervisor supporting OVA deployment (such as VMware ESXi) or installed on a Red Hat Enterprise Linux or CentOS Linux host through an RPM. It supports NFS, SMB, and basic multiprotocol migration, with host machines known as **proxies** running DobiMigrate software to handle the data transfer of the migration. Management of migration sessions using DobiMigrate is performed through an intuitive UI that provides status and reporting options through each step of the migration operation.

The following figure shows a configuration diagram from the Datadobi document NAS and Object Migration Software for Modern Data Centers.

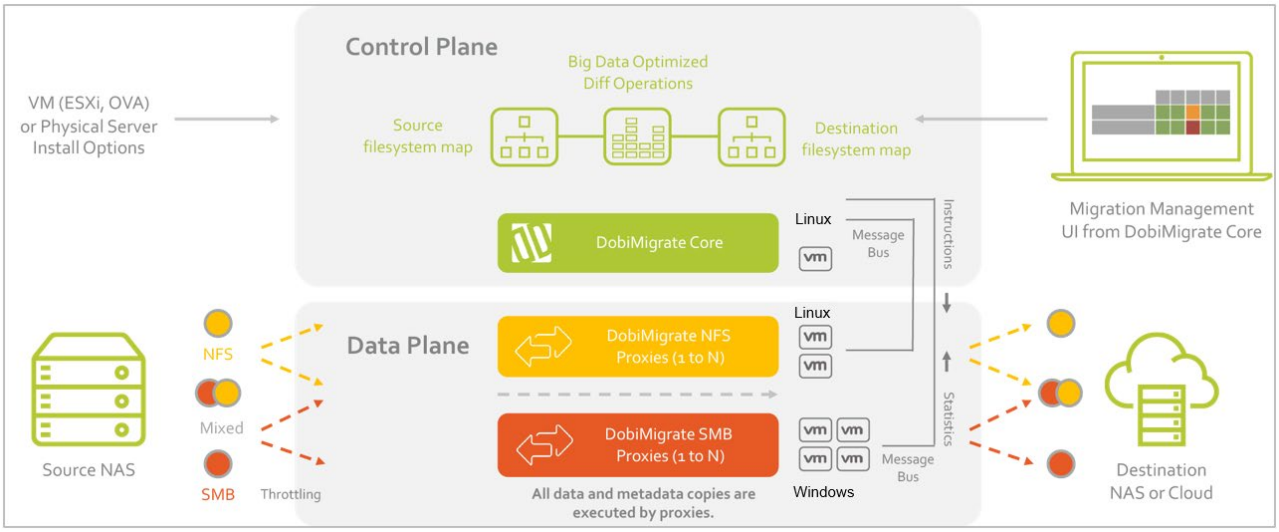


Figure 41. DobiMigrate configuration

More information about Datadobi DobiMigrate can be found on the Datadobi site. For information about Datadobi and its integration points with Dell storage, go to Dell Support.

Migrating virtualized environments

Introduction

This section provides an overview of the tools that can be used to migrate virtualized environments in VMware ESXi and VMware vCenter server.

RecoverPoint for VMs

Dell RecoverPoint for Virtual Machines is part of the RecoverPoint family and offers integration with VMware virtualized environments. It enables replication of data with VM granularity between ESXi hosts and the underlying storage for the VM datastores. RecoverPoint for Virtual Machines can be used to migrate the storage for virtualized environments to PowerStore. Because the migration occurs at the VM level, migration is storage-agnostic and supports various Dell storage systems, and other third-party storage.

RecoverPoint for Virtual Machines is a virtual appliance that is deployed on a VMware ESXi host. A VMware vCenter plug-in adds management capabilities directly into vCenter, enabling setup and monitoring of migration sessions from a familiar interface. RecoverPoint for Virtual Machines is fully supported by Dell Technologies and requires a license for use.

Deploy the virtual appliance for RecoverPoint for Virtual Machines in a clustered configuration. Depending on the size of the virtual environment and the data to transfer, hardware requirements for the cluster vary and should be considered. For more information about sizing and using RecoverPoint for Virtual Machines, go to Dell Support.

VMware vSphere vMotion

VMware vSphere Storage vMotion is an included feature with VMware vCenter Server. It provides the capability to migrate VM compute power to a different ESXi server, or its backing storage to a different datastore. This functionality can be used to migrate VM storage to a datastore hosted by a PowerStore T model or PowerStore X model.

Migration using Storage vMotion is a simple operation in vCenter Server. To ensure that a VMware datastore has been presented from PowerStore to the vCenter environment, select a VM and migrate the VM storage to that datastore. This action starts a migration session (see Figure 42). The migration is performed with the VM remaining online during the data transfer, and there is a short cutover to complete the operation.

vMotion migration can also be used to move compute workloads to a PowerStore X model. The migration of compute is a simple operation that can be followed using the same migrate action available for each VM in the vCenter. It offers the option to select either **Change compute resource only** or **Change both compute resource and storage**.

VMware vSphere vMotion and Storage vMotion are packaged with VMware vCenter Server, which requires a license for use.

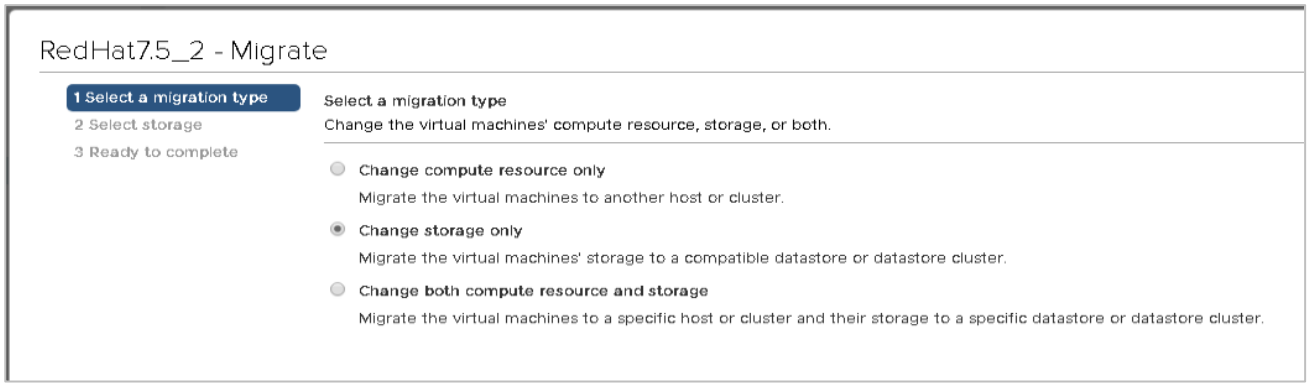


Figure 42. vMotion migration types

Conclusion

Summary

There are many technologies that can be used to migrate to the Dell PowerStore platform. Migration involves the movement of data and changes in host connectivity from one storage device to another. The type of data varies—between file, block, or both—which is critical when deciding which tools to use for the migration.

The native import feature can be used to move storage resources into PowerStore from other Dell storage systems. There are also other tools for migrating to PowerStore, including tools that are used to migrate block data, file data, and virtualized environments.

References

Dell Technologies documentation

The Dell Technologies Storage Info Hub provides expertise that helps to ensure customer success with Dell storage platforms.

Dell.com/powerstoredocs provides detailed documentation about how to install, configure, and manage Dell PowerStore systems.