



**Hewlett Packard
Enterprise**

HPE Storage Plug-in 2.4.0 for SAP Landscape Management User Guide

Abstract

This guide provides information about installing and using the HPE Storage Plug-in for SAP Landscape Management. This guide is intended for the system and storage administrators who monitor and direct system configurations for HPE Storage Plug-in 2.4.0 for SAP Landscape Management. For the latest information about this product, see the HPE Storage Plug-in 2.4.0 for SAP Landscape Management Release Notes.

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Introduction

This chapter provides an overview of HPE Storage Plug-in for SAP Landscape Management.

NOTE:

This SAP software is officially known as *SAP Landscape Virtualization Manager* or *SAP LVM* prior to version 2.1. SAP has renamed this software from the recently released major version 3.0 as *SAP Landscape Management (SAP LaMa)*. HPE Storage Plug-in supports both versions of the SAP Landscape management software, v2.1 and v3.0, starting from plug-in version v2.4.0. Throughout this document, we will generally refer to both the SAP software versions 2.1 and 3.0 as SAP Landscape Management unless otherwise stated.

SAP Landscape Management is a management tool that helps simplify and optimize provisioning, deployment, and management of SAP systems.

The key features of SAP Landscape Management are as follows:

- Framework for SAP system clone, copy, and refresh
- Capacity management—proposal-based dialog instance scaling
- End-to-end visibility, monitoring, and management of SAP and non-SAP applications in virtual infrastructures
- Overview dashboard with customization options
- Landscape visualization from a high-level landscape view down to the infrastructure level
- Various reporting options

HPE Storage Plug-in for SAP LaMa integrates SAP LaMa and HPE 3PAR StoreServ systems.

HPE Storage Plug-in supports the following tasks:

- Supports System Snapshots (online and offline)
- System Clone, Full Clone, Clone from Snapshot (online and offline)
- Support for multiple vCenter Servers
- SAP Instance relocation (Mass or DB)
- SAP System Copy
- SAP System Refresh (Full or DB)

System requirements

This chapter lists the minimum hardware and software requirements to install the Storage Plug-in.

Software requirements

Plug-in Component	Software Requirements
HPE Storage Adapter - SAP Landscape Manager plug-in (.sca)	SAP LVM 2.1 (up to SP9) SAP Netweaver v7.3, v7.4 (SAP JVM 6.1/JDK 1.6) SAP LaMa 3.0 (up to SP2) SAP Netweaver v7.5 (SAP JVM 8.1/JDK1.8)
HPE Storage Provider - Array Access Middleware	RHEL v6.0 (x64), v6.1(x64), 6.5, or 7.2 Windows Server 2008, 2012
HPE Storage Host Agent Library (libsapacosprep_HPE.so)	RHEL 6.5, 7.0, 7.2 SLES 11.0 SP2, 11.0 SP3, 11.0 SP4, 12.0 SP1 HPE Storage Host agent library depends on the following Linux software components (pre-requisite): <code>rescan-scsi-bus.sh</code> , <code>lsscsi</code>

Hardware requirements

Plug-in Component	Hardware Requirements
HPE Storage Adapter - SAP Landscape Manager plug-in (.sca)	Refer to hardware requirements for SAP LVM 2.1 or LaMa 3.0 from SAP Product Availability Matrix - http://support.sap.com/pam
HPE Storage Provider - Array Access Middleware	Compute Node with min 4GB RAM (8 GB recommended) and one CPU (two recommended) NOTE: It is recommended that the array access middleware runs separately in its own dedicated physical machine or VM in a production environment.
HPE Storage Host Agent Library (libsapacosprep_HPE.so)	SAP Host with HBA compatible with QLogic. (not applicable for VM) 3PAR storage array must be connected to managed SAP Host (or the ESX hosting the VM) via Fibre Channel.

NOTE:

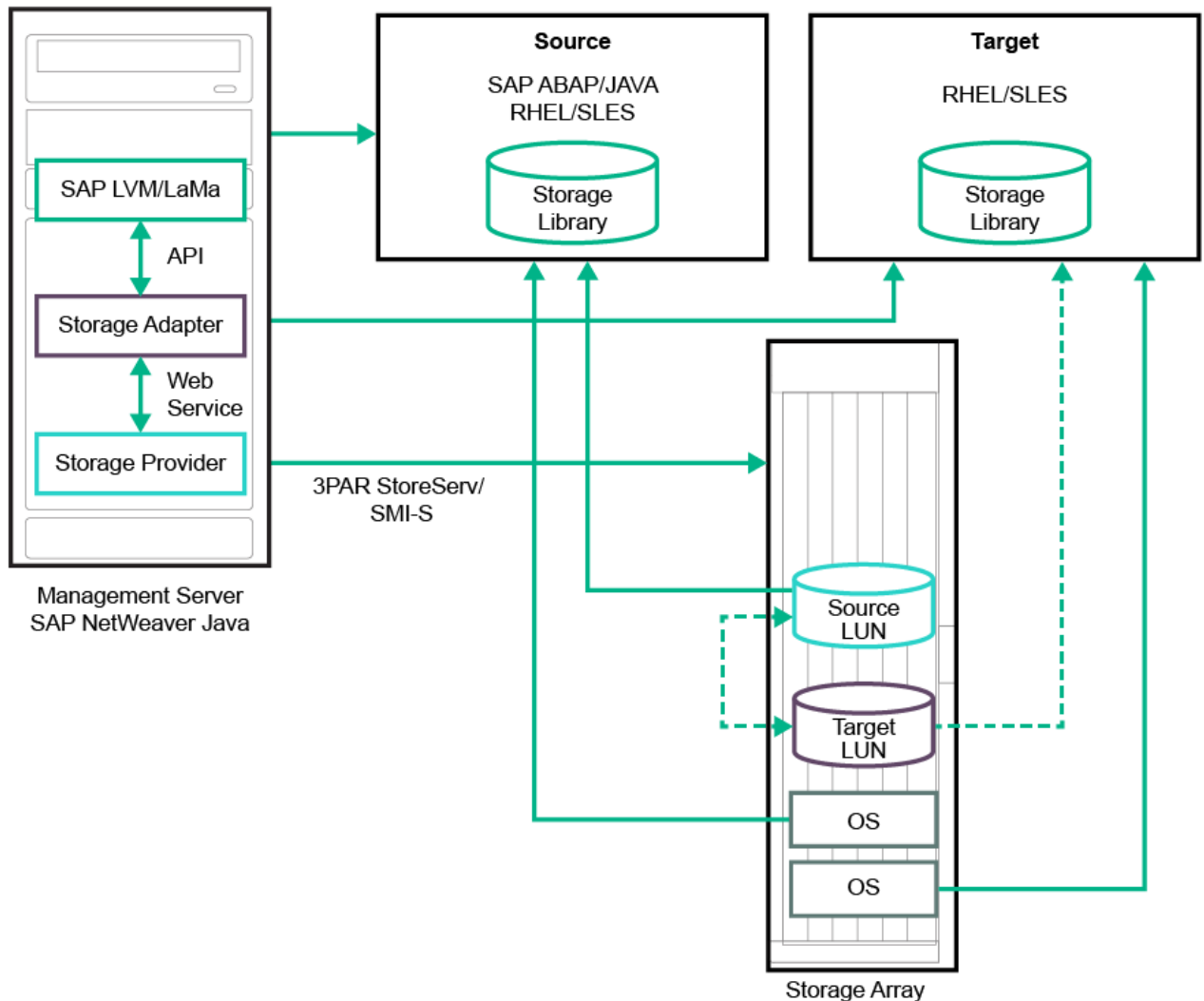
- For more information on the software and hardware requirements for installing SAP LVM 2.1 or LaMa 3.0, see the SAP Notes/PAM (Product Availability Matrix) at <http://support.sap.com/pam>.
- For more information on the supported hardware and software platforms, see the webpage at <http://www.hpe.com/storage/spock>.

Architecture

This chapter provides an overview of HPE Storage Plug-in.

Architecture

This section explains the architecture of Storage Plug-in.



The Storage Adapter communicates to SAP Landscape Management using API integration and provides array related functionality for System Clone, System Copy, System Refresh, and Application Migration. The Storage Adapter sends requests to the common HPE Storage Provider using web services to interact with the underlying HPE Storage Arrays.

The Storage Provider implements the array functionality. The Storage Provider provides a common layer for the various storage arrays. The Common Storage Provider interprets the request from the Storage Adapter, communicates with the underlying Storage Array through HPE 3PAR StoreServ SMI-S.

HPE Storage Library must be deployed on every managed SAP landscape. The Storage Library interacts with the SAP host agents and the underlying operating system.

HPE Storage Provider

The Storage Provider integrates with Storage Arrays to enable the SAP clone, copy, and application relocation of the SAP systems.

HPE Storage Library for SAP Landscape Management

The SAP executable file, `sapacosprep`, initiates the SAP and Hewlett Packard Enterprise shared libraries to mount the clones, or to copy the libraries to the target server. The Storage library, `libsapacosprep_HPE.so`, performs the following functions:

- Importing and exporting the logical volume groups.
- Mounting and unmounting of the file systems.
- Getting storage resource properties.
- Listing attached file systems.

Installing HPE Storage Plug-in

This chapter describes the installation, configuration, and integration of Storage Plug-in 2.4.0 for SAP Landscape Management on Windows and Linux operating systems.

HPE Storage Provider

This section describes the installation and removal of Storage Provider.

Installing HPE Storage Provider

Installing Storage Provider on Windows operating system

Procedure

1. Double-click the `HPE_Storage_Plug-in_for_SAP_LVM.exe` file to launch the installation wizard. Click **Next** to continue.
2. Accept the terms of the license agreement and click **Next** to continue.
3. Choose the destination folder for the Storage Plug-in 2.4.0 installation and click **Next**.
4. Specify the port numbers for the Storage Modules and click **Next**.
5. Specify the port numbers for the Storage Module J2EE and click **Next**.

NOTE:

Hewlett Packard Enterprise recommends that you maintain the default port numbers for Storage Module and Storage Module J2EE.

-
6. Set and confirm the password and click **Next**.

NOTE:

The default username is `admin` and you cannot change it.

-
7. When the installation is complete, click **Done**.

After successful installation of Storage Provider:

- The `C:\Program Files (x86)\HPE\HPE_Storage_Plug-in_for_SAPLVM` folder is created with the following files:
 - Storage adapter for SAP LVM 2.1 (`HPE_Storage_Adapter_20.sca`)
 - Storage adapter for SAP LaMa 3.0 (`HPE_Storage_Adapter_30.sca`)
 - HPE Storage Host Agent Library for Linux (`libsapacosprep_HPE.so`)
- Storage Administrator Portal is installed.

Installing HPE Storage Provider on Linux operating system

To install Storage Provider on SAP LVM 2.1 for Linux:

1. Grant all permissions to the `HPE_Storage_Plug-in_for_SAPLVM.bin` file.
2. Run the file using `./HPE_Storage_Plug-in_for_SAPLVM.bin` command.

NOTE:

You must run the commands from a GUI-enabled console.

