

Dell EMC SRDF Adapter for VMware vCenter Site Recovery Manager

9.0

Dell EMC SRDF Adapter for VMware Site Recovery Manager Release Notes

Rev. 04
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These release notes contain supplemental information about the Dell EMC SRDF Adapter for VMware Site Recovery Manager 9.0 release. Topics include:

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Revision history

Table 1. Changes made to this document

Revision	Date	Description
01	May 7th, 2018	First release of this document.
02	May 31st, 2018	Updated document to include VMAX 950FX arrays.
03	December 7th, 2018	Removed references to Enginuity 5875.
04	June, 2020	Updated the known issues section.

Product description

Dell EMC® SRDF® Adapter 9.0 is a Storage Replication Adapter (SRA) that extends the disaster restart management functionality of VMware® vCenter™ Site Recovery Manager™ (SRM) to the Dell EMC storage environment. It allows Site Recovery Manager to automate storage-based disaster restart operations on Dell EMC arrays in an SRDF® configuration.

New and changed features

This section details functional changes, new features, and software enhancements provided in Dell EMC SRDF Adapter version 9.0. These enhancements extend the existing functionality, while providing the industry-leading technology that you expect from Dell EMC.

For information on previously released features, or any updates to this document, refer to the corresponding release notes located on Dell EMC Online Support at: <https://support.EMC.com>

Support announcements

Dell EMC lists the Service Life dates for the versions of SRDF Adapter for VMware Site Recovery Manager at: <https://support.EMC.com>.

Search by Product for **SRDF Adapter**.

New features and changes for V9.0

- Support for PowerMax 2000 and PowerMax 8000 arrays.
- Support for SRDF Metro devices with mobility ID.
- Support for Automatic target device creation for local replication in TestFailover.
- Support for test masking replica for Automatic target device in TestFailover.
- Support for executing TestFailover workflow when protected site is down.

NOTE: SRA now ignores consistency disabled state when the Global option TestFailoverForce is enabled to support Test failover workflow. SRA now uses a FORCE flag for SnapVX establish when the Global option TestFailoverForce is enabled to support Test failover workflow.

Global option TestFailoverForce should be used with caution as usage might result in establishing the SnapVX session with a FORCE flag. Snapshots established with a FORCE flag cannot be guaranteed for data consistency and so should not be used for backups or for restoring production data.

Support deprecation

The following lists the planned future support deprecation:

- VMAX 10K, VMAX 20K, VMAX 40K running with Enginuity 5876 is planned to be deprecated after Dell EMC SRA Adapter V9.1.
- Support for TimeFinder/snap is planned to be deprecated after Dell EMC SRA Adapter V9.1.


Fixed issues

The following issues are fixed in SRA V9.0:

- Re-protect now supports standalone SRDF devices belonging to multiple RA groups.
- SRA now uses device effective WWN (external WWN) if the effective WWN of the device has been set. The device effective WWN will be used by SRA to populate output XML for all VMware SRM commands which require the device WWN to be provided.

Environment and system requirements

The following requirements apply to VMAX 10K, VMAX 20K, VMAX 40K, VMAX 100K, VMAX 200K, VMAX 400K, VMAX 250F, VMAX 450F, VMAX 450FX, VMAX 850F, VMAX 850 FX, VMAX 950F, VMAX 950FX, PowerMax 2000 and PowerMax 8000 arrays:

- If the SYMAPI server is different from the server running VMware Site Recovery Manager, the SYMAPI server must be running Solutions Enabler 9.0 or higher.
- The following operating environment requirements apply:
 - VMAX 10K, VMAX 20K, and VMAX 40K arrays must be running Enginuity 5876.
 - VMAX 100K, 200K, 400K, 250F, 450F, 450FX, 850F, 850 FX, 950F and 950FX arrays must be running HYPERMAX OS 5977 or higher.
-  **NOTE: EMC SRDF Adapter Utilities (SRDF-AU) has been discontinued and is not supported for SRA 9.0.**

VMware requirements

The table below lists the SRA 9.0 requirements.

Table 2. SRA 9.0 Compatibility and interoperability matrix

VMAX platform	VMware vCenter (a)	ESX/ESXi Server (a)	VMware vCenter Site Recovery Manager (a)	VMAX Enginuity/HYPERMAX OS/PowerMax OS (b)	Solutions Enabler (d)
VMAX 10K, VMAX 20K, VMAX 40K	6.0 Update 1, 6.0 Update 2, 6.0 Update 3, 6.5, 6.5 Update 1 6.7	5.5, 5.5 Update 1, 5.5 Update 2, 5.5 Update 3, 6.0, 6.0 Update 1, 6.0 Update 2, 6.0 Update 3, 6.5, 6.5 Update 1 6.7	6.1 6.1.1 6.1.2 6.5 6.5.1 8.1	5876 (c)	9.0
VMAX 100K, VMAX 200K, VMAX 400K	6.0 Update 1, 6.0 Update 2, 6.0 Update 3, 6.5, 6.5 Update 1 6.7	5.5, 5.5 Update 1, 5.5 Update 2, 5.5 Update 3, 6.0, 6.0 Update 1, 6.0 Update 2, 6.0 Update 3, 6.5, 6.5 Update 1	6.1 6.1.1 6.1.2 6.5 6.5.1 8.1	5977	9.0

Table 2. SRA 9.0 Compatibility and interoperability matrix(continued)

VMAX platform	VMware vCenter (a)	ESX/ESXi Server (a)	VMware vCenter Site Recovery Manager (a)	VMAX Enginuity/HYPERMAX OS/PowerMax OS (b)	Solutions Enabler (d)
		6.7			
VMAX 250F, VMAX 450F, VMAX 850F, VMAX 450FX, VMAX 850FX, VMAX 950F, VMAX 950FX, PowerMax 2000, PowerMax 8000	6.0 Update 1, 6.0 Update 2, 6.0 Update 3, 6.5, 6.5 Update 1 6.7	5.5, 5.5 Update 1, 5.5 Update 2, 5.5 Update 3, 6.0, 6.0 Update 1, 6.0 Update 2, 6.0 Update 3, 6.5, 6.5 Update 1 6.7	6.1 6.1.1 6.1.2 6.5 6.5.1 8.1	5977, 5978	9.0

(a) For complete and detailed VMware supported platforms, refer to the VMware vCenter Site Recovery Manager Compatibility Matrix available on the VMware support website at: www.vmware.com/support/pubs/srm_pubs.html.

