# EMC ViPR Controller

Version 3.5

## Ingest Services for Existing Environments Guide

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# CHAPTER 1

# Using ViPR Controller with Existing Environments

This chapter contains the following topics:

# Overview

ViPR Controller enables storage arrays to be added to a virtual data center and for their storage pools to be used as the target for block and file storage provisioning operations. ViPR Controller provides a mechanism to manage volumes or file systems that were created outside of ViPR Controller.

The mechanism for bringing storage under ViPR Controller control is referred to as *ingestion*.

In addition to file systems and basic block volumes,ViPR Controller also provides the ability to ingest volumes that are part of a VPLEX configuration, or that are protected using the Symmetrix Remote Protection Facility (SRDF) or RecoverPoint (RP).

The way in which existing storage has been provisioned on an array affects the ability of ViPR Controller to ingest block volumes or file systems from the array, and can affect future provisioning operations. The following table lists the import mechanisms that are provided and identifies some of the limitations. For the full list of notes and constraints, see Ingestion notes and constraints on page 15.

**Table 1** Existing environment support

| Operation | Systems | Notes and Limitations |
|---|---|---|
| **Ingest Block Volumes** Supports the ingestion of block volumes from block storage systems that are managed by ViPR Controller. | VMAX | VMAX volumes - both exported and unexported - can be ingested. However, where masking views exist, the provisioning of standard or FAST LUNs can be affected. The following white paper describes the effects of masking views and zones. See *EMC ViPR in Existing VMAX Environments* which can be found on the ViPR Controller Product Documentation Index . |
| | VMAX and associated SRDF or RP volumes | Supports both SRDF/S and SRDF/A protected volumes. |
| | VPLEX and associated RP volumes | Both exported and unexported VPLEX virtual volumes can be ingested. You can also ingest the virtual volumes and backend volumes, which is full ingestion, or just the virtual volumes. |
| | VPLEX and VMAX | When creating VPLEX volumes, existing masking views must meet ViPR Controller criteria. For more information, see the *EMC ViPR Enhancement: Discovery and Use of VPLEX-VMAX Pre-Existing Multiple Masking Views White Paper* on the ViPR Controller Product Documentation Index . |
| | VNX and associated RP volumes | Both exported and unexported VNX volumes can be ingested. |
| | VMAX and VNX | ViPR Controller does not support the ingestion of volumes that are in a consistency group. |
| | XtremIO | All hosts and clusters must be discovered and configured in ViPR Controller. |

**Table 1** Existing environment support (continued)

| Operation | Systems | Notes and Limitations |
|---|---|---|
| **Ingest File Systems** Supports the ingestion of file systems from file storage systems that are managed by ViPR Controller. | Isilon/VNX File/NetApp | To be ingested by ViPR Controller, a file system can be exported or unexported. In addition:<br><br>• For all systems except VNXe, a export can have multiple export rules. For VNXe, an export can only have a single export rule.<br><br>• For systems other than Isilon:<br><br>  ▪ ViPR Controller only supports exports with single security type. For example, an NFS export on an array is allowed to have multiple security types (sys, krb, krbi, krbp, etc.) while ViPR Controller only allows for one security type<br><br>  ▪ all endpoints within an export have one set of host permissions (read-write, read-only and root) type<br><br>• For Isilon systems:<br><br>  ▪ ViPR Controller supports exports with multiple security types<br><br>  ▪ ViPR Controller supports an NFS export on a file system directory with a security flavor to NFS hosts with different access permissions (read-only, read-write and root) |
| Import and move LUNs using the Host Migration Utility | | Can be used to onboard a non-ViPR Controller LUN by migrating the data to a ViPR Controller-managed LUN. Can change the virtual storage pool of a LUN by migrating a source LUN to a new target.<br><br>For more information, see the *EMC ViPR Migration Services - Host Migration Utility Installation and Configuration Guide* on the ViPR Controller Product Documentation Index . |

# Block storage systems under ViPR Controller management

Using only ViPR Controller to manage the volume prevents conflicts between the storage system database and the ViPR Controller database, and avoids concurrent lock operations being sent to the storage system.

After a volume is placed under ViPR Controller management and is provisioned or exported to a host through a ViPR Controller service, do not use the storage system element manager to provision or export the volume to hosts. Here are some examples of failures that could occur when the element manager and the ViPR Controller database are not synchronized:

• If you use the element manager to create a volume, and at the same time another user tries to run the "Create a Volume" service from ViPR Controller on the same

storage system, the storage system may be locked by the operation run from the element manager, causing the ViPR Controller "Create a Volume" operation to fail.

- After a volume is exported to a host through ViPR Controller, the same masking view, which was used by ViPR Controller during the export, was changed on the storage system through the element manager. When ViPR Controller attempts to use the masking view again, the operation fails because what ViPR Controller has in the database for the masking view is not the same as the actual masking view reconfigured on the storage system.

However, you can continue to use the storage system element manager to manage storage pools, add capacity, and troubleshoot ViPR Controller issues.

# File storage systems under ViPR Controller management

Once a filesystem is under ViPR Controller management, and has been provisioned or exported to a host through a ViPR Controller service, you should no longer use the storage system element manager to provision or export the filesystem to hosts. Using only ViPR Controller to manage the volume will prevent conflicts between the storage system database and the ViPR Controller database, as well as avoid concurrent lock operations being sent to the storage system. You can however continue to use the storage system element manager to manage storage pools, add capacity, and troubleshoot ViPR Controller issues.

# Managing exported volumes created outside of ViPR Controller

ViPR Controller has the ability to manage exported volumes that it did not create or ingest. This discussion explains how ViPR Controller processes these volumes and the associated limitations.

For hosts with existing exported volumes that cannot be fully brought under ViPR Controller management, ViPR Controller makes a significant effort to co-exist by allowing new volumes to be created and exported to these hosts from within ViPR Controller. ViPR Controller attempts to reuse existing export entities (such as masking views and storage groups) on the storage system to do the following:

- Adhere to certain storage array restrictions that prevent new export entities from being created. For example, VMAX and VNX limit the number of initiator groups for a given initiator to one, resulting in ViPR Controller reusing the existing initiator groups.

- Avoid depleting the available resources on a storage system by reusing export entities instead of creating new ones. By reusing existing export entities on a storage system, ViPR Controller makes the following assumptions:

  - The existing export is correct and complete. ViPR Controller does not attempt to add additional storage ports or zones to these exports, and does not validate the exports against the virtual pool that is associated with the volumes being added.

  - ViPR Controller does not automatically try to ingest, manage or make visible pre-existing volumes in the export.

**Limitations**
Review the following limitations to managing volumes that were created outside of ViPR Controller:

- If ViPR Controller uses an existing export mask, no new zones are created, even if there are existing zones.

