

SRM User Guide: Installing the FlashArray Storage Replication Adapter

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http://support-sandbox.purestorage.com/Solutions/VMware_Platform_Guide/User_Guides_for_VMware_Solutions/Using_VMware_Site_Recovery_Manager_with_the_Pure_Storage_FlashArray/SRM_User_Guide:_Installing_the_FlashArray_Storage_Replication_Adapter

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In order for Site Recovery Manager to failover virtual environments, the persistence layer of the environments needs to be readied at the target site. The persistence layer refers to the storage-which is protected by array-based replication. The process of "readying" is typically called a failover. A failover is usually comprised of a few steps, synchronizing the data on the target side with the source side, making the source side inaccessible, making the target side accessible, and vendor-specific operations that surround those operations. Since all vendors implement their replication differently (and have correspondingly heterogeneous APIs) VMware implemented a translation layer for SRM that provides a common set of APIs for communication across all vendors. This layer is implemented as a plugin by the storage vendor and within it is where vendor-specific operations are executed. This translation layer is called a Storage Replication Adapter--usually abbreviated as an SRA. The SRA receives SRM specific API calls (synchronize a data set for instance) and then issues that to the array in a way that the array understands.

The vendor creates the SRA, certifies it via a specific VMware-provided test suite, then makes the SRA available to customers for download. SRM does not come packaged with these SRAs, so a customer must download it then install it into the SRM environment.

SRM comes in two varieties, a Windows-based implementation, and a Linux-based appliance implementation. The process to install the SRA is slightly different for each version so the process for each will be outlined on this page.

Downloading the SRA

To download the SRA, go to the quick reference page:

[Site Recovery Manager Quick Reference](#)

There are two options for downloading, Windows or Photon (Linux). Note that throughout this guide Linux and Photon will be used interchangeably. Select the correct version and download the corresponding zip or tar file.

To verify you indeed have downloaded the latest available version, please refer to the VMware compatibility guide which can be found here:

https://www.vmware.com/resources/compatibility/search.php?deviceCategory=sra&details=1&partner=399&page=1&display_interval=10&sortColumn=Partner&sortOrder=Asc

Installing the SRA with Windows-based SRM

Download the zip file for the Windows-based SRM offering. Extract or open the zip file. Navigate to the .exe file and right-click it and run it.

NET Framework 4.8 and above is required for SRA 4.0 and later



Name

EUA.rtf

Licenses.txt

PureSRAInstaller_3,0,14.exe

Open

Browse with .NET Reflector

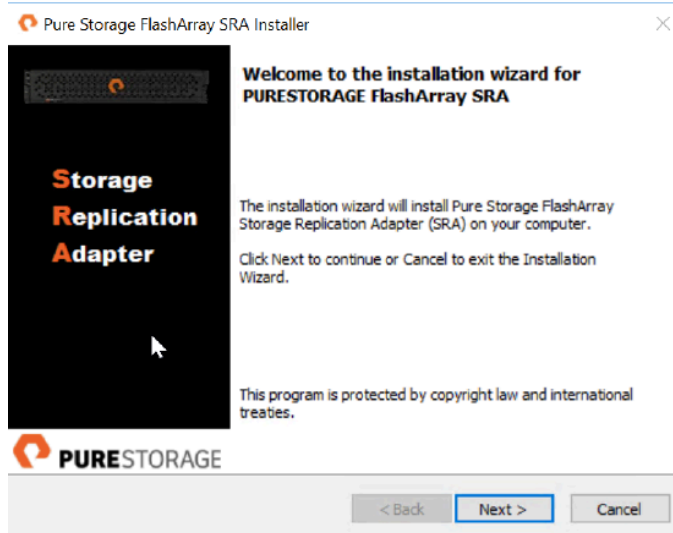


Run as administrator



Open with Code

Once the installer appears, click Next to start the installation wizard:



Accept the EULA and click Next again:

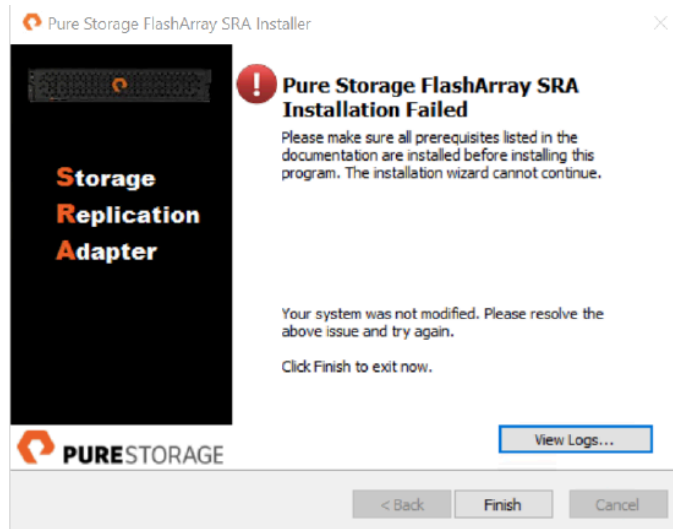


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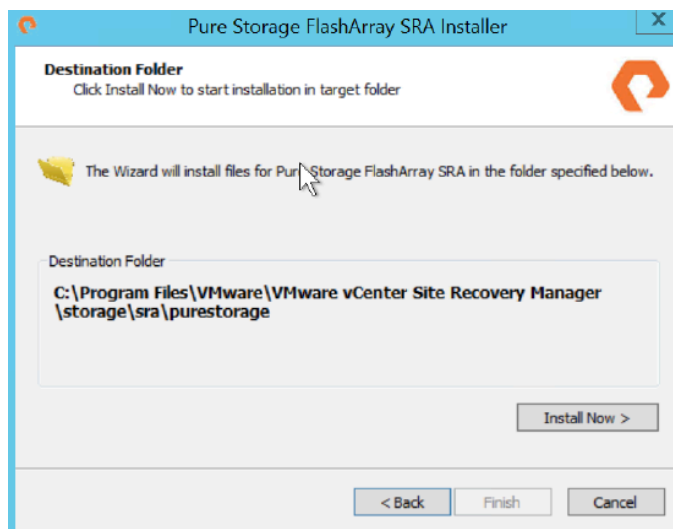
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If there is an issue, the installer will fail on the next page prior. The installer checks for a few pre-requisites and if they are not present the process will fail. The most common being that SRM is not yet installed. Ensure that SRM is installed on this Windows machine and restart the process.



To view the reason for the failure, click on the View Logs button and scroll to near the bottom of the log file to view the exception. If there are no issues the installation can be started. Click Install Now to begin the process.



If there are no issues with installation, the process will complete quickly and report success. Click Finish to exit the wizard.

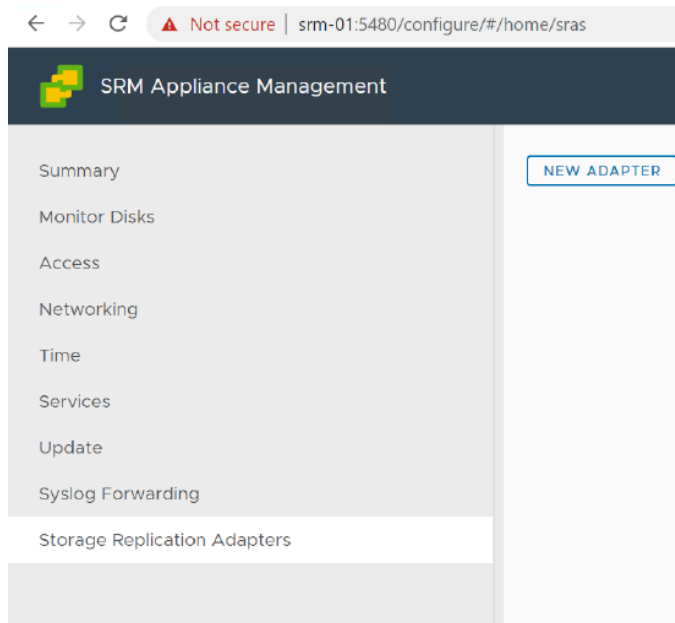
Repeat this process on **both** Site Recovery Manager servers. Ensure that the exact same SRA version is installed on both SRM servers as well.



Installing the SRA with Linux-based SRM

Download the zip file for the Linux-based SRM offering. Extract the files to a local folder. Navigate to the admin page of the SRM server with your chosen web browser. The web address is `https://<srm server>:5480`. The default user is admin with a password you selected upon deployment of SRM.

Click on the left-hand side panel listing for Storage Replication Adapters.



Click on the New Adapter button that appears on the right of the panel.

New Adapter

Select a storage replication adapter archive.

File Name *no file selected*

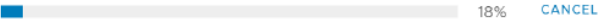
Click Upload and navigate to the extracted folder of the downloaded SRA. Choose the .tar file. If you only see a .exe file, you downloaded the Windows version, not the Linux release. Re-download the correct SRA if so.

Select the tar file and click Upload.



New Adapter

Uploading puresra_3.0.154+b647382.tar...



CLOSE

Once the process completes, the SRA will properly report in SRM:

| Pure Storage FlashArray SRA | |
|-----------------------------|--|
| Version | 3.0.154 |
| Vendor | Pure Storage |
| Vendor URL | http://support.purestorage.com |
| Repository tags | puresra:latest |
| Docker image ID | sha256:a7d1c6b2045f488b9ddcce9b59fced4666e8e94705b9735cc93c941176c4d7c |

Repeat this process on **both** Site Recovery Manager servers. Ensure that the exact same SRA version is installed on both SRM servers as well.



SRM User Guide: Configuring the FlashArray SRA Array Managers

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Using_VMware_Site_Recovery_Manager_with_the_Pure_Storage_FlashArray/SRM_User_Guide:_Configuring_the_FlashArray_SRA_Array_Managers](http://support-sandbox.purestorage.com/Solutions/VMware_Platform_Guide/User_Guides_for_VMware_Solutions/Using_VMware_Site_Recovery_Manager_with_the_Pure_Storage_FlashArray/SRM_User_Guide:_Configuring_the_FlashArray_SRA_Array_Managers)

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FlashArray Array Manager Overview

In Site Recovery Manager there are two important parts that allow discovery of your replication environment; the SRA, and array managers.

The SRA is an installed "plugin" that provides the libraries for SRM to be able to communicate to a 3rd party array, like the FlashArray. In order for SRM to be able to talk to a given array though it needs to be authenticated. Authentication to a given array, more specifically an array pair, is achieved through something called an array manager. An array manager is an authenticated instance in SRM that allows source and target arrays to be discovered and controlled.

For Pure Storage FlashArrays, there is no requirement to deploy a management appliance to provide API-based control of the array. Instead, every FlashArray comes built-in with a REST API service. So the process to allow SRM control of a FlashArray is two-fold: [installing the SRA](#), and populating the array managers with FlashArray addresses and respective credentials.

When configuring an SRM array manager, you need to supply credentials for the array(s) hosting your VMs and for the array(s) that they are being replicated to. Furthermore, since SRM is a two-site, bidirectional tool, the remote SRM server needs those same credentials as well.

Before we continue let's define a few terms:

- **Storage Replication Adapter**--the installed plugin that imports the required libraries to communicate with a FlashArray
- **Array Manager**--an interface that allows specific FlashArrays to be identified and authenticated to.
- **Array Manager Pair**--Array managers must be configured on both the local SRM server and the remote SRM server for every given array pair.
- **Discovered Arrays**--each array manager pair coordinates in order to identify arrays that are properly authenticated and are replicating to each other. In SRM, array pairs are then returned. This includes physical FlashArrays as well as pods.
- **Discovered Devices**--from each discovered array pair, all of the devices that are replicated between the source array and the target array are listed. These listed devices are the storage objects that are marked as replicated by the SRA for use within SRM. It is important to note that these objects can only be including in a SRM protection group if they are in use in that particular VMware environment. If they are not in use as a VMFS or an RDM, SRM will filter them out as options for inclusion in a SRM protection group.

The FlashArray SRA currently supports three modes of replication:

1. **Periodic replication from a FlashArray to another FlashArray.** These are volumes that exist on one FlashArray that are periodically snapshotted and those snapshots are sent to a target FlashArray. SRM can then failover volumes from the source FlashArray to a target FlashArray connected over the asynchronous distance.
2. **Periodic replication from within a pod on one FlashArray to another FlashArray.** This pod may or may not be stretched across physical FlashArrays--being stretched, though, is not a requirement. These are volumes that exist in a pod that are periodically snapshotted and those snapshots are sent to a target FlashArray. The main difference between this option and the previous option (volumes that are not in a pod) is that these volumes are



not tied to a physical FlashArray as the source--the pod and therefore the volumes in it can be moved from one FlashArray to another without reconfiguring SRM protection groups. SRM can then failover volumes from the source pod to a target FlashArray connected over the asynchronous distance. Array manager configuration is no different for this replication as for the previous section and will be treated as the same.

3. **Continuous Replication from a FlashArray to another FlashArray.** This is referred to as ActiveDR. Volumes are created in a pod and that pod is linked to a remote pod on a remote FlashArray. All data in the pod (either written to volumes or stored by snapshots) gets sent over to the remote pod and stored in distinct volumes and snapshots that maintain their relationships and configurations. ActiveDR pod relationships are represented by array pairs within SRM array discovery.
4. **Stretched storage.** In this case, a volume is in a pod that is stretched over two physical FlashArrays. For this to work, the pod **MUST** be stretched. When a volume is stretched, the volume exists on two arrays and can be written to and read from simultaneously on both FlashArrays. In this configuration, there is no periodic replication, and there is no failing over of datastores. Instead, since the latest copy of the VMs on a datastore is always at both sites, an SRM failover just coordinates a restart of the affected VMs at the recovery site. There is no storage failover. If the sites are properly connected there may not even be a restart of the VMs, instead a cross-vCenter vMotion is attempted to move the running memory and CPU state of the VMs from one vCenter to the target vCenter.

How array managers are configured dictates what type of failover is allowed. Follow through to the appropriate sections for information on configuring the array managers for your specific replication topology.

When Pure Storage FlashArray array managers are configured, one or more FlashArray addresses (along with credentials) are entered to provide the SRA with access to the REST API services on those FlashArrays. Array managers can be considered to be configured in pairs (one pair for a given FlashArray replication topology for each SRM server) but that isn't an entirely accurate view--this runs on the assumption that an array manager always has an equal and opposite array manager for the opposing paired SRM server. This is not always the case (though is the most common configuration). In short, for a FlashArray replication pair, one array manager must be configured to discover the array on one SRM server and another array manager must be configured to see the other FlashArray in that pair. In the case of two FlashArrays on site A that are both replicating to the same target FlashArray located in site B, there could be two array managers (one on each site) or three array managers (two on site A, one for each FlashArray there, and 1 on site B).

FlashArray Array Manager Credentials

The FlashArray array managers require credentials for both the source and target arrays. For all source (local) FlashArrays listed in a given array manager, there can only be one set of credentials so they must be valid for all specified source (local) FlashArrays. For all target (peer) FlashArrays listed in a given array manager, there can only be one set of credentials so they must be valid for all specified target (peer) FlashArrays.



Edit Local Array Manager

Enter a name for the array manager on "vcenter-01.purecloud.com": vc01-m50-1-stretched

The local Array(s)
Connection parameters for the local Array(s)

Address flasharray-m50-1.purecloud.com,flasharray-m20-1.purecloud.com
Enter the address(es) of the local Array(s)

Username srmuser
Enter the username for the local Array(s)

Password *****
Enter the password for the local Array(s)

The peer Array(s)
Connection parameters for the remote Array(s)

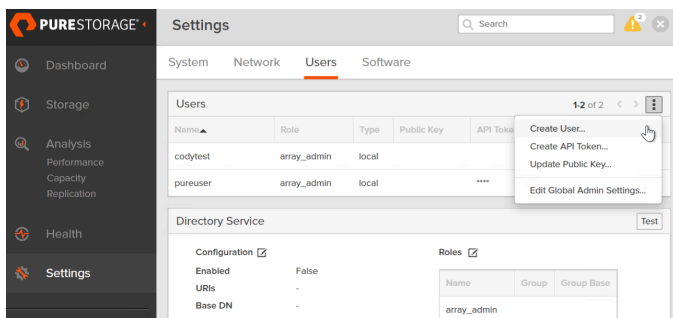
Address flasharray-m50-2.purecloud.com
Enter the comma separated address(es) of the peer Array(s)

Username srmuser
Enter a username that is a Storage Admin on all peer Array(s)


Password ****
Enter the password of the Storage Admin user

The credentials need to have **storage admin level** authorization--they do not need to be array admin (like pureuser) and they cannot be read only or ops admin. It is recommended to either use active directory or LDAP credentials, or create a specific local user on the FlashArray for the SRA for auditing purposes.

To create a local user, login to the FlashArray and click **Settings > Users > Create User**:



Enter in the username and password and choose **Storage Admin**.



Note that if you plan on using ActiveDR failover, you must use ARRAY ADMIN level permissions. The failover process includes managing the state of an entire pod which requires admin-level permissions. For customers using ActiveCluster and/or Protection Group/Periodic replication, storage admin level permissions will suffice.

Create User

User srmuser

Role Storage Admin

Password *****

Confirm Password *****



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Repeat for each FlashArray and then use those credentials in SRM.