-
3. Accept the terms of the license agreement and click **Next** to continue.
 4. Choose the destination folder for the Storage Plug-in installation and click **Next**.
 5. Specify the port numbers for the Storage Modules and click **Next**.

6. Specify the port numbers for the Storage Module J2EE and click **Next**.

NOTE:

Hewlett Packard Enterprise recommends that you maintain the default port numbers for the Storage Module and Storage Module J2EE.

7. Set and confirm the password and click **Next**.

NOTE:

The default username is `admin`, and you cannot change it.

8. When the installation is complete, click **Done**.

After successful installation of Storage Provider:

- The `/opt/HPE_Storage_Plug-in_for_SAP_LVM/` folder is created with the following files:
 - Storage adapter for SAP LVM 2.1 (`HPE_Storage_Adapter_20.sca`)
 - Storage adapter for SAP LaMa 3.0 (`HPE_Storage_Adapter_30.sca`)
 - HPE Storage Host Agent Library for Linux (`libsapacosprep_HPE.so`)
- Storage Administrator Portal is installed.

Upgrading to HPE Storage Plug-in 2.4.0

To upgrade to Storage Plug-in 2.4.0 from a previous version:

Procedure

1. Remove the existing version—For information on removing an existing version, see [Uninstalling HPE Storage Provider](#) on page 10.
2. Install Storage Plug-in 2.4.0—For information on installing Storage Plug-in 2.4.0, see [Installing HPE Storage Provider](#) on page 9.

Verifying installation

To verify installation of the Storage Provider:

Procedure

1. For Windows—Ensure that the `HPE_Storage_Plug-in_for_SAPLVM` service is running.
2. For Linux—Ensure that the `hpstorageadapter` service is running.

Uninstalling HPE Storage Provider

Removing Storage Provider on Windows

To remove the Storage Provider on Windows, do the following:

1. Run the `Uninstall_HPE_Storage_Plug-in_for_SAPLVM.exe` file from the `Uninstall_HPE_Storage_Plug-in_for_SAPLVM` folder, under the install path.

Removing Storage Provider on Linux

To remove the Storage Provider on Linux, do the following:

1. Run `Uninstall_HPE_Storage_Plug-in_for_SAPLVM.bin` from the `Uninstall_HPE_Storage_Plug-in_for_SAPLVM` folder, under the install path.

NOTE:

You must run the commands from a GUI-enabled console.

Validating HPE 3PAR StoreServ Storage SSL certificates

3PAR StoreServ enables management and validation of SSL certificates by the host and client applications to establish a secure connection.

HPE 3PAR CLI and HPE 3PAR OS versions 3.1.2, 3.2.2 MU2, and 3.2.2 MU3 supports a self-signed 2048-bit RSA SSL certificate for 3PAR StoreServ Storage.

After upgrade, Storage Plug-in requires that you validate and accept the 3PAR StoreServ Storage SSL certificate to perform any operations related to 3PAR StoreServ. If you do not accept the certificate, connection to 3PAR StoreServ is denied.

Configuring arrays using Storage Administrator Portal

You can configure HPE 3PAR StoreServ Storage systems using Storage Administrator Portal.

NOTE:

Storage Administrator Portal is supported only on Internet Explorer.

Procedure

1. Launch Storage Administrator Portal by navigating to `http://<hostname/>ipaddress>:<portnumber>/ui_mgmt.jsp`. For example:
`http://localhost:3500/ui_mgmt.jsp`.
2. Login using the following credentials:
 - a. Username—admin
 - b. Password—the password used during installation of the Storage Provider
3. Click **Add**.
4. Select the Storage Array from the **Type** list, and click **Next**.
5. Enter the hostname or IP address of the array, and enter the credentials.
The 3PAR StoreServ Storage SSL certificate is displayed.
6. Accept the certificate. Click **Next** to configure and use 3PAR StoreServ.
7. Click **Next** to view the details of the array.
8. Click **Finish** to view the array listed in the home page of the portal.

The screenshot shows the Storage Administrator Portal for HPE Storage Plug-in for SAP LVM. The main heading is "Configured Storage Systems and Management Servers" with a sub-note: "Only the configured HPE Storage Systems can be viewed in HPE Storage Plug-in for SAP LVM." Below this are buttons for "Add...", "Modify...", "Remove...", and "Add/Remove Columns...". A table displays the following data:

System Name	System Type	System Model	System Firmware	System Identifier	Managers / Mana...	Current User
EIS_206_REC	HPE 3PAR StoreServ	HPE 3PAR StoreSer...	3.2.2 (MU2)	2FF70002AC00B69E	15.213.67.206	3paradm

Updating HPE 3PAR StoreServ Storage SSL certificates

If you have upgraded to the current version, then all the arrays configured in the previous version are displayed in Storage Administrator Portal. However, the required SSL certificates are not available in the database for HPE 3PAR StoreServ Storage systems. To obtain an HPE 3PAR StoreServ SSL certificate, do the following:

Procedure

1. Open Storage Administrator Portal.
2. Select the required HPE 3PAR StoreServ and click **Modify**.
3. Enter the HPE 3PAR StoreServ credentials, when prompted.

The HPE 3PAR StoreServ Storage SSL certificate is displayed.

4. Accept the certificate. Click **Next** to configure and use 3PAR StoreServ.

The certificate details for 3PAR StoreServ are updated in the database. System Model and System Firmware details of the array are also displayed.

