



## **Protect datastores and virtual machines**

### **ONTAP tools for VMware vSphere 10**

NetApp

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# Protect datastores and virtual machines

## Protect using host cluster protection

ONTAP tools for VMware vSphere manages the protection of host clusters. All the datastores belonging to the selected SVM and mounted on one or more hosts of the cluster are protected under a host cluster.

### Before you begin

Ensure the following prerequisites are met:

- The host cluster has datastores only from one SVM.
- Datastore mounted on the host cluster should not be mounted on any host outside of the cluster.
- All Datastores mounted on the host cluster must be VMFS datastores with iSCSI/FC protocol. vVols, NFS, or VMFS datastores with NVMe/FC and NVMe/TCP protocols are not supported.
- FlexVol/LUN forming datastores mounted on the host cluster should not be part of any existing consistency group (CG).
- FlexVol/LUN forming datastores mounted on the host cluster should not be part of any existing SnapMirror relationship.
- The host cluster should have at least one datastore.

### Steps

1. Log in to the vSphere client
2. Right-click a host cluster and select **NetApp ONTAP tools > Protect Cluster**.
3. In the protect cluster window, the datastore type and source storage virtual machine (VM) details are auto populated. Select the datastores link to view the protected datastores.
4. Enter the **consistency group name**.
5. Select **Add Relationship**.
6. In the **Add SnapMirror Relationship** window, select the **Target storage VM** and the **Policy** type.

The policy type can be Asynchronous or AutomatedFailOverDuplex.

When you add the SnapMirror relationship as an AutomatedFailOverDuplex type policy, you must add the target storage VM as storage backend to the same vCenter where ONTAP tools for VMware vSphere is deployed.

In the AutomatedFailOverDuplex policy type, there are uniform and non-uniform host configurations. When you select the **uniform host configuration** toggle button, the host initiator group configuration is implicitly replicated on the target site. For details, refer to [Key concepts and terms](#).

7. If you choose to have a non-uniform host configuration, select the host access (source/target) for each host inside that cluster.
8. Select **Add**.
9. In the **Protect cluster** window, you cannot edit the protected cluster during the create operation. You can delete and add protection again. During the Modify host cluster protection operation, the edit option is available. You can edit or delete the relationships using the ellipsis menu options.

10. Select the **Protect** button.

A vCenter task is created with job ID details, and its progress is shown in the recent tasks panel. This is an asynchronous task; the user interface shows only the request submission status and does not wait for the task to be completed.

11. To view the protected host clusters, navigate to **NetApp ONTAP tools > Protection > Host cluster relationships**.

## Protect using SRA protection

### Enable SRA to protect datastores

ONTAP tools for VMware vSphere provides the option to enable the SRA capability to configure disaster recovery.

#### Before you begin

- You should have set up your vCenter Server instance and configured ESXi host.
- You should have deployed ONTAP tools for VMware vSphere.
- You should have downloaded the SRA Adapter `.tar.gz` file from the [NetApp Support Site](#).
- Source and destination ONTAP clusters must have the same custom SnapMirror schedules created before running the SRA workflows.

#### Steps

1. Log in to the VMware Live Site Recovery appliance management interface using the URL: `https://:<srm_ip>:5480`, and then go to Storage Replication Adapters in VMware VMware Live Site Recovery appliance management interface.
2. Select **New Adapter**.
3. Upload the `.tar.gz` installer for the SRA plug-in to VMware Live Site Recovery.
4. Rescan the adapters to verify that the details are updated on the VMware Live Site Recovery Storage Replication Adapters page.

### Configure SRA for SAN and NAS environments

You should set up the storage systems before running Storage Replication Adapter (SRA) for VMware Live Site Recovery.

#### Configure SRA for SAN environments

##### Before you begin

You should have the following programs installed on the protected site and the recovery site:

- VMware Live Site Recovery

Documentation about installing VMware Live Site Recovery is on the VMware site.

[About VMware Live Site Recovery](#)

- SRA

The adapter is installed on VMware Live Site Recovery.

### Steps

1. Verify that the primary ESXi hosts are connected to the LUNs in the primary storage system on the protected site.
2. Verify that the LUNS are in igroups that have the `ostype` option set to *VMware* on the primary storage system.
3. Verify that the ESXi hosts at the recovery site have appropriate iSCSI connectivity to the storage virtual machine (SVM). The secondary site ESXi hosts should have access to the secondary site storage, and the primary site ESXi hosts should have access to the primary site storage.

You can do this either by verifying that the ESXi hosts have local LUNs connected on the SVM or the `iscsi show initiators` command on the SVMs. Check the LUN access for the mapped LUNs in the ESXi host to verify iSCSI connectivity.