The local Array(s)
Connection parameters for the local Array(s)

Address flasharray-m50-1.purecloud.com,flasharray-
Enter the address(es) of the local Array(s)

Username srmuser
Enter the username for the local Array(s)

Password ***** 
Enter the password for the local Array(s)

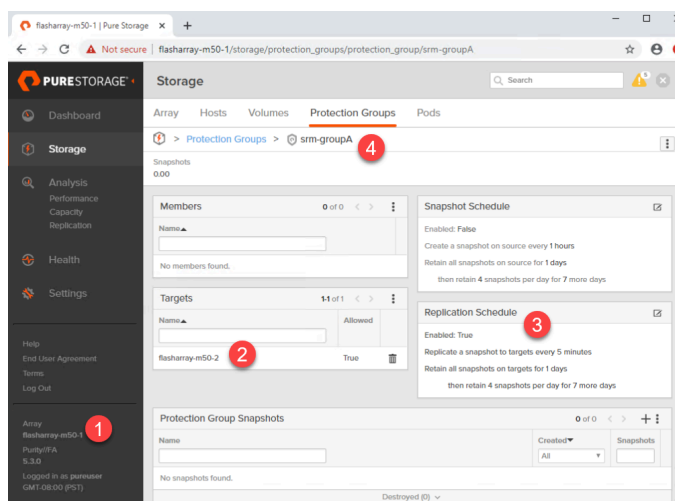
Array Manager Configuration for Periodic Replication

The FlashArray offers asynchronous replication in a periodic fashion through a mechanism called Protection Groups. A FlashArray Protection Group is a consistency group that has a remote replication schedule that specifies a replication interval (how often a snapshot is created and sent to a remote FlashArray) and a retention policy (how long each replicated snapshot is kept on the remote FlashArray). FlashArray volumes in this scenario can host a VMFS datastore or a Raw Device Mapping (RDM). SRM can then failover over the datastores/RDMs from the source FlashArray to the remote FlashArray. The FlashArray hosting the volumes can be considered the source FlashArray and the FlashArray that is being replicated to can be considered the remote FlashArray.

This section does not cover how to configure array managers for protection groups that are inside of a pod. That will be covered in the next section.



Note that the frequency of replication and/or the retention policy has no direct bearing on SRM. Replication must be enabled on the protection group to allow SRM to discover the volumes as replicated—but no specific settings beyond that are required. It is important to note though, the more frequent the replication the shorter the synchronization period during a failover, and more importantly, the shorter the RPO in the case of a disaster.



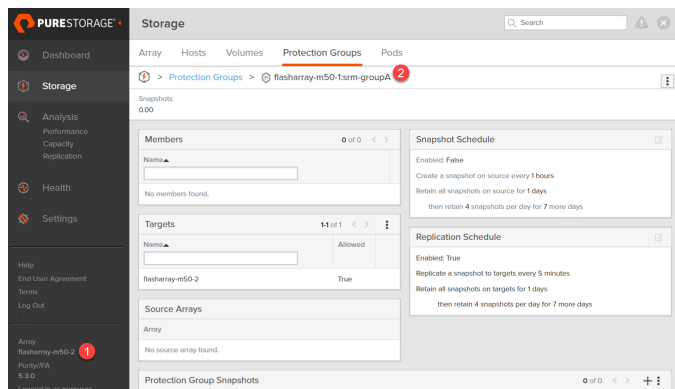
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The above image is the view of the protection group on the source FlashArray (**flasharray-m50-1**). The protection group is always created and managed on the source FlashArray. As seen in the image, there is a protection group named **srn-groupA** (seen near number label 4) created on a FlashArray called **flasharray-m50-1** (seen near number label 1). This protection group replicates to a FlashArray called **flasharray-m50-2** (seen near number label 2). This particular protection group replicate any volume in it to from **flasharray-m50-1** to **flasharray-m50-2** every 5 minutes (as seen near number label 3).

The protection group can also be viewed on the remote FlashArray. If you login to the remote FlashArray, you can see the "remote" view of the protection group **srn-groupA** as well. The remote protection group view shows the protection group name slightly differently as it shows the source FlashArray name as a prefix (followed by a colon) as seen near number label 2 in the following image. The FlashArray hosting this remote view of the protection group can be seen near number label 1.



The next step is to configure the SRM array managers with the connection information to both arrays. Let's re-confirm the requirements:

1. Have a replication connection **enabled and healthy** between your source and target arrays (this can be a synchronous or asynchronous connection--either is fine)

| Connected Arrays | | | | | | | |
|------------------|-----------|-------------------|---------|--------------------|------------------------------|-----------|-----|
| Name | Status | Type | Version | Management Address | Replication Address | Throttled | |
| flasharray-m50-1 | connected | async-replication | 5.3.0 | 10.21.202.52 | 10.21.202.54 10.21.202.55 | False | ⓘ ✕ |
| flasharray-m50-2 | connected | sync-replication | 5.3.0 | 10.21.202.60 | 10.21.202.66 10.21.202.67 | False | ⓘ ✕ |

2. Each SRM server should have **TCP port 443** access to the virtual IPs of **both** FlashArrays
3. Have at least one **enabled protection group** on the source array to the target array.
4. A supported release of the SRA installed on both SRM servers. Both SRAs **must** be the same version. Pure Storage encourages the use of the latest available version of the SRA.

Once configurations are confirmed, log into Site Recovery Manager management interface.

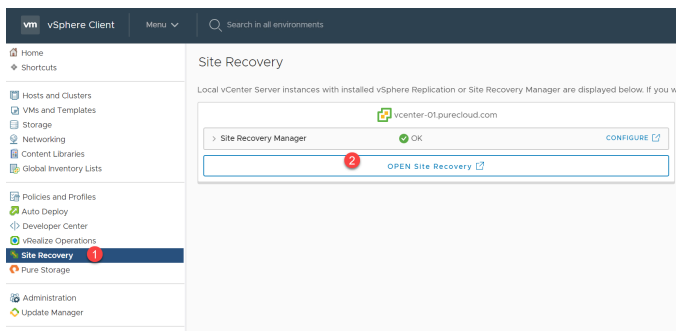
i

These instructions are focused on the 8.2 release of SRM, so screenshots and exact step-by-step clicks may vary. The requirements and the inputs do not change between different releases though unless specifically noted.

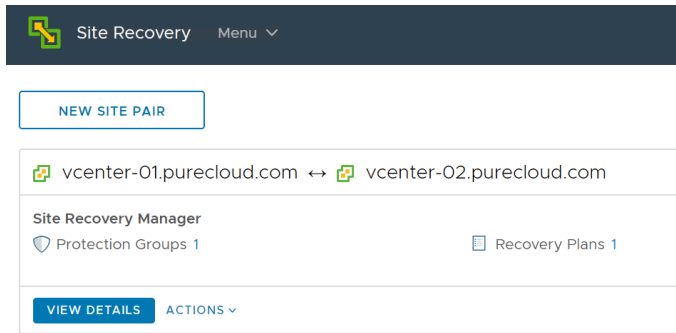


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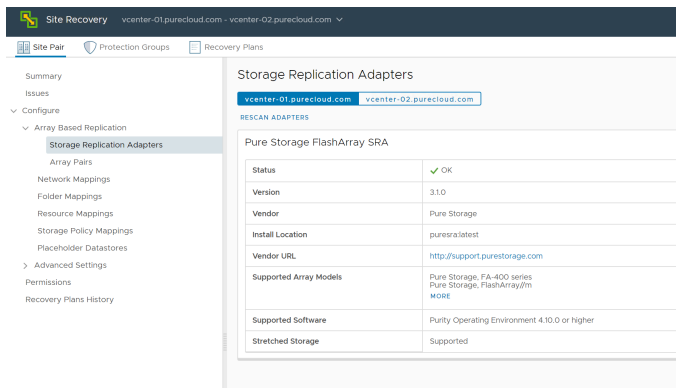
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Then click on **View Details** of the SRM pair you would like to configure to find the array manager configuration interface.



First confirm that the Pure Storage SRA is installed. Click on Array Based Replication -> Storage Replication Adapters.



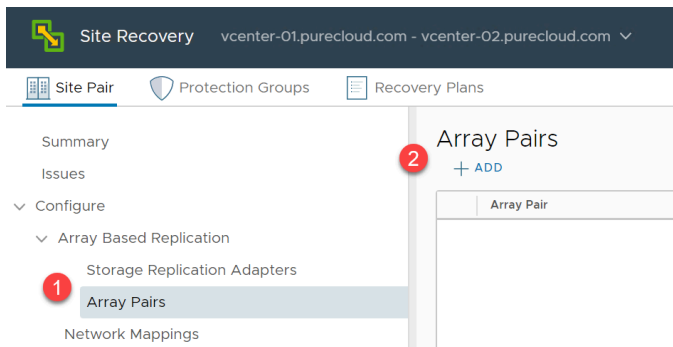
Confirm that the status is **OK**. If so, click on Array Pairs and then the **Add** button.



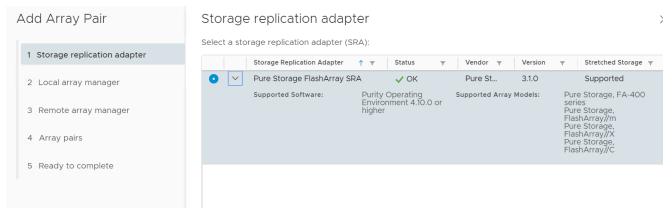
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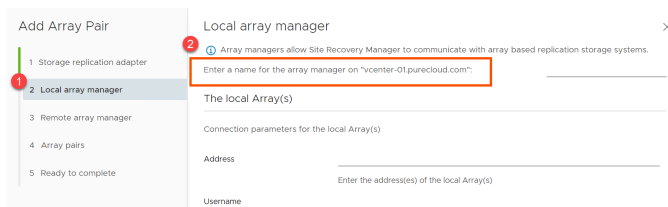
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In the window that appears, select the **Pure Storage FlashArray SRA** and then **Next**.

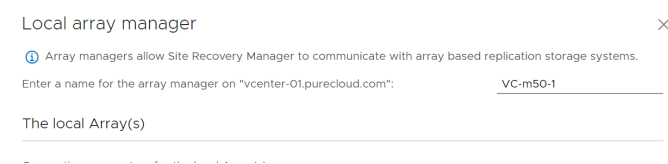


In this wizard, array managers are configured for both the source SRM server and the target SRM server. The first step is usually the source SRM server. Since SRM is technically a bidirectional tool (and therefore there really is no such thing as a "source" and "target" SRM server as they both can be both at the same time) it is important to verify which server you are operating on. In the Local Array Manager step in the wizard, look at the top where it says **"Enter a name for the array manager on <insert vCenter name>".**



In the above case, the vCenter is named "vcenter-01.purecloud.com". Verify which **arrays are local** to the vCenter reported there in **your** environment. In this case my array flasharray-m50-1 is local to this vCenter and the flasharray-m50-2 is connected to the other vCenter.

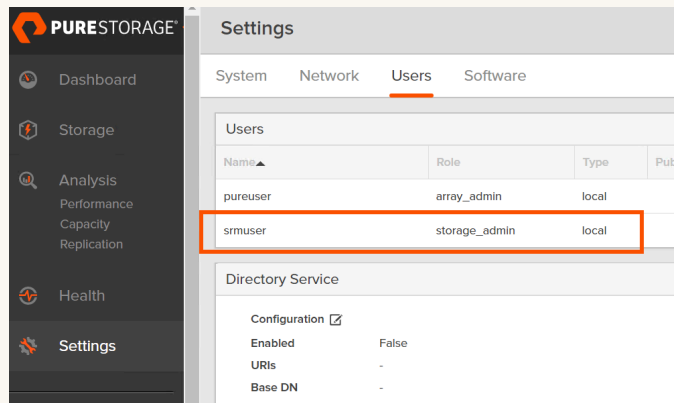
First, name the array manager something that makes sense to you. I will call mine "VC-m50-1".



Next populate the connection information. Enter in the FQDN of the FlashArray (the maps to the virtual IP address of the array). IP addresses are also acceptable, but FQDNs are generally preferred.



The recommendation is to create a special account for SRM interaction. This can be either a local account or through an external source like LDAP. All that matters is that it is at the user level of **storage admin** or higher.



Enter in the credentials and FQDN to the local array in the local array(s) entry form:

Add Array Pair

- 1 Storage replication adapter
- 2 Local array manager
- 3 Remote array manager
- 4 Array pairs
- 5 Ready to complete

Local array manager

Array managers allow Site Recovery Manager to communicate with array based replication storage systems.

Enter a name for the array manager on "vcenter-01.purecloud.com": VC-m50-1

The local Array(s)

Connection parameters for the local Array(s)

Address: flasharray-m50-1.purecloud.com

Enter the address(es) of the local Array(s)

Username: srmuser

Enter the username for the local Array(s)

Password: *****

Enter the password for the local Array(s)



Note that starting with SRA release 3.1, you can enter in more than one array in the local arrays address box. Each array can be entered in via comma separation. The requirement to do that though is that the same credentials are valid for each array. If they have different credentials, you will need to create a separate array manager pair.

The local Array(s)

Connection parameters for the local Array(s)

Address: flasharray-m50-1.purecloud.com,flasharray-m50-2.purecloud.com

Enter the address(es) of the local Array(s)

Once the local array has been added, add in the connection information for the peer array. Towards the bottom of the screen, enter in the target information for the peer array in the section called "The peer Array(s)".



The peer Array(s)

Connection parameters for the remote Array(s)

Address flasharray-m20-1.purecloud.com
Enter the comma separated address(es) of the peer Array(s)

Username srmsuser
Enter a username that is a Storage Admin on all peer Array(s)

Password *****
Enter the password of the Storage Admin user

In this case I have entered in the peer FlashArray as **flasharray-m20-1.purecloud.com**. This represents the following replication connection listed on **flasharray-m50-1.purecloud.com**:

| Connected Arrays | | | | | | | |
|------------------|-----------|-------------------|---------|--------------------|--|-----------|-----|
| Name | Status | Type | Version | Management Address | Replication Address | Throttled | |
| flasharray-m20-1 | connected | async-replication | 5.3.0 | 10.21.202.52 | 10.21.202.54 10.21.202.55 10.21.202.66 | False | ⓘ ✕ |

The full local array manager looks as follows:

Add Array Pair

- 1 Storage replication adapter
- 2 Local array manager
- 3 Remote array manager
- 4 Array pairs
- 5 Ready to complete

Local array manager

Array managers allow Site Recovery Manager to communicate with array based replication storage systems.

Enter a name for the array manager on "vcenter-01.purecloud.com": VC-m50-1

The local Array(s)

Connection parameters for the local Array(s)

Address flasharray-m50-1.purecloud.com
Enter the address(es) of the local Array(s)

Username srmsuser
Enter the username for the local Array(s)

Password *****
Enter the password for the local Array(s)

The peer Array(s)

Connection parameters for the remote Array(s)

Address flasharray-m20-1.purecloud.com
Enter the comma separated address(es) of the peer Array(s)

Username srmsuser
Enter a username that is a Storage Admin on all peer Array(s)

Password *****
Enter the password of the Storage Admin user

CANCEL BACK NEXT

Confirm the details and click **Next**.

Now for the screen labeled Remote array manager, enter in the reverse details as compared to the local array manager. This will enter in the array connection information for the remote SRM server. Confirm the listed vCenter near the top and give the array manager a name:

Add Array Pair

- 1 Storage replication adapter
- 2 Local array manager
- 3 Remote array manager
- 4 Array pairs

Remote array manager

☐ Do not create a remote array manager now.

Enter a name for the array manager on "vcenter-02.purecloud.com": VC-m20-1

The local Array(s)

Connection parameters for the local Array(s)

Next populate the array connection information. The local should be what was listed as the peer in the previous array manager and the peer should be listed as what you put in for the local array.



Add Array Pair

1 Storage replication adapter
2 Local array manager
3 Remote array manager
4 Array pairs
5 Ready to complete

Remote array manager

☐ Do not create a remote array manager now.

Enter a name for the array manager on "vcenter-02.purecloud.com": VC-m20-1

The local Array(s)

Connection parameters for the local Array(s)

Address flasharray-m20-1.purecloud.com

Enter the address(es) of the local Array(s)

Username srmuser

Enter the username for the local Array(s)

Password *****

Enter the password for the local Array(s)

The peer Array(s)

Connection parameters for the remote Array(s)

Address flasharray-m50-1.purecloud.com

Enter the comma separated address(es) of the peer Array(s)

Username pureuser

Enter a username that is a Storage Admin on all peer Array(s)


Password *****

Enter the password of the Storage Admin user

CANCEL BACK NEXT

When done, click **Next**.

The next step will list discovered array pairs. The pairs that are listed will be the FlashArrays that have replication connections from the arrays entered. In the case above, I entered the FlashArray **flasharray-m50-1** on one site and the FlashArray **flasharray-m20-1** on the other.



An important point to understand is that there really isn't such a thing as a remote array manager. In reality all array managers are local array managers. The key is a given array manager is *LOCAL* to a certain SRM server. That same array manager in reference to the other SRM server in that pair is *REMOTE*. In other words, an array manager is local to one SRM server and remote to the other one.

These two array managers allow the SRA to see what arrays are available on either side. Since a local array manager was found for both arrays, the pairing of the two is valid.

Add Array Pair

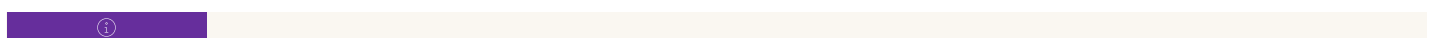
1 Storage replication adapter
2 Local array manager
3 Remote array manager
4 Array pairs
5 Ready to complete

Array pairs

Select the array pairs to enable:

| | | | |
|-------------------------------------|-----------------------------|---|---------------------|
| <input type="checkbox"/> | vcenter-01.purecloud.com | vcenter-02.purecloud.com | Status |
| <input type="checkbox"/> | flasharray-m50-1 (VC-m50-1) | flasharray-m50-20a942743-616e-459c-8... | No peer array pair |
| <input checked="" type="checkbox"/> | flasharray-m50-1 (VC-m50-1) | flasharray-m20-1 (VC-m20-1) | Ready to be enabled |

Array pairs that have identified local manager spread across the two SRM servers will be shown as **Ready to be enabled**. The array pair discovery process will also find array pairs that exist to the specified arrays but are listed as **No peer array pair**. This means that the SRA found other arrays one or both of the specified arrays are replicating to, but it did not find an array manager that is configured with that array as a local array. For an array pair to be considered a valid array pair, both arrays must be configured as a local array in separate array managers.