Deploying Storage Adapter on SAP Landscape Management

❗ IMPORTANT:

- HPE recommends to undeploy any old HPE adapter sca present on your system before deploying the new one. For more information on undeploying, see [Undeploying Central Storage Adapter on SAP LVM 2.1](#).
 - For deployment on to SAP LVM 2.1 use `HPE_Storage_Adapter_20.sca` from deployed Storage Provider files, or if the target environment is SAP LaMa 3.0 then use `HPE_Storage_Adapter_30.sca`.
-

Procedure

1. Copy the `.sca` file from the deployed Storage Provider to `/usr/sap/trans/EPS/in`.
2. Use the SUM (Software Update Manager) tool provided by SAP and deploy the adapter on SAP Landscape Management.
3. After a successful deployment of the adapter, the status of the adapter service (`HPE_Storage_Adapter` service) is `Stopped`.
4. Log in to the NWA (NetWeaver Administrator) portal.
5. Click **Operations** and select **Start & Stop**.
6. Navigate to **Start & Stop: Java Applications** and select **HPE_Storage_Adapter**.
7. The following details are displayed for the selected adapter:
 - Vendor—`hpe.com`
 - Status—`Stopped`
8. Click **Start** to start the `HPE_Storage_Adapter` service.

NOTE:

After deployment of `sca`, log in to CAAL URL: `http://[NWA_IP]:[NWAportnumber]/LVMMonitoring/Overview?advanced=true` and clear `StorageMountMappingCache`, `StoragePoolCache`, `StorageSystemCache`, and `StorageVolumeCache`.

Undeploying HPE Storage Adapter on SAP Landscape Management

Procedure

1. Go to: `/usr/sap/<SID>/J00/j2ee/console/`
If M39 is your SID then the location would be: `#cd /usr/sap/M39/J00/j2ee/console/`
2. Log on to guiconsole app using LVM admin credentials
`#sh guiconsole.sh <LVM_IP> <PORT>`
for example, `sh guiconsole.sh 10.10.20.39 50004`
3. Check for the deployed adapter in the listing by logging-on as Administrator and running the command: `list_app`. This command lists the applications deployed on the system.
4. To undeploy sca, run the command: `undeploy name="HPE_Storage_Adapter" vendor="hpe.com"`
5. Run `list_app` again to verify that the old HPE adapter is undeployed.

NOTE:

The undeploy command for plugin-versions prior to 2.2.2 is: `undeploy name="HPE_Storage_Adapter" vendor="hpe.com"`

Configuring HPE Library on the Managed SAP system

This section describes the process to configure HPE Library on the Managed SAP system.

Configuring HPE Library for Linux

Before you configure HPE Library on the Managed SAP system for Linux, ensure that:

- `sg3-utils` is installed on the managed systems.
- Multipath service is running on the managed systems with `user_friendly_names` set to `no` in the configuration file.

To configure HPE Library on the Managed SAP system for Linux, do the following:

Copy the `libsapacosprep_HPE.so` file to the directory having the host agent executable file.

For example, navigate to the `/usr/sap/hostctrl/exe` folder, and copy the `.so` file.

NOTE:

The `libsapacosprep_HPE.so` file is available in the `<HPE Storage Provider/Installation Directory>/saplvm_saplinux`.

Configuring HPE Storage Adapters

Configuring HPE Storage Adapter for HPE 3PAR StoreServ Storage systems

You must configure the HPE Storage arrays that need to be managed using SAP Landscape Management in the **Configuration > Infrastructure > Storage Manager** section, by selecting **HPE 3PAR Storage Adapter**. Enter the following details in the **Storage Manager** section:

NOTE:

- The HPE 3PAR SMI-S secure port number must be 5989.
 - For the adapter to export and create hosts on the array, use superuser privileges for HPE 3PAR.
-
- Label—Each adapter imported into SAP Landscape Management must have a label. Labels help to differentiate the adapters logically.
 - URL—The URL of the installed Storage Provider.
 - For example, if the Storage Provider is installed on the same server as that of SAP Landscape Management at port 3501, then the URL will be `//<IP_address>/:3501/ui_mgmtjsp`.

NOTE:

Enter username as `admin`.

-
- Password—The password for the installed Storage Provider configured during the Storage Provider installation.
 - vCenter host—The IP address or host name of the vCenter managing the virtual infrastructure. Storage Adapter supports and manages the SAP instances running on the VMware Virtual machines. This requires the adapter to have access to the ESX servers where the SAP instances are running.

You can have multiple vCenter hosts configured in an Storage Adapter.

- vCenter user—The username to connect to the vCenter.

You can have multiple user names added for the corresponding vCenters in Storage Adapter.

- vCenter password—The password to connect to the vCenter.

You can have multiple passwords added for the corresponding vCenters in Storage Adapter.

NOTE:

- If the managed SAP instances are physical servers, then it is not mandatory to provide the vCenter host user ID and password.
 - You can enter blank values when entering the non-mandatory fields, so that only the first valid set (IP, username, and password) is matched.
 - You can add the same credentials multiple times and only the first valid vCenter containing the ESX will be used.
-

SAP Landscape Virtualization Management

Overview Operations Provisioning Automation Monitoring Configuration **Infrastructure**

Network Components Virtualization managers **Storage Managers** Repositories Java PCA

◀ Previous Next ▶ | Save Cancel | Supported Storage Integration

1 2 3 4
 Storage Manager Types Storage Manager Properties **Storage Systems** Summary

Storage Systems

Name	Vendor Name	Product Name
EIS_206_REC	HPE	HP_P10000_7400

Click **Test connection** to test the credentials and connectivity to the HPE 3PAR Storage array.