- When adding an initiator, ViPR Controller will create a new zone if there are not existing zones.

- ViPR Controller does not check for other hosts in an export mask. If you export a new volume to a host, other hosts in the same export mask can see the new volume.

- ViPR Controller does not detect ports in an export mask, even without a connection, that are out of the virtual array.

- ViPR Controller does not verify initiator types. For example, it does not detect that the failover mode is not 4.

- ViPR Controller does not check the maximum paths and paths per initiator values set for the virtual pool before reusing masking views.

# CHAPTER 2

# Ingesting Unmanaged Block Volumes into ViPR Controller

This chapter contains the following topics:

# Introduction

Existing block volumes can be brought under ViPR Controller management by ingesting them using services provided in the Service Catalog. The operation is a two stage process and requires the use of two services, a discovery service followed by an ingestion service. The services are for use by System Administrators only and are not visible to normal catalog users.

Storage resources that have been ingested into ViPR Controller can be managed as if they had been created using ViPR Controller. The can be exported to hosts, expanded, or protected using snapshot and copy techniques.

Any volume that is brought under ViPR Controller management must be assigned to a block virtual pool. Before you can ingest volumes, ensure that a virtual pool exists whose criteria match those of the volumes to be ingested. For example, if you want to ingest volumes located on solid state devices (SSDs), you must ensure that virtual pools exist that allow SSDs. Similarly, if you want to ingest VMAX volumes that have associated SRDF volumes, you must ensure that there is a block virtual pool that can have VMAX volumes that are SRDF protected.

The discovery process finds volumes on a specified array and matches them with block virtual pools. When you use the ingestion service, only volumes that were previously discovered are ingested.

## Before discovery - VPLEX virtual volumes

ViPR Controller enables you to ingest unmanaged VPLEX virtual volumes.

Before you ingest an unmanaged VPLEX virtual volume, complete the following procedures.

- Build a virtual array that includes network access to the VPLEX device and the VPLEX cluster on which the volume is configured.

- Build a virtual pool that has the same **High Availability** setting as the volume. (**VPLEX Local** or **VPLEX Distributed**)

- if the VPLEX virtual volume is in a consistency group, the virtual pool must have **Multi-Volume Consistency** enabled.

An option is given to the user to ingest backing storage.

## Snapshots, full copies, and continuous copies

When ViPR Controller ingests VMAX, VMAX3 and VNX volumes, it can also ingest their snapshots, full copies, and continuous copies. This ingestion can occur for exported and unexported volumes.

Always use the same project to ingest the source volume and its associated snapshots, full copy, and continuous copy volumes into ViPR Controller. Access is prohibited to these associated volumes when they are in a project that differs from their parent source volume.

ViPR Controller can ingest the following:

### Snapshots

Snapshot targets are ingested as block snapshots. The ingested target has a corresponding session if one is available.

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**Note**

For VNX volumes, ViPR Controller cannot ingest cascaded snapshots.

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**Full copies**

When ingesting differential full copies with active sessions to the source volume (regardless of their current state), detached full copies are ingested as independent volumes without maintaining association to the actual source.

**Continuous copies**

All continuous copies with active links to the source volume regardless of their current state are ingested. Any VNX continuous copies in a fractured or a split state are ingested as full copies. Detached continuous copies are ingested as independent volumes without maintaining association to the actual source volume.

**Ingestion constraints**

ViPR Controller does not ingest the following:

- Remote full and continuous copies

- Group snapshot relationships (Group snapshots are ingested, but only as a collection of individual snapshots that can be used for other operations.)

- Nested replicas, such as a snapshot of a snapshot

- VMAX3 SnapVX sessions

- VNX SnapView sessions

**Post ingestion operations**

After snapshots, full copies, and continuous copies are ingested, ViPR Controller can perform the following operations on them:

- Snapshots:

  - Restore

  - Delete

  - Export

  - Unexport

- Full copies:

  - Restore

  - Resynchronize

  - Detach

  - Delete

- Continuous copies:

  - Pause

  - Resume

  - Stop

  - Delete

**Note**

Before running the Remove Continuous Copy service, you must unexport the volume storing the continuous copies and then pause continuous copies. If not, this message appears: `Remove Continuous Copies for ingested mirror vol failed because mirror vol exported on array side before ingest.`

## Ingestion of VMAX3 volumes with snapshots, full copies and continuous copies

When a VMAX3 array has volumes with snapshots, full copies or continuous copies, ViPR Controller ingests the source volume but not the associated replica volume and marks the source volume as internal. This also includes SRDF R1 and R2 volumes. Since ViPR Controller does not view these volumes as stand-alone volumes, you cannot perform any operations on these volumes until you ingest the associated replica volume.

ViPR Controller does not support VMAX3 VP Snap snapshots. If ViPR Controller ingests VMAX3 volumes with snapshots that were created with TimeFinder VP Snap, it cannot restore, export, or delete these snaphots. ViPR Controller uses TimeFinder SnapVX for snapshot operations, and this technology does not work with snapshots created with TimeFinder VP Snap. Always manage these snapshots outside of ViPR Controller.

Additionally, ViPR Controller does not support restoring TimeFinder SnapVX snapshots that were ingested on VMAX3 volumes. You must also manage these snapshots outside of ViPR Controller.

## Guidelines and limitations for ingesting RecoverPoint consistency groups

When ingesting RecoverPoint consistency groups, you must ensure that they do not contain mixed replication sets, for example, both VMAX and VPLEX volumes.

Before using ViPR Controller to discover and ingest RecoverPoint consistency groups, ensure all source volumes are the same storage technology and all target volumes per RecoverPoint copy (target virtual array in ViPR Controller) are the same storage technology.

**Note**

Each RecoverPoint copy can be on a different technology. For example, VPLEX/VMAX sources with VNX targets in the same RecoverPoint consistency group are supported.

**Limitations**

Ingestion of RecoverPoint consistency groups is not supported for these use cases:

- RecoverPoint links to copies in one RecoverPoint consistency group are mixed between synchronous and asynchronous.
- Replication sets in one RecoverPoint consistency group have both VPLEX and native RecoverPoint volumes.
- RecoverPoint links have a status other than Active, Standby, or Snapidle.
- RecoverPoint consistency group is in a failed over state or not enabled state.
- Remote copy is not in the "no access" state.
- RecoverPoint target volume has VPLEX protection but the source volume does not.

After all volumes from one RecoverPoint consistency group have been ingested, you cannot ingest additional volumes from that consistency group that were created outside of ViPR Controller. After you ingest the RecoverPoint consistency group, use ViPR Controller to create additional volumes only. Otherwise you have to inventory-only delete and re-ingest the whole RecoverPoint consistency group again.