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Enabling an array pair means that SRM device discovery will occur between those arrays which lists what volumes are replicated and suitable for SRM control. If you do not want volumes on an array pair to be listed for SRM, do not enable that pair.

Valid array pairs will be selected. If you would like that array pair to be enabled, then leave it selected. If there are pairs that are valid, but for whatever reason you do not want them to be enabled, it is safe to deselect them (you can enable them at a later date if you prefer). If there is an array pair that is not listed as ready to be enabled but you want it to be, verify that both arrays in the pair are listed as local arrays in the array manager on their respective SRM server.

Click **Next**.

Add Array Pair

1 Storage replication adapter

2 Local array manager

3 Remote array manager

4 Array pairs

5 Ready to complete

Ready to complete

Review your selected settings.

| | |
|--|-------------------------------------|
| Storage replication adapter | Pure Storage FlashArray SRA |
| Array manager for "vcenter-01.purecloud.com" | VC-m50-1 |
| Array manager for "vcenter-02.purecloud.com" | VC-m20-1 |
| Array pairs to enable | flasharray-m50-1 ↔ flasharray-m20-1 |

Verify the information and click **Finish** when ready.

The selected array pairs will be enabled and will be listed in the Array Pairs screen.

| Array Pairs | | |
|--|---------------------|--------------------------------------|
| + Add | | |
| Array Pair | Array Manager Pair | Last Array Manager Ping |
| ✓ flasharray-m50-1 ↔ flasharray-m20-1 | VC-m50-1 ↔ VC-m20-1 | ✓ Success, 1/24/20, 6:47:12 PM -0800 |
| ○ flasharray-m50-1 ↔ flasharray-m50-2 (aad42743-6f1e-45ac-8b93-a669c472bald) | VC-m50-1 ↔ -- | ✓ Success, 1/24/20, 6:47:12 PM -0800 |

This will list the source/target array pairs and the corresponding array managers that control each side of the replication.

Array Manager Configuration for Pod-based Periodic Replication

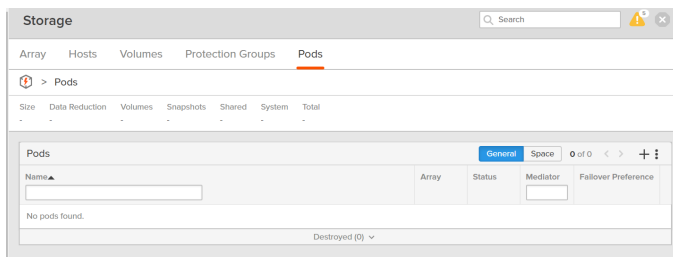
On the FlashArray, there is an object referred to as a pod. A pod can be defined in many ways, but the simplest explanation is that a pod is a unique namespace. Within this namespace you can create volumes, protection groups, and snapshots with names that do not have to have globally unique names.



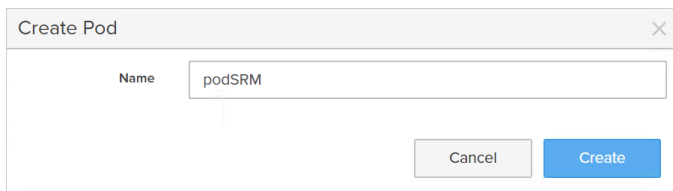
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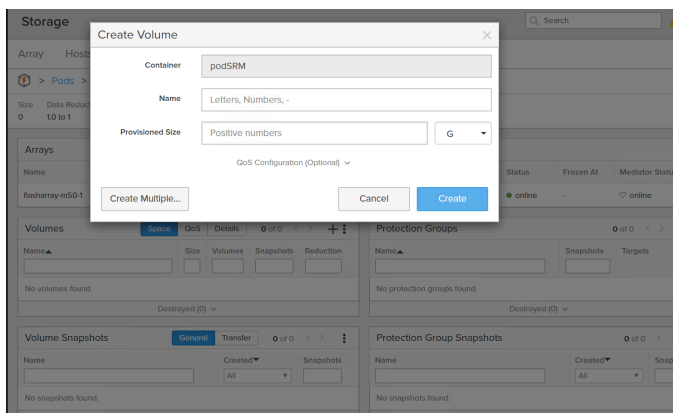
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A pod is created by logging into a FlashArray and simply creating one--the only input required is a name:



Once that pod is created, objects can then be created within it.



So a simple question is, why do I need a pod? Why not just create volumes with no pod? Well, an important part of a pod is that it is not only a unique namespace, but a mobile namespace. It is a namespace that can be moved non-disruptively from one physical FlashArray to another. It is not forever tied to where it was initially created. This allows a user such as yourself to be able to move a group of volumes and their resources (snapshots, asynchronous replication groups, etc) to another FlashArray as needed.

A pod is moved between arrays through a process called stretching. "Stretching" a pod means making that pod and all of its internal resources (volumes, snapshots, protection groups) available on a 2nd array simultaneously. When a pod exists on two arrays at once, all of the volumes can also be written to and read from on both FlashArrays at once. This configuration is referred to as ActiveCluster. ActiveCluster is the FlashArray term for active-active synchronous replication.

A pod can then be unstretched from one array, which effectively moves the pod to a new array. It can then be stretched back to the original array or a completely different array.

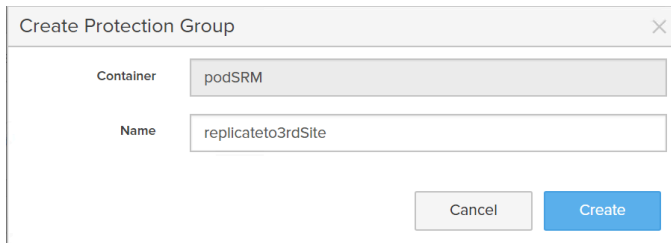
So a basic process around pod management might be:



1. **Create a pod on FlashArray A.**
2. **Create a volume called myVolume in that pod.**
3. **Stretch the pod to FlashArray B.** The pod and the volume named myVolume now exist on two arrays, FlashArray A and B. This is now an ActiveCluster configuration and the pod and its volumes can remain in this state indefinitely. Volumes in an ActiveCluster state have higher resiliency because the volumes remain available even if an entire FlashArray fails.
4. **Unstretch the pod from FlashArray A.** The pod now only exists on FlashArray B. So the volume myVolume has now been non-disruptively moved from FlashArray A to B. This effectively disables ActiveCluster on the volume myVolume.
5. **Stretch the pod to FlashArray C.** This now makes the volume myVolume available on FlashArray B and C at the same time--re-enabling ActiveCluster but with a slightly different pair of FlashArrays (B and C instead of A and B)

Periodic Replication from a Pod

Furthermore, the protection provided by pods and ActiveCluster can be complemented with periodic replication over great distance. As of Purity 5.3.x, ActiveCluster supports arrays at a distance up to 11 ms RTT time--which may not be enough distance to put both FlashArrays out of the blast radius of a major disaster (typhoon, hurricane, etc.). Therefore, starting with Purity 5.2.x, it is possible to replicate the volumes in a pod (stretched or not) to a third FlashArray by creating an periodic replication-enabled protection group in the pod, and then putting desired volumes in that pod also in the protection group. This will replicate snapshots of those protected volumes to another array on a specified interval.



The screenshot shows a 'Create Protection Group' dialog box. It has two input fields: 'Container' with the value 'podSRM' and 'Name' with the value 'replicateto3rdSite'. At the bottom right, there are two buttons: 'Cancel' and 'Create'.

Periodic replication can protect either stretched pods or standalone pods.

For more information on ActiveCluster, please see the following page:


[ActiveCluster with VMware User Guide](#)

Your next question might be "Yeah, cool, but what does this have to do with array managers in SRM?". Good question, anonymous reader.



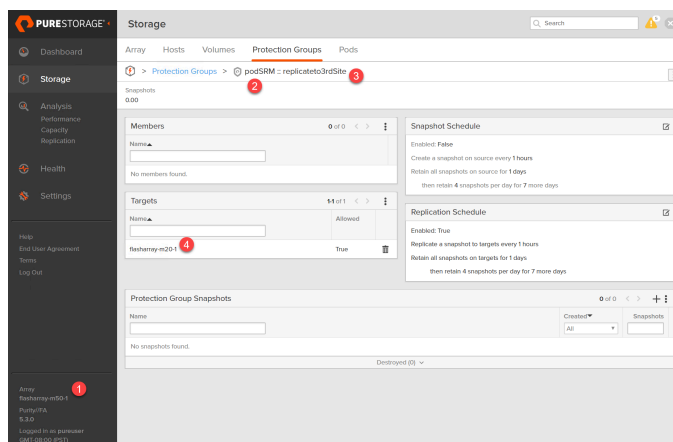
The characteristic that a pod is not tied to a specific physical array is something we did not want to break, or more accurately, it is a behavior that we didn't want to unnecessarily *restrict* within SRM. Traditionally, when FlashArray pairs were discovered in SRM array managers, the FlashArray SRA would return physical array pairs (e.g. FlashArray A replicates to FlashArray B). If the SRA returned volumes replicated from a pod under that physical array pair, it would require the containing pod to never be moved. If the pod was moved (unstretched then stretched) to a new array pair, SRM would not be able to understand the change (changing what array pairs owns a volume is not a workflow that SRM supports) and a reconfiguration of SRM would be required--likely breaking disaster recovery abilities until resolved. This is less than ideal.

To avoid this dissonance, the FlashArray SRA version 3.1 and later returns pods as potential replication sources for array pairs. So a pod is the source and a remote physical FlashArray is the target.



Note that currently (as of Purity 5.3.x) a pod cannot be a target for periodic replication--it can only be a source. Periodic replication (snapshot-based replication managed by a protection group) always replicates to the "root" of the array.

So in the below example, we have a pod named **podSRM** (seen near number label 2) currently residing on a FlashArray called **flasharray-m50-1** (seen near number label 1) with a protection group in it called **replicateto3rdSite** (seen near number label 3). This protection group replicates to a FlashArray called **flasharray-m20-1** (seen near number label 4).



Since this pod has a replication relationship, the SRA will discover the pod as a source "array" and the target physical FlashArray as the target:

| Array Pairs | | | | | |
|-------------------------------|---|-----------------------------|--------------------------------------|--|---|
| + ADD | | ARRAY PAIR ▼ | ARRAY MANAGER PAIR ▼ | | |
| | Array Pair | | Array Manager Pair | | Last Array Manager Ping |
| 1 | ✓ flasharray-m50-1 ↔ flasharray-m20-1 | VC-m50-1 ↔ VC-m20-1 | ✓ Success, 1/27/20, 6:47:33 PM -0800 | | |
| 2 | ✓ flasharray-m50-1 ↔ flasharray-m50-2 (ad42743-676-45-... | VC-m50-1 ↔ VC-m50-1 | ✓ Success, 1/27/20, 6:47:33 PM -0800 | | |
| 3 | ✓ podSRM ↔ flasharray-m20-1 | VC-m50-1 ↔ VC-m20-1 | ✓ Success, 1/27/20, 6:47:33 PM -0800 | | |
| Storage relationship adapter: | | Pure Storage FlashArray SRA | | | |
| Switched storage: | | Supported | | | |
| | | SRA version: | 3.1.0 | | VC-m20-1 |
| | | Address: | flasharray-m50-1.purecloud.com | | SRA version: 3.1.0 |
| | | Last ping: | ✓ Success, 1/27/20, 6:47:33 PM -0800 | | Address: flasharray-m20-1.purecloud.com |
| | | | | | Last ping: ✓ Success, 1/27/20, 6:48:44 PM -0800 |

Near number label 1, the **flasharray-m50-1** (a physical FlashArray) to **flasharray-m20-1** (a physical FlashArray) replication pair can be seen.

Near number label 2 the **podSRM** (a pod) to **flasharray-m20-1** (a physical FlashArray) relationship will be seen.



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So volumes that are in asynchronous replication-enabled protection groups that are NOT in any pod will be in the "physical" array pair. Volumes that are in protection groups in the pod **podSRM** will be listed under the "pod to array" array pair.

Configuring the array managers for this is very similar to non-pod based periodic replication. In the local array, enter in the source array and for the peer add the array that is a failover target. How this is slightly different is for pods that are stretched across two arrays.

Let's walk through both scenarios.

Configuring Arrays Managers for Periodic Replication from an Unstretched Pod

An *unstretched* pod is a pod that is currently on only one FlashArray at the current point-in-time. A *stretched* pod is a pod that is on two FlashArrays at the current point-in-time.



Another name for this configuration is a "local" pod--though I am not a fan of this terminology. It seems to imply that there is a fundamental difference between a local pod or a stretched pod, and more specifically implies there is a "type" of a pod, which could be misleading. There are no pod types, just current pod states. Therefore, I will use the term unstretched pod or stretched pod when necessary. The standalone term "pod" will be used when the fact that a pod happens to be stretched or unstretched makes no difference to the statement.

To configure an array manager for a pod, identify which FlashArray the pod currently sits on, and also the FlashArray that the pod-based protection group replicates to.

Below I have a pod called **srmPod**, which is currently only on a FlashArray called **flasharray-m50-1**.


Array

Hosts

Volumes

Protection Groups


Pods



>

Pods

>

 srmPod

| Size | Data Reduction | Volumes | Snapshots | Shared | System | Total |
|------|----------------|---------|-----------|--------|--------|-------|
| 0 | 1.0 to 1 | 0.00 | 0.00 | 0.00 | - | 0.00 |

Arrays

Name

flasharray-m50-1

Volumes

Space

QoS

Details

0 of 0 < > + ⋮

Name



Size

Volume

Snapshot

Distribution

This pod also has a protection group called **srmProtectionGroup**:

| Protection Groups | | | 11 of 1 | < | > | + | ⋮ |
|---|----------------------|---------------------------------------|---|---|---|---|---|
| Name▲ | Snapshots | Targets | | | | | |
| <input type="text"/> | <input type="text"/> | | | | | | |
|  srmPod:srmProtectionGroup | 0.00 | Allowed on 1 of 1 replication targets |  | | | | |
| Destroyed (0) ▾ | | | | | | | |



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This protection group replicates every 10 minutes to a FlashArray called **flasharray-m20-1**:

The screenshot shows the 'Storage' console with the 'Protection Groups' tab selected. The breadcrumb trail is 'Protection Groups > srmPod : srmProtectionGroup'. The 'Members' section is empty. The 'Targets' section shows one target: 'flasharray-m20-1' with 'Allowed' set to 'True'. The 'Snapshot Schedule' is 'Enabled: False' with a frequency of 'every 1 hours' and a retention of '1 days'. The 'Replication Schedule' is 'Enabled: True' with a frequency of 'every 10 minutes' and a retention of '1 days'.

In SRM, go to create a new array manager:

The screenshot shows the VMware Site Recovery Manager (SRM) console. The 'Configure' tab is selected, and the 'Array Pairs' section is highlighted. A red circle with the number '1' is next to the 'Array Pairs' link. A red circle with the number '2' is next to the '+ ADD' button in the 'Array Pairs' section.

Confirm the correct SRA version is installed (latest available is generally recommended)

The screenshot shows the 'Add Array Pair' dialog box in SRM. The 'Storage replication adapter' section is expanded, showing a table of supported SRA versions. The table has columns for 'Storage Replication Adapter', 'Status', 'Vendor', 'Version', and 'Supported Storage'. The 'Pure Storage FlashArray SRA' is selected, with a status of 'OK' and a version of '3.10'. The supported storage is listed as 'Supported'.

Name the local array manager something descriptive. This will be for communication to the FlashArrays local to my vCenter called **vcenter-01** so I will name it **vc01-local**. The FlashArray (**flasharray-m50-1**) hosting my pod is local to **vcenter-01**, so that will be the address entered in for local array. The target array (**flasharray-m20-1**) will be entered as my peer array.



Local array manager ×

Array managers allow Site Recovery Manager to communicate with array based replication storage systems.

Enter a name for the array manager on "vcenter-01.purecloud.com":

The local Array(s)

Connection parameters for the local Array(s)

Address
Enter the address(es) of the local Array(s)

Username
Enter the username for the local Array(s)

Password
Enter the password for the local Array(s)

The peer Array(s)

Connection parameters for the remote Array(s)

Address
Enter the comma separated address(es) of the peer Array(s)

Username
Enter a username that is a Storage Admin on all peer Array(s)

Password
Enter the password of the Storage Admin user

Click **Next**. Now do the opposite FlashArray configuration for the target vCenter. In my case the target vCenter is called **vcenter-02**.

Remote array manager ×

☐ Do not create a remote array manager now.

Enter a name for the array manager on "vcenter-02.purecloud.com":

The local Array(s)

Connection parameters for the local Array(s)

Address
Enter the address(es) of the local Array(s)

Username
Enter the username for the local Array(s)

Password
Enter the password for the local Array(s)

The peer Array(s)

Connection parameters for the remote Array(s)

Address
Enter the comma separated address(es) of the peer Array(s)

Username
Enter a username that is a Storage Admin on all peer Array(s)

Password
Enter the password of the Storage Admin user

Click **Next**. You will see discovered array pairs in the next screen. SRM will automatically select array pairs that it can immediately enable. Select and de-select as needed. You can also enable or disable array pairs at a later time. If you have no intention of using a specific array pair, the suggestion would be to not enable it. This will shorten device discovery by not having the SRA query unneeded array pairs for replication details.