(b) Snap operations of SRDF/A R2 devices require Enginuity 5876. Device-level write pacing must be enabled before initiating the snap operations. TimeFinder/VP Snap of SRDF/A R2 devices require Enginuity 5876 or higher and device-level write pacing must be enabled before initiating the VP Snap session. TimeFinder Snap or VP Snap operation off of the Asynchronous devices in a Cascaded SRDF or Cascaded SRDF/Star configuration requires that the R21 site array be running 5876.359 or higher to support write pacing on R21 devices.

(c) Stretched Storage devices are not supported for Enginuity versions lower than 5977.

(d) SRA supports any Solutions Enabler point release or major release beyond the initially supported release. For instance, if a patched version of 9.0 became available (9.0.x) or a major release such as 10.0, either would be supported.

Known issues

This section details the known problems, performance, or functionality restrictions that may apply to your specific storage environment or host platform:

- SRA now ignores consistency disabled state when the Global option TestFailoverForce is enabled to support Test failover workflow. SRA now uses a FORCE flag for SnapVX establish when the Global option TestFailoverForce is enabled to support Test failover workflow.

Global option TestFailoverForce should be used with caution as usage might result in establishing the SnapVX session with a FORCE flag. Snapshots that are established with a FORCE flag cannot be guaranteed for data consistency and so should not be used for backups or for restoring production data.

- A TestFailover operation succeeds when SRDF consistency is disabled and the global option "TestFailoverForce" is set to Yes.
- Test failover fails for stretched devices when TestFailoverForce is enabled and SRDF pair state is not Activebias/ActiveActive.
- SRDF/Metro 3-site cascaded setups are not supported in any configuration. Only SRDF/Metro 3-site concurrent setups are supported.
- Reprotect workflow is not supported for SRDF/Metro 3 site, Failover to Async configuration. Reprotect must be done manually which may include downtime.
- Test cleanup for Timefinder/SnapVX with global option "TerminateCopySessions" set may fail if all tracks are not defined on the SnapVX target.
- Test failover for stretched devices without snapshots is not supported.
- SRDF masking for R1 stretched devices is not supported.
- Devices that are used for testing a recovery plan using TimeFinder Clone must be non-SRDF devices.
- Goldcopy backup is not supported with devices that are contained in GNS-enabled device groups.
- <AutoTargetDevice> is not supported with devices that are contained in a GNS-enabled configuration.

- A recovery operation may fail in Concurrent SYNC/Async Star configuration on VMAX 10K, 20K, and 40K systems when Star and Sync site are in protected state. The following error is reported: [SYMAPI_C_SFS_UNKNOWN : Received SFS status is not known] A retry of this operation may pass the recovery operation.
- When disaster recovery is run with the protected site down, and the R1-R2 session is in a split state, the recovery returns with warnings. Attempt a second recovery after the protected site comes back up. If the R1-R2 session is still in a split state, SRDF write disables the R1 mirror before running the recovery for the second time.
- TestFailover and Recovery operations are not supported when a composite group contains SRDF devices from multiple storage systems.
- In a disaster recovery operation, Site Recovery Manager may time out and the operation may fail when SRDF/Star configuration is in a halted state. The reason is the default timeout value is 300 s, which is too short for a disaster recovery operation when SRDF/Star configuration is in a halted state. Increase the parameter to at least 600 s in Site Recovery Manager.
- In an SRDF/Star with failover to the ASYNC target site environment, there are a few limitations to the Star operations. Once a Planned Migration or Disaster Recovery has run, the final state of Star is Unprotected. The first target site is Protected, and the second target site is Connected. If a Planned Migration or Disaster Recovery has to run again, it should be verified that the target sites are in the states that are previously mentioned. If the target sites are in a different state, you should manually get them to the required state outside of SRA.
- The SetReplicaTargetToReady option is not supported during the Reprotect operation in SRDF/Star configurations.
- Site Recovery Manager does not support the creation of protection group of a multi-extent datastore when the extents do not belong to a CG/DG.
- In Cascaded SRDF/Star environments that have been recovered to the Asynchronous target site, test failover, with or without TimeFinder ("without" means enabling the advanced setting TestFailoverWithoutLocalSnapshots) is not supported. Only full recovery back to the original workload site is supported with the SRDF Adapter.
- During a reverse replication operation (reprotect) SRA continues despite failure to enable SRDF consistency after swapping the R1/R2 devices.
- ReverseReplicationDuringRecovery is not supported for Star configurations.
- ReverseReplicationDuringRecovery is not supported for Disaster recovery scenarios. Ensure that this option is disabled before performing disaster recovery operations or it may result in undefined behavior.
- If Star is not protected at the end of the Recovery operation and none of the sites are in disconnected state, manually protect or enable Star and then run Reprotect at the synchronous site.
- In a 3-site concurrent Sync/Sync configuration, the SRDF pairs must be created in a specific order. The first SRDF pair that is created must always be the SRDF pair between the Site Recovery Manager protected site and the Site Recovery Manager recovery site. If not, SRA fails to discover the Sync/Sync concurrent configuration.
- If SRDF consistency is enabled using SRDF group names at R11 and R21 in non-Star concurrent and cascaded configurations, SRA fails to perform reverse replication.
- When disaster recovery is run with only compute resources down at the Site Recovery Manager protected site (that is, storage resources are not down), a Refresh operation must be performed from within the Site Recovery Manager Array Manager before performing a Reprotect operation.
- When SRA uses TestFailoverWithoutLocalSnapshots to test a cascaded SRDF configuration (non-Star) to the Sync site, it does not suspend the hop2 link. This propagates all the changes that are made during the test of the sync devices to the third site removing any protection against failure. It is recommended not to use TestFailoverWithoutLocalSnapshots in this environment.
- TestFailover is not supported with SRDF/S configurations when the SRDF devices (part of the same recovery plan) belong to multiple SRDF groups and no composite group (CG) has been created.
- TestFailover is not supported with the global option TestFailoverWithoutLocalSnapshots enabled when testing in a disconnected state.

Limitations

There are no limitations in this release.

Installation

This section explains how to install and configure the SRDF Adapter.

The SRDF Adapter software must be installed on both the protected and recovery servers.

Before you begin

Before you begin installing SRDF Adapter, verify that:

- The pair of PowerMax/VMAX arrays are running the appropriate version of PowerMax OS, the VMware vCenter Site Recovery Manager servers are running the appropriate version of Solutions Enabler, and the SYMAPI servers (if any) are running the appropriate version of Solutions Enabler. For more information, refer to “Environment and system requirements” on page 3.
- The PowerMax/VMAX arrays for each protected VMware vCenter data center are locally defined to one or more hosts, and that these hosts are configured with Solutions Enabler client/server.
- Consistency protection is enabled at the protection site. You can do this by adding the SRDF devices to the device groups or composite groups. The corresponding remote devices must be added to a device group/composite group at the recovery site. Consistency groups are required even if there is only one device to be added to the group.
- The SRDF/Star configuration is set up before installation.