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**Note**

The consistency group in ViPR Controller is created when the last volume in the RecoverPoint consistency group has been ingested. This ensures the ViPR Controller consistency group attributes match those in the RecoverPoint consistency group.

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**RecoverPoint -compatible feature support**

- Distributed RecoverPoint consistency groups
- Customized copy settings (for example, protection window)
- Customized link settings (for example, compression)

# Ingestion notes and constraints

ViPR Controller performs a set of tests before ingesting volumes. Before you ingest a volume, review the following notes and limitations.

For a complete list of arrays from which ViPR Controller can ingest volumes, see the *ViPR Controller Support Matrix* which can be found on the ViPR Controller Product Documentation Index .

## General Ingestion notes and constraints

The following is a list of notes and constraints for ingesting supported volumes types.

- Datastore information built from an ESX cluster is not ingested into ViPR Controller when the volume underlying the datastore is ingested. Only the volume presented to ESX is ingested.
- ViPR Controller cannot ingest volumes exposed to hosts with both iSCSI and Fiber Channel initiators present.
- After SRDF/A volumes set with the consistency exempt option are ingested, ViPR Controller can only perform the Create, Delete, Stop, and Suspend SRDF operations on them. All other SRDF operations act on the RDF group as a whole.
- Both the virtual pool and virtual array specified in the service order must be active and accessible to the requesting tenant and project.
- You cannot ingest a volume or metavolume that is in a consistency group. If you request three volumes to be ingested, and two of them belong to consistency groups on the array, one volume will be successfully ingested and the two volumes in the consistency groups will be skipped.
- If the volume's auto-tiering policy does not match the auto-tiering policy specified in its virtual pool, it cannot be ingested.
- If, by ingesting the volumes you requested, the capacity quota set on the virtual pool would be exceeded, the ingestion will fail.
- The SAN Multipath parameters in the virtual pool must satisfy the constraints established in the volume's masking view and zoning. See SAN Multipath settings for VNX volume ingestion on page 22 for more information.
- If you are ingesting a VNX volume that was exported to a host, verify that the host is registered with ViPR Controller using its Fully Qualified Domain Name (FQDN). If the host is registered with ViPR Controller using its IP address, use the ViPR Controller User Interface to change the Host IP address to an FQDN.
- When ingesting RecoverPoint VNX volumes, the VNX volumes must be in a single storage group on VNX with all the RecoverPoint cluster initiators in the storage group. For example, if a RecoverPoint cluster contains four initiators, then all VNX volumes to be ingested should also reside in that storage group.

- Ingestion of an exported volume will fail if the ports in its export mask are not part of the virtual array into which it will be ingested.

- If you ingest a volume, the Host LUN ID for the volume is not ingested from the export group on the array.

- You must run the **Discover unmanaged block volumes,** service before ingesting unmanaged block volumes. The discovery of unmanaged volumes may take a considerable amount of time in very large scale configurations that manage several thousands of volumes, exports, and replication groups.

## VPLEX -specific notes and constraints

These notes and constraints are specific to ingesting VPLEX virtual volumes and backend volumes.

Supported configurations for ingestion:

- VPLEX local volume.

- VPLEX distributed volume.

- VPLEX local volume with snapshot. Multiple snapshots are supported if the virtual volume is not in a VPLEX consistency group.

- VPLEX distributed volume with snapshot on source side.

- VPLEX local volume with a clone that is configured as a VPLEX virtual volume.

- VPLEX distributed volume with a clone on the source side that is configured as a VPLEX virtual volume.

- VPLEX native device mirrors on a VPLEX local volume or on either or both legs of a VPLEX distributed volume.

Additional notes and constraints:

- ViPR Controller can ingest exported and unexported VPLEX Local and VPLEX distributed virtual volumes.

- Before ingesting exported VPLEX volumes, you must discover the hosts.

- The maximum number of VPLEX volumes to ingest, per order, must be less than 25.

- VPLEX virtual volumes that are part of a consistency group can be ingested.

- Volumes that are part of a backend consistency group cannot be ingested.

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**Note**

The exception is for volumes that are part of a backend consistency group where the backend array is VMAX only, and SMIS Provider 8.1 or later is used. After ingestion, use **Block Storage Services › Ingest VMAX Block Volumes into Consistency Groups**. The constraint is that volumes in the consistency group can not have more than one set of snapshot or clone. See Ingesting VMAX volumes into a consistency group on page 30.

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- When ingesting a VPLEX virtual volume, you can also ingest the backend storage. This is referred as the `Full Ingestion Including Backend Volumes` ingestion method. Before performing a full ingestion, both the VPLEX and all backend arrays must be added to ViPR Controller. In addition, all arrays have been discovered for unmanaged volumes.

- VPLEX virtual volumes can also be ingested without the backend storage using the `Ingest Only Virtual Volume` method in the ViPR Controller UI. Similar to non-VPLEX ingestion, any snapshots or clones on the backend storage should be ingested separately.

- Cloned virtual volumes in a VPLEX consistency group are not ingested.
- ViPR Controller does not support backend-only clones ingestion. The backend clones must be part of a VPLEX virtual volume, either exported or unexported.
- ViPR Controller will not ingest VPLEX volumes that have mirrors created for the backend volumes on the backend arrays. However, ViPR Controller will ingest mirrors created on the VPLEX itself where the top-level supporting device of a virtual volume consists of a RAID-1 configured pair of devices.
- TimeFinder Snap, both SnapVX and VPSnap, restores on VMAX3 for ingested backend volumes are not supported.
- Ingestion of a VPLEX virtual volume having a SRDF backend volume is not supported.
- In a stretched cluster with VPLEX Metro the Host cluster must be cross-connected to the VPLEX Metro for successful ingestion. Ingestion of a stretched cluster with VPLEX Metro and isolated fabrics is not supported because a VIPR ExportGroup can only belong to one Virtual Array.

## XtremIO-specific notes and constraints

Before you ingest an XtremIO volume, review the following notes and limitations.

- ViPR Controller can ingest exported and unexported volumes and snapshots from XtremIO.
- For XtremIO, if a snapshot has multiple export masks (exported to multiple hosts) and ViPR Controller ingests only one of them, and if you delete this snapshot from the ingested volume, then the snapshots are also deleted from all export masks. In other words, all hosts containing the exported snapshots loose access to the ingested snapshot and are removed.
- For XtremIO iSCSI ingestion, all array storage ports (iSCSI and Fibre Channel) must exist in the virtual array for ViPR Controller to ingest the unmanaged export mask.

# Ingestion constraint: masking view with no zones

Follow this procedure to correct an error that may occur when ingesting a volume that is masked, but has no zones.