In my case I will keep on the array pair that reflects my pod to array replication pair (**srmPod** to **flasharray-m20-1**):



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Array pairs

Select the array pairs to enable:

| <input type="checkbox"/> | vcenter-01.purecloud.com | vcenter-02.purecloud.com | Status |
|-------------------------------------|-------------------------------|----------------------------------|---------------------|
| <input type="checkbox"/> | flasharray-m50-1 (vc01-local) | flasharray-m50-2(aad42743-611... | No peer array pair |
| <input type="checkbox"/> | flasharray-m50-1 (vc01-local) | flasharray-m20-1 (vc02-local) | Ready to be enabled |
| <input checked="" type="checkbox"/> | srmPod (vc01-local) | flasharray-m20-1 (vc02-local) | Ready to be enabled |



If a discovered pair shows up as "No peer array pair" that usually means SRM could not identify an array manager on the opposing SRM from which the array was discovered for that particular FlashArray (or pod). If you would like to enable that array pair, ensure that the address of the FlashArray hosting the missing array is added as a local array on the opposing SRM server.

Click **Finish**.

Add Array Pair

- 1 Storage replication adapter
- 2 Local array manager
- 3 Remote array manager
- 4 Array pairs
- 5 Ready to complete

Ready to complete

Review your selected settings.

| | |
|--|-----------------------------|
| Storage replication adapter | Pure Storage FlashArray SRA |
| Array manager for "vcenter-01.purecloud.com" | vc01-local |
| Array manager for "vcenter-02.purecloud.com" | vc02-local |
| Array pairs to enable | srmPod ↔ flasharray-m20-1 |

All pods on the source array and target arrays will be discovered as an array, whether or not they have a protection group in them replicating to another array.

Configuring Arrays Managers for Periodic Replication from a Stretched Pod

The configuration of array managers to support failover from a stretched pod is almost identical to configuration for an unstretched pod, with one major exception: there are now two local arrays, not one. So both need to be specified in the appropriate place in the local array manager and the remote array manager.



While it is not technically required to specify both FlashArrays that host a stretched pod in the array manager it is advisable to do so. If only one array is registered and that array fails--the SRA will not be able to perform a planned migration. Instead an SRM disaster recovery operation will need to be started instead. This will still result a successful failover, but the source side will not be fully brought down which will then require eventual manual cleanup. Therefore, an SRM failover from a stretched pod requires that both FlashArrays be specified in the array manager to provide the most resilient experience..

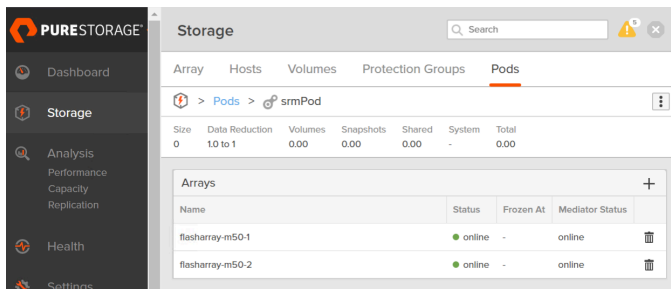
Below there is a pod named **srmPod** that is stretched across two FlashArrays; **flasharray-m50-1** and **flasharray-m50-2**:



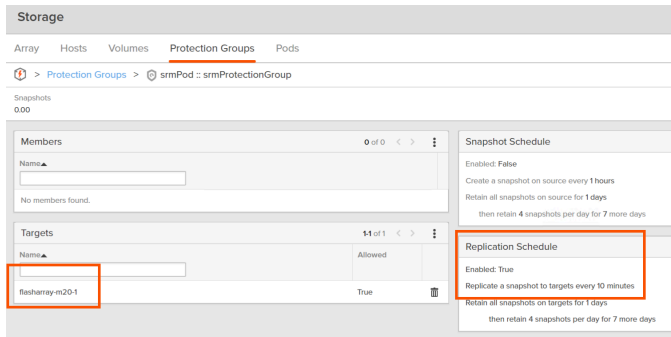
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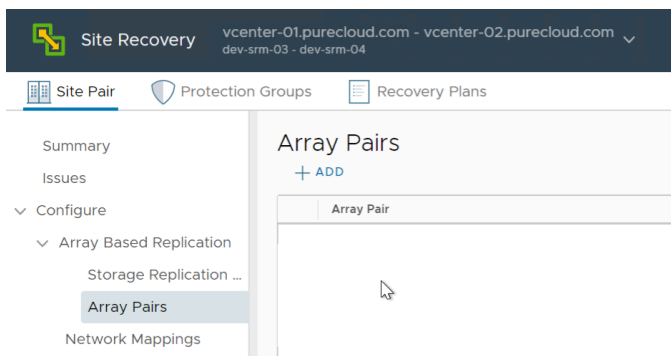
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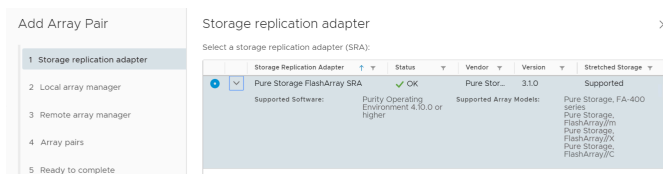
This pod has a protection group called **srmProtectionGroup** that replicates to a 3rd FlashArray called **flasharray-m20-1** every 10 minutes:



Therefore, flasharray-m50-1 and flasharray-m50-2 should be seen as the local array manager sources and flasharray-m20-1 should be seen as the local array manager peer. So log into Site Recovery Manager:



Click **Add**. Ensure you are using the 3.1 or later release of the SRA in the first screen. Click **Next**.



For the local array manager, double check you are configuring the array manager for the correct side of the vCenter pair. To make things simpler, it is best to be on the SRM server that is paired with the vCenter that currently hosts the datastores you want to protect (the one that has access to the volumes in the pods). You can verify the vCenter name at the top of the Local array manager window:



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Local array manager

 Array managers allow Site Recovery Manager to communicate with array

Enter a name for the array manager on "vcenter-01.purecloud.com": vc01-local

The local Array(s)

vCenter-01 is the vCenter that has access to my stretched-pod datastores, so I am on the right side. If you are logged into the opposite side, you can still follow these instructions, just do this in reverse order (3rd array as local first, stretched pod arrays as peer, then the opposite).

In my local array manager (which I will call vc01-local), I will put in my **flasharray-m50-1** and **flasharray-m50-2** FQDNs in the local array address, and the remote FlashArray (**flasharray-m20-1**) FQDN in the peer array address.



Currently all arrays specified in a single address entry (local or peer) must share the same credentials. In other words, while the local array(s) can have one set of credentials and the peer array(s) can have different credentials, all arrays specified in local arrays must have the same credentials, and all arrays specified in the peer arrays must have the same credentials. So in the example below, flasharray-m50-1 and flasharray-m50-2 must have the same credentials, while flasharray-m20-1 can then either also be configured with those same credentials or can have its own unique credentials.

Local array manager

 Array managers allow Site Recovery Manager to communicate with array based replication storage systems.

Enter a name for the array manager on "vcenter-01.purecloud.com": vc01-local

The local Array(s)

Connection parameters for the local Array(s)

Address flasharray-m50-1.purecloud.com,flasharray-m50-2.purecloud.com

Enter the address(es) of the local Array(s)

Username srmuser

Enter the username for the local Array(s)

Password *****

Enter the password for the local Array(s)

The peer Array(s)

Connection parameters for the remote Array(s)

Address flasharray-m20-1.purecloud.com

Enter the comma separated address(es) of the peer Array(s)

When complete, click **Next**.

Now configure the array manager that is local to the other vCenter in the pair. In the below case, my "target" vCenter is called **vcenter-02.purecloud.com**.



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Remote array manager

☐ Do not create a remote array manager now.

Enter a name for the array manager on "vcenter-02.purecloud.com":

I will call this array manager **vc02-local**.

Remote array manager

☐ Do not create a remote array manager now.

Enter a name for the array manager on "vcenter-02.purecloud.com":

vc02-local

The local Array(s)

For the local array(s) address entry I only need to enter in my 3rd array, the one I am periodically replicating to from my stretched pod, which in my case is the FQDN of the FlashArray named **flasharray-m20-1**.

Remote array manager

☐ Do not create a remote array manager now.

Enter a name for the array manager on "vcenter-02.purecloud.com":

vc02-local

The local Array(s)

Connection parameters for the local Array(s)

Address

flasharray-m20-1.purecloud.com

Enter the address(es) of the local Array(s)

Username

srmuser

Enter the username for the local Array(s)

Password

Enter the password for the local Array(s)

The peer Array(s)

Connection parameters for the remote Array(s)

Address

flasharray-m50-1.purecloud.com,flasharray-m50-2.purecloud.com

Enter the comma separated address(es) of the peer Array(s)

For the peer arrays, I will enter the FQDNs of the arrays that host the stretched pod, the arrays named **flasharray-m50-1** and **flasharray-m50-2**. Add in the respective credentials for both the local and peer connections.

Click **Next**.

The array managers will be configured in SRM and identified array pairs will be listed. SRM will automatically select array pairs that it can immediately enable. Select and de-select as needed. In this case, select the pod and target FlashArray pair to be enabled (and any other pair you would like to enable).

In my case I will keep on the array pair that reflects my pod to array replication pair (**srmPod** to **flasharray-m20-1**).



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Array pairs



Select the array pairs to enable:

| <input type="checkbox"/> | vcenter-01.purecloud.com | vcenter-02.purecloud.com | Status |
|-------------------------------------|-------------------------------|--|---------------------|
| <input type="checkbox"/> | srmPod (vc01-local) | flasharray-m20-2(7b5ecbdc-9241-42cc... | No peer array pair |
| <input type="checkbox"/> | flasharray-m50-1 (vc01-local) | flasharray-m20-2(7b5ecbdc-9241-42cc... | No peer array pair |
| <input type="checkbox"/> | flasharray-m50-2 (vc01-local) | flasharray-m20-1 (vc02-local) | Ready to be enabled |
| <input checked="" type="checkbox"/> | srmPod (vc01-local) | flasharray-m20-1 (vc02-local) | Ready to be enabled |
| <input type="checkbox"/> | flasharray-m50-1 (vc01-local) | flasharray-m20-1 (vc02-local) | Ready to be enabled |

You can also enable or disable array pairs at a later time. If you have no intention of using a specific array pair, the suggestion would be to not enable it. This will shorten device discovery by not having the SRA query unneeded array pairs for replication details.

Confirm the selections and click **Finish**.

Ready to complete

Review your selected settings.

| | |
|--|-----------------------------|
| Storage replication adapter | Pure Storage FlashArray SRA |
| Array manager for "vcenter-01.purecloud.com" | vc01-local |
| Array manager for "vcenter-02.purecloud.com" | vc02-local |
| Array pairs to enable | srmPod ↔ flasharray-m20-1 |

Multi-Array to Multi-Array Replication Configuration

Prior the the release of the FlashArray SRA version 3.1, multi-array replication topologies (fan-in or fan-out) required the use of more than two array managers (one at each site for each array--this [blog post](#) details the setup of this). The main reason for this is that the FlashArray SRA did not allow for more than one target FlashArray address in a single array manager.

In the 3.1 release of the SRA and later, this is no longer required. All arrays can be added to a single array manager pair.

Fan-in or Fan-out

Functionally there is no difference between fan-in or fan-out (it is a matter of perspective). It is also important to remember that an array pair does not dictate array-replication directions--an array pair can have devices replicating in both directions as a given time. So whether your configuration has many arrays in the source site, or many arrays in the target site does not change how the array managers are configured. If the arrays are local to that site, put them as local in the local array managers. If they are remote, put them as peers. Then do the same with the opposing site array manager, for the arrays that are local to that site, put their addresses in as local. For the ones that are remote, put their addresses in as peers.



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In the case of one array (array1) on Site A which replicates to two arrays (array2 and array3) on Site B, your array managers would be configured like so:

Site A:

Local array manager
The local Array(s)

Connection parameters for the local Array(s)

| | |
|----------|---|
| Address | <u>array1.purecloud.com</u> |
| | Enter the address(es) of the local Array(s) |
| Username | <u>srmuser</u> |
| | Enter the username for the local Array(s) |
| Password | <u>*****</u> |
| | Enter the password for the local Array(s) |

The peer Array(s)

Connection parameters for the remote Array(s)

| | |
|----------|--|
| Address | <u>array2.purecloud.com,array3.purecloud.com</u> |
| | Enter the comma separated address(es) of the peer Array(s) |
| Username | <u>srmuser</u> |

Site B:

Remote array manager

Connection parameters for the local Array(s)

| | |
|----------|--|
| Address | <u>array2.purecloud.com,array3.purecloud.com</u> |
| | Enter the address(es) of the local Array(s) |
| Username | <u>srmuser</u> |
| | Enter the username for the local Array(s) |
| Password | <u>*****</u> |
| | Enter the password for the local Array(s) |

The peer Array(s)

Connection parameters for the remote Array(s)

| | |
|----------|---|
| Address | <u>array1.purecloud.com</u> |
| | Enter the comma separated address(es) of the peer Array(s) |
| Username | <u>srmuser</u> |
| | Enter a username that is a Storage Admin on all peer Array(s) |

Note that they are opposites, one array as local on site A, with two as peers, and two arrays as local on site B with one array as a peer.

The process is the same for many to one as well (two in site A as local and one in site B as local).



Many-to-Many Replication

Many-to-many replication is essentially identical to the fan-in or fan-out array manager configuration. The only arguable difference is that both sites have multiple arrays--but the basic tenet remains the same: ff the arrays are local to that site, put them as local in the local array managers. If they are remote, put them in as peers. Then do the same with the opposing site array manager; for the arrays that are local to that site, put their addresses in as local. For the ones that are remote, put their addresses in as peers.

In the case of two arrays (array1 and array2) on Site A which replicate to two arrays (array3 and array4) on Site B, your array managers would be configured like so:

Site A:

Local array manager

Enter a name for the array manager on "vcenter-01.purecloud.com":

siteA

The local Array(s)

Connection parameters for the local Array(s)

Address

array1.purecloud.com,array2.purecloud.com

Enter the address(es) of the local Array(s)

Username

srmuser

Enter the username for the local Array(s)

Password

Enter the password for the local Array(s)

The peer Array(s)

Connection parameters for the remote Array(s)

Address

array3.purecloud.com,array4.purecloud.com

Enter the comma separated address(es) of the peer Array(s)

Username

srmuser

Site B:

Remote array manager

Enter a name for the array manager on "vcenter-02.purecloud.com":

siteB

The local Array(s)

Connection parameters for the local Array(s)

Address

array3.purecloud.com,array4.purecloud.com

Enter the address(es) of the local Array(s)

Username

srmuser

Enter the username for the local Array(s)

Password

Enter the password for the local Array(s)

The peer Array(s)

Connection parameters for the remote Array(s)

Address

array1.purecloud.com,array2.purecloud.com

Enter the comma separated address(es) of the peer Array(s)

Username

srmuser




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Array Manager Configuration for Pod-based Continuous Replication (ActiveDR)

Standalone pods can also be protected by continuous asynchronous replication, which on the FlashArray is called ActiveDR.

ActiveDR links two distinct pods and sends data to the target as quickly as it can--achieving much lower RPO than Periodic Asynchronous replication. In Purity 6.0 and with the 4.0 release of the SRA ActiveDR protection of a pod is supported for control within SRM.




> Pods >  codyPodA (demoted)

| | | | | | | | |
|------|----------------|--------|-------------|-----------|--------|--------|-------|
| Size | Data Reduction | Unique | Replication | Snapshots | Shared | System | Total |
| 48 T | 1.0 to 1 | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 |

Arrays

| Name | Status |
|------------------|-----------------------|
| flasharray-m20-1 | ● online |

Pod Replica Links

| Local Pod | Direction | Remote Pod | Remote Array |
|--|-----------|------------|------------------|
|  codyPodA (demoted) | ← | codyPodB | flasharray-m20-2 |

For more information on implementing ActiveDR with VMware, see the following:

[ActiveDR with VMware User Guide](#)

A difference between Continuous Replication from a Pod (ActiveDR) and Periodic Replication from a Pod (Protection Groups) is that ActiveDR replicates from one pod to another. The target is not the root (non-pod) part of a FlashArray. So when you configure array managers, you ensure that the FlashArray hosting the source pod is configured as the local array and the FlashArray hosting the target pod is listed as the peer array.

Below is an example ActiveDR configuration. Two pods activeDRpodA and activeDRpodB hosted on FlashArrays flasharray-m20-1 and flasharray-m20-2 respectively.