Installing SRDF Adapter

About this task

To install SRDF Adapter:

Steps

1. Download the SRDF Adapter zip file from the VMware website.
2. Unzip the file and run the .exe file.
3. In the **Welcome** dialog box, click **Next**.
4. In the **License Agreement** dialog box, click **I accept the terms in the license agreement** and then click **Next**.
5. In the **Ready to Install Program** dialog, click **Install**.
6. In the **EMC SRDF SRA Wizard Completed** dialog box, click **Finish**.

Upgrading SRDF Adapter

Upgrading from SRA 5.6.x

Before upgrading SRDF Adapter to version 9.0, ensure that VMware vCenter Site Recovery Manager and vCenter have been upgraded to their respective versions. While installing SRDF Adapter 9.0, select Upgrade and complete the installation.

EMC SRDF Adapter 9.0 provides the following options files:

- EmcSrdfSraGlobalOptions.xml
- EmcSrdfSraTestFailoverConfig.xml
- EmcSrdfSraRecoverySiteGoldcopyConfig.xml
- EmcSrdfSraProtectionSiteGoldcopyConfig.xml
- EMCSrdfSraDeviceMaskingControl.xml

If any of the options files for SRDF Adapter 5.6.x were modified either manually, or using EMC Storage Viewer or EMC Virtual Storage Integrator, re-populate these files after the upgrade. The old options file, renamed as `EmcSrdfSraGlobalOptions.xml_bak` will still be available for reference in the new SRA data directory under the common application data folder defined by the following registry key:

```
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Explorer\Shell Folders\Common AppData
```

After installation and upgrade, rescan SRAs on both sites and ensure that the SRA status is OK.

Upgrading from SRA 5.5.x, or lower versions

SRA 9.0 does not allow upgrade from SRA 5.5.x or lower versions. The installer allows you to back up the configuration files if the previous SRA kit is already installed on the server.

When attempting to upgrade from a 32-bit SRA (version lower than SRA 5.6) kit to a SRA 9.0 kit, the installer displays the following EMC SRDF Adapter warning message:

```
32 bit SRA kit already installed on this host and SRA 9.0(64 bit) does
not support upgrade. So please follow below instructions.
- Click YES to take backup of all Config files.
- Click NO to abort installation without backup of all config files.
- After above steps click Cancel or Finish to Abort installation.
- Uninstall previously installed SRA from host and then install SRA 9.0
kit.
```

Uninstall the existing version of SRA and then install SRA 9.0.

 **NOTE:** The config files backup is saved to `ProgramData\EMC\EmcSrdfSra\Config\`

Registry key

About this task

After you have successfully installed the adapter, the installation program creates the **EMC SRDF Adapter** registration key under `HKEY_LOCAL_MACHINE\SOFTWARE\EMC`.

The following values are under the **EMC SRDF Adapter** key:

- **InstallPath:** Refers to the location of `command.pl`.
- **Version:** Contains the version of the adapter that verifies the integrity of your installation.

To verify the integrity of your SRDF Adapter installation, use the **md5sums** checksum utility:

Steps

1. Download and install the **md5sum.exe**. Remember to set up the PATH environment variable to point to the location of the executable, which can be found under: `SRM_install_dir\storage\sra\EMC Symmetrix`
The default path for `SRM_install_dir` is `C:\Program Files\VMware\VMware vCenter Site Recovery Manager`.
2. Open the Windows command prompt and change the directory to the SRDF Adapter installation directory. Its default location is: `SRM_install_dir\storage\sra\EMC Symmetrix`
3. Type the following command: `md5sum EmcSrdfSra.exe`
The checksum of the indicated file appears.
4. Verify the output against the output included in the `md5checksums.txt` file in the installation directory.

Configuring SRDF Adapter

This section provides the procedures for configuring SRDF Adapter to work with Site Recovery Manager.

Configuring a locally attached PowerMax array

When configuring a PowerMax array that is locally attached to the server running VMware vCenter Site Recovery Manager, specify Local in the SYMAPI Server field in the Array Manager configuration wizard of VMware Site Recovery Manager.

Configuring for SYMAPI client/server support

SRDF Adapter requires the use of `SYMAPI Server [:Port]` format in the Array Manager configuration wizard, where `SYMAPI Server` can be either an IP address, or the name of the host machine where the SYMAPI server is running.

To configure the SYMAPI server on a non-default port, the port number is specified in the above format. If a port number is not specified, the adapter uses the default port number 2707.

For example:

`SERVER.lss.emc.com:2708` or `192.168.10.1:2708` (non-default port)

or

`SERVER.lss.emc.com` or `192.168.10.1` (default port)

To change the security level of the SYMAPI sever connection, use the Solutions Enabler options file located in the C:\Program Files\EMC\SYMAPI\Config directory. This option must be set prior to starting the adapter.

Additional configuration guidelines

Consider the following when configuring devices used by the SRDF Adapter:

- The R1 devices being protected must be defined as ReadWrite, and the corresponding R2 devices must be defined as WriteDisabled, not NotReady.
- Devices must be defined as dynamic SRDF capable.
- Larger environments may need the storage timeout increased.
- Device-level write pacing must be enabled to take TimeFinder snaps or TimeFinder VP snaps off of SRDF/A R2 devices for VMAX 10K, VMAX 20K, and VMAX 40K arrays.

Cascaded and concurrent configurations

Follow the guidelines in the table below for cascaded and concurrent configurations.

Table 3. Concurrent and cascaded configurations

Three site (initial configuration)		Three site (after reprotect)		
R1 -> R2 (1st mirror)	R11 -> R2 (2nd mirror)	R1 -> R21 (1st mirror)	R21 -> R2 (2nd mirror)	vCenter Site Recovery Manager Recovery Site
Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous
Synchronous	Asynchronous	Adaptive Copy - DISK	Asynchronous	Asynchronous
Synchronous	Adaptive Copy - DISK	Synchronous	Adaptive Copy - DISK	Synchronous
Synchronous	Adaptive Copy - WP VMAX 10K, 20K, and 40K only. This configuration (WP) is not supported on VMAX All Flash and PowerMax arrays.	Synchronous	Adaptive Copy - DISK	Synchronous
Synchronous	Synchronous	Synchronous	Adaptive Copy - DISK	Synchronous
Asynchronous	Asynchronous	Asynchronous	Adaptive Copy - DISK	Asynchronous
Asynchronous	Adaptive Copy - DISK	Asynchronous	Adaptive Copy - DISK	Asynchronous
Asynchronous	Adaptive Copy - WP VMAX 10K, 20K, and 40K only. This configuration (WP) is not supported on VMAX All Flash and PowerMax arrays.	Asynchronous	Adaptive Copy - DISK	Asynchronous
R1 -> R21 (1st mirror)	R21 -> R2 (2nd mirror)	R11 -> R2 (1st mirror)	R11 -> R2 (2nd mirror)	vCenter Site Recovery Manager Recovery Site
Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous
Synchronous	Adaptive Copy - DISK	Synchronous	Adaptive Copy - DISK	Synchronous
Asynchronous	Adaptive Copy - DISK	Asynchronous	Adaptive Copy - DISK	Asynchronous
R1 -> R21(1st mirror)	R21 -> R2 (2nd mirror)	R1 -> R21 (1st mirror)	R21 -> R2 (2nd mirror)	vCenter Site Recovery Manager Recovery Site