If you are trying to ingest a volume that has been exported to a host, you could encounter this error:

```
Checking numpath for host rmhostc22.lss.emc.com
Initiator 20:00:00:25:B5:16:C1:20 of host rmhostc22.lss.emc.com is
not assigned to any ports.
Host rmhostc22.lss.emc.com
(urn:storageos:Host:a380810f-0962-4a69-952a-bbe2a498cf1a:vdc1)
has fewer ports assigned 0 than min_paths 4
```

This error indicates that there are no zones established for the masking view. To fix this problem, follow these steps:

1. Using your switch software, create zones for the masking view if they were not already created.

2. From the ViPR Controller user interface, choose **Physical Assets** › **Fabric Managers** and rediscover the switch.

3. Run **Block Storage Services** › **Discover Unmanaged Volumes** to discover the unmanaged volumes on the array.

4. Rerun **Block Storage Services** › **Ingest Exported Unmanaged Volumes**.

# Ingest unexported unmanaged volumes

To ingest a volume that is not exported to a host, run these services in this order:

1. **Discover Unmanaged Volumes**.

2. **Ingest Unexported Unmanaged Volumes**.

> **Note**
>
> For RecoverPoint -protected volumes, repeat step 2 as needed to ingest source, target, and journal volumes. The order of ingestion does not matter.

## Before discovery - unexported volumes and metavolumes

Before you run the Discover Unmanaged Volumes service on an unmanaged volume or metavolume, follow this procedure.

### Before you begin

From ViPR Controller, discover the storage array where the volume resides. This brings the physical storage pools on the array under ViPR Controller management.

### Procedure

1. Examine the volume in Unisphere to determine the storage pool in which the volume resides.

2. From ViPR Controller, build a virtual array that includes connectivity to the physical storage array on which your volume resides.

3. From ViPR Controller, build a virtual pool that matches the physical storage pool where the volume resides.

4. If the volume resides in a thin pool on the array, be sure that the virtual pool that matches the volume's physical storage pool has **Provisioning Type: Thin**.

## Discover unmanaged volumes

The ViPR Controller Service Catalog provides a **Discover Unmanaged Volumes** service that finds block volumes which are not under ViPR Controller management and matches them to a ViPR Controller virtual pool.

### Before you begin

- This operation requires the System Administrator role in ViPR Controller.

- The virtual array and virtual pool into which you want to ingest the storage pools must exist when the discovery is performed. There must be at least one virtual pool in ViPR Controller that matches the physical storage pool that contains the volume.

> **Note**
>
> The **Discover Unmanaged Volumes** service automatically performs an unmanaged RecoverPoint consistency group discovery on all data protection systems upon completion.

### Procedure

1. Select **Catalog** › **View Catalog** › **Block Storage Services** › **Discover Unmanaged Volumes**.

2. Select the physical block storage system on which you want to discover unmanaged volumes. You can select more than one storage system.

3. Select **Order**.

   The orders page is displayed and shows the progress of the request.

# Discover unmanaged RecoverPoint consistency groups

The ViPR Controller Service Catalog provides a **Discover Unmanaged RecoverPoint CGs** service that finds RecoverPoint consistency groups on protection systems not created by ViPR Controller. The operation is also supported from the ViPR Controller API and CLI.

**Before you begin**

The following prerequisites are applicable:

- This operation requires the System Administrator role in ViPR Controller.
- Consistency groups are only discovered on volumes that are associated with storage arrays that were added to ViPR Controller.

**Note**

Use the **Discover Unmanaged Volumes** service for the initial discovery during the normal ingestion process. The **Discover Unmanaged RecoverPoint CGs** service can be used for subsequent discoveries following a change in the RecoverPoint consistency group. For example:

- when the consistency group is enabled or repaired.
- when a copy is added.
- when a policy is changed.

**Procedure**

1. Select **Service Catalog** › **View Catalog** › **Block Storage Services** › **Discover Unmanaged RecoverPoint CGs**

2. Select the RecoverPoint protection system.

3. Select **Order**.

   The orders page is displayed and shows the progress of the request. If the order is successfully fulfilled, you can use **Service Catalog › View Catalog › Block Storage Services › Ingest Unexported Unmanaged Volumes** or **› Ingest Exported Unmanaged Volumes** to bring the volumes in the consistency groups under management by ViPR Controller.

## Was the discovery successful?

Review this section to determine how to verify if the discovery service was successful and what to do if it was not.

There are two ways to determine if the discovery is successful:

- Check the ViPR Controller log ( {vipr home}/logs/controllersvc.log) for the string SUPPORTED_VPOOL_LIST after unmanaged volume discovery. The matching virtual pools are listed in the logs. If no pools are listed in the logs, the SUPPORTED_VPOOL_LIST is missing in the logs for a given unmanaged volume.

- Call the following ViPR Controller REST API:

```
GET
/vdc/unmanaged/volumes/{id}
```

The SUPPORTED_VPOOL_LIST section of the unmanaged volume feed should contain the names of the matching virtual pools. If this list is empty, then the volume can not be ingested as there are no supported virtual pools.

# Ingest unexported unmanaged volumes

The ViPR Controller Service Catalog provides an Ingest Unexported Unmanaged Volumes service that brings previously discovered unexported and unmanaged block volumes, including snapshots, full copies, and continuous copies, under ViPR Controller management. The operation is also supported from the ViPR Controller API and CLI.

### Before you begin

- You must run Discover Unmanaged Volumes on page 18 or Discover unmanaged RecoverPoint consistency groups on page 19 on the array from which the block volumes are ingested.

- Ingested volumes are assigned to a project. You must belong to a selected project and have write-permissions on that project.

### Procedure

1. Go to **Service Catalog** › **View Catalog** › **Block Storage Services** › **Ingest Unexported Unmanaged Volumes**.

   In the service order form, enter this information.

   **Table 2** Ingest Unexported Unmanaged Volumes service settings

   | Field | Description |
   |---|---|
   | Storage Systems | Select the storage system from which you want to ingest the block volumes. |
   | Virtual Array | Select a virtual array that contains physical array storage pools that you want to import. The storage system might contribute physical storage pools to a number of virtual pools. If you want to ingest volumes that match other virtual pools you must run the service again for the other virtual pools. |
   | Virtual Pool | From the array physical storage pools that form part of the virtual array, select a virtual pool that matches the physical pool where the unexported unmanaged volume resides. |
   | Project | Choose the project you built. Always use the same project to ingest the source volume and its associated snapshots, full copies, and continuous copies volumes into ViPR Controller. Access is prohibited to these associated volumes when they are in a different project from their parent source volume. |
   | Volume Filter | Select how you want to filter the volumes. The filter retrieves the volumes, sorts them alphabetically, and then provides a way to list up to 500 volumes at a time. |
   | Ingestion Method | For VPLEX only, to ingest the virtual volumes and the backend volumes, select `Full Ingestion Backend Volumes`, which is the default. To ingest only the virtual volumes, select `Ingest Only Virtual` |

Table 2 Ingest Unexported Unmanaged Volumes service settings (continued)

| Field | Description |
|---|---|
| | `Volume.` This option is useful when you want to ingest the virtual volumes that encapsulate storage from an array that is not supported by ViPR Controller. You can then migrate these volumes into an array supported by ViPR Controller. |
| Volumes | Select the discovered volumes to ingest. These are volumes that are not currently managed by ViPR Controller. If your desired volumes are not shown here, you may need to discover them. Or, the volumes may already be ingested. |

2. Select **Order**.

The orders page shows the progress of the request. If the order is successfully fulfilled, you can look at the **Resources** page to see the imported volumes.