>

Pods

>

activeDRpodA (promoted)

| | | | | | | | |
|----------|----------------|--------|-------------|-----------|---------|--------|-------|
| Size | Data Reduction | Unique | Replication | Snapshots | Shared | System | Total |
| 125954 G | 21.9 to 1 | 150 G | 0.00 | 183.08 M | 44.61 M | - | 172 G |

Arrays

| Name | Status |
|------------------|--------------------|
| flasharray-m20-1 | <div></div> online |

Pod Replica Links

| Local Pod | Direction | Remote Pod | Remote Array |
|---|--------------|--------------|------------------|
| <div><div></div>activeDRpodA (promoted)</div> | <div>→</div> | activeDRpodB | flasharray-m20-2 |

To configure this relationship in SRM, create a new array manager if not already created between those FlashArrays. If this pair is already configured, FSN

vmware
Site Recovery
vcenter-01.purecloud.com - vcenter-02.purecloud.com

Site Pair

Protection Groups

Recovery Plans

Summary

Issues

Configure

- Array Based Replication
 - Storage Replication Adapters
 - Array Pairs
 - Network Mappings

ADD

Array Pair

Ensure that the 4.0 or later Pure Storage SRA is installed:

Storage replication adapter ×

Select a storage replication adapter (SRA):

| Storage Replication Adapter | Status | Vendor | Version | Stretched Storage |
|---|--------|--------------|---------|-------------------|
| <div> <div>+</div> <div>Pure Storage FlashArray SRA</div> </div> <div>Supported Software: Purity Operating Environment 4.10.0 or higher</div> <div>Supported Array Models: Pure Storage, FA-400 series, Pure Storage, FlashArray//m, Pure Storage, FlashArray//X, Pure Storage, FlashArray//C</div> | ✓ OK | Pure Stor... | 4.0.0 | Supported |

Then provide a friendly name for the array manager and then enter in the source FlashArray into the local array and the remote FlashArray address into the peer array:

i

Ensure you are creating array managers on the correct vCenter/SRM server. Enter local arrays that are local to that vCenter:

Local array manager

i

Array managers allow Site Recovery Manager to communicate with a

Enter a name for the array manager on "vcenter-01.purecloud.com":

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Local array manager

Array managers allow Site Recovery Manager to communicate with array based replication storage systems.

Enter a name for the array manager on "vcenter-01.purecloud.com":

VC1-m20-1

The local Array(s)

Connection parameters for the local Array(s)

Address

flasharray-m20-1.purecloud.com

Enter the address(es) of the local Array(s)

Username

pureuser

Enter the username for the local Array(s)

Password

.....

Enter the password for the local Array(s)

The peer Array(s)

Connection parameters for the remote Array(s)

Address

flasharray-m20-2.purecloud.com

Enter the comma separated address(es) of the peer Array(s)

Username

pureuser

Enter a username that is a Storage Admin on all peer Array(s)

Password

.....

Enter the password of the Storage Admin user

For ActiveDR management, the entered credentials must be array admin level credentials, because pod state manipulation is considered an administrative change.

Click **Next**.

Enter in the information for the remote manager with the information in reverse:

Remote array manager

☐ Do not create a remote array manager now.

Enter a name for the array manager on "vcenter-02.purecloud.com":

VC2-m20-2

The local Array(s)

Connection parameters for the local Array(s)

Address

flasharray-m20-2.purecloud.com

Enter the address(es) of the local Array(s)

Username

pureuser

Enter the username for the local Array(s)

Password

.....

Enter the password for the local Array(s)

The peer Array(s)

Connection parameters for the remote Array(s)

Address

flasharray-m20-1.purecloud.com

Enter the comma separated address(es) of the peer Array(s)

Username

pureuser

Enter a username that is a Storage Admin on all peer Array(s)

Password

.....

Enter the password of the Storage Admin user

Click **Next**.

The next screen shows all found array pairs and will auto-select pairs that are eligible to be enabled (the arrays on each side of a pair must be discovered locally by array managers configured on opposite SRM servers).



Array pairs

Select the array pairs to enable:

| | | |
|-------------------------------------|-------------------------------|--|
| <input type="checkbox"/> | vcenter-01.purecloud.com | vcenter-02.purecloud.com |
| <input checked="" type="checkbox"/> | activeDRpodA (VC1-m20-1) | activeDRpodB (VC2-m20-2) |
| <input type="checkbox"/> | flasharray-m20-1 (VC1-m20-1) | flasharray-m50-2(aad42743-611e-45ac-8b93-a86f) |
| <input checked="" type="checkbox"/> | flasharray-m20-1 (VC1-m20-1) | flasharray-m20-2 (VC2-m20-2) |
| <input checked="" type="checkbox"/> | SRM-ActiveDR-PodA (VC1-m20-1) | SRM-ActiveDR-PodB (VC2-m20-2) |
| <input checked="" type="checkbox"/> | VMware-pod-m20-1 (VC1-m20-1) | VMware-pod-m20-2 (VC2-m20-2) |
| <input type="checkbox"/> | flasharray-m20-1 (VC1-m20-1) | flasharray-m50-1(53f027a7-828d-4b4d-a3a8-d4f) |
| <input checked="" type="checkbox"/> | SRM-podA (VC1-m20-1) | SRM-podB (VC2-m20-2) |
| <input checked="" type="checkbox"/> | codyPodA (VC1-m20-1) | codyPodB (VC2-m20-2) |

You do not need to enable every pair. Array managers will list all physical FlashArray pairs, pod to physical array pairs, and ActiveDR pod to pod pairs. In this case, I will only enable the pod pair I want SRM to control by deselecting the others. Other pairs can be enabled at any point in the future.

| | | |
|-------------------------------------|-------------------------------|--|
| <input type="checkbox"/> | vcenter-01.purecloud.com | vcenter-02.purecloud.com |
| <input checked="" type="checkbox"/> | activeDRpodA (VC1-m20-1) | activeDRpodB (VC2-m20-2) |
| <input type="checkbox"/> | flasharray-m20-1 (VC1-m20-1) | flasharray-m50-2(aad42743-611e-45ac-8b93-a86f) |
| <input type="checkbox"/> | flasharray-m20-1 (VC1-m20-1) | flasharray-m20-2 (VC2-m20-2) |
| <input type="checkbox"/> | SRM-ActiveDR-PodA (VC1-m20-1) | SRM-ActiveDR-PodB (VC2-m20-2) |
| <input type="checkbox"/> | VMware-pod-m20-1 (VC1-m20-1) | VMware-pod-m20-2 (VC2-m20-2) |
| <input type="checkbox"/> | flasharray-m20-1 (VC1-m20-1) | flasharray-m50-1(53f027a7-828d-4b4d-a3a8-d4f) |
| <input type="checkbox"/> | SRM-podA (VC1-m20-1) | SRM-podB (VC2-m20-2) |
| <input type="checkbox"/> | codyPodA (VC1-m20-1) | codyPodB (VC2-m20-2) |

Click **Next** and then confirm the selected pair(s) to be enabled and click **Finish**.

Ready to complete

Review your selected settings.

| | |
|--|-----------------------------|
| Storage replication adapter | Pure Storage FlashArray SRA |
| Array manager for "vcenter-01.purecloud.com" | VC1-m20-1 |
| Array manager for "vcenter-02.purecloud.com" | VC2-m20-2 |
| Array pairs to enable | activeDRpodA ↔ activeDRpodB |

This will invoke a discover of that pair and all volumes in the pod will be returned:



| Array Pairs | | | |
|------------------------------------|---|-----------------------|---------------------|
| ADD | ARRAY PAIR | ARRAY MANAGER PAIR | |
| | Array Pair | Array Manager Pair | |
| <input checked="" type="radio"/> | activeDRpodA ↔ activeDRpodB | VC1-m20-1 ↔ VC2-m20-2 | |
| <input type="radio"/> | codyPodA ↔ codyPodB | VC1-m20-1 ↔ VC2-m20-2 | |
| <input type="radio"/> | flasharray-m20-1 ↔ flasharray-m20-2 | VC1-m20-1 ↔ VC2-m20-2 | |
| <input type="radio"/> | flasharray-m20-1 ↔ flasharray-m50-153f027a7-828d-4b4... | VC1-m20-1 ↔ ... | |
| <input type="radio"/> | flasharray-m20-1 ↔ flasharray-m50-2(aad42743-61e-45a... | VC1-m20-1 ↔ ... | |
| <input type="radio"/> | SRM-ActiveDR-PodA ↔ SRM-ActiveDR-PodB | VC1-m20-1 ↔ VC2-m20-2 | |
| <input type="radio"/> | SRM-podA ↔ SRM-podB | VC1-m20-1 ↔ VC2-m20-2 | |
| <input type="radio"/> | VMware-pod-m20-1 ↔ VMware-pod-m20-2 | VC1-m20-1 ↔ VC2-m20-2 | |
| EXPORT | | | |
| DISCOVER DEVICES | | | |
| Device (vcenter-01.guestcloud.com) | Datstore | Status | Device (vcenter-02) |
| ActiveDR-RDM-01 | | → Forward | Replica of active |
| ActiveDR-RDM-02 | | → Forward | Replica of active |
| ActiveDR-RDM-03 | | → Forward | Replica of active |
| ActiveDR-VMFS-01 | | → Forward | Replica of active |
| ActiveDR-VMFS-02 | | → Forward | Replica of active |

Array Manager Configuration for Stretched Storage Support

Traditionally, SRM protected VMs that were on datastores with active/passive array based replication. Therefore a failover meant removing the VMs entirely (shutting them down and unregistering them) and bringing up copies of the datastores on the remote array. In this scenario the source side and the target side had different datastores on different storage devices but the arrays replicated data between them so they could be used to fail VMs back and forth.

In Site Recovery Manager 6.1, VMware introduced support for managing virtual machines that are protected by "stretched" storage. In other words, managing VMs that are on VMFS datastores that are active on two arrays at once. Unlike active/passive, "stretched" storage was active/active. Both sides has the exact same copy of the data at the same time and therefore the same exact datastore was available on both sides at once.

The Pure Storage FlashArray SRA supports this configuration since the 2.x release of the SRA.

In order to allow for the discovery of stretched devices, you need to configure the SRM array managers in a specific way.



To use the Site Recovery Manager support of stretched storage, you need the enterprise license of SRM. The standard edition does not include this feature.

In the example below, I have a volume hosting a VMFS in a pod called **srmPod**. this pod exists on two FlashArrays so that the volumes in that pod are stretched. This pod exists on **flasharray-m50-1** and **flasharray-m50-1**.

| Array Hosts Volumes Protection Groups Pods | | | | | | |
|--|----------------|-----------|-----------------|---------|--------|---------|
| Pods > srmPod | | | | | | |
| Size | Data Reduction | Volumes | Snapshots | Shared | System | Total |
| 34 T | 19.4 to 1 | 24.74 M | 105.94 K | 22.35 K | - | 24.87 M |
| Arrays | | | | | | |
| Name | Status | Frozen At | Mediator Status | | | |
| flasharray-m50-1 | online | - | online | | | |
| flasharray-m50-2 | online | - | online | | | |

Login to SRM and create a new array manager. It is important to know which FlashArray is local to which vCenter. In the example environment, **flasharray-m50-1** is local to **vCenter-01** and **flasharray-m50-2** is local to **vCenter-02**.




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In the array manager configuration, verify which vCenter you are looking at first:

Local array manager ×

 Array managers allow Site Recovery Manager to communicate with array based replication storage systems.

Enter a name for the array manager on "vcenter-01.purecloud.com":

I am configuring the array manager on **vCenter-01** first, so my local array will be **flasharray-m50-1**. I will name the array manager **m50-1**.

I will enter the FlashArray **flasharray-m50-1** address and credentials in the local array:

The local Array(s)

Connection parameters for the local Array(s)

| | |
|----------|---|
| Address | <input type="text" value="flasharray-m50-1.purecloud.com"/> |
| | Enter the address(es) of the local Array(s) |
| Username | <input type="text" value="srmuser"/> |
| | Enter the username for the local Array(s) |
| Password | <input type="password" value="....."/> |
| | Enter the password for the local Array(s) |

and then **flasharray-m50-2** in the peer array:

The peer Array(s)

Connection parameters for the remote Array(s)

| | |
|----------|---|
| Address | <input type="text" value="flasharray-m50-2.purecloud.com"/> |
| | Enter the comma separated address(es) of the peer Array(s) |
| Username | <input type="text" value="srmuser"/> |
| | Enter a username that is a Storage Admin on all peer Array(s) |
| Password | <input type="password" value="....."/> |
| | Enter the password of the Storage Admin user |

For the remote array manager in vCenter-02, I will do the opposite. Verify the vCenter and give the manager a name:

Remote array manager

☐ Do not create a remote array manager now.

Enter a name for the array manager on "vcenter-02.purecloud.com":

Now add the array local to that site:



The local Array(s)

Connection parameters for the local Array(s)

| | |
|----------|---|
| Address | <input type="text" value="flasharray-m50-2.purecloud.com"/> |
| | Enter the address(es) of the local Array(s) |
| Username | <input type="text" value="srmuser"/> |
| | Enter the username for the local Array(s) |
| Password | <input type="password" value="*****"/> |
| | Enter the password for the local Array(s) |

And then the peer:

The peer Array(s)

Connection parameters for the remote Array(s)

| | |
|----------|---|
| Address | <input type="text" value="flasharray-m50-1.purecloud.com"/> |
| | Enter the comma separated address(es) of the peer Array(s) |
| Username | <input type="text" value="srmuser"/> |
| | Enter a username that is a Storage Admin on all peer Array(s) |
| Password | <input type="password" value="*****"/> |
| | Enter the password of the Storage Admin user |

The wizard will then show all discovered array pairs.

Array pairs

Select the array pairs to enable:

| <input type="checkbox"/> | vcenter-01.purecloud.com | vcenter-02.purecloud.com | Status |
|-------------------------------------|--------------------------|----------------------------|---------------------|
| <input type="checkbox"/> | flasharray-m50-1 (m50-1) | flasharray-m20-2(7b5ec... | No peer array pair |
| <input type="checkbox"/> | flasharray-m50-1 (m50-1) | flasharray-m20-1(5ee869... | No peer array pair |
| <input type="checkbox"/> | srmPod (m50-1) | flasharray-m20-2(7b5ec... | No peer array pair |
| <input type="checkbox"/> | srmPod (m50-1) | flasharray-m20-1(5ee869... | No peer array pair |
| <input checked="" type="checkbox"/> | flasharray-m50-1 (m50-1) | flasharray-m50-2 (m50-2) | Ready to be enabled |

Enable the pair going from **flasharray-m50-1** to **flasharray-m50-2** (in this example).



Note pairs with pod names are not relevant to this type of SRM protection. Pod-based pairs are for failing volume from OUT of a pod. This type of failover simply fails VMs from one vCenter to another without moving the data--it stays in the pod. So it will essentially fail over the VM I/O to the pod volumes to go from one FlashArray front-end to the other FlashArray front-end.

If configured right, the array pair will enable and discovered devices will appear.



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| | | | |
|----------------------------------|---|---|---------------|
| <input type="radio"/> | > | flasharray-m50-1 ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6) | m50-1 ↔ - |
| <input checked="" type="radio"/> | > | flasharray-m50-1 ↔ flasharray-m50-2 | m50-1 ↔ m50-2 |
| <input type="radio"/> | > | srmPod ↔ flasharray-m20-1(5ee86996-f833-4fa0-a26a-d23496e5abde) | m50-1 ↔ - |

| Device (vcenter-01.purecloud.co...) | Datastore | Status | Device (vcenter-02.purecloud.co...) |
|-------------------------------------|-----------|--------------------------------|-------------------------------------|
| srmPod:rtrgfe | | No Site Preference (Stretch... | srmPod:rtrgfe |

Enabling or Disabling Array Pairs

In SRM, array managers beget arrays. Arrays then beget array pairs. Array pairs then beget replicated devices. In order for replication devices to be discovered, you need to enable the array pairs that participate in that replication.

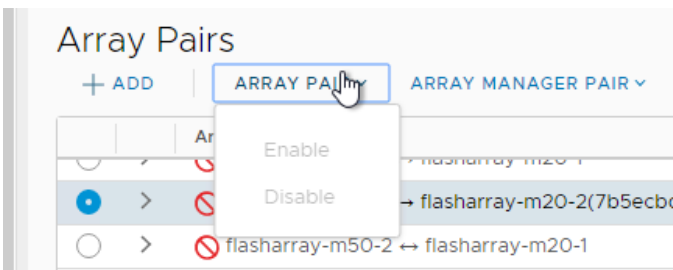
Enabling an Array Pair

In order for an array pair to be enabled, one array must be locally discovered by an array manager on one SRM server in an SRM pair, and the other array in that replication pair must be discovered by a separate array manager on the opposing SRM server. If both arrays are discovered as local to the same SRM server, it cannot be enabled. If one of the two arrays are not discovered at all, then the pair cannot be enabled. Finally, there also must be replication between both arrays. If replication is not enabled between FlashArray A and FlashArray B (even if the array managers are properly configured), the replication pair cannot be enabled, because, well, there is no replication.

Take the instance below:

| Array Pairs | | | |
|----------------------------------|---|--------------------|--|
| | Array Pair | Array Manager Pair | |
| <input type="radio"/> | flasharray-m50-1 ↔ flasharray-m20-1 | m50 ↔ m20 | |
| <input checked="" type="radio"/> | flasharray-m50-1 ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6) | m50 ↔ - | |
| <input type="radio"/> | flasharray-m50-2 ↔ flasharray-m20-1 | m50 ↔ m20 | |

When selected, it cannot be enabled:



The pair flasharray-m50-1 to flasharray-m20-2 is an identified replication pair, but cannot be enabled. Why? Well if you look at the Array Manager Pair column, only one SRM server (or more accurately only one array manager) can find that pair. The other SRM server does not have an array manager that sees that pair too. Therefore, you need to either create an array manager on that SRM server that has access to flasharray-m20-2, or make sure an existing array manager can access it.



Note that the array in an array pair that does not have a corresponding array manager will also display the array serial number next to the name in the listing.

If a given array pair is seen on both sites (indicated that the array manager column lists two array managers) it can be enabled.