Cloning

Preparing the source and target SAP systems

Before you configure in SAP Landscape Management, complete the following preparation steps for the source and target SAP systems:

Procedure

1. Create mount directories with specific user permissions and user groups on the target server similar to that of the Source system.
2. Install the Storage library in the SAP host agent directory and restart the SAP host agent, on both source and target hosts.
3. Hewlett Packard Enterprise recommends you to run multipath on the source SAP system to ensure that the LUNs (Logical Unit Numbers) presented on the server are active and highly available.
4. Verify connectivity of the 3PAR StoreServ Storage system to the target servers. HPE 3PAR StoreServ Storage connectivity can be verified using the `3PARInfo` tool.
5. Configure the landscape in SAP Landscape Management.

Configuring landscapes in SAP Landscape Management

To configure landscapes in SAP Landscape Management, do the following:

Procedure

1. Configure pools, services, resources, Virtualization Managers (vCenter credentials), network, and Storage Manager.
2. Click **Setup > Operation settings > Allow Multiple services on same resource**.
3. Add the source SAP system with the following host agent settings:
 - a. Username—`sapadm`
 - b. Password—password of the SAP system
4. Edit the Database, Central Services, and Central Instances with the required credentials, and test the same wherever applicable.
5. Click **Configuration > Services > Edit Mount Points**, and click **Export Path** to configure the export path.

For more information on the supported export paths, see [Supported export paths](#).

If you are using multiple disks or multiple logical volumes, see [Mapping multiple physical disks and multiple logical volumes](#).

- a. Verify the mount point. However, if the mount points are not available, then retrieve the mounts from the **Retrieve Mount Point List**.

NOTE:

For 3PAR StoreServ:

- `ArrayIdentifier` is Array WWN (World Wide Node Name)
 - `iArrayDiskIdentifier` is Array Disk WWN
-

- b. Configure the mount point presented to that instance.
6. Add the target resource in SAP Landscape Management, and edit the required details.
 7. Click **Operations > Instance > Validation**, and click **Validate All** to successfully validate all the services and resources.

Supported export paths

All disks of the configured SAP systems in SAP Landscape Management are retrieved from the export path. The following are the supported export path formats:

Sr. No.	Format	Description
1	arrayIdentifier\$disk1WWN	Direct mapping without using the volume manager.
2	arrayIdentifier \$disk1WWN=LogicalVolumePath1	Mapping with the volume manager.
3	arrayIdentifier\$disk1WWN, disk2WWN	Direct mapping of multiple disks from the same array, without using the volume manager.
4	arrayIdentifier \$disk1WWN=LogicalVolumePath1, disk2WWN=LogicalVolumePath2	Mapping of multiple disks from the same array with the volume manager.
5	disk1WWN	Direct mapping without using the volume manager, but without array ID specified.
6	disk1WWN=LogicalVolumePath1	Mapping with the volume manager, but without array ID specified.
7	disk1WWN, disk2WWN	Direct mapping of multiple disks from the same array, without using the volume manager, but without array ID specified.
8	disk1WWN=LogicalVolumePath1, disk2WWN=LogicalVolumePath2	Mapping of multiple disks from the same array with the volume manager, but without array ID specified.

NOTE:

If the array identifier is not specified, as in formats five through eight, the operations might be slow.

Cloning and Snapshot

The Storage Plug-in facilitates the following:

- Clone an existing SAP system—You can either choose the full-copy clone or the or clone from snapshot option to create a clone. Cloning the SAP system is a multi-step process. To clone storage related tasks, SAP Landscape Management delegates a request to 3PAR StoreServ Storage Adapter based on the storage system from which the storage for the SAP system originates. Storage Adapter triggers a clone or a full copy clone creation request on the Storage system based on the SAP system cloning option that you have chosen while triggering the clone operation in Landscape Management.

NOTE:

- Virtual Volume sets on 3PAR StoreServ Storage are not supported in the current release of Storage Plug-in.
 - SAP system installed on partitioned LUNs are not supported in the current release of Storage Plug-in.
-
- Clone from an existing snapshot of SAP system—This feature is supported for 3PAR StoreServ only.
 - Snapshot of an existing SAP system—The snapshot of the SAP system is a point in time copy of the SAP system. To take a snapshot, SAP Landscape Management delegates a request to 3PAR StoreServ Storage Adapter. The Adapter in turn triggers a snapshot creation request to the Storage system.

Full Clone

A full clone is the full copy of a volume. Data stored in a full clone is not updated with subsequent changes to the parent volume. The parent volume is the original volume that is copied to the destination volume.

You can create a full clone of a volume from the parent volume only if the associated pool of the volume has enough space to create the target clone disk to accommodate write operations to that volume during full clone. Full clones can be online or offline.

Creating system clones

To create system clones, do the following:

Procedure

1. Log in to SAP Landscape Management.
2. Click the **Provisioning** tab.
3. Click the **System and AS Provisioning** tab.
4. Select the system to clone from **System Landscape**. The details of the selected source system are displayed.
5. Click **Clone System**, to clone the selected system. The Basic Data of the Target System is displayed.
6. Click **Next**. The Host Selection of Target System is displayed.
7. Select **Target** in the **Host Resource** column, and click **Next**.
8. You can edit the Target IP, hostname, and network detail in the **Host Names** tab, and click **Next**.
9. Select all the check boxes in the **Full Copy** column, and click **Next**.
10. Choose **Database Consistency** and click **Next**. System displays the network configurations.
11. Click **Next**.
12. In the **Summary** tab, click **Start System Cloning**. The system creates the system clone.