**After you finish**

After the unexported unmanaged volumes are ingested into ViPR Controller, you can export them to a host and then mount them, or use these volumes for other functions such as SRDF mirror volumes.

To export a volume to either a Windows or Linux host, use:

**Service Catalog** › **View Catalog** › **Block Storage Services** › **Export Volume to a Host**.

To mount the volumes on a host:

- For Linux hosts use: **Service Catalog** › **View Catalog** › **Block Service for Linux** › **Mount Existing Volume on Linux**.

- For Windows hosts use: **Service Catalog** › **View Catalog** › **Block Service for Windows** › **Mount Volume on Windows**.

# Ingest exported unmanaged volumes

To ingest a volume that is exported to a host, you must run these services in this order:

1. **Discover Unmanaged Volumes.**

2. **Ingest Exported Unmanaged Volumes**

- For a VMAX3 replica volume, repeat step 2 to ingest this volume

- For RecoverPoint-protected volumes, repeat step 2 to ingest source, target, and journal volumes. The order of ingestion does not matter.

## Before discovery - exported volumes and metavolumes

Before you run the **Discover Unmanaged Volumes** service on an unmanaged volume or metavolume that has been exported to a host or cluster, follow this procedure.

**Before you begin**

From ViPR Controller:

- Discover the storage array where the volume resides.

- Discover the host or cluster to which the volume was exported. Use the FQDN of the host for discovery. If you discover the host using its IP address, you may have encounter problems ingesting the exported VNX volumes.

**Procedure**

1. Examine the volume in Unisphere to determine the storage pool in which the volume resides.

2. Build a project or choose an existing project to which you have write access.

3. From ViPR Controller, build a virtual array that includes connectivity to the physical storage array on which your volume resides, and any hosts to which your target volume has been exported.

4. From ViPR Controller, build a virtual pool that matches the physical storage pool where the volume resides.

5. If the volume resides in a thin pool on the array, be sure that the virtual pool that matches the volume's physical storage pool has **Provisioning Type: Thin**.

## Before discovery - Checks for exported VMAX volumes

Before you ingest an unmanaged VMAX block volume that was exported to a host, you must collect some information from the masking views on the array and the fabric on the switch.

From the masking view, collect this information:

- Determine if the Masking View has a storage group (SG) associated with a specific FAST policy. If so, the FAST policy must be specified in the virtual pool that you use for the ingestion.

- For VMAX3, use Unisphere or the `symsg` command to determine the Service Level Option (SLO), the Workload Level and the Storage Resource Pool (SRP) settings for the storage group in the masking view. The following `symsg` commands provide this information:

  - `symsg -sid <SID> list`
  - `symsg -sid <SID> show <SG_Name>`

- If the host or cluster has multiple masking views, and those masking view have different FAST policies assigned, you will have to build multiple virtual pools - one for each FAST policy.

- If the storage group in the masking view specifies Host IO Limit settings, the virtual pool must specify Host IO Limit Settings that match the Storage Group.

Use your switch software to collect information about the fabric that enables communication between your host and your array.

- If your host initiator is zoned to 2 front end adapter ports, the virtual pool you use for ingest must have Minimum Paths set to 2.

- Set the Maximum Paths value in the virtual pool to the number of paths established for all of the host's initiators in all zones on the switch (or a greater value).

- If a host has multiple initiators, all of those initiators must be zoned to the same number of array ports. The number of paths per initiator is set in the virtual pool you use for ingest.

## SAN Multipath settings for VNX volume ingestion

If you are ingesting an exported VNX volume, set SAN Multipath fields according to these guidelines.

This information is required when you build the virtual pool for ingestion.

- Check the host in Unisphere (or ViPR Controller or another tool) for the initiators associated with the host.

- Use the switch software (such as CMCNE or an equivalent CLI) to count the number of paths from each of the host's initiator ports to the array. This value is the number of array ports to which all host's initiators were zoned. For VNX, the number of paths is determined based on the existing zones between the host initiators and the array ports that are in the VNX storage group. For example, if a host has two initiators, and each initiator is zoned to two array ports, the Maximum Paths field in the ingest virtual pool is set to 4.

- Check to be sure that each of the host's initiators is zoned to the same number of array ports. If the host's initiators are zones to different numbers of array ports, the ingest service will fail.

### Setting paths in zones and on the array before ViPR Controller ingest

When computing the number of paths a host has to a VNX storage group or a VMAX masking view, ViPR Controller uses the zoning paths between the host initiators and the storage ports that are in that VNX storage group or VMAX masking view.

For some arrays, such as a VPLEX and VNX, the same paths defined in the zones must also be defined on the storage array for the paths to become effective. It is possible for the two paths sets (the switch-defined zone paths and the array-defined paths) do not match. This is a mis-configuration that must be corrected.

For example, assume the following:

- A storage group has 2 initiators: I1 and I2

- The storage group has two storage ports P1 and P2

- VNX paths are defined as I1 --› P1 and I2 --› P2

- All initiator ports are in a single zone: I1, I2, P1 and P2.

When ViPR Controller generates a path count, it counts 4 paths:

- I1 --› P1

- I1 --› P2

- I2 --› P1

- I2 --› P2

If you assume only 2 paths exist (and enter **2** in the Maximum Paths field of the virtual pool used for the ingest operation) but ViPR Controller counts 4, your ingest may fail. Remove un-used zoning paths before you try to ingest the volume.

## FAST policy settings for ingested volumes

If your volume has a FAST policy assigned to it on the array, you must set the **Auto-tiering Policy** field to that policy name in the virtual pool that you use for ingestion.

# Ingest exported unmanaged volumes

The ViPR Controller Service Catalog provides an Ingest Exported Unmanaged Volumes service that brings previously discovered unmanaged block volumes, including snapshots, full copies, and continuous copies, that were exported to hosts under ViPR Controller management. The operation is also supported from the ViPR Controller API and CLI.

**Procedure**

1. Go to **Service Catalog › Block Storage Services › Ingest Exported Unmanaged Volumes**.

   In the service order form, enter this information.