Array Pairs

+ ADD | ARRAY PAIR ▾ | ARRAY MANAGER PAIR ▾

| | Array Pair | Array Manager Pair |
|----------------------------------|---|--------------------|
| <input type="radio"/> | flasharray-m50-1 ↔ flasharray-m20-2(7b5e... | m50 ↔ -- |
| <input checked="" type="radio"/> | flasharray-m50-2 ↔ flasharray-m20-1 | m50 ↔ m20 |
| <input type="radio"/> | srmPod ↔ flasharray-m20-1 | m50 ↔ m20 |

Select the pair, click on **Array Pair**, and click **Enable**.

Array Pairs

+ ADD | ARRAY PAIR ▾ | ARRAY MANAGER PAIR ▾

| | Array Pair | Array Manager Pair |
|----------------------------------|---|--------------------|
| <input type="radio"/> | flasharray-m50-1 ↔ flasharray-m20-2(7b5e... | m50 ↔ -- |
| <input checked="" type="radio"/> | flasharray-m50-2 ↔ flasharray-m20-1 | m50 ↔ m20 |
| <input type="radio"/> | srmPod ↔ flasharray-m20-1 | m50 ↔ m20 |

Enable
Disable

Once enabled, the pair will show as enabled and the SRA will discover all devices in that replication pair.

Array Pairs

+ ADD | ARRAY PAIR ▾ | ARRAY MANAGER PAIR ▾

| | Array Pair | Array Manager Pair |
|----------------------------------|---|--------------------|
| <input type="radio"/> | flasharray-m50-1 ↔ flasharray-m20-2(7b5e... | m50 ↔ -- |
| <input checked="" type="radio"/> | flasharray-m50-2 ↔ flasharray-m20-1 | m50 ↔ m20 |
| <input type="radio"/> | srmPod ↔ flasharray-m20-1 | m50 ↔ m20 |
| <input type="radio"/> | srmPod ↔ flasharray-m20-2(7b5ecbdc-924... | m50 ↔ -- |

DISCOVER DEVICES

| Device (vcenter-01.purecloud.com) ▾ | Datastore ▾ | Status |
|-------------------------------------|-------------|--------|
|-------------------------------------|-------------|--------|

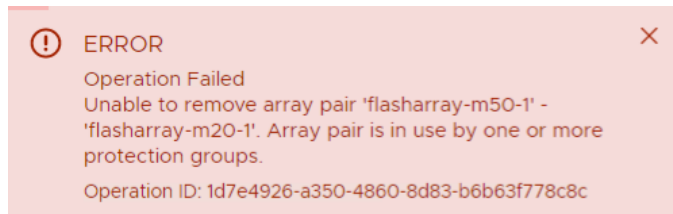
The next question is likely: "Should I enable all discovered array pairs?". In general, the recommendation is to enable just the array pairs that you need. Each pair that you enable will cause discoveries to occur. If you do not plan on using any devices in that pair, there is no reason to enable it--it just causes unnecessary work in SRM discovery time.



Disabling an Array Pair

If an array pair is no longer needed (permanently or temporarily) you can disable the array pair. This will ensure no recovery plans are built on top of that pair. In order though for an array pair to be disabled it must not be in use. An array pair is considered to be "in-use" if there are any replication devices discovered from that pair in a SRM protection group.

A disable operation will fail return the below error if it is in-use:



You can verify a pair is not in-use by selecting it and then verifying that no protection groups are listed in the **Protection Group** column of the **Discovered Devices** table:

Array Pairs

+ ADD

Array Pair

Array Manager Pair

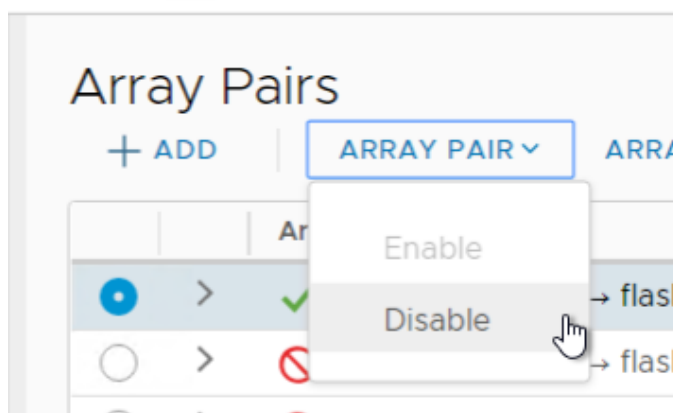
| Array Pair | Array Manager Pair | Last Array Manager Ping |
|--|----------------------|---|
| <div> <div>✓</div> <div>flasharray-m50-1 ↔ flasharray-m20-1</div> </div> | <div>m50 ↔ m20</div> | <div>✓ Success, 2/29/20, 9:35:14 PM -0800</div> |
| <div> <div>○</div> <div>flasharray-m20-2 ↔ flasharray-m20-2/75ecbdc-924f-42cc-8548-95e46d31c6</div> </div> | <div>m50 ↔ ...</div> | <div>✓ Success, 2/29/20, 9:35:14 PM -0800</div> |
| <div> <div>○</div> <div>flasharray-m50-1 ↔ Test</div> </div> | <div>m50 ↔ m20</div> | <div>✓ Success, 2/29/20, 9:35:14 PM -0800</div> |
| <div> <div>✓</div> <div>flasharray-m50-2 ↔ flasharray-m20-1</div> </div> | <div>m50 ↔ m20</div> | <div>✓ Success, 2/29/20, 9:35:14 PM -0800</div> |

7 items

DISCOVERED DEVICES

| Device (center-01.purecloud.com) | Database | Status | Device (center-02.purecloud.com) | Protection Group |
|----------------------------------|---------------------|-----------|---|------------------|
| dev-vmfs01 | Local (dev-vmfs01) | → Forward | Replica of flasharray-m50-1-dev-vmfs01 | |
| prod-vmfs01 | Local (prod-vmfs01) | → Forward | Replica of flasharray-m50-1-prod-vmfs01 | |

If that is clear, it is safe to select the array pair, click the **Array Pair** drop down and choose **Disable**.



Changing the FlashArray Membership of a Pod

Part of the design around pod support in the FlashArray SRA is to allow for the easy and non-disruptive migration of a pod from one physical FlashArray to another without breaking recovery plans. Moving a pod can be considered any one of the following operations:

1. Stretching a currently unstretched pod to a second FlashArray



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2. Unstretching a stretched pod from a FlashArray
3. Stretching a currently unstretched pod to a second FlashArray AND then unstretching from the original (moving a pod).

In all of these cases, the advice is the same. Prior to making any kind of ownership changes to a pod, you should make sure that the FlashArrays are all already configured in the SRM array managers as mentioned above.



Stretching a Local Pod to a Second FlashArray

Stretching a pod to a second FlashArray means making the volumes (and other objects) that are in that pod available also on a second array. For Site Recovery Manager, it is recommended to make sure that the second array is added into the array managers before stretching the pod.

You can either stretch the pod first and then add the second array to the array managers or you can add the second array to the array managers and then stretch the pod to it.



It is generally recommended to do the second option (stretch last) this way you can be sure that SRM can still manage that pod if one of the arrays hosting the pod fails as if you make sure your first step is to update (and/or verify) the array managers prior to a stretch you are less likely to forget to do so.

So take the example a pod called **testPod** which is on a FlashArray called **flasharray-m50-1**.

|  > Pods >  testPod | | | | | | |
|--|----------------|---------|-----------|--------|--------|-------|
| Size | Data Reduction | Volumes | Snapshots | Shared | System | Total |
| 32 T | 1.0 to 1 | 0.00 | 0.00 | 0.00 | - | 0.00 |

| Arrays |
|------------------|
| Name |
| flasharray-m50-1 |

This pod has a production group called testPG that replicates to flasharray-m20-1:

| | | | | |
|---|-------|---------|-------------------|------|
| Array | Hosts | Volumes | Protection Groups | Pods |
|  > Protection Groups >  testPod :: testPG | | | | |
| Snapshots 0.00 | | | | |

| Members | | | 11 of 1 | < | > | ⋮ |
|---------------------|--|--|---------|---|---|---|
| Name▲ | | | | | | |
| testPod:testVMFS-01 | | | | | | X |

| Targets | | | 11 of 1 | < | > | ⋮ |
|------------------|---------|--|---------|---|---|---|
| Name▲ | Allowed | | | | | |
| flasharray-m20-1 | True | | | | | ⌵ |

SRM discovers this array pair as well as the VMFS that is replicated in it:



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Array Pairs

+ ADD | ARRAY PAIR v | ARRAY MANAGER PAIR v

| | Array Pair |
|----------------------------------|---|
| <input type="radio"/> | > testPod ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6) |
| <input checked="" type="radio"/> | > ✓ testPod ↔ flasharray-m20-1 |
| <input type="radio"/> | > testPod ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6) |
| <input type="radio"/> | > srmPod ↔ flasharray-m20-1 |
| <input type="radio"/> | > flasharray-m50-1 ↔ flasharray-m50-2(aad42743-611e-45ac-8b93-a869c4728a1d) |
| <input type="radio"/> | > flasharray-m50-1 ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6) |
| <input type="radio"/> | > ✓ flasharray-m50-1 ↔ flasharray-m20-1 |

DISCOVER DEVICES

| Device (vcenter-01.purecloud.com) | Datastore | Status | Device |
|-----------------------------------|----------------------|-----------|--------|
| testVMFS-01 | Local: [testVMFS-01] | → Forward | Repli |

I now want to stretch this pod to also exist on the FlashArray called **flasharray-m50-2**. Before I do that I need to ensure my array managers are configured appropriately.

Select the existing array pair, and choose **Edit Local Array Manager** from the **Array Manager Pair** drop down:

Array Pairs

+ ADD | ARRAY PAIR v | ARRAY MANAGER PAIR v

| | Array Pair |
|----------------------------------|---|
| <input type="radio"/> | > testPod ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6) |
| <input checked="" type="radio"/> | > ✓ testPod ↔ flasharray-m20-1 |
| <input type="radio"/> | > srmPod ↔ flasharray-m20-1 |
| <input type="radio"/> | > srmPod ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6) |
| <input type="radio"/> | > flasharray-m50-1 ↔ flasharray-m50-2(aad42743-611e-45ac-8b93-a869c4728a1d) |

Edit Local Array Manager
 Edit Remote Array Manager
 Discover Array Pairs
 Remove

If flasharray-m50-2 is not listed in the local array(s) address input, add it:

Edit Local Array Manager

Enter a name for the array manager on "vcenter-01.purecloud.com":

The local Array(s)

Connection parameters for the local Array(s)

Address: flasharray-m50-1.purecloud.com,flasharray-m50-2.purecloud.com
 Enter the address(es) of the local Array(s)

Username: srmuser
 Enter the username for the local Array(s)

Password:
 Enter the password for the local Array(s)

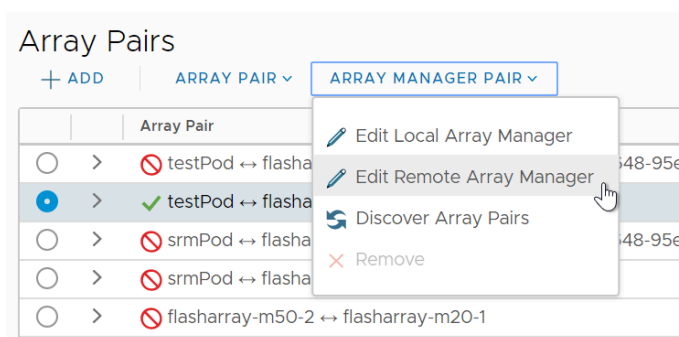
Click **Save**. Now edit the remote array manager:



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Make sure **flasharray-m50-2** is added in the peer array(s) address input:

The peer Array(s)

Connection parameters for the remote Array(s)

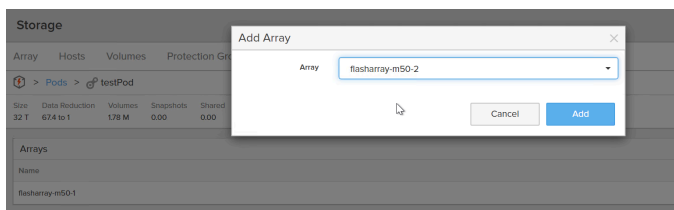
Address flasharray-m50-1.purecloud.com,flasharray-m50-2.purecloud.com
 Enter the comma separated address(es) of the peer Array(s)

Username srmuser
 Enter a username that is a Storage Admin on all peer Array(s)

Password *****
 Enter the password of the Storage Admin user

If it isn't, add it and click **Save**.

Now you can stretch the pod to flasharray-m50-2:



Unstretching a Pod

If you have followed best practices there is nothing required inside of SRM to unstretch a pod. With that being said, mistakes happen and it is important to be sure.

Before unstretching a pod you should be sure of two things:

1. The array that will still own the pod is configured in SRM array managers. This will ensure that SRM can still control the pod now that it is only on one array.
2. The array that will still own the pod has existing and valid connections for all of the volumes in use. This will ensure that the VMware environment will still have storage access to the volumes when the one FlashArray is removed from the pod.





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So the first step is to verify array manager configuration.

In this example I have a pod called **testPod** on stretched across two FlashArrays, **flasharray-m50-1** and **flasharray-m50-2**:

| Array | Hosts | Volumes | Protection Groups | Pods | | |
|--|----------------|---------|-------------------|--------|--------|--------|
|  > Pods >  testPod | | | | | | |
| Size | Data Reduction | Volumes | Snapshots | Shared | System | Total |
| 32 T | 70.0 to 1 | 1.45 M | 0.00 | 0.00 | - | 1.45 M |

Arrays

Name

flasharray-m50-1

flasharray-m50-2

I want to remove it from **flasharray-m50-2**. In SRM, click on the array pair for **testPod** and choose **Edit Local Array Manager** from the **Array Manager Pair** drop down.

| | | | | |
|----------------------------------|---|---|------------------|----------------------|
| Array Pairs | | + ADD | ARRAY PAIR ▾ | ARRAY MANAGER PAIR ▾ |
| <input type="radio"/> | > | testPod ↔ flasharray-m50-1 | 48-95e4f6d311c6) | |
| <input checked="" type="radio"/> | > | testPod ↔ flasharray-m50-2 | 48-95e4f6d311c6) | |
| <input type="radio"/> | > | srmPod ↔ flasharray-m50-1 | 48-95e4f6d311c6) | |
| <input type="radio"/> | > | srmPod ↔ flasharray-m50-2 | 48-95e4f6d311c6) | |
| <input type="radio"/> | > | flasharray-m50-2 ↔ flasharray-m20-1 | | |
| <input type="radio"/> | > | flasharray-m50-1 ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6) | | |
| <input type="radio"/> | > | flasharray-m50-1 ↔ flasharray-m20-1 | | |

Edit Local Array Manager

Edit Remote Array Manager

Discover Array Pairs

Remove

Since I will be removing **flasharray-m50-2** and the pod will remain on **flasharray-m50-1**, I want to make sure the address of **flasharray-m50-1** is listed. If it is not, add it now:

The local Array(s)

Connection parameters for the local Array(s)

| | |
|----------|---|
| Address | flasharray-m50-1.purecloud.com,flasharray-m50-2.purecloud.com |
| | Enter the address(es) of the local Array(s) |
| Username | srmuser |
| | Enter the username for the local Array(s) |
| Password | |
| | Enter the password for the local Array(s) |

If you have made any changes. Click **Save**.

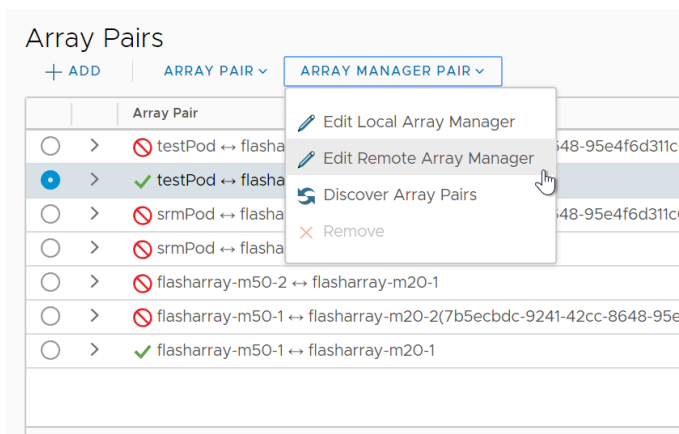
Now verify it is listed in the remote array manager. Select the pair, then the **Array Manager Pair** drop down and then **Edit Remote Array Manager**:



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Same as above, ensure that the eventual surviving owner (flasharray-m50-1 in this case) is listed. But this time in the peer array(s) address entry:

The peer Array(s)

Connection parameters for the remote Array(s)

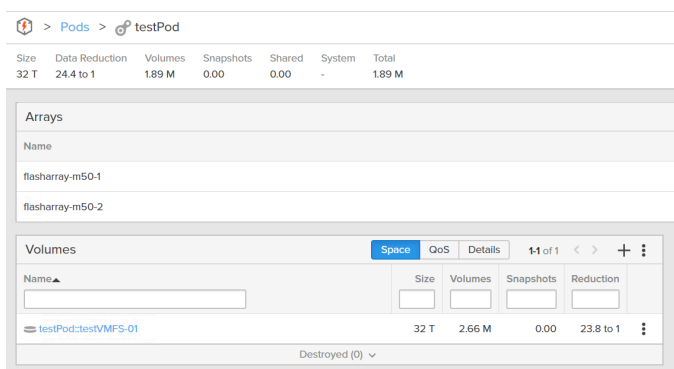
Address flasharray-m50-1.purecloud.com,flasharray-m50-2.purecloud.com
Enter the comma separated address(es) of the peer Array(s)

Username srmuser
Enter a username that is a Storage Admin on all peer Array(s)

Password *****
Enter the password of the Storage Admin user

If it is not there, add it and click **Save**.