## Configure SRA for NAS environments

### Before you begin

You should have the following programs installed on the protected site and the recovery site:

- VMware Live Site Recovery

Documentation about installing VMware Live Site Recovery can be found on the VMware site.

[About VMware Live Site Recovery](#)

- SRA

The adapter is installed on VMware Live Site Recovery and the SRA server.

### Steps

1. Verify that the datastores at the protected site contain virtual machines that are registered with vCenter Server.
2. Verify that the ESXi hosts at the protected site have mounted the NFS exports volumes from the storage virtual machine (SVM).
3. Verify that valid addresses such as the IP address, host name, or FQDN on which the NFS exports are present are specified in the **NFS Addresses** field when using the Array Manager wizard to add arrays to VMware Live Site Recovery.
4. Use the `ping` command on each ESXi host at the recovery site to verify that the host has a VMkernel port that can access the IP addresses that are used to serve NFS exports from the SVM.

## Configure SRA for highly scaled environments

You should configure the storage timeout intervals per the recommended settings for Storage Replication Adapter (SRA) to perform optimally in highly scaled environments.

### Storage Provider settings

You should set the following timeout values on VMware Live Site Recovery for scaled environment:

Advanced settings	Timeout values
<code>StorageProvider.resignatureTimeout</code>	Increase the value of the setting from 900 seconds to 12000 seconds.
<code>storageProvider.hostRescanDelaySec</code>	60
<code>storageProvider.hostRescanRepeatCnt</code>	20
<code>storageProvider.hostRescanTimeoutSec</code>	Set a high value (For example: 99999)

You should also enable the `StorageProvider.autoResignatureMode` option.

Refer to [Change Storage Provider Settings](#) for more information on modifying Storage Provider settings.

## Storage settings

When you hit a timeout, increase the values of `storage.commandTimeout` and `storage.maxConcurrentCommandCnt` to a higher value.



The timeout interval specified is the maximum value. You do not need to wait for the maximum timeout to be reached. Most commands finish within the set maximum timeout interval.

Refer to [Change Storage Settings](#) for modifying SAN Provider settings.

## Configure SRA on the VMware Live Site Recovery appliance

After you have deployed the VMware Live Site Recovery appliance, you should configure SRA on the VMware Live Site Recovery appliance. The successful configuration of SRA enables the VMware Live Site Recovery appliance to communicate with SRA for disaster recovery management. You should store ONTAP tools for VMware vSphere credentials (IP address) in the VMware Live Site Recovery appliance to enable communication between VMware Live Site Recovery appliance and SRA.

### Before you begin

You should have downloaded the `tar.gz` file from [NetApp Support Site](#).

### About this task

The configuration of SRA on VMware Live Site Recovery appliance stores the SRA credentials in the VMware Live Site Recovery appliance.

### Steps

1. On the VMware Live Site Recovery appliance screen, select **Storage Replication Adapter > New Adapter**.
2. Upload the `.tar.gz` file to VMware Live Site Recovery.
3. Log in using administrator account to the VMware Live Site Recovery appliance using putty.

4. Switch to the root user using the command: `su root`
5. Run the command `cd /var/log/vmware/srm` to navigate to the log directory.
6. At the log location, enter the command to get the docker ID used by SRA: `docker ps -l`
7. To log in to the container ID, enter the command: `docker exec -it -u srm <container id> sh`
8. Configure VMware Live Site Recovery with ONTAP tools for VMware vSphere IP address and password using the command: `perl command.pl -I --otv-ip <OTV_IP>:8443 --otv-username <Application username> --otv-password <Application password> --vcenter-guid <VCENTER_GUID>'`



You need to provide the password value within single quotes to ensure that the Perl script does not read the special characters in the password as a delimiter of the input.



The application username and password is set during the ONTAP tools deployment. This is needed for VASA Provider/SRA registration.

9. Rescan the adapters to verify that the details are updated on the VMware Live Site Recovery Storage Replication Adapters page.

A success message confirming that the storage credentials are stored is displayed. SRA can communicate with SRA server using the provided IP address, port and credentials.

## Update SRA credentials

For VMware Live Site Recovery to communicate with SRA, you should update SRA credentials on the VMware Live Site Recovery server if you have modified the credentials.

### Before you begin

You should have executed the steps mentioned in the topic [Configuring SRA on VMware Live Site Recovery appliance](#).

### Steps

1. Run the following commands to delete the VMware Live Site Recovery machine folder cached ONTAP tools username password:
  - a. `sudo su <enter root password>`
  - b. `docker ps`
  - c. `docker exec -it <container_id> sh`
  - d. `cd conf/`
  - e. `rm -rf *`
2. Run the Perl command to configure SRA with the new credentials:
  - a. `cd ..`
  - b. `perl command.pl -I --otv-ip <OTV_IP>:8443 --otv-username <OTV_ADMIN_USERNAME> --otv-password <OTV_ADMIN_PASSWORD> --vcenter-guid <VCENTER_GUID>` You need to have a single quote around the password value.