Destroying system clones

To destroy or remove system clones, you must unprepare each individual instance of the cloned system, and then remove it. To remove system clones:

1. Select each instance of the cloned system that you need to unprepare.
2. Click **Stop and Unprepare**.
3. To destroy a system, navigate to the **Provisioning** tab, select the system you want to destroy, and then click **Destroy System**.
4. Verify the storage system and the volumes that are configured as mount points.
5. To create a task to destroy the system, navigate to the **Summary** screen, and click **Start System Destroy**.
6. To view the task progress, navigate to the **Monitoring** tab.
7. The clone is removed from SAP Landscape Management, after the task is completed.

NOTE:

For system destroy, SAP instances must be in `not Prepared` state. Stop the SAP on target system and bring down the database and central service instances to perform system destroy.

Snapshot

A snapshot is a virtual copy of a base volume. Base volume is the original volume that is copied. A full clone is a duplicate copy of an entire volume, however a virtual copy only records changes to the base volume. This allows you to create an earlier state of the original virtual volume by starting with its current state, and rolling back all the changes that are made since the virtual copy is created.

You can make snapshots of the following:

- Fully provisioned virtual volumes
- TPVVs (Thin provisioned virtual volumes)
- Full clones

HPE Storage uses copy-on-write techniques to create a snapshot. You can create multiple snapshots of each virtual volume, provided the associated pool of the volume (in case of snapshot, the snap pool of the source disk) has sufficient space to create the target snapshot disk.

Creating snapshots

To create snapshots using SAP Landscape Management:

1. Log in to SAP Landscape Management.
2. Click the **Provisioning** tab.
3. Click the **System and AS Provisioning** tab.
4. Click **Manage System Snapshots** and select **Take Snapshot** to create the snapshot of the source LUN. The **Take System Snapshot** dialog box appears.
5. Enter appropriate description for the snapshot, verify the listed Storage volumes and then click **Next**.
6. Select appropriate options under **Database consistency** and **Scheduled execution of cloning step**.
7. Verify the details listed under **Summary** and click **Take Snapshot**.

A snapshot of the source LUN is created.

After successful generation of the snapshot, the snapshot details are displayed.

NOTE:

For offline snapshots, stop SAP on the source system.

Destroying snapshots

To destroy or remove existing snapshots:

1. Log in to SAP Landscape Management.
2. Click the **Provisioning** tab.
3. Click the **System and AS Provisioning** tab.
4. Click **Manage System Snapshots** and select **Display or Remove System Snapshots**.
5. Select the snapshot of the source LUN that you need to destroy and click **Remove Snapshot**.

The selected snapshot is removed.

Enabling consistency groups for HPE 3PAR StoreServ Storage

Storage Plug-in 2.4.0 for SAP Landscape Management allows you to create consistent group snapshots at the same point in time so that the related structures on different volumes in the group are consistent. This feature allows you to create copies that are better for recovery than a non-consistent one. The term `consistency group` refers to local replication of the source volumes in a batch or group.

Physical Copies

A physical copy is a point-in-time copy that duplicates all the data from the source volume to the destination volume. This is performed so that the data on the destination volume can be used if the source volume becomes unavailable. If you make any change to either the source or destination volume, then the synchronization between the source and destination volumes is lost. You can resynchronize the volumes to remove the differences between the volumes.

You can create consistent group physical copies from a list of virtual volumes. A physical copy can only be made from a volume that has the required free space to write to the volume during a physical copy operation.

- The destination volume must have:
 - Sufficient snapshot space.
 - At least as much user space as the volume that is being copied.

NOTE:

The destination volume must not be exported to a host.

Virtual copies

A virtual copy is a snapshot of a virtual volume. You can make virtual copies of base volumes, physical copies, or other virtual copies. You can create Virtual copies using copy-on-write techniques. However, this feature is available only with the HPE 3PAR Virtual Copy license. Unlike a physical copy that duplicates the entire base volume, a virtual copy records only the changes to the original volume.

This allows you to recreate an earlier state of the original volume by starting with the current state and rolling back all of the changes that have been made since the virtual copy was created. For information on system-level maximum limits on virtual copies, see the *HPE 3PAR OS Configuration Matrix*.

You can create and manage virtual copies in groups to reduce the number of management tasks. You can also create a consistent group virtual copies from a list of virtual volumes.

NOTE:

Certain features mentioned in this documentation might require additional licenses. Make sure that you have the appropriate licenses to use these features.

Operational flow

1. Configure the HPE 3PAR storage Storeserv arrays in Storage Administrator Portal.

Storage Administrator Portal for HPE Storage Plug-in for SAP LVM

Configured Storage Systems and Management Servers

Only the configured HPE Storage Systems can be viewed in HPE Storage Plug-in for SAP LVM.

[Add...](#)
[Modify...](#)
[Remove...](#)
[Add/Remove Columns...](#)

System Name	System Type	System Model	System Firmware	System Identifier	Managers / Mana...	Current User
EIS_206_REC	HPE 3PAR StoreServ	HPE 3PAR StoreSer...	3.2.2 (MU2)	2FF70002AC00B69E	15.213.67.206	3paradm
3par	HPE 3PAR StoreServ	HPE 3PAR StoreSer...	3.2.2 (MU4)	2FF70002AC07E1B6	15.213.71.17	3paradm

2. Verify that the arrays are listed in **Storage Systems** under **Storage Manager**.

The screenshot shows the SAP Landscape Virtualization Management interface. The 'Storage Managers' tab is active, displaying a table of storage adapters. Below the table, the 'Details' section for the selected '3parAdapter' is visible, showing basic properties like Label, User Name, Password, URL, and Monitoring Interval. The 'Additional Properties' section lists vCenter host, vCentre User, and vCentre User Password with 'Show Values' links.