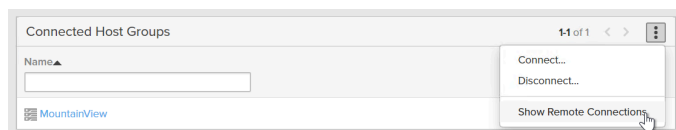
The next step is to verify storage connectivity. This is standard procedure for any unstretch operation. The FlashArray will not let you unstretch from a FlashArray if the volumes in that pod have active connections to one or more hosts on that particular FlashArray. So, for any volume connections on **flasharray-m50-2**, they should also be connected to those same hosts on **flasharray-m50-1**. Below I currently have one volume in the pod (repeat this process for all of them):



Click on the volume.



Then go to the Connected Hosts and Connected Host Groups. In the vertical ellipsis menu, click Show Remote Connections:



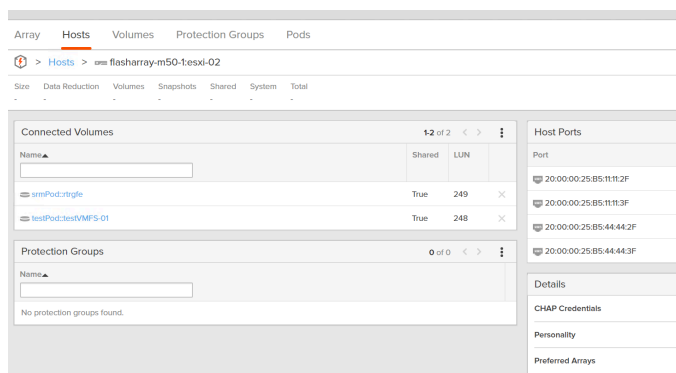
This will show the host(s) or host group(s) (depending on what box you are in) connections on both FlashArrays in the pod:



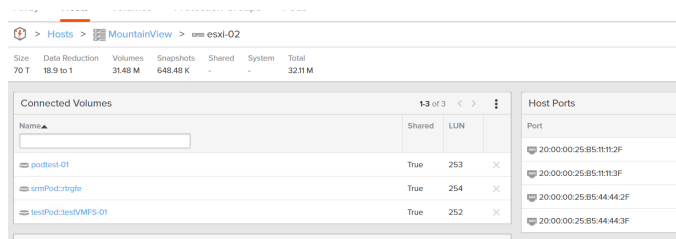
Verify for every connection on the FlashArray you want to remove that there is a corresponding connection on the other array. In the case of host groups, ensure that the hosts in the host groups are the same (verify by looking click on the host group, then the hosts to verify the initiators).

So for example, the host called esxi-02 is the same on flasharray-m50-1 in host group MountainView as the host esxi-02 in host group MountainView on flasharray-m50-2:

flasharray-m50-1:



flasharray-m50-2:



To be extra sure, verify that the host themselves see all of the paths as live by looking at the FlashArray GUI on the array you want to keep the pod on. Click on Health > Connections and then the host name:



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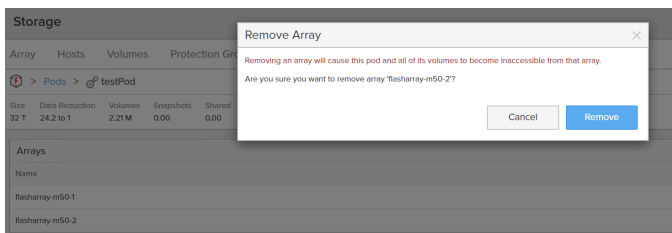
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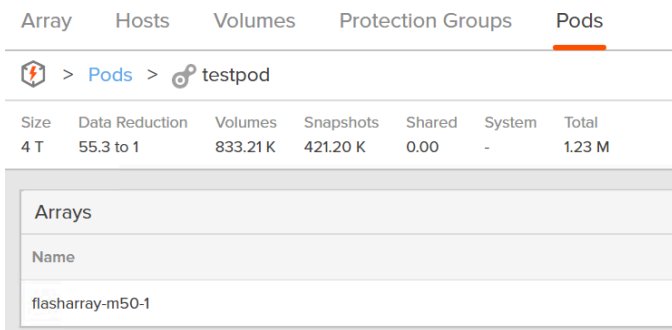
Confirm that the host has at least two connections to both CT0 and CT1 that are marked as green. If one or both controllers do not have green connections, verify zoning (for Fibre Channel) or ESXi host configuration (for iSCSI).

Once confirmed you can safely unstretch the pod.

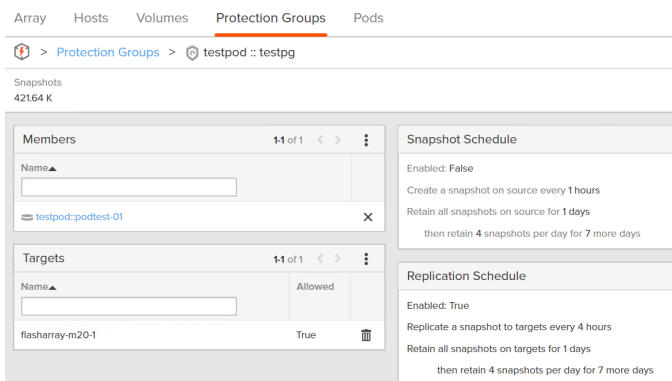


Moving a Pod to a different FlashArray

Let's take the case of a pod called **testPod** that is currently hosted on a FlashArray called **flasharray-m50-1**:



This also has a protection group configured for periodic replication to a FlashArray called **flasharray-m20-1**:



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In SRM, on my site that has access to the **flasharray-m50-1**, the array manager has it configured as a local array and the **flasharray-m20-1** configured as a peer:

The local Array(s)

Connection parameters for the local Array(s)

| | |
|----------|---|
| Address | <u>flasharray-m50-1.purecloud.com</u> |
| | Enter the address(es) of the local Array(s) |
| Username | <u>srmuser</u> |
| | Enter the username for the local Array(s) |
| Password | <u>*****</u> |
| | Enter the password for the local Array(s) |

The peer Array(s)

Connection parameters for the remote Array(s)

| | |
|----------|---|
| Address | <u>flasharray-m20-1.purecloud.com</u> |
| | Enter the comma separated address(es) of the peer Array(s) |
| Username | <u>srmuser</u> |
| | Enter a username that is a Storage Admin on all peer Array(s) |
| Password | <u>*****</u> |
| | Enter the password of the Storage Admin user |

The opposing array manager is configured in the opposite way (**flasharray-m20-1** as the local and **flasharray-m50-1** as the peer):

The local Array(s)

Connection parameters for the local Array(s)

| | |
|----------|---|
| Address | <u>flasharray-m20-1.purecloud.com</u> |
| | Enter the address(es) of the local Array(s) |
| Username | <u>srmuser</u> |
| | Enter the username for the local Array(s) |
| Password | <u>*****</u> |
| | Enter the password for the local Array(s) |

The peer Array(s)

Connection parameters for the remote Array(s)

| | |
|----------|---|
| Address | <u>flasharray-m50-1.purecloud.com</u> |
| | Enter the comma separated address(es) of the peer Array(s) |
| Username | <u>srmuser</u> |
| | Enter a username that is a Storage Admin on all peer Array(s) |
| Password | <u>*****</u> |
| | Enter the password of the Storage Admin user |

The replication pair (testPod to flasharray-m20-1) is enabled and has a datastore in use and protected by a SRM protection group:



| | | |
|--|-----------|---------------|
| smf-pd ↔ flasharray-m20-1 (7b5ecbdc-9241-42cc-8648-95e4f6d31c6) | m20 ↔ m50 | Success, 3/2/ |
| testpod ↔ flasharray-m20-1 | m50 ↔ m20 | Success, 3/2/ |
| testpod ↔ flasharray-m20-2 (7b5ecbdc-9241-42cc-8648-95e4f6d31c6) | m50 ↔ m20 | Success, 3/2/ |

| Device (vcenter-01.purecloud.co...) | Datstore | Status | Device (vcenter-02.purecloud.co...) | Protection Group |
|-------------------------------------|---------------------|-----------|-------------------------------------|------------------|
| podtest-01 | Local: [podtest-01] | → Forward | Replica of testpod:podtest-01 | test |

For whatever reason, I want to move the pod and its volume(s) from the FlashArray named **flasharray-m50-1** to another FlashArray named **flasharray-m50-2** while maintaining periodic replication to the array **flasharray-m20-1**.

The high level process that is recommended is shown below:

1. Add **flasharray-m50-2** to the local arrays on the source site array manager and also as a peer on the remote site array manager.
2. Stretch the pod to **flasharray-m50-2**
3. Connect the volume(s) to the appropriate host(s)/host group(s) on **flasharray-m50-2**
4. Ensure the new paths appear in the relevant ESXi host(s)
5. Disconnect the volume(s) on **flasharray-m50-1** from the relevant host(s)/host group(s). The old paths will go dead, rescan the ESXi cluster(s) to clear them out.
6. Unstretch the pod from **flasharray-m50-1**.

Optionally, if **flasharray-m50-1** is no longer in use, you can disable any pair using it and then remove it from the source and target array managers. Let's walk through the process now.

First add the flasharray-m50-2 to the source site array manager as a local array address (now listed in addition to flasharray-m50-1):

Edit Local Array Manager

Enter a name for the array manager on "vcenter-01.purecloud.com":

The local Array(s)

Connection parameters for the local Array(s)

Address flasharray-m50-1.purecloud.com flasharray-m50-2.purecloud.com
 Enter the address(es) of the local Array(s)

Username srmuser
 Enter the username for the local Array(s)

Password *****
 Enter the password for the local Array(s)

The peer Array(s)

Connection parameters for the remote Array(s)

Address flasharray-m20-1.purecloud.com
 Enter the comma separated address(es) of the peer Array(s)

Username srmuser
 Enter a username that is a Storage Admin on all peer Array(s)

Password *****
 Enter the password of the Storage Admin user



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Now add it on the remote site array manager as a peer:

Edit Remote Array Manager

Enter a name for the array manager on "vcenter-02.purecloud.com":

The local Array(s)

Connection parameters for the local Array(s)

| | |
|----------|---|
| Address | <input type="text" value="flasharray-m20-1.purecloud.com"/> |
| | Enter the address(es) of the local Array(s) |
| Username | <input type="text" value="srmuser"/> |
| | Enter the username for the local Array(s) |
| Password | <input type="password" value="*****"/> |
| | Enter the password for the local Array(s) |

The peer Array(s)

Connection parameters for the remote Array(s)

| | |
|----------|--|
| Address | <input type="text" value="flasharray-m50-1.purecloud.com,flasharray-m50-2.purecloud.com"/> |
| | Enter the comma separated address(es) of the peer Array(s) |
| Username | <input type="text" value="srmuser"/> |
| | Enter a username that is a Storage Admin on all peer Array(s) |
| Password | <input type="password" value="*****"/> |
| | Enter the password of the Storage Admin user |

Next login to flasharray-m50-1 and stretch the pod to flasharray-m50-2:

> Pods > testpod

| Size | Data Reduction | Volumes | Snapshots | Shared | System | Total |
|------|----------------|---------|-----------|--------|--------|--------|
| 4 T | 33.8 to 1 | 2.18 M | 110.48 K | 0.00 | - | 2.29 M |

Arrays

| Name | Status | Frozen At | Mediator Status |
|------------------|--------|-----------|-----------------|
| flasharray-m50-1 | online | - | online |

Choose the array:

Add Array

Array

-- Select an array --

flasharray-m50-2

Cancel

Add

Wait for it to finish syncing:

> Pods > testpod

| Size | Data Reduction | Volumes | Snapshots | Shared | System | Total |
|------|----------------|---------|-----------|--------|--------|--------|
| 4 T | 33.8 to 1 | 2.18 M | 110.48 K | 0.00 | - | 2.29 M |

Arrays

| Name | Status | Frozen At | Mediator Status |
|------------------|--------------------|-----------|-----------------|
| flasharray-m50-1 | online | - | online |
| flasharray-m50-2 | resyncing (17.86%) | - | online |



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...

Pod > Pods > testpod

| Size | Data Reduction | Volumes | Snapshots | Shared | System | Total |
|------|----------------|---------|-----------|--------|--------|--------|
| 4 T | 33.8 to 1 | 2.18 M | 110.48 K | 0.00 | - | 2.29 M |

| Arrays | | | | |
|------------------|--------|-----------|-----------------|--|
| Name | Status | Frozen At | Mediator Status | |
| flasharray-m50-1 | online | - | online | |
| flasharray-m50-2 | online | - | online | |

Next identify all of your volumes in the pod. Any volume that has a connection should be verified. I currently have one volume in this pod:

| Volumes | | | | | Space | QoS | Details | 11 of 1 | < | > | + | : |
|--------------------|------|---------|-----------|-----------|-------|-----|---------|---------|---|---|---|---|
| Name | Size | Volumes | Snapshots | Reduction | | | | | | | | |
| testpod:podtest-01 | 4 T | 1.95 M | 11773 K | 35.1 to 1 | | | | | | | | |
| Destroyed (0) | | | | | | | | | | | | |

Inside of vSphere, identify what datastore or RDM is using that volume, the vSphere Plugin is a simple way to verify (though manual methods can be used, or scripted methods work the best at scale):

podtest-01 ACTIONS

Summary Monitor Configure Permissions Files Hosts VMs

Type: VMFS 6
URL: ds:///vmfs/volumes/5e5c50d6-d82b3d28-88aa-0025b512345f/

Details

Tags

FlashArray

SNAPSHOTS CAPACITY PERFORMANCE

| | |
|------------------------|--------------------------------------|
| Arrays | flasharray-m50-1 flasharray-m50-2 |
| Volume Name | podtest-01 |
| Volume Bandwidth Limit | - |
| Volume IOPS Limit | - |
| Data Reduction | 10.96-to-1 |
| Pod | testpod |
| Volume Group | - |
| Serial# | 53F027A7828D4B4D000385BB |
| Snapshot Count | 1 |



The plugin verifies that datastore podtest-01 is indeed the volume above in the pod. Click on the **Configure** tab then **Connectivity and Multipathing**. Choose a host and verify its pathing (currently will be only from one array):



Connectivity and Multipathing

Mount

Unmount

| Host | Datastore Mounted | Datastore Connectivity |
|---|-------------------|------------------------|
|  esxi-04.purecloud.com | Mounted | Connected |
|  esxi-02.purecloud.com | Mounted | Connected |

Device: PURE Fibre Channel Disk (naa.624a937053f027a7828d4b4d000385bb) ▼

Multipathing Policies

Path Selection Policy

Storage Array Type Policy

Owner Plugin

Round Robin (VMware)

VMW_SATP_ALUA





NMP

Paths

Refresh

Enable

Disable

| Runtime Name | Status | Target | LUN |
|----------------------|--|---|-----|
| vmhba3:C0:T1542:L248 |  Active (I/O) | 52-4a-93-78-abb9-84:00 52-4a-93-78-abb9-84:00 | 248 |
| vmhba3:C0:T4846:L248 |  Active (I/O) | 52-4a-93-78-abb9-84:11 52-4a-93-78-abb9-84:11 | 248 |
| vmhba3:C0:T1540:L248 |  Active (I/O) | 52-4a-93-78-abb9-84:01 52-4a-93-78-abb9-84:01 | 248 |
| vmhba3:C0:T4845:L248 |  Active (I/O) | 52-4a-93-78-abb9-84:10 52-4a-93-78-abb9-84:10 | 248 |

Now login to flasharray-m50-2. Connect the volume to the appropriate host groups. In my case, I want to connect it to a ESXi cluster called MountainView which is similarly named on the flasharray-m50-2:

> Volumes > testpod :: podtest-01

| Size | Data Reduction | Volumes | Snapshots | Shared | System | Total |
|------|----------------|----------|-----------|--------|--------|----------|
| 4 T | 17.8 to 1 | 745.30 K | 0.00 | - | - | 745.30 K |

Connected Hosts 0 of 0

Name: LUN:

No hosts found.

Connected Host Groups 0 of 0

Name:

No host groups found.

Connect... Disconnect... Show Remote Connections

Choose the host group:

Connect Host Groups

Available Host Groups 1-4 of 4

- Infrastructure
- Mission
- ☒ MountainView
- Sunnyvale

Selected Host Groups 1 selected Clear all

- MountainView

LUN: Automatic

Cancel Connect

Back in vCenter you should see the paths double (in this case 4 paths to 8):



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Device: PURE Fibre Channel Disk (naa.624e937053f027a7828d4b4d000385bb) v

Multipathing Policies
 Path Selection Policy Round Robin (VMware)
 Storage Array Type Policy VMW_SATP_ALUA
 Owner Plugin NMP

Paths
 Refresh Enable Disable

| Runtime Name | Status | Target | LUN |
|-----------------------|--------------|---|-----|
| vmhba3:CO:115215:L253 | Active (I/O) | 52-4a93:7c:07:113d:02 52-4a93:7c:07:113d:02 | 253 |
| vmhba3:CO:14984:L253 | Active (I/O) | 52-4a93:7c:07:113d:03 52-4a93:7c:07:113d:03 | 253 |
| vmhba3:CO:11542:L248 | Active (I/O) | 52-4a93:78:ab:b984:00 52-4a93:78:ab:b984:00 | 248 |
| vmhba3:CO:1507:L253 | Active (I/O) | 52-4a93:7c:07:113d:13 52-4a93:7c:07:113d:13 | 253 |
| vmhba3:CO:14846:L248 | Active (I/O) | 52-4a93:78:ab:b984:11 52-4a93:78:ab:b984:11 | 248 |
| vmhba3:CO:115249:L253 | Active (I/O) | 52-4a93:7c:07:113d:12 52-4a93:7c:07:113d:12 | 253 |
| vmhba3:CO:11540:L248 | Active (I/O) | 52-4a93:78:ab:b984:01 52-4a93:78:ab:b984:01 | 248 |
| vmhba3:CO:14845:L248 | Active (I/O) | 52-4a93:78:ab:b984:10 52-4a93:78:ab:b984:10 | 248 |

Click **Refresh** if they do not appear. If they do not appear after that, verify host connectivity to the array. Verify this path change on all hosts connected to the datastore. You can now safely disconnect it from the host group(s) on flasharray-m50-1:

Disconnect Host Group

Disconnecting a host group will break the connection between the volume and every host in the host group.