Table 3. Concurrent and cascaded configurations (continued)

Three site (initial configuration)		Three site (after reprotect)		
Synchronous	Asynchronous	N/A	N/A	Asynchronous (In this scenario, Reprotect is not supported. The user is required to manually fail back to the original site.)

Configuring SRDF/Star

SRDF/Star is a data-protection and failure-recovery solution that covers three geographically dispersed data centers in a triangular topology.

Consider the following when configuring SRDF/Star:

- Reconfiguration of the SRDF/Star topology from Concurrent to Cascaded, and from Cascaded to Concurrent, is not a supported workflow. If reconfiguration is needed, it has to be done outside SRA.
- The SRDF/Star commands in SRA might take multiple hours. It depends on the amount of replication data.
- SRA supports the following valid SRDF/Star states for device discovery:

Table 4. Valid SRDF/Star states for device discovery

SRDF/Star state	Sync target site state	Async target site state
Protected	Protected	Protected
Tripped	PathFailed	PathFailed
Tripped	PathFailed	Protected
Tripped	Protected	PathFailed
Unprotected	Disconnected	Protected
Unprotected	Connected	Protected
Unprotected	Protected	Protected
Unprotected	Halted	Halted
Unprotected	Isolated	Protected
Unprotected	Protected	Isolated
Unprotected	Isolated	Disconnected

- SRA supports the following SRDF/Star states for vCenter Site Recovery Manager operations, such as Recovery and Test Recovery:

Table 5. Valid SRDF/Star states for recovery and test recovery operations for sync target site

SRDF/Star state	Sync target site state	Async target site state
Protected	Protected	Protected
Tripped	PathFailed	PathFailed
Tripped	PathFailed	Protected
Tripped	Protected	PathFailed

- Only if site A is down, or partitioned from site B, can the mode of operation change from Cascaded Star to Concurrent Star. To return the configuration to its original Cascaded Star mode, a reconfiguration, outside of SRA, is required.

Table 6. Valid SRDF/Star states for recovery and test recovery operations for async target site

SRDF/Star State	1st Target site state	2nd Target site state
Protected	Protected	Protected

Table 6. Valid SRDF/Star states for recovery and test recovery operations for async target site (continued)

SRDF/Star State	1st Target site state	2nd Target site state
Tripped	PathFailed	PathFailed
Tripped	PathFailed	Protected
Tripped	Protected	PathFailed
Unprotected	Protected	Connected

- Only if Site B is down, can the mode of operation change from Cascaded Star to Concurrent Star. To return the configuration to its original Cascaded Star mode, a reconfiguration, outside of SRA, is required.

Uninstalling SRDF Adapter

About this task

To uninstall SRDF Adapter:

Steps

1. From the Windows **Start** menu, select **Settings > Control Panel > Add/Remove Programs**.
2. In the **Add/Remove Programs** dialog box, select **EMC SRDF Adapter**, and click **Remove**.

Software media, organization, and files

The EMC SRDF Adapter version 9.0 software and these release notes can be downloaded from the VMware website: <https://my.vmware.com/web/vmware/downloads>

The SRDF Adapter is distributed as a zip file, which contains two files: These release notes and the software installer.

Documentation

This section lists the supporting documentation for SRDF Adapter.

Dell EMC documentation

The following documents are available on the Dell EMC online support website:

- *The Dell EMC Solutions Enabler Installation Guide* contains helpful information for configuring the SRDF Adapter.
- *The Dell EMC Solutions Enabler SRDF Family CLI Product Guide* contains helpful information for performing a failback operation.
- *The SRDF SRA Tech Book*.
- White Paper: *EMC Business Continuity for VMware View Enabled by EMC SRDF/S and VMware vCenter Site Recovery Manager - A Detailed Review*.

VMware documentation

VMware documentation is available on the VMware support website at <http://www.vmware.com/products/site-recovery-manager/> and www.vmware.com/support/pubs/srm_pubs.html.

- VMware vCenter Site Recovery Manager Documentation.
- Site Recovery Manager Storage Partner Compatibility Matrix.

Technical notes

This section provides technical information on the SRDF Adapter.

Setting log levels

To set the log levels for SRDF Adapter in the VMware vCenter Site Recovery Manager environment, the following XML tags should be added to the `vmware-dr.xml`:

```
<level id="Storage">
<logName>Storage</logName>
<logLevel>verbose</logLevel>
</level>
<level id="SraCommand">
<logName>SraCommand</logName>
<logLevel>verbose</logLevel>
</level>
```

Restart the Site Recovery Manager service for these settings to take effect.

SYMAPI debug log

In Solutions Enabler, the variable `permit_symapi_debug` is available for the `storsrvd` daemon. The value can be:

- **SERVER**: The default value.
- **CLIENT**: For collecting SYMAPI debug logs with EMC SRDF Adapter.

The debug logs are generated in the following folder: `SYMAPI\logs\debug`. SRA tries to create the SYMAPI debug log at the SYMAPI server being used. If you want to collect the SYMAPI debug logs with Solution Enabler, first set the variable `permit_symapi_debug` to **CLIENT** at the SYMAPI server. For more information, refer to the *EMC Solutions Enabler Command Reference Guide*.

EmcSrdfSra command

This section presents the syntactical form with argument and option descriptions for the `EmcSrdfSra` command.

Syntax

```
EmcSrdfSra [-env | -version]
```

Description

This command provides the application interface to EMC SRDF Adapter. Its compound actions perform the necessary commands, in the proper order, to allow Site Recovery Manager to manage the recovery environment for PowerMax arrays. This command is normally invoked directly by Site Recovery Manager.

Arguments

STDIN

The normal command options passing method scheme used by Site Recovery Manager.

Options

`-env`

Displays the option settings from the options files. If the options are not specified in the options files, the adapter displays the default options.