Label	Vendor	Product	Version	Required Storage Library Version
3parAdapter	HPE	HPE 3Par Storage Adapter	2.4.0.003	1.0.7

Rows: 1 total, 1 shown, 1 selected Selected: 3parAdapter

Basic Properties

Label: 3parAdapter
 User Name: admin
 Password: *****
 URL: https://10.10.33.123:3501
 Monitoring Interval (Seconds): 900

Additional Properties

Name	Value	Type	Mandatory	Description
vCenter host	Show Values	String Array	<input type="checkbox"/>	vCenter host
vCentre User	Show Values	String Array	<input type="checkbox"/>	vCentre user
vCentre User Password	Show Values	String Array	<input type="checkbox"/>	vCenter Password

3. Make sure that the prerequisites listed earlier in this section are complete before cloning.
4. Select the target storage system for each disk in the **Clone options** tab below **Storage**.

Mapping multiple physical disks and multiple logical volumes

To manage volumes used by the host systems, HPE Storage Plug-in 2.4.0 supports the following features:

- Multiple physical disks contributing to one logical volume.
- Multiple logical volumes created from one physical disk.
- Multiple disks contribute to a volume group from which multiple logical volumes are created.

You can also use a physical disk directly, bypassing the host's logical volume manager, for a mount point.

These features are applicable to and independent of:

- The array used:
 - HPE 3PAR StoreServ
- The host operating systems:
 - RHEL
 - SLES

Ensure that appropriate logical volume managers is used in the host systems.

Volume management involves mapping of the following elements:

- Physical disks or physical volumes
- Volume group
- Logical volumes

HPE Storage Library located in the hosts maps all these elements.

During mount point retrieval from the host, all mount points of a system are mapped and returned in the format (DiskWWN=PhysicalVolume-VolumeGroup-LogicalVolume,...). All paths from the physical disk to the logical volume (DiskWWN=PhysicalVolume-VolumeGroup-LogicalVolume) are unique. The system lists all the contributing paths for each mount point. Individual paths are separated by commas.

HPE Storage Library marks the duplicated disks using asterisks (*), so that the duplicated disks are not cloned or relocated more than once.

CAUTION:

- Do not share physical disks across instances.
- Ensure that the Volume groups are exclusive to an instance and not used for external purposes (for example, to create logical volumes that are not used in any instance).
- Do not share overlapping mount points across instances.

HPE Storage Library lists the mounted Logical Volumes and performs mount and unmount operations.

Troubleshooting

ARRAY_NOT_COMMUNICATED

Cause

This is a general runtime exception thrown by Storage Provider layer when it finds there are environmental issues bothering the interworking with the storage array. Some of the most common reasons include array network connectivity issues due to which a CIM connection to the array has failed / timed out. Also, the load on the array due to other external processes hitting the management interface and/or array running to its full capacity could be a possible cause. And then, setting the Landscape Management monitoring interval to an aggressive value could compound the problem and lead to slowness and timeouts, which manifest ultimately as this exception.

Action

1. Check and rectify the network connection between the host and the array management interface. Ensure that the control path network performance remains responsive and performant.
2. If the cause is diagnosed to be the load on the array, consider optimizing the same by either scaling up the array hardware OR by reducing the load, suitably.
3. Consider increasing the storage monitoring interval to a higher value (less frequent) while remaining feasible to the business need at hand. The recommended value is 900 seconds.

NOT_AUTHENTICATED message failure

Symptom

Invalid credentials provided for the Storage Provider—re-enter the credentials, and test the configuration.

Cause

A timeout between the Storage adapter and the Storage Provider makes the current session invalid. Perform the following steps to increase the timeout to an appropriate value.

Action

1. Navigate to `<Installation Directory>/Storage/JBoss/standalone/ configuration/ standalone.xml`
2. Under **<system-properties>**, add the following:

```
<property name="Authentication.SessionTimeoutInSeconds" value="" />
```

The current default value is 1800 seconds. Increase the default timeout to an appropriate value.

SCA file not listed after deployment

Symptom

The `list_app` command does not list the SCA file after deployment.

Cause

This occurs due to timeout during deployment in the environment. The current default timeout is 15 seconds.

Action

1. Login to NWA (NetWeaver Administrator) portal.
2. Click **Availability and Performance > System Overview > AS Java**, and then click **Nodes**.
3. Click **Started**, and select **Manage Java Server nodes**.
4. On the **Start & Stop: Java instances** page, click the **Java Instances** tab, and then click **More Actions > View System Properties**.
5. On the **Java System Properties: Overview** page, navigate to the **Services** tab under **Details** for the instances of the selected Java.
6. Select **Timeout**, and click **Modify** under the **Extended Details** section for Timeout. Enter a higher value as appropriate.

Inactive logical volume groups

Symptom

After you reboot the hosts in SUSE environment, the existing logical volume groups become inactive.

Action

1. Manually run the `vgchange -a y <volume group>` command after every reboot.
This command re-activates the logical volume groups after every SUSE reboot.

CS instance down after System Clone

Symptom

The CS (Central Service) instance is down and the Enqueue server stopped after a System Clone operation.

Action

1. Add all the SAP ports (for example, SAP System Dispatcher Port, SAP System Gateway Port, SAP System Dispatcher Security Port, and SAP System Gateway Security Port) from the `/etc/services` file of the source to the target.
2. Restart SAP manually in the target system. The CS instance will start after the restart.

Unable to upgrade Storage plugin

Symptom

Unable to upgrade Storage Plug-in Installer to v2.4.0 in Linux environment.

Action

1. Remove and reinstall the Storage Plug-in in the Linux environment.
For information on removing and installing Storage Plug-in, see [Installing HPE Storage Plug-in](#).

Unable to see updated version in Storage Administrator Portal

Symptom

After upgrading the firmware, the updated version does not appear in Storage Administrator Portal.