A success message confirming that the storage credentials are stored is displayed. SRA can communicate with SRA server using the provided IP address, port and credentials.

## Configure protected and recovery sites

You should create protection groups to protect a group of virtual machines on the protected site.

### Configure protection groups

#### Before you begin

You should ensure that both the source and target sites are configured for the following:

- Same version of VMware Live Site Recovery installed
- Virtual machines
- Paired protected and recovery sites
- Source and destination datastores should be mounted on respective sites

#### Steps

1. Log in to vCenter Server and then select **Site Recovery > Protection Groups**.
2. In the **Protection Groups** pane, select **New**.
3. Specify a name and description for the protection group, direction and select **Next**.
4. In the **Type** field, select the **Type field option...** as Datastore groups (array-based replication) for NFS and VMFS datastore. The fault domain is nothing but SVMs with replication enabled. The SVMs that have only peering implemented and have no issues are displayed.
5. In the Replication groups tab, select either the enabled array pair or the replication groups that have the virtual machine you configured, and then select **Next**.

All the virtual machines on the replication group are added to the protection group.

6. Select either the existing recovery plan or create a new plan by selecting **Add to new recovery plan**.
7. In the Ready to complete tab, review the details of the protection group that you created, and then select **Finish**.

### Pair protected and recovery sites

You should pair the protected and recovery sites created using your vSphere Client to enable Storage Replication Adapter (SRA) to discover the storage systems.

#### Before you begin

- You should have VMware Live Site Recovery installed on the protected and recovery sites.
- You should have SRA installed on the protected and recovery sites.

#### Steps

1. Double-click **Site Recovery** on the vSphere Client home page and select **Sites**.
2. Select **Objects > Actions > Pair Sites**.
3. In the **Pair Site Recovery Manager Servers** dialog box, enter the address of the protected site's Platform Services Controller, and then select **Next**.



4. In the Select vCenter Server section, do the following:
  - a. Verify that the protected site's vCenter Server appears as a matching candidate to pair.
  - b. Enter the SSO administrative credentials, and then select **Finish**.
5. If prompted, select **Yes** to accept the security certificates.

### Result

Both the protected and recovery sites will appear in the Objects dialog box.

## Configure protected and recovery site resources

### Configure network mappings

You should configure your resource mappings like VM networks, ESXi hosts, and folders on both sites to enable the mapping of each resource from the protected site to the appropriate resource at the recovery site.

You should complete the following resource configurations:

- Network mappings
- Folder mappings
- Resource mappings
- Placeholder datastores

### Before you begin

You should have connected the protected and recovery sites.

### Steps

1. Log in to vCenter Server and select **Site Recovery > Sites**.
2. Select your protected site and select **Manage**.
3. Select **Network Mappings > New** in the manage tab to create a new network mapping.
4. In the Create Network Mapping wizard, do the following:
  - a. Select **Automatically Prepare Mappings for Networks with Matching Names** and select **Next**.
  - b. Select the required data center objects for the protected and recovery sites and select **Add Mappings**.
  - c. Select **Next** after mappings are created successfully.
  - d. Select the object used earlier to create reverse mapping, then select **Finish**.

### Result

The Network Mappings page displays the protected site resources and the recovery site resources. You can follow the same steps for other networks in your environment.

### Configure folder mappings

You should map your folders on the protected site and recovery site to enable communication between them.

### Before you begin

You should have connected the protected and recovery sites.

### Steps

1. Log in to vCenter Server and select **Site Recovery > Sites**.
2. Select your protected site and select **Manage**.
3. Select **Folder Mappings > Folder** icon in the Manage tab to create a new folder mapping.
4. In the Create Folder Mapping wizard, perform the following:
  - a. Select **Automatically Prepare Mappings for Folders with Matching Names** and select **Next**.
  - b. Select the required data center objects for the protected and recovery sites and select **Add Mappings**.
  - c. Select **Next** after mappings are created successfully.
  - d. Select the object used earlier to create reverse mapping and then select **Finish**.

### Result

The Folder Mappings page displays the protected site resources and the recovery site resources. You can follow the same steps for other networks in your environment.

### Configure resource mappings

You should map your resources on the protected site and recovery site so that virtual machines are configured to fail over into one group of hosts or the other.

### Before you begin

You should have connected the protected and recovery sites.



In VMware Live Site Recovery, resources can be resource pools, ESXi hosts, or vSphere clusters.