**Table 3** Ingest Exported Unmanaged Volumes service settings

| Field | Description |
|---|---|
| Storage Type | Choose **Exclusive** or **Shared**. Exclusive means that this volume is exported to a single host. Shared means that this volume is exported to a cluster. |
| Host | Choose the Host or Cluster to which the volume has been exported. |
| Virtual Array | Select a virtual array that contains physical array storage pools that you want to import. The storage system might contribute physical storage pools to a number of virtual pools. If you want to ingest volumes that match other virtual pools you must run the service again for the other virtual pools. |
| Virtual Pool | From the array physical storage pools that form part of the virtual array, select a virtual pool that matches the physical pool where the exported unmanaged volume resides. |
| Project | Choose the project you built.<br>Always use the same project to ingest the source volume and its associated snapshots, full copies, and continuous copies volumes into ViPR Controller. Access is prohibited to these associated volumes when they are in a different project from their parent source volume. |
| Volume Filter | Select how you want to filter the volumes. The filter retrieves the volumes, sorts them alphabetically, and then provides a way to list up to 500 volumes at a time. |
| Ingestion Method | For VPLEX only, to ingest the virtual volumes and the backend volumes, select `Full Ingestion Backend Volumes`, which is the default. To ingest only the virtual volumes, select `Ingest Only Virtual Volume`. This option is useful when you want to ingest the virtual volumes that encapsulate storage from an array that is not supported by ViPR Controller. You can then migrate these volumes into an array supported by ViPR Controller. |
| Volumes | Select the discovered volumes to ingest. |

2. Click **Order**.

   The orders page shows the progress of the request. If the order is successfully fulfilled, the ingested volume appears on the Resources page. For VMAX3 volumes with an associated replica volume, an error displays in the Status field and a message similar to the following appears:

   ```
   Error 64000: Unmanaged Volume Ingestion. Replicas
   Symmetrix+000196700583+VOLUME+0060A not ingested for unmanaged
   volume 008CF.
   The unmanaged volume 008CF has been ingested but the ViPR object
   has been
   marked as internal.
   ```

   The ingested source volume, which is marked as internal, does not appear on the Resources page until you ingest the VMAX3 replica volume.

3. Repeat steps 1 and 2 to ingest the VMAX3 replica volume.

If the order is successfully fulfilled, the ingested source and replica volumes appear on the Resources page.

# Block volume ingestion use cases

For some ingestion use cases, the ingestion procedure requires additional steps or additional configuration to perform ingestion.

The following use cases are described:

To review an SRDF ingestion use case, and requirements see the *ViPR Controller Integration with VMAX and VNX Storage Systems Guide*, which is available from the ViPR Controller Product Documentation Index .

## Ingest VPLEX volumes

Ingestion of VPLEX volumes can be achieved using the discover and ingest services from the ViPR Controller Service Catalog, or using the ViPR Controller API or CLI. Because ViPR Controller does not support all of the array back-end types supported by VPLEX , it can ingest the VPLEX virtual volume and perform operations that do not depend having control of the back-end array.

A volume can be ingested only if the VPLEX operations supported by ViPR Controller can be performed. For example Export, Unexport, Mirror, Migrate etc.

Ingested volumes can also be moved to a different virtual pool. This is useful where you want to migrate the back-end storage of a an ingested VPLEX volume from an array that is not supported by ViPR Controller to an array that is supported. When performing this virtual pool migration, the following apply:

- A virtual pool change to migrate the back-end storage can be performed on all ingested Local VPLEX volumes. For distributed VPLEX volumes, the ingested volume must consist of a single extent on a single storage volume.

- A virtual pool change of an ingested local VPLEX volume will result in a change to the name of the volume on the VPLEX . The VPLEX automatically changes the name of the local virtual volume to be the name of the local device on which it is built with the "_vol" suffix appended. Since it is migrated to a new local device created by ViPR Controller, with the ViPR Controller naming convention, the new name has the same convention as a ViPR Controller created volume. This name change does not happen for a distributed volume, because the extent migration is used instead of the device migration.

### VPLEX ingestion with snapshot

After adding a new volume into an ingested consistency group, and then taking a snapshot of the new volume, a "restore snapshot fails with error, "Invalid CIM Type!" after attempting to restore the snapshot. This error is seen in an RecoverPoint and VPLEX environment when VMAX3 is the backing storage system.

To avoid this issue, add the volumes from the consistency group into an application group.

# Ingest RecoverPoint consistency groups

Ingestion of RecoverPoint-protected volumes can be achieved using the discover and ingest services from the ViPR Controller Service Catalog, or using the ViPR Controller API or CLI. This process enables ViPR Controller to take over the management of volumes that are protected by RecoverPoint.

ViPR Controller ingests consistency groups from the following systems and treats them as if ViPR Controller created them. After ingestion, you can create array-based consistency group snapshots for these volumes:

- RecoverPoint
- VPLEX (distributed and local)
- XtremIO (XIO)

ViPR Controller does not ingest consistency groups from VMAX or VNX. Use **Service Catalog** › **Application Services** › **Application Block Protection Services** to manage full copies or snapshots of volumes from these systems.

Before ViPR can correctly ingest RecoverPoint consistency groups, you must remove from the ViPR Controller inventory block volumes that were created in ViPR Controller but were manually configured in RecoverPoint. From the Service Catalog, use the Inventory-only deletion type in the **Remove Block Volumes** or **Remove Block volume for Host** service to delete:

- Volumes
- Snaps/Clones/Mirrors
- Volumes that are exported to host/clusters
- VPLEX volumes
- RecoverPoint-protected volumes

**Note**

Use the inventory-only deletion type

- To remove volumes from ViPR Controller management prior to ingesting RecoverPoint consistency groups so the RP volumes can be ingested into the correct virtual pool.

- To delete volumes at any point in the ingestion process if you make a mistake, for example, you assign volumes to the wrong virtual pool. Run the **Discover Unmanaged Volumes** service again after deletion in order to populate the correct virtual pool.

  **Note**

  The first time you discover the volumes in the RecoverPoint consistency groups, you must use the **Service Catalog** › **Block Storage Services** › **Discover Unmanaged Volumes** service. But after that, if you need to repeat the discovery process to correct errors in the RecoverPoint consistency group configuration, you can use the **Discover Unmanaged RecoverPoint CGs** service.

Ensure that you set up a virtual array with a virtual pool for ingesting the RecoverPoint consistency group volumes.

---

**Note**

The multi-volume consistency flag must be checked when you create the virtual pool that holds the block volumes. From **Virtual** › **Block Virtual Pools** › **Edit Block Virtual Pool**, choose the **Hardware** tab and select **Multi-Volume Consistency**.

---

## Ingestion workflow for RecoverPoint consistency groups

Use this feature to discover and ingest all volumes associated with RecoverPoint consistency groups.