Action

1. Restart the `HPE_Storage_Plug-in_for_SAPLVM` service.

Unable to see updated version in SAP Landscape Management Portal

Symptom

After upgrading Storage Adapter, the upgraded version is not updated in SAP Landscape Management Portal.

Action

1. Undeploy the existing Storage Adapter and deploy the new adapter.

System Clone failed on SLES

Symptom

Unable to successfully complete system clone. Failed in `prepare` phase (if using SLES).

Action

1. Select the failed clone operation and click the **Retry** button present on the same page under **Monitoring > Activities**.

System Refresh failed on SLES

Symptom

NOTE:

Unable to complete System Refresh. Failed in 'prepare' phase (if using SLES 11.0 SP2, SP3, SP4, or SLES 12 SP1).

The cause for this failure is attributed to the way SUSE Linux apparently handles hardware changes on the PCI (SCSI) host bus. Refer KB article published by SUSE for more details: <https://www.suse.com/support/kb/doc/?id=7009660>.

Cause

- Open Host Agent log file under `/usr/sap/hostctrl/work/libsapacosprep.log` and check if storage library has scanned for presence of multipathed device mapper file `/dev/mapper/<wwn>` repeatedly, and eventually failed after several retries.
- If yes, execute `pvs` command from shell and check to see if there are IO errors reported on PV devices. If IO errors are present, or if Disk WWNs are found to be stale (not in synch with what is RDM'ed) or if multipath daemon is found as hung then execute the following procedure:

Action

1. Record IP settings of the target SAP host where prepare failed.
2. Reboot the target host.
3. Reconfigure VIP using `ifconfig` for the SAP instances.
4. Retry the Refresh operation from monitoring tab of SAP Landscape Management.

System clone failed or completed partially when multiple vcenters are configured

Symptom

Creating RDM for disk[DiskId] to VM[VM IP] failed is seen during the system clone steps.

Action

1. Please configure the vCenter hosts in the order of source host first and target host next.

Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:
www.hpe.com/assistance
- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website:
www.hpe.com/support/hpesc

Information to collect

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates, go to either of the following:

- Hewlett Packard Enterprise Support Center

Get connected with updates

page:www.hpe.com/support/e-updates

- Software Depot website:www.hpe.com/support/softwaredepot
- To view and update your entitlements, and to link your contracts and warranties with your profile, go to the Hewlett Packard Enterprise Support Center

More Information on Access to Support Materials

page:www.hpe.com/support/AccessToSupportMaterials

ⓘ IMPORTANT:

Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HPE Passport set up with relevant entitlements.

Websites

Website	Link
Hewlett Packard Enterprise Information Library	www.hpe.com/info/enterprise/docs
Hewlett Packard Enterprise Support Center	www.hpe.com/support/hpesc
Contact Hewlett Packard Enterprise Worldwide	www.hpe.com/assistance
Subscription Service/Support Alerts	www.hpe.com/support/e-updates
Software Depot	www.hpe.com/support/softwaredepot
Customer Self Repair	www.hpe.com/support/selfrepair
Insight Remote Support	www.hpe.com/info/insightremotesupport/docs
Serviceguard Solutions for HP-UX	www.hpe.com/info/hpux-serviceguard-docs
Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix	www.hpe.com/storage/spock
Storage white papers and analyst reports	www.hpe.com/storage/whitepapers

Customer self repair

Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product. If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider or go to the CSR website:

www.hpe.com/support/selfrepair

Remote support

Remote support is available with supported devices as part of your warranty or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product's service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

For more information and device support details, go to the following website:

www.hpe.com/info/insightremotesupport/docs

Documentation feedback

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Glossary

HPE 3PAR Remote Copy Software

A host-independent, array-based data mirroring solution that enables data distribution and disaster recovery for applications. This optional utility enables a user to copy virtual volumes from one system to a second system. The user must have 3PAR Remote Copy Software licenses for all storage systems participating in remote-copy replication.

Latency

A measure of time delay experienced in a network. Round-trip latency measures the time for a signal to go from source to destination and back to the source.

Primary Storage System

One of two storage systems in a remote-copy pair. The primary storage system holds the original virtual volumes which are replicated to the backup storage system.

Secondary Storage System

The second storage system in a remote-copy pair.

Primary Volume Group

The volume group that resides on the primary storage system and that receives data from the host. The primary volume group is linked to a secondary volume group on the secondary storage system.

Secondary Volume Group

The volume group that resides on the secondary storage system and that receives data from the primary volume group in a remote-copy pair.

Remote Copy Volume Group (RCG)

A pair of virtual volume sets that are logically related and that are used when data needs to be consistent between specified sets of virtual volumes.

Remote Copy Pair

Two linked storage systems, consisting of a primary storage system and a backup storage system. The primary storage system holds the volumes that are copied to the remote backup storage system.

RPO (Recovery point objective)

The maximum amount of acceptable data loss in the event of a disaster. RPO is generally specified as an amount of time (minutes, hours, days). The RPO may be zero.

RTT (Round Trip Time)

The time in milliseconds, that a signal takes to be sent plus the time it takes for receipt of the signal to be acknowledged.

Synchronization Modes

The method by which data on a remote-copy pair are made consistent. Synchronization modes most used are:

- synchronous
- asynchronous periodic

Synchronous mode

Data replication that writes data to the primary and secondary sites simultaneously over a network, such that data remains current between sites.

Asynchronous periodic mode

Data replication in which the primary and secondary volumes are resynchronized at set times (when scheduled or when resynchronization is manually initiated).

LVM

Landscape Virtualization Management

LaMa

Landscape Management