### Steps

1. Log in to vCenter Server and select **Site Recovery > Sites**.
2. Select your protected site and select **Manage**.
3. Select **Resource Mappings > New** in the manage tab to create a new resource mapping.
4. In the Create Resource Mapping wizard, perform the following:
  - a. Select **Automatically Prepare Mappings for Resource with Matching Names** and select **Next**.
  - b. Select the required data center objects for the protected and recovery sites and select **Add Mappings**.
  - c. Select **Next** after mappings are created successfully.
  - d. Select the object used earlier to create reverse mapping and then select **Finish**.

### Result

The Resource Mappings page displays the protected site resources and the recovery site resources. You can follow the same steps for other networks in your environment.

### Configure placeholder datastores

You should configure a placeholder datastore to hold a place in the vCenter inventory at the recovery site for the protected virtual machine (VM). The placeholder datastore does

not need to be large as the placeholder VMs are small and use only a few hundred or fewer kilobytes.

#### Before you begin

- You should have connected the protected and recovery sites.
- You should have configured your resource mappings.

#### Steps

1. Log in to vCenter Server and select **Site Recovery > Sites**.
2. Select your protected site and select **Manage**.
3. Select **Placeholder Datastores > New** in the manage tab to create a new placeholder datastore.
4. Select the appropriate datastore and select **OK**.



Placeholder datastores can be local or remote and should not be replicated.

5. Repeat steps 3 to 5 to configure a placeholder datastore for the recovery site.

#### Configure SRA using array manager

You can configure Storage Replication Adapter (SRA) by using the Array Manager wizard of VMware Live Site Recovery to enable interactions between VMware Live Site Recovery and storage virtual machines (SVMs).

#### Before you begin

- You should have paired the protected sites and recovery sites in VMware Live Site Recovery.
- You should have configured your onboarded storage before configuring the array manager.
- You should have configured and replicated the SnapMirror relationships between the protected sites and recovery sites.
- You should have enabled the SVM management LIFs to enable multitenancy.

SRA supports cluster-level management and SVM-level management. If you add storage at a cluster level, then you can discover and perform operations on all the SVMs in the cluster. If you add storage at an SVM level, then you can manage only that specific SVM.

#### Steps

1. In VMware Live Site Recovery, select **Array Managers > Add Array Manager**.
2. Enter the following information to describe the array in VMware Live Site Recovery:
  - a. Enter a name to identify the array manager in the **Display Name** field.
  - b. In the **SRA Type** field, select **NetApp Storage Replication Adapter for ONTAP**.
  - c. Enter the information to connect to the cluster or the SVM:
    - If you are connecting to a cluster, you should enter the cluster management LIF.
    - If you are connecting directly to an SVM, you should enter the IP address of the SVM management LIF.



When configuring the array manager, you should use the same connection (IP address) for the storage system that was used to onboard the storage system in ONTAP tools for VMware vSphere. For example, if the array manager configuration is SVM scoped, then the storage under ONTAP tools for VMware vSphere should be added at SVM level.

- d. If you are connecting to a cluster, enter the name of the SVM in the **SVM name** field.

You can also leave this field blank.

- e. Enter the volumes to be discovered in the **Volume include list** field.

You can enter the source volume at the protected site and the replicated destination volume at the recovery site.

For example, if you want to discover volume `src_vol1` that is in a SnapMirror relationship with volume `dst_vol1`, you should specify `src_vol1` in the protected site field and `dst_vol1` in the recovery site field.

- f. **(Optional)** Enter the volumes to be excluded from discovery in the **Volume exclude list** field.

You can enter the source volume at the protected site and the replicated destination volume at the recovery site.

For example, if you want to exclude volume `src_vol1` that is in a SnapMirror relationship with volume `dst_vol1`, you should specify `src_vol1` in the protected site field and `dst_vol1` in the recovery site field.

3. Select **Next**.

4. Verify that the array is discovered and displayed at the bottom of the Add Array Manager window and select **Finish**.

You can follow the same steps for the recovery site by using the appropriate SVM management IP addresses and credentials. On the Enable Array Pairs screen of the Add Array Manager wizard, you should verify that the correct array pair is selected, and that it shows as ready to be enabled.

## Verify replicated storage systems

You should verify that the protected site and recovery site are successfully paired after configuring Storage Replication Adapter (SRA). The replicated storage system should be discoverable by both the protected site and the recovery site.

### Before you begin

- You should have configured your storage system.
- You should have paired the protected site and recovery site by using the VMware Live Site Recovery array manager.
- You should have enabled FlexClone license and SnapMirror license before performing the test failover operation and failover operation for SRA.
- You should have the same SnapMirror policies and schedules on source and destination sites.

### Steps

1. Log in to your vCenter Server.

2. Navigate to **Site Recovery > Array Based Replication**.
3. Select the required Array Pair and verify the corresponding details.

The storage systems should be discovered at the protected site and recovery site with the Status as "Enabled".

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