**Workflow**

1. Use the **Service Catalog** › **Block Storage Services** › **Discover Unmanaged Volumes** to discover RecoverPoint consistency groups on protection systems that were not created by ViPR Controller.

2. Use the **Service Catalog** › **Block Storage Services** › **Ingest Unexported Unmanaged Volumes** to ingest the unexported RecoverPoint volumes. These are volumes that are not yet exported to hosts. During the ingestion process, a consistency group is automatically created and marked as complete or incomplete depending on whether all volumes in the RecoverPoint consistency group have been ingested.
   Repeat the ingestion process for each type of volume: source, target, journal, and their replicas. This can occur in any order. Different volumes may be exported to different hosts, so ingestion may take more than one step. (Ingestion is host-based.)

   Any volume protected by RecoverPoint is exported to the RecoverPoint cluster. However, it is not considered exported from the perspective of ViPR Controller's service catalog.

   ---

   **Note**

   Here is the preferred ingestion sequence for RecoverPoint replicas and volumes:

   - Ingest replicas before ingesting RecoverPoint volumes.

   - For regular RecoverPoint volumes:

        a. target volume

        b. target journal

        c. source journal

        d. source volume

   ---

3. Use the **Service Catalog** › **Block Storage Services** › **Ingest Exported Unmanaged Volumes** to ingest the exported RecoverPoint volumes.
   This ingests RecoverPoint volumes that are exported to hosts.

After ingestion is complete you can perform operations on the consistency group, such as link management, or add or remove volumes from the consistency group.

## Guidelines for managing RecoverPoint full copies or snapshots after ingestion

After ingesting a RecoverPoint consistency group, you can take a snapshot of the RecoverPoint volumes. You can also restore ingested individual volume full copies or snapshots including ones made in device groups before ingestion.

**Clone sets or snap sets from device groups**
If the ingested RecoverPoint consistency group has a clone set or snap set in a device group:

- Use the **Catalog** › **View Catalog** › **Application Services** when you want to create full copies or snapshots of sub groups of volumes.

**Note**

The ingestion process will not automatically group replicas that were created in a RecoverPoint device/replication group before ingestion. These replicas are consistent with each other and are most conveniently managed as a group, but ViPR Controller cannot identify replicas that were created in a group due to provider limitations. After ingesting a RecoverPoint consistency group with replicas, all management operations should be performed on all of the snapshots in ViPR Controller to get a consistent result and to ensure that data integrity is upheld. In order to restore the entire snapshot set, restore each snapshot to its respective volume at the same time.

You can still access, mount, delete, restore, and manage the individual snapshots. This is possible because:

- Replicas are ingested with the consistency group.
- Relationships are established in ViPR between each individual replica and its originating volume.

## Ingest XtremIO consistency groups

Ingestion of XtremIO consistency groups can be achieved using the discover and ingest services from the ViPR Controller Service Catalog, or using the ViPR Controller API or CLI. This process enables ViPR Controller to take over the management of volumes that are created with XtremIO.

ViPR Controller ingests consistency groups from the following systems and treats them as if ViPR Controller created them. After ingestion, you can create array-based consistency group snapshots for these volumes:

- VPLEX (distributed and local)
- XtremIO

**Prerequisites**

- Ensure that you set up a virtual array with a virtual pool for ingesting the XtremIO consistency group volumes.

  **Note**

  The multi-volume consistency flag must be checked when you create the virtual pool that holds the block volumes. From **Virtual** › **Block Virtual Pools** › **Edit Block Virtual Pool,** choose the **Hardware** tab and select **Multi-Volume Consistency**.

- Set up the proper zoning configuration for exported volumes.
- Discover the hosts in ViPR Controller before discovering the unmanaged volumes.

### Ingestion workflow for XtremIO consistency groups

Use this feature to discover and ingest all volumes associated with XtremIO consistency groups.

**Workflow**

1. From the ViPR Controller interface, use **Physical** › **Storage Providers** and **Physical** › **Hosts** to discover the XtremIO XMS and the hosts to which XtremIO volumes and snaps are exported.

2. Use the **Service Catalog** › **Block Storage Services** › **Discover Unmanaged Volumes** service to discover volumes not managed by ViPR Controller on the XtremIO storage system.

   **Note**

   Backend XtremIO volumes on VPLEX storage systems are also discovered.

3. Use the **Service Catalog** › **Block Storage Services** › **Ingest Unexported Unmanaged Volumes** to ingest the unexported XtremIO volumes, snapshots, and associated consistency groups. These are volumes that are not yet exported to hosts. During the ingestion process, a consistency group is automatically created and marked as complete or incomplete depending on whether all volumes in the XtremIO consistency group have been ingested. ViPR Controller can manage individual volumes and snapshots even when the consistency group is not fully ingested.

   **Note**

   You may ingest volumes from multiple consistency groups during the same operation.

4. Use the **Service Catalog** › **Block Storage Services** › **Ingest Exported Unmanaged Volumes** to ingest the exported XtremIO volumes.
   This ingests XtremIO volumes that are exported to hosts.

After ingestion is complete you can perform operations on the consistency group such as:

- adding volumes to ingested consistency groups.
- removing volumes from ingested consistency groups.
- taking snapshots of ingested consistency groups.
- restoring ingested consistency group volumes.
- resynchronizing ingested consistency group snapshots.
- deleting snapshots of ingested consistency groups.

## Move data from an unsupported array to supported array using VPLEX

You can use a VPLEX storage system managed by ViPR Controller to move data from an array that is not supported by ViPR Controller to a supported array. The procedure requires you to connect the unsupported array to VPLEX and ingest the source array.

### Before you begin

- Ensure that a VPLEX system has been added to ViPR Controller and has been successfully discovered.
- Ensure that a VPLEX virtual pool exists. This is used to create a target volume to which data will be moved. The virtual pool must specify High Availability as `VPLEX Local`.
- You must have the Tenant Administrator role in ViPR Controller to access the **Change Volume Virtual Pool** Service.
- You must have the System Administrator role to perform any physical or virtual asset operations and to run the discovery and ingestion services.

### Procedure

1. Create backend array volumes and virtual volumes on the VPLEX using element managers.

2. Discover the target backend storage system and the VPLEX within ViPR Controller.

3. Create a virtual array that contains the target backend storage system and one of the VPLEX clusters (that also has physical connectivity to the unsupported backend array).

4. Create a virtual pool that contains the previously created virtual array and an appropriate **High Availability** setting. The `Storage Type` parameter should not be set to allow for execution of a virtual pool change to change the backend storage at a later time.

5. Create a virtual pool for the target of the virtual pool change that contains the previously created virtual array and an appropriate **High Availability** setting. The `Storage Type` parameter (and/or other parameters) should be set to define the characteristics of the target volume that will be created on a supported backend storage system.