`-version`

Returns the installed `EmcSrdfSra` version.

Options files

EMC SRDF Adapter provides the following options files under the folder `ProgramData\EMC\EmcSrdfSra\Config`:

- `EmcSrdfSraGlobalOptions.xml`
- `EmcSrdfSraTestFailoverConfig.xml`
- `EmcSrdfSraProtectionSiteGoldCopyConfig.xml`
- `EmcSrdfSraRecoverySiteGoldCopyConfig.xml`
- `EmcSrdfSraDeviceMaskingControl.xml`

The options files are XML based. The options can be set to control some of the adapter features. A Document Type Definition (DTD) is a set of instructions that states which tags are usable and which (re)actions are created.

The following DTDs provide the definitions of all options files.

EmcSrdfSraGlobalOptions.xml

EmcSrdfSraGlobalOptions.xml comes pre-filled with default values. In most cases, these values do not need to be changed. However, if you need to change any of the default values, it is recommended that you understand the consequence of those changes before proceeding.

The following DTD describes EmcSrdfSraGlobalOptions.xml:

```
<!ELEMENT EmcSrdfSraGlobalOptions (Version?, SymapiDebug,
TestFailoverForce, TestFailoverWithoutLocalSnapshots, TerminateCopySessions,
FailoverIfGoldCopyFails, IgnoreActivatedSnapshots, FilterNonVmwareDevices,
CheckForVirtualDisks, FailoverToAsyncSite, SetReplicaTargetToReady,
TestReplicaMaskingControl, RdfDeviceMaskingControl, ReverseReplicationDuringRecovery)>
<!ELEMENT Version (#PCDATA)>
<!ELEMENT SymapiDebug (#PCDATA)>
<!ELEMENT TestFailoverForce (#PCDATA)>
<!ELEMENT TestFailoverWithoutLocalSnapshots (#PCDATA)>
<!ELEMENT TerminateCopySessions (#PCDATA)>
<!ELEMENT FailoverIfGoldCopyFails (#PCDATA)>
<!ELEMENT IgnoreActivatedSnapshots (#PCDATA)>
<!ELEMENT FilterNonVmwareDevices (#PCDATA)>
<!ELEMENT CheckForVirtualDisks (#PCDATA)>
<!ELEMENT SetReplicaTargetToReady (#PCDATA)>
<!ELEMENT TestReplicaMaskingControl (#PCDATA)>
<!ELEMENT RdfDeviceMaskingControl (#PCDATA)>
<!ELEMENT ReverseReplicationDuringRecovery (#PCDATA)>
<!ELEMENT FailoverToAsyncSite (#PCDATA)>
<!ELEMENT IgnoreDisconnectedStar (#PCDATA)>
<!ELEMENT AutoTargetDevice (#PCDATA)>
<!ELEMENT AutoTargetDeviceReuse (#PCDATA)>
```

The following is an example of EmcSrdfSraGlobalOptions.xml:

```
<?xml version="1.0" encoding="UTF-8"?>
<EmcSrdfSraGlobalOptions>
  <Version>9.0</Version>
  <SymapiDebug>0</SymapiDebug>
  <TestFailoverForce>No</TestFailoverForce>
  <TerminateCopySessions>No</TerminateCopySessions>
  <TestFailoverWithoutLocalSnapshots>No</TestFailoverWithoutLocalSnapshots>
  <FailoverIfGoldCopyFails>Yes</FailoverIfGoldCopyFails>
  <IgnoreActivatedSnapshots>No</IgnoreActivatedSnapshots>
  <FilterNonVmwareDevices>Yes</FilterNonVmwareDevices>
  <CheckForVirtualDisks>No</CheckForVirtualDisks>
  <FailoverToAsyncSite>No</FailoverToAsyncSite>
  <SetReplicaTargetToReady>No</SetReplicaTargetToReady>
  <TestReplicaMaskingControl>No</TestReplicaMaskingControl>
  <RdfDeviceMaskingControl>No</RdfDeviceMaskingControl>
  <ReverseReplicationDuringRecovery>No</ReverseReplicationDuringRecovery>
  <IgnoreDisconnectedStar>No</IgnoreDisconnectedStar>
  <AutoTargetDevice>No</AutoTargetDevice>
  <AutoTargetDeviceReuse>Yes</AutoTargetDeviceReuse>
</EmcSrdfSraGlobalOptions>
```

The following section describes the options in EmcSrdfSraGlobalOptions.xml.

SymapiDebug

Specifies whether SYMAPI debug logging is enabled. This option can be set either to 1 or 0. When set to 1, SYMAPI debug logging is enabled. By default this option is disabled. The name of the SYMAPI debug log file is SYMAPI_debug_<YYYYMMDD>.log.

For example:

```
<SymapiDebug>1</SymapiDebug>
```

TestFailoverForce

Forces the test failover operation to proceed regardless of the state of the SRDF link (the only exception is transmit idle). The possible values for this option are YES and NO. By default, the value is set to NO.

For example:

```
<TestFailoverForce>NO</TestFailoverForce>
```

TestFailoverWithoutLocalSnapshots

Performs a test failover operation directly off of R2 devices without a need to use local TimeFinder replica devices. In case of SRDF/Star, the target site is Isolated when this option is enabled. During Cleanup, the Isolated site is connected back. The possible values are YES and NO. By default, the value is set to NO.

For example:

```
<TestFailoverWithoutLocalSnapshots>NO</TestFailoverWithoutLocalSnapshots>
```

TerminateCopySessions

Forces the test failover operation to terminate the clone snap and VP Snap sessions when the test failover operation resets storage. When this option is enabled, SRA removes the devices from the device group or composite group during cleanup. The possible values are YES and NO. By default, the value is set to NO.

For example:

```
<TerminateCopySessions>NO</TerminateCopySessions>
```

FailoverIfGoldCopyFails

When the goldcopy backup operation fails prior to failover, this option can be set or unset if failover of the LUNs is desired. The possible values for this option are YES and NO. By default, the value is set to YES.

For example:

```
<FailoverIfGoldCopyFails>YES</FailoverIfGoldCopyFails>
```

IgnoreActivatedSnapshots

Ignores activated TimeFinder Snap snapshot, TimeFinder clone, or TimeFinder VP snap sessions and allows the test failover operation to complete successfully. In the case of SRDF/Star, Isolated target site is ignored when this option is enabled. The possible values are YES and NO. By default, the value is NO.

For example:

```
<IgnoreActivatedSnapshots>NO</IgnoreActivatedSnapshots>
```

FilterNonVmwareDevices

Filters out all the SRDF devices that are not visible to VMware environment. This must be set to the same value at both sites. The possible values are YES and NO. By default, the value is set to Yes.