Are you sure you want to disconnect host group 'MountainView'?

Cancel Disconnect

You will then see the original paths go dead:

Device: PURE Fibre Channel Disk (naa.624e937053f027a7828d4b4d000385bb) v

Multipathing Policies
 Path Selection Policy Round Robin (VMware)
 Storage Array Type Policy VMW_SATP_ALUA
 Owner Plugin NMP

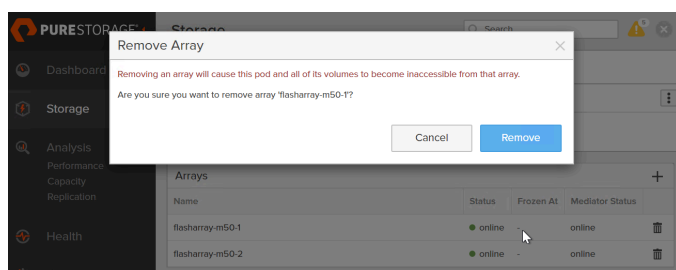
Paths
 Refresh Enable Disable

| Runtime Name | Status | Target | LUN |
|-----------------------|--------------|---|-----|
| vmhba3:CO:115215:L253 | Active (I/O) | 52-4a93:7c:07:113d:02 52-4a93:7c:07:113d:02 | 253 |
| vmhba3:CO:14984:L253 | Active (I/O) | 52-4a93:7c:07:113d:03 52-4a93:7c:07:113d:03 | 253 |
| vmhba3:CO:11542:L248 | Dead | 52-4a93:78:ab:b984:00 52-4a93:78:ab:b984:00 | 248 |
| vmhba3:CO:1507:L253 | Active (I/O) | 52-4a93:7c:07:113d:13 52-4a93:7c:07:113d:13 | 253 |
| vmhba3:CO:14846:L248 | Dead | 52-4a93:78:ab:b984:11 52-4a93:78:ab:b984:11 | 248 |
| vmhba3:CO:115249:L253 | Active (I/O) | 52-4a93:7c:07:113d:12 52-4a93:7c:07:113d:12 | 253 |
| vmhba3:CO:11540:L248 | Dead | 52-4a93:78:ab:b984:01 52-4a93:78:ab:b984:01 | 248 |
| vmhba3:CO:14845:L248 | Dead | 52-4a93:78:ab:b984:10 52-4a93:78:ab:b984:10 | 248 |

You can clear the old paths immediately with a host rescan.

Once this has been completed for all volumes in the pod that are connected, you can then unstretch. The FlashArrays will NOT let you unstretch from an array if there are any still-connected volumes from the pod on the array you want to unstretch the pod from.

Go to either FlashArray and remove the flasharray-m50-1 from membership of the pod.

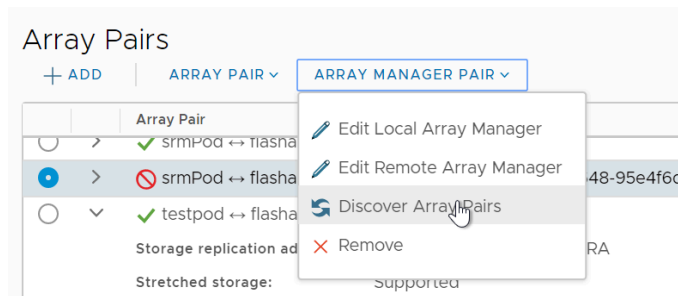


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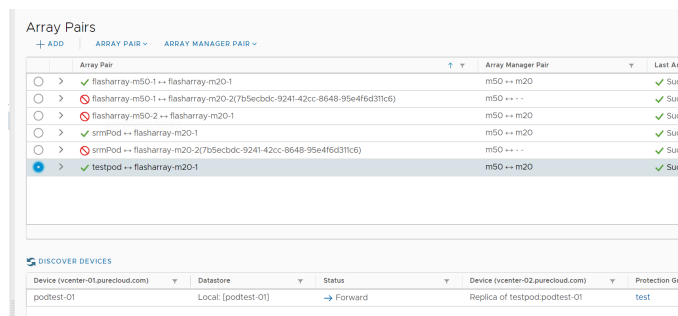
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Go back to SRM and rescan for array pairs:



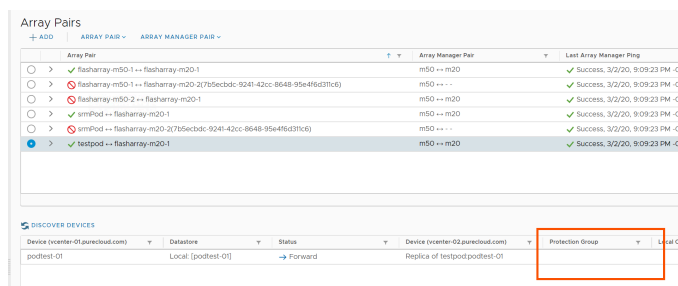
The pair will still be valid, and the pod now lives on an entirely new FlashArray!



Deleting an Array Manager

An array manager can be deleted when no devices are in SRM protection groups from any array pair in that manager and no array pairs are enabled.

First ensure no devices are protected (there should be no protection groups listed in the Discover Devices columns for any enabled array pairs in the array manager pair):



Then disable any array pairs:

| Array Pairs | | | |
|----------------------------------|---|---|----------------------|
| + ADD | | ARRAY PAIR ▾ | ARRAY MANAGER PAIR ▾ |
| <input type="radio"/> | > | Enable | |
| <input type="radio"/> | > | Disable | |
| <input type="radio"/> | > | flasharray-m20-1 | m50 ↔ m20 |
| <input type="radio"/> | > | flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6) | m50 ↔ m20 |
| <input type="radio"/> | > | flasharray-m50-2 ↔ flasharray-m20-1 | m50 ↔ m20 |
| <input type="radio"/> | > | srmpod ↔ flasharray-m20-1 | m50 ↔ m20 |
| <input type="radio"/> | > | srmpod ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6) | m50 ↔ m20 |
| <input checked="" type="radio"/> | > | testpod ↔ flasharray-m20-1 | m50 ↔ m20 |

Then select any disabled pair and then **Array Manager Pair** and choose **Remove**:

| Array Pairs | | | |
|----------------------------------|---|---|----------------------|
| + ADD | | ARRAY PAIR ▾ | ARRAY MANAGER PAIR ▾ |
| <input type="radio"/> | > | flasharray-m50-1 | |
| <input type="radio"/> | > | flasharray-m50-1 | |
| <input type="radio"/> | > | flasharray-m50-2 | |
| <input checked="" type="radio"/> | > | srmpod ↔ flasharray-m20-1 | |
| <input type="radio"/> | > | srmpod ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6) | |
| <input type="radio"/> | > | testpod ↔ flasharray-m20-1 | |

SRM will confirm the array pairs related to that array manager pair before proceeding:

Remove Array Managers



You are about to remove "m50" and "m20". This also removes all array pairs using these array managers:

- flasharray-m50-1 ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6)
- srmpod ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e4f6d311c6)
- flasharray-m50-1 ↔ flasharray-m20-1
- testpod ↔ flasharray-m20-1
- srmpod ↔ flasharray-m20-1
- flasharray-m50-2 ↔ flasharray-m20-1

Remove array managers?

CANCEL

REMOVE

Click **Remove**. If it fails, it means you missed an array pair:

ERROR

Operation Failed
Unable to remove array manager 'm50'. The array manager cannot be removed while it has enabled array pairs.

Operation ID: 440b85a4-5ed1-4421-99a0-1a28ca5c5cbf



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Troubleshooting Array Pairs

The following sections refer to issues that can be encountered in array discovery.

An Array Pair is not Listed

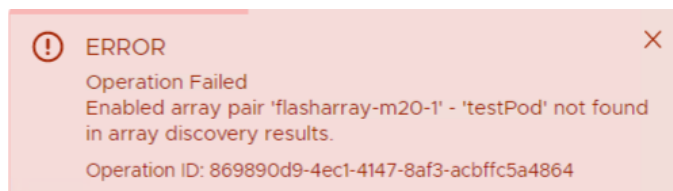
Array pair discovery is based on discovered replication connections, as can be seen in the FlashArray Web Interface under Storage > Array > Connected Arrays:

| Connected Arrays | | | | | | |
|------------------|---------------------|-------------------|---------|--------------------|---------------------|---------------|
| Name | Status | Type | Version | Management Address | Replication Address | |
| flasharray-m20-1 | connected | async-replication | 5.3.4 | 10.21.202.52 | 10.21.202.54 | 10.21.202.55 |
| flasharray-m50-2 | connected | sync-replication | 5.3.4 | 10.21.202.60 | 10.21.202.66 | 10.21.202.67 |
| flasharray-m20-2 | partially_connected | async-replication | 5.3.4 | 10.21.88.248 | 10.21.202.68 | 10.21.202.237 |

If an array is not listed here, then the array pair will not be shown in SRM.

Array Pair Not Found Error during Array Discovery

If an array manager fails to discover arrays with a similar error to below:



And the listing for Last Array Manager Ping is in a failed state:

| Array Pairs | | | | Learn more ? | |
|-------------|--|-----|--------------------|------------------------------|----------------------------------|
| Array Pair | | ↑ ↓ | Array Manager Pair | Last Array Manager Ping | |
| | flasharray-m50-1 ↔ flasharray-m20-1 | | m50 ↔ m20 | | Failed, 3/7/20, 3:13:44 PM -0800 |
| | flasharray-m50-1 ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e46d31fc5) | | m50 ↔ -- | | Failed, 3/7/20, 3:13:44 PM -0800 |
| | flasharray-m50-2 ↔ flasharray-m20-1 | | m50 ↔ m20 | | Failed, 3/7/20, 3:13:44 PM -0800 |
| | srmlPod ↔ flasharray-m20-1 | | m50 ↔ m20 | | Failed, 3/7/20, 3:13:44 PM -0800 |
| | srmlPod ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e46d31fc5) | | m50 ↔ -- | | Failed, 3/7/20, 3:13:44 PM -0800 |
| | testPod ↔ flasharray-m20-1 | | m50 ↔ m20 | | Failed, 3/7/20, 3:13:44 PM -0800 |
| | testPod ↔ flasharray-m20-2(7b5ecbdc-9241-42cc-8648-95e46d31fc5) | | m50 ↔ -- | | Failed, 3/7/20, 3:13:44 PM -0800 |

The likely cause is one of the following issues:

1. A pod was renamed that was part of an enabled array pair (renaming protected pods is not support in the 3.1 SRA release)
2. A pod was destroyed that was part of an enabled array pair
3. The pod that was part of an enabled array pair was moved to a new FlashArray and that new FlashArray is not included in any array manager.



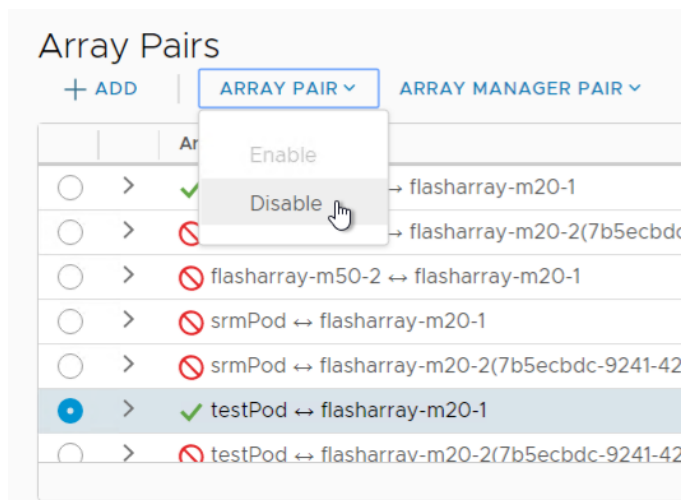
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Check if the Pod was Renamed

In the case of a rename, if the array pair is not needed in SRM, you can simply disable the pair and array discovery will work again.



In the 3.1 release of the SRA, renaming pods without reconfiguring SRM protection is not supported. In a future SRA release, the ability to rename pods without having to reconfigure protection in SRM will be added.

If the array pair that included the renamed pod is still needed, you will need to rename it back to the original name. Identify the FlashArray(s) that hosted the original pod and go to either one of the web interfaces of FlashArrays (if of course it was on two) that hosted the pod and go to **Settings > Users > Audit Trail**.

Search for the command *purepod* and the subcommand *rename*. This will show any pod renames that occurred on the array. If no results show up for the original pod, try the other array (if it was stretched).

| Audit Trail | | | | | |
|------------------|----------|---------|------------|---------|----------------------|
| Time | User | Command | Subcommand | Name | Arguments |
| All | | purepod | rename | | |
| 2020-03-07 15:13 | pureuser | purepod | rename | 2033458 | testPod testPod1 |
| 2020-03-07 15:11 | pureuser | purepod | rename | 2033457 | testPod-test testPod |
| 2020-03-06 18:04 | pureuser | purepod | rename | 2033434 | testPod testPod-test |
| 2020-03-06 17:31 | pureuser | purepod | rename | 2033421 | testPod-01 testPod |
| 2020-03-06 17:24 | pureuser | purepod | rename | 2033414 | testPod testPod-01 |

Once you find what the pod was renamed to, rename it back to the original name.

Rename Pod

Name

testPod

Cancel

Rename



Renaming it back to the original name will fix array discovery.

Check if the Pod was Destroyed

It is also possible that the pod itself was destroyed on the FlashArray. Before deciding upon the right course of action, it is important to verify that this is indeed what happened. Login to the FlashArray web interface of the array that hosted the pod originally and go to **Settings > Users > Audit Trail**.

Search for the command *purepod* and the subcommand *destroy*. This will show any pod destroy operations that occurred on the array. If no results show up for the original pod, try the other array (if it was stretched).

| Audit Trail | | | | | |
|------------------|----------|---------|------------|---------|-----------------|
| Time | User | Command | Subcommand | Name | Arguments |
| All | | purepod | destroy | | |
| 2020-03-07 15:43 | pureuser | purepod | destroy | 2033499 | testPod |
| 2020-03-06 13:19 | pureuser | purepod | destroy | 2033355 | TestFailoverPod |

Once you confirm that the pod was indeed destroyed, you have a few options:

1. Is that array pair even needed any more (are there are pre-existing protected volumes discovered from it in-use)? If no, then just disable the destroyed pod in SRM and rediscover.
2. If there are protected volumes in it, verify the volumes are still in-use and were moved out of the pod prior to the pod destruction. If they are still in-use:
 1. If it has been less than 24 hours, restore the pod from the Destroyed Pods box and move the volumes back in it

| Destroyed Pods | | | | | |
|----------------|---------|-----------|--------|----------------|------|
| 1 of 1 < > ⋮ | | | | | |
| Name | Volumes | Snapshots | Shared | Time Remaining | |
| testPod | 0.00 | 0.00 | 0.00 | 23 h 55 m | 🔄 🗑️ |

2. If it has been more than 24 hours, or the pod was manually eradicated (permanently deleted), you can create a new pod with the same name and move the affected volumes into it. Then re-run array discovery.
3. Move the volumes into a new pod (or into a non-pod protection group) and re-create (or remove and re-add it to) their protection group entirely in SRM. In this case, you will need to remove any affected devices from their SRM protection groups and re-add them under a new array pair.

Check if the Pod was Moved

In the case of the pod being moved to a different array (or arrays), it is necessary to find where the pod was moved from and then update the array managers with the new FlashArray addresses.

Login to the FlashArray web interface of the array that hosted the pod originally and go to **Settings > Users > Audit Trail**.

Search for the command *purepod* and the subcommand *remove*. This will show any pod unstretches from that array. If there is a remove operation it means it was removed from that array.



| Audit Trail | | | | | |
|------------------|----------|---------|------------|---------|----------------------------------|
| Time | User | Command | Subcommand | Name | Arguments |
| All | | purepod | remove | | |
| 2020-03-07 16:19 | pureuser | purepod | remove | 2033580 | --array flasharray-m50-1 testPod |

Now search for the command *purepod* and the subcommand *add*. This will show any pod stretches from that array. If there is a add operation it means it was added to that array.

| Audit Trail | | | | | |
|------------------|----------|---------|------------|---------|----------------------------------|
| Time | User | Command | Subcommand | Name | Arguments |
| All | | purepod | add | | |
| 2020-03-07 16:16 | pureuser | purepod | add | 2033576 | --array flasharray-m50-2 testPod |
| 2020-03-06 14:50 | pureuser | purepod | add | 2033407 | --array flasharray-m50-2 testPod |
| 2020-03-03 03:08 | pureuser | purepod | add | 2033392 | --array flasharray-m50-2 testPod |

Now that you know where the pod is, follow the steps in the section, [Moving a Pod to a different FlashArray](#)