6. In the ViPR Controller UI, run the discovery service **Service Catalog** › **View Catalog** › **Block Storage Services** › **Discover Unmanaged Volumes** on the VPLEX array.

7. After successful discovery, run the ingestion process.. You will need to specify the virtual pool that you created and that has the origin volume. See Ingest exported unmanaged volumes on page 21 or Ingest unexported unmanaged volumes on page 20.

8. Run the Change Volume Virtual Pool service to migrate the data. The service is located in the service catalog at **Service Catalog** › **View Catalog** › **Block Storage Services** › **Change Volume Virtual Pool** and specify the **Operation** as `VPLEX Data Migration`.

   This step creates volumes on both the VPLEX and the destination array and ViPR Controller converts the underlying volume on the destination array to a ViPR Controller-managed volume.

### Results

As part of the migration, once all the data has been copied to the new backend volume using VPLEX migration services, ViPR Controller will remove the original source virtual volume. Additional manual steps will be necessary to remove the backend volume from the unsupported array.

# Ingesting VMAX volumes into a consistency group

The **Ingest VMAX Block Volumes into Consistency Groups** service imports the source VMAX volumes, including snapshots, continuous copies, and full copies, into a ViPR Controller consistency group. These volumes cannot belong to other consistency groups. Use this service for native or VPLEX-protected volumes on VMAX only. Do not use for RecoverPoint -protected volumes.

This allows you to use the ViPR Controller consistency group to take snapshots and clones of your virtual volumes at the consistency group level. All of the virtual volumes in the consistency group must come from the same storage array.

Ingestion of SRDF Metro volumes is not supported.

**Note**

If you already have consistency groups for backend volumes, clones and snaps, and would like to continue using those existing manually created consistency groups, you will need to manage those consistency groups outside of ViPR Controller. However, it is recommended that you create and start using the backend consistency groups created by ViPR Controller once the backend volumes, clones and snapshots are ingested in to ViPR Controller.

### Procedure

1. Select **Service Catalog** › **Block Storage Services** › **Ingest VMAX Block Volumes into Consistency Groups.**

2. Select the **Project** to which the consistency group belongs.

3. Select the **Consistency Group.**

4. Select the source **Volumes** to add to the consistency group.

# CHAPTER 3

# Ingesting Unmanaged File Systems into ViPR Controller

This chapter contains the following topics:

# Introduction

System Administrators can incorporate unmanaged file systems under ViPR Controller management by ingesting them. This ingestion includes the subdirectories of the file systems and their shares and exports. The operation requires two catalog services: a discovery service followed by an ingestion service.

You must first assign these file systems to file virtual pools and ensure these file virtual pools have the same criteria as their corresponding file systems. During discovery, ViPR Controller finds the file systems on a specified array and matches them with the file virtual pools. It discovers the subdirectories, shares, and access control lists associated with the shares and exports. When you run the ingest service, only the discovered file systems belonging to the specified file virtual pool are ingested.

Once under ViPR Controller management, you manage the ingested storage resources by provisioning users in the same way as if you created them in ViPR Controller. You can export them to hosts, expanded them, and use snapshot and copy techniques to protect them.

# Ingest file systems from the ViPR Controller UI

To ingest file systems using the ViPR Controller Service Catalog, perform these tasks.

**Procedure**

1. Discover all unmanaged file systems on an array.

   See Discover unmanaged file systems on page 34.

2. Ingest unmanaged file systems.

   See Ingest unmanaged file systems on page 35.

## Discover unmanaged file systems

The ViPR Controller Service Catalog provides a Discover Unmanaged File Systems service that finds file systems which are not under ViPR Controller management. The operation is also supported from the ViPR Controller API and CLI.

**Before you begin**

The following prerequisites are applicable:

- This operation requires the System Administrator role in ViPR Controller.
- The virtual array and virtual pool into which you want to ingest the storage pools must exist when the discovery is performed.

   The discovery process finds storage pools on a selected storage system and identifies the virtual array and virtual pool that discovered each file system matches with.

- File systems are only discovered on file storage system that were added to ViPR Controller as physical assets.

**Procedure**

1. Select **Service Catalog** › **View Catalog** › **File Storage Services** › **Discover Unmanaged File Systems**

2. Select the physical file storage systems from which you want to discover unmanaged file systems. You can select more than one file storage system.

3. Select **Order**.

   The orders page is displayed and shows the progress of the request. If the order is successfully fulfilled, you can use the Ingest Unmanaged File Systems to bring them under management by ViPR Controller.

# Ingest unmanaged file systems

The ViPR Controller Service Catalog provides an Ingest Unmanaged File Systems service that brings previously discovered unmanaged file systems under ViPR Controller management.You can also perform this operation using the ViPR Controller API and CLI.

**Before you begin**

The following prerequisites are applicable:

- Only System Administrators can ingest unmanaged file systems.
- To be ingested, the unmanged file systems must be in physical pools that are already associated with a ViPR Controller virtual storage pool.
- The Discover Unmanaged File Systems service must have been run on the file storage system.
- Rerun the Discover Unmanaged File Systems service if the virtual array or virtual pools was modified since the last time the Discover Unmanaged File Systems service was run.
- Ingested file systems are assigned to a project. You must belong to the selected project and have write-permissions on the project.
- To ingest an Isilon unmanaged file systems:
  - The virtual pool must have been configured with the `Provisioning Type` set to Thin. Isilon file systems are thinly provisioned. Thin resources can only be created in thin vpools.
  - By default, the Isilon file system exports will be ingested from either /ifs/sos or /ifs/vipr. You can also ingest them using a custom path. In the ViPR Controller UI, go to **Physical › Controller Config › Isilon,** and select **Unmanaged File System Locations**. The default path is shown in the first row and is grayed out. Add another line and specify a new value to override the default.

**Procedure**

1. Select **Service Catalog › View Catalog › File Storage Services › Ingest Unmanaged File Systems**
2. Select the storage system from which you want to ingest file systems.
3. Select the virtual array whose virtual pools contain the storage system physical pools that host the file systems you want to import. The storage system might contribute physical storage pools to a number of virtual pools. If you want to ingest to all virtual pools, you will need to run the service again for the other virtual pools.

   It is possible that not all of the storage system physical pools are included in the virtual array that forms part of your virtual data center. For this reason, you do not want to ingest all unmanged file systems on the storage system, just those in physical storage pools that meet the criteria of your virtual pools.
4. Select the virtual pool that the unmanaged file systems are in.
5. Select the project that you want the unmanaged file systems to be assigned to.
6. Select the file system type, Exported or Unexported.
7. Select **Order**.

The orders page is displayed showing the progress of the request. If the order is successfully fulfilled, you can look at the **Resources** › **File Systems** page to see the imported file systems.