

Supported Storage for Serviceguard and SGeRAC

NOTE: The tables on the following pages contain information about currently supported Storage for Serviceguard, Serviceguard Extension for Oracle RAC (SGeRAC) and the Serviceguard Storage Management Suite products. The purpose of these tables is to list each storage device that is supported with the Serviceguard, SGeRAC and the Serviceguard Storage Management Suite products and what volume managers are supported for packaged application data. It also lists any known restrictions or requirements that exist for the device. *It does not provide detailed product or configuration information.*

Please refer to the following table to determine which Volume Managers are supported on given HP-UX and Serviceguard or SGeRAC revisions.

Volume Manager	Supported HP-UX revisions	Supported Serviceguard/SGeRAC revisions
LVM, Shared LVM (SLVM)	11.0	A.11.14
	11i v1	A.11.14, A.11.15, A.11.16
	11i v2	A.11.15, A.11.16, A.11.17, A.11.18, A.11.19
	11i v3	A.11.17.01, A.11.18, A.11.19
VxVM 3.5, CVM 3.5	11i v1	A.11.14, A.11.15, A.11.16
	11i v2	A.11.15, A.11.16, A.11.17, A.11.18
VxVM 4.1	11i v3	A.11.17.01, A.11.18
VxVM 4.1, CVM 4.1, CFS 4.1	11i v2	A.11.17, A.11.18 (Note CFS 4.1 requires Serviceguard Storage Management Suites A.01.00 or A.01.01 with CFS support)
VxVM 5.0	11i v2	A.11.17, A.11.18, A.11.19
VxVM 5.0, CVM 5.0, CFS 5.0	11i v2	A.11.18, A.11.19 (Note CFS 5.0 requires Serviceguard Storage Management Suites A.02.00 or A.02.01 with CFS support)
	11i v3	

All storage devices listed in the following tables are supported as Serviceguard cluster locks using LVM-based cluster locks or cluster lock LUN (for Serviceguard A.11.18 and later) unless otherwise specified. The term *Cluster lock disk* refers to both types of cluster locks unless otherwise noted.

Disk Enclosures (JBODS)											
HP Product	Minimum SG/SGeRAC revision	LVM SLVM	VxVM 3.5	CVM 3.5	VxVM 4.1	CVM 4.1	CFS 4.1	VxVM 5.0	CVM 5.0	CFS 5.0	Notes
HP SureStore Disk System 2120 (DS2120)	SG/SGeRAC A.11.14 or later on HP-UX 11.0, 11i v1 or 11i v2	✓	✓	✓	NO	NO	NO	NO	NO	NO	A
HP SureStore Disk System 2300 (DS2300)	SG/SGeRAC A.11.14 or later on HP-UX 11.0, 11i v1 or 11i v2, SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
Modular Smart Array 30 Multiple-Initiator (MSA30 MI)	SG/SGeRAC A.11.14 or later on HP-UX 11.0, 11i v1 or 11i v2, SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	✓	✓	✓	✓	✓	✓	✓	✓	B
HP SureStore Disk System 2500 (DS2500)	SG/SGeRAC A.11.16 or later on HP-UX 11i v1 or 11i v2, SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	NO	NO	NO	NO	NO	✓	NO	NO	C
Modular Smart Array 60 Modular Smart Array 70	SG/SGeRAC A.11.16 or later on HP-UX 11i v2, SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	NO	NO	NO	NO	NO	NO	NO	NO	C, D

NOTES:

A = Requires software mirroring for data protection, using MirrorDisk/UX or VxVM mirroring between 2 separate disk enclosures

B = Requires software mirroring for data protection, using MirrorDisk/UX or VxVM mirroring between 2 separate buses in the same disk enclosure, or 2 different disk enclosures

C = Requires software mirroring for data protection, using MirrorDisk/UX mirroring between 2 separate buses in the same disk enclosure, or 2 different disk enclosures

D = Supported only with the AH303A HP SC44Ge SAS Host Bus Adapter. This is a PCIe card, so it is only supported in HP Integrity Servers that support PCIe.

Low end Disk Arrays											
HP Product	Minimum SG/SGeRAC revision	LVM SLVM	VxVM 3.5	CVM 3.5	VxVM 4.1	CVM 4.1	CFS 4.1	VxVM 5.0	CVM 5.0	CFS 5.0	Notes
MSA 1000 Single Controller	SG/SGeRAC A.11.15 or later on HP-UX 11i v1 or 11i v2, SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	NO	NO	NO	NO	NO	NO	NO	NO	B
MSA 1000 Active/Active controllers		✓	NO	NO	NO	NO	NO	NO	NO	NO	A
MSA 1500cs Single Controller		✓	NO	NO	NO	NO	NO	NO	NO	NO	B
MSA 1500cs Active/Active controllers	SG/SGeRAC A.11.16 or later on HP-UX 11i v1 or 11i v2, SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	NO	NO	NO	NO	NO	NO	NO	NO	A
MSA 2000	N/A	NO	NO	NO	NO	NO	NO	NO	NO	NO	C
MSA 2312fc, MSA 2324fc	SG/SGeRAC A.11.17 or later on HP-UX 11i v2, SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	NO	NO	NO	NO	NO	NO	NO	NO	D, E
MSA 2312sa, MSA 2324sa	SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	NO	NO	NO	NO	NO	NO	NO	NO	E, F

NOTES:

A = Requires firmware version 6.86 or later. HP-UX 11i v3 requires firmware version 7.0 or later.