For example:

```
<FilterNonVmwareDevices>YES</FilterNonVmwareDevices>
```

CheckForVirtualDisks

Checks if the target TimeFinder devices for test failover or goldcopy are already used VMware environment as virtual disks (Raw device mappings or Flat virtual disks). The possible values are YES and NO. By default, the value is set to No.

For example:

```
<CheckForVirtualDisks>NO</CheckForVirtualDisks>
```

NOTE: **FilterNonVmwareDevices** and **CheckForVirtualDisks** options require VMware vCenter user credentials configured in the local Solutions Enabler authorization table. Make sure you have the right credentials configured using SYMCLI. For instructions on this process, please refer to *Using EMC SRDF Adapter for VMware Site Recovery Manager* which is available on <https://support.EMC.com>.

FailoverToAsyncSite

Performs recovery operations between the sites connected with SRDF/A link. This option is applicable only when SRDF/Star and 3 site configurations are used in the Site Recovery Manager environment. The possible values are YES and NO. By default, the value is set to No. This option requires the same value set at the both site.

For example:

```
<FailoverToAsyncSite>No</FailoverToAsyncSite>
```

SetReplicaTargetToReady

Tries to set the target SRDF device to Ready state. For `TestFailoverWithoutLocalSnapshots`, the target SRDF device is set back to Not Ready during cleanup. For the Recovery operation, the source device will be set to Not Ready after the Reprotect. The possible values are YES and NO. By default, the value is set to No.

For example:

```
<SetReplicaTargetToReady>No</SetReplicaTargetToReady>
```

ReverseReplicationDuringRecovery

When enabled SRA tries to reverse the replication direction at the end of the recovery operation. This is supported only in planned migration recovery. This option should be disabled for Disaster recovery. Also this is not supported in Star configurations. The possible values are YES and NO. By default, the value is set to NO.

For example:

```
<ReverseReplicationDuringRecovery>Yes</ReverseReplicationDuringRecovery>
```

RdfDeviceMaskingControl

When enabled:

1. During a planned recovery operation, RDF1 devices are masked to the protected site and RDF2 devices are unmasked (made visible) to the recovery site.
2. During a disaster recovery operation, RDF1 devices may or may not be masked to the protected site, based on the availability of Site Recovery Manager server, and RDF2 devices are unmasked (made visible) to the recovery site.

This option uses the masking view information provided in `EmcSrdfSraDeviceMaskingControl.xml` file. Possible values are YES and NO. By default, the value is set to No.

For example:

```
<RdfDeviceMaskingControl>No</RdfDeviceMaskingControl>
```

TestReplicaMaskingControl

When enabled, SRA tries to mask or unmask the TimeFinder devices and RDF2 devices (if `TestFailoverWithoutLocalSnapshots` is enabled) to the recovery site. This option is only applicable to test recovery operations. Possible values are YES and NO. By default, the value is set to No.

For example:

```
<TestReplicaMaskingControl>No</TestReplicaMaskingControl>
```

IgnoreDisconnectedStar

When enabled (set to YES), SRA does not try to bring up any Star configuration (even the ones protected by Site Recovery Manager) irrespective of the state of the Star. By default, this option is set to NO, which means that SRA tries to bring up the Star during discover devices.

For example:

```
<IgnoreDisconnectedStar>No</IgnoreDisconnectedStar>
```

AutoTargetDevice

When this option is enabled, SRA creates target devices dynamically to link snapshots during a Test operation. By default, these devices present to the same hosts to which corresponding R2 devices are visible. To present these dynamically created target devices to a different host, set the corresponding R2 device as a placeholder in `EmcSrdfSraMaskingControl.xml` file under `SrcDeviceList` tag.

For example:

```
<MaskView>
  <ArrayId> ArrayID </ArrayId>
  <StorageGroup> Storage Group</StorageGroup>
  <SrcDeviceList>
    <Device>R2 devices set as placeholder for dynamically created target device</Device>
  </SrcDeviceList>
</MaskView>
```

Also when this option is enabled, these target devices would be unrepresented from hosts as well as deleted during a Cleanup operation (if the `AutoTargetDeviceReuse` global option is not set).

This release supports ONLY SnapVX copy type for the dynamic target devices. By default copy mode is NOCOPY when no valid `CopyInfoBlock` is found in the `EmcSrdfSraTestFailoverConfig.xml` file. To use copy mode as COPY, `EmcSrdfSraTestFailoverConfig.xml` should be filled with valid `CopyInfoBlock`, leaving Target tags empty in `DevicePairs`.

For example:

```
<AutoTargetDevice>No</AutoTargetDevice>
```

AutoTargetDeviceReuse

When enabled along with AutoTargetDevice, SRA retains dynamically created target devices and adds the source to target mapping in the EmcSrdfSraTestFailoverConfig.xml file. SRA will reuse these devices in subsequent operations until a Cleanup operation is called with disabled AutoTargetDeviceReuse which also removes mapping from the EmcSrdfSraTestFailoverConfig.xml file. Whenever SRA modifies EMCSrdfSraTestFailoverConfig.xml content, the original file content will be preserved by adding the suffix ".EMCSRDFSRA.bak_YYMMDDhhmmssuuu" to the original file where year is YY, month is MM, date is DD, hour is hh, minutes are mm, seconds are ss and microseconds are uuu.

For example:

```
<AutoTargetDeviceReuse>Yes</AutoTargetDeviceReuse>
```

Notes on using AutoTargetDevice and AutoTargetDeviceReuse:

- Enabling AutoTargetDevice can cause a conflict when both TerminateCopySession and AutoTargetDeviceReuse are disabled. This is due to a disabled TerminateCopySession preserve session between a snapshot and a target device that makes dynamic target devices undeletable and AutoTargetDeviceReuse disable tried to delete these devices when Cleanup is called. To resolve this, either TerminateCopySession must be enabled to make sure dynamically created devices can be deleted in Cleanup or else turn on AutoTargetDeviceReuse enable so that a Cleanup operation does not delete target devices.
- SRA fails when AutoTargetDeviceReuse is enabled but AutoTargetDevice is disabled as an invalid configuration. To fix this, AutoTargetDevice must be enabled to create target devices first and then enabled AutoTargetDeviceReuse is a valid configuration to retain those target devices.
- The creation and deletion of devices is an expensive operation in terms of time and may lead to SRM timeout. This can be fixed by adjusting the SRM timeout to a suitable value.
- SRA fails on Test and Cleanup operations when the CopyInfoBlock of the EmcSrdfSraTestFailoverConfig.xml file contains partially-filled Target tags. Either all Target tags should be empty or all should be filled (by SRA when Test successful completed and AutoTargetDeviceReuse is enabled). To avoid this issue, the EmcSrdfSraTestFailoverConfig.xml file can be deleted or renamed.
- SRA fails on Test and Cleanup operations when the CopyInfoBlock of the EmcSrdfSraTestFailoverConfig.xml file contains non-empty Targets (filled manually) and AutoTargetDevice is enabled. To fix this, the EmcSrdfSraTestFailoverConfig.xml file should be move/renamed to use the AutoTargetDevice feature.
- If devices in the SRM replication plan are a subset of the CopyInfoBlock device list, then target devices would be created for all R2 devices present in CopyInfoBlock. These devices will be deleted when a Cleanup operation is called with AutoTargetDeviceReuse disabled.