B = Since there is only one controller, requires software mirroring for data protection, using MirrorDisk/UX mirroring between 2 separate disk arrays.

C = Will never be supported.

D = Requires firmware M100R18 or later.

E = Support for Veritas 5.0 Volume Managers expected soon.

F = Supported only with BladeServers using the HP P700m 3Gb SAS Controller (mezzanine) and the HP 3Gb SAS BL Switch (interconnect). The P700m must be in Pass-Thru mode (RAID mode is not supported). Requires firmware M110R21 or later.

HP StorageWorks Enterprise Virtual Arrays

HP Product	Minimum SG/SGeRAC revision	LVM SLVM	VxVM 3.5	CVM 3.5	VxVM 4.1	CVM 4.1	CFS 4.1	VxVM 5.0	CVM 5.0	CFS 5.0	Notes
EVA3000, EVA5000 with VCS up to v3.110 (this is an Active/Passive controller configuration)	SG/SGeRAC A.11.14 or later on HP-UX 11.0, 11i v1 or 11i v2	✓	NO	NO	NO	NO	NO	NO	NO	NO	A
EVA5000, EVA3000 with VCS v4.007 up to v4.100 (this is an Active/Active controller configuration)	SG/SGeRAC A.11.16 or later on HP-UX 11i v1 or 11i v2, SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	✓ HP-UX 11i v1 only	NO	✓	✓	✓	✓	✓	✓	B
EVA4000, EVA4100, EVA6000, EVA6100, EVA8000, EVA8100	SG/SGeRAC A.11.14 or later on HP-UX 11.0, 11i v1 or 11i v2, SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	✓ HP-UX 11i v1 only	NO	✓	✓	✓	✓	✓	✓	B, C, D
EVA4400	SG/SGeRAC A.11.16 or later on HP-UX 11i v1 or 11i v2, SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	NO	NO	✓	✓	✓	✓	✓	✓	B, D
EVA6400, EVA8400	SG/SGeRAC A.11.16 or later on HP-UX 11i v1 or 11i v2, SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	NO	NO	NO	NO	NO	✓	✓	✓	B, D

NOTES:

A = Requires SecurePath for Alternate paths.

B = Supports LVM PVlinks or Veritas DMP for Alternate paths on 11i v1 and 11i v2. Supports HP-UX 11i v3 Agile I/O for Alternate paths.

C = ASL patch required for Veritas 4.1 with the EVA8x00.

D = The HP StorageWorks EVA iSCSI Connectivity option is not supported to be used for shared storage with Serviceguard or SGeRAC.

HP StorageWorks XP Disk Arrays											
HP Product	Minimum SG/SGeRAC revision	LVM SLVM	VxVM 3.5	CVM 3.5	VxVM 4.1	CVM 4.1	CFS 4.1	VxVM 5.0	CVM 5.0	CFS 5.0	Notes
XP48 XP512	SG/SGeRAC A.11.14 or later on HP-UX 11.0, 11i v1 or 11i v2	✓	✓	✓	✓	✓	✓	NO	NO	NO	
XP128 XP1024	SG/SGeRAC A.11.14 or later on HP-UX 11.0, 11i v1 or 11i v2 SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	✓	✓	✓	✓	✓	✓	✓	✓	
XP10000	SG/SGeRAC A.11.14 or later on HP-UX 11.0, 11i v1 or 11i v2 SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
XP12000	SG/SGeRAC A.11.14 or later on HP-UX 11.0, 11i v1 or 11i v2 SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
XP20000	SG/SGeRAC A.11.16 or later on HP-UX 11i v1 or 11i v2 SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	✓	NO	✓	✓	✓	✓	✓	✓	A, B
XP24000	SG/SGeRAC A.11.16 or later on HP-UX 11i v1 or 11i v2 SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	✓	NO	✓	✓	✓	✓	✓	✓	A, B

NOTES:

A = XP10000, XP12000, XP20000 and XP24000 External Storage is supported for use with Serviceguard, including as a cluster lock disk. However, if the External Storage device has only one Active Path to the XP array, it must not be used as a cluster lock disk, and should not be used for Serviceguard package application data unless the data is mirrored to the XP array's internal storage, or mirrored to another External Storage device connected to the XP array via a separate fibre channel connection. This is required to eliminate the Single Point of Failure of the single path to the device.