EmcSrdfSraTestFailoverConfig.xml

This file is used to specify device pairs for test failover operations.

The following Document Type Definition (DTD) describes EmcSrdfSraTestFailoverConfig.xml:

```
<!ELEMENT TestFailoverInfo (Version?, CopyInfo+)>
<!ELEMENT Version (#PCDATA)>
<!ELEMENT CopyInfo (ArrayId?, CopyType?, SavePoolName?, DeviceList?, CopyMode?)>
<!ELEMENT ArrayId (#PCDATA)>
<!ELEMENT CopyType (#PCDATA)>
<!ELEMENT CopyMode (#PCDATA)>
<!ELEMENT SavePoolName (#PCDATA)>
<!ELEMENT DeviceList (DevicePair+)>
<!ELEMENT DevicePair (Source, Target)>
<!ELEMENT Source (#PCDATA)>
<!ELEMENT Target (#PCDATA)>
```

The following is an example of EmcSrdfSraTestFailoverConfig.xml:

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<TestFailoverInfo>
  <Version>9.0</Version>
  <CopyInfo>
    <ArrayId>000190300186</ArrayId>
    <CopyType>SNAP</CopyType>
    <CopyMode>NOCOPY</CopyMode>
  <SavePoolName>SRA</SavePoolName>
  <DeviceList>
    <DevicePair>
      <Source>4D8</Source>
      <Target>4DE</Target>
    </DevicePair>
    <DevicePair>
```

```

        <Source>4D9</Source>
        <Target>4DF</Target>
    </DevicePair>
</DeviceList>
</CopyInfo>
</TestFailoverInfo>

```

The following section describes the options in `EmcSrdfSraTestFailoverConfig.xml`.

TestFailoverInfo

Contains all of the elements for the test failover operations.

CopyInfo

The CopyInfo element defines device pairs for a specific copy type on a PowerMax array.

ArrayId

You can specify multiple CopyInfo blocks within TestFailoverInfo or GoldCopyInfo with different array IDs.

For example:

```
<ArrayId>000190300186</ArrayId>
```

CopyType

Specifies the type of replication technology for the test failover or goldcopy operation. The possible values are VSE (TimeFinder/VP Snap), clone, snap (only for VMAX 10K, 20K, and 40K arrays) and SnapVx (only for VMAX 100K, 200K, and 400K arrays).

For example:

```
<CopyType>CLONE</CopyType>
```

CopyMode

Specifies the type of the data copy used in the TimeFinder SnapVX replication. This is applicable only to the TimeFinder SnapVX replication technologies. The possible values are COPY and NOCOPY.

For example:

```
<CopyMode>COPY</CopyMode>
```

SavePoolName

Specifies the save pool name. If the copy type selected is snap, this option is required to create a snap session.

For example:

```
<SavePoolName>SRA_SAVE_POOL</SavePoolName>
```

DeviceList

Specifies the device pair information. This is necessary to perform the test failover operation. Each device pair represents source and target device pairs. For all copy types, the source device is the R2 device on the recovery site. For VSE type, the targets are TDEV devices. For clone types, the target devices are the clone targets, and for snap types, the target devices are the VDEVs. For SnapVX types, the target devices are TDEV devices.

For example:

```

<DeviceList>
  <DevicePair>
    <Source>4D8</Source>
    <Target>4DC</Target>
  </DevicePair>
  <DevicePair>
    <Source>4D9</Source>
    <Target>4DD</Target>
  </DevicePair>
</DeviceList>

```

EmcSrdfSraProtectionSiteGoldcopyConfig.xml

This file is used to specify device pairs for protection site goldcopy backup operations.

The following DTD describes `EmcSrdfSraProtectionSiteGoldcopyConfig.xml`:

```

<!ELEMENT ProtectionSiteGoldcopyInfo (Version?, CopyInfo+)>
<!ELEMENT Version (#PCDATA)>

```



```

<!ELEMENT CopyInfo (ArrayId?, CopyType?, SavePoolName?, DeviceList?, CopyMode?)>
<!ELEMENT ArrayId (#PCDATA)>
<!ELEMENT CopyType (#PCDATA)>
<!ELEMENT CopyMode (#PCDATA)>
<!ELEMENT SavePoolName (#PCDATA)>
<!ELEMENT DeviceList (DevicePair+)>
<!ELEMENT DevicePair (Source, Target)>
<!ELEMENT Source (#PCDATA)>
<!ELEMENT Target (#PCDATA)>

```

The following is an example of `EmcSrdfSraProtectionSiteGoldcopyConfig.xml`:

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<ProtectionSiteGoldcopyInfo>
  <Version>9.0</Version>
  <CopyInfo>
    <ArrayId>000190300186</ArrayId>
    <CopyType>CLONE</CopyType>
    <CopyMode>NOCOPY</CopyMode>
    <SavePoolName></SavePoolName>
    <DeviceList>
      <DevicePair>
        <Source>4D8</Source>
        <Target>4DC</Target>
      </DevicePair>
      <DevicePair>
        <Source>4D9</Source>
        <Target>4DD</Target>
      </DevicePair>
    </DeviceList>
  </CopyInfo>
</ProtectionSiteGoldCopyInfo>

```

The options in `EmcSrdfSraProtectionSiteGoldCopyConfig.xml` are the same as those for `EmcSrdfSraTestFailoverConfig.xml`.

EmcSrdfSraRecoverySiteGoldcopyConfig.xml

This file is used to specify device pairs for recovery site goldcopy backup operations.

The following DTD describes `EmcSrdfSraRecoverySiteGoldcopyConfig.xml`:

```

<!ELEMENT RecoverySiteGoldcopyInfo (Version?, CopyInfo+)>
<!ELEMENT Version (#PCDATA)>
<!ELEMENT CopyInfo (ArrayId?, CopyType?, SavePoolName?, DeviceList?, CopyMode?)>
<!ELEMENT ArrayId (#PCDATA)>
<!ELEMENT CopyType (#PCDATA)>
<!ELEMENT CopyMode (#PCDATA)>
<!ELEMENT SavePoolName (#PCDATA)>
<!ELEMENT DeviceList (DevicePair+)>
<!ELEMENT DevicePair (Source, Target)>
<!ELEMENT Source (#PCDATA)>
<!ELEMENT Target (#PCDATA)>

```

The following is an example of `EmcSrdfSraRecoverySiteGoldcopyConfig.xml`:

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<RecoverySiteGoldcopyInfo>
  <Version>9.0</Version>
  <CopyInfo>
    <ArrayId>000190300186</ArrayId>
    <CopyType>CLONE</CopyType>
    <CopyMode>NOCOPY</CopyMode>
    <SavePoolName></SavePoolName>
    <DeviceList>
      <DevicePair>
        <Source>4D8</Source>
        <Target>4DC</Target>
      </DevicePair>
      <DevicePair>
        <Source>4D9</Source>
        <Target>4DD</Target>
      </DevicePair>
    </DeviceList>
  </CopyInfo>
</RecoverySiteGoldCopyInfo>

```

```

        </DevicePair>
    </DeviceList>
</CopyInfo>
</RecoverySiteGoldCopyInfo>

```

The options in `EmcSrdfSraRecoverySiteGoldCopyConfig.xml` are the same as those for `EmcSrdfSraTestFailoverConfig.xml`.

EmcSrdfSraDeviceMaskingControl.xml

This file is used to specify PowerMax device masking details for SRDF and TimeFinder devices.

The following DTD describes `EmcSrdfSraDeviceMaskingControl.xml`:

EmcSrdfSraDeviceMaskingControl.xml

```

<!ELEMENT DeviceMaskingInfo (Version?, MaskViewList?)>
<!ELEMENT Version (#PCDATA)>
<!ELEMENT MaskViewList (MaskView+)>
<!ELEMENT MaskView (ArrayId?, StorageGroup?, DeviceList?)>
<!ELEMENT ArrayId (#PCDATA)>
<!ELEMENT StorageGroup (#PCDATA)>
<!ELEMENT DeviceList (Device+)>
<!ELEMENT SrcDeviceList (Device+)>
<!ELEMENT DevicePair (#PCDATA)>

```

The following is an example of `EmcSrdfSraDeviceMaskingControl.xml`:

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<DeviceMaskingInfo>
  <Version>9.0</Version>
  <MaskViewList>
    <MaskView>
      <ArrayId>000194900390</ArrayId>
      <StorageGroup>spea219_390</StorageGroup>
      <DeviceList>
        <Device>0422c</Device>
        <Device>044b6</Device>
      </DeviceList>
      <SrcDeviceList>
        <Device>0422d</Device>
        <Device>044b7</Device>
      </SrcDeviceList>
    </MaskView>
  </MaskViewList>
</DeviceMaskingInfo>

```

The following section describes the options in `EmcSrdfSraDeviceMaskingControl.xml`:

MaskViewList

A list of MaskViews. Multiple MaskView blocks can be used for different array IDs.

MaskView

The MaskView information for a specific array ID.

ArrayId

The array ID for which device masking information is provided.

StorageGroup

A container of a storage devices. A masking view includes a storage group, a port group, and an initiator group. When a masking view is created, the devices in the storage group become visible to the host. This option takes the name of the storage group to which a set of devices should be added or removed.

DeviceList

A list of devices to be added or removed from storage group.

SrcDeviceList

A list of R2 devices as placeholder for dynamically created target devices. This tag is effective when `AutoTargetDevice` and `TestReplicaMaskingControl` both are enabled in `EmcSrdfSraGlobalOptions.xml`.

Device

The ID of a PowerMax device that needs to be added or removed from a storage group. A device can be either an SRDF device or a TimeFinder device.

SRA does not check for duplicate Device IDs. The first MaskView under which a Device ID is found is used in the device masking operation.

Troubleshooting and getting help

When experiencing difficulties with your host and connected storage environment, be sure to examine the "[Known issues and limitations](#)" and "[Technical notes](#)" sections to see if your difficulty is a known problem recognized by Dell EMC.


Some functions described in these release notes and/or in the SRA Adapter documentation set may not be supported by all versions of Engenuity or Solutions Enabler in use.

To ensure your host operating system is supported, check all specifications and limitations defined in E-Lab Interoperability Navigator, which can be reached at: <https://elabnavigator.EMC.com>.

Examine the storage system you are managing, noting its version of the VMAX Engenuity operating environment. Correlate Engenuity feature behaviors and problems while referencing parameters and limitations. If a SRA Adapter feature does not function properly, or does not function as described in the SRA Adapter documentation, contact the Dell EMC Customer Support Center for assistance.

Where to get help

Dell EMC product, support, and licensing information can be obtained on Dell EMC Online Support as described next.

 **NOTE:** To open a service request through Dell EMC Online Support, you must have a valid support agreement. Contact your Dell EMC sales representative for details about obtaining a valid support agreement or to answer any questions about your account.

Product information

For documentation, release notes, software updates, or for information about Dell EMC products, licensing, and service, go to Dell EMC Online Support (registration required) at: www.dell.com/support.

Technical support

Dell EMC offers a variety of support options.

- Support by Product — Dell EMC offers consolidated, product-specific information on the web at: www.dell.com/support/product. The Support by Product web pages offer quick links to documentation, white papers, advisories (such as frequently user Knowledge Base articles), and downloads, as well as more dynamic content, such as presentations, discussion, relevant Customer Support Forum entries, and a link to Dell EMC Live Chat.
- Dell EMC Live Chat — Use Dell EMC Live Chat to open a chat or instant message session with an EMC Customer Support Engineer.

eLicensing support

To activate your entitlements and obtain your VMAX license files, visit the Service Center at www.dell.com/support, as directed on your License Authorization Code (LAC) letter emailed to you.

For help with missing or incorrect entitlements after activation (that is, expected functionality remains unavailable because it is not licensed), contact your Dell EMC Account Representative or Authorized Reseller.

For help with any errors applying license files through Solutions Enabler, contact the Dell EMC Customer Support Center.

If you are missing an LAC letter, or require further instructions on activating your licenses through Online Support, contact Dell EMC's worldwide Licensing team at licensing@emc.com or call:

- North America, Latin America, APJK, Australia, New Zealand: SVC4EMC (800-782-4362) and follow the voice prompts.
- EMEA: +353 (0) 21 4879862 and follow the voice prompts.

Your comments

Your suggestions will help us continue to improve the accuracy, organization, and overall quality of the user publications. Send your opinions of this document to: <mailto:VMAXContentFeedback@emc.com>.

Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.