B = Supported with XP Thin Provisioning.

EMC Disk Arrays											
EMC Product	Minimum SG/SGeRAC revision	LVM SLVM	VxVM 3.5	CVM 3.5	VxVM 4.1	CVM 4.1	CFS 4.1	VxVM 5.0	CVM 5.0	CFS 5.0	Notes
The following Symmetrix models are supported with Fibre Channel interfaces: 3330, 3430, 3630, 3700, 3830, 3930	SG/SGeRAC A.11.14 or later on HP-UX 11.0, 11i v1 or 11i v2	✓	✓	✓	NO	NO	NO	NO	NO	NO	
The following Symmetrix models are supported with Fibre Channel interfaces: 8130, 8230, 8430, 8530, 8730, 8830	SG/SGeRAC A.11.14 or later on HP-UX 11.0, 11i v1 or 11i v2	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
The following EMC DMX Series arrays are supported: 800, 1000, 2000, 3000, DMX-3, DMX-4	SG/SGeRAC A.11.14 or later on HP-UX 11.0, 11i v1 SG/SGeRAC A.11.15 or later on HP-UX 11i v2 SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	✓	✓	✓	✓	✓	✓	✓	✓	B, C

NOTES:

A = Symmetrix firmware 5.0 or later is required with HP-UX 11i v2.

B = Symmetrix firmware 5.0 or later is required with HP-UX 11i v2 and 11i v3.

C = DMX-3 and DMX-4 are not supported with HP-UX 11.0.

HP StorageWorks SAN Virtualization Services Platform											
HP Product	Minimum SG/SGeRAC revision	LVM SLVM	VxVM 3.5	CVM 3.5	VxVM 4.1	CVM 4.1	CFS 4.1	VxVM 5.0	CVM 5.0	CFS 5.0	Notes
SVSP	SG/SGeRAC A.11.17 or later on HP-UX 11i v2 SG/SGeRAC A.11.17.01 or later on HP-UX 11i v3	✓	✓	NO	NO	NO	NO	NO	NO	NO	A, B, C

NOTES:

A = Requires SVSP version 2.0 or later.

B = Refer to the SVSP Streams documentation for DPM and VSM firmware versions required for the HP-UX version being used. Refer to the SVSP Streams documentation for the Command View and SecurePath versions required for the HP-UX version being used.

C = Only supported with SVSP-supported external storage (available on SPOCK).

Additional Notes for the information in the tables above:

1. Other disks or arrays (not listed in these tables) that are supported for HP-UX may be used on non-shared buses.
2. Oracle RAC data is generally required to be stored in RAW volumes on Shared LVM (SLVM) volume groups or Veritas Cluster Volume Manager (CVM) disk groups, or can be stored on Cluster File Systems (CFS).
3. To determine if a storage device is supported with the Serviceguard Storage Management Suites, check if the device is supported for VERITAS versions 4.1 or 5.0 and VxVM, CVM and CFS.
4. It is supported to mix Fibre Channel, SAS or SCSI mass storage devices within the same Serviceguard cluster.
5. All storage devices are supported as Serviceguard cluster lock disks, using LVM-based cluster lock or cluster lock LUN unless otherwise noted.
6. It is important to understand what is meant here when this document refers to a *Shared Bus*. A Shared Bus is any bus (SCSI, SAS or Fibre Channel) connected to more than a single node. This is also known as having *Multiple Initiators*.
7. Generally, the information listed in this document is specifically regarding the use of the device as a shared data disk with Serviceguard, Serviceguard Extension for RAC (**SGeRAC**, formerly Serviceguard OPS Edition) or the Serviceguard Storage Management Suites (**SGSM**). Unless otherwise noted, the information here does not apply to the use of any device for purposes other than as a shared data disk for Serviceguard, SGeRAC and SGSM.
8. Another important restriction with Serviceguard and SGeRAC is that shared SCSI buses should not contain any non-disk devices (such as DDS tape drives, DLT tape drives or CD-ROM drives). This is because most of these devices do not handle buses with Multiple Initiators properly. This restriction does not apply for Fibre Channel or SAS, since Fibre Channel and SAS switches provide the needed isolation.
9. Any Fibre Channel or SAS Host Bus Adapters and Switches supported by HP-UX are also with Serviceguard, SGeRAC and SGSM. Supported Host Bus Adapters for HP-UX can be found at: <http://www.hp.com/products1/serverconnectivity/storagesnf2/index.html>

Third Party Mass Storage

HP only tests HP mass storage devices to verify that they meet Serviceguard's High Availability requirements, therefore full support is provided for these devices only. The sole exception to this is EMC Symmetrix disk arrays. All mass storage devices listed on this web page are fully supported (with noted exceptions where appropriate) for use with Serviceguard.

Some third party mass storage has been tested for basic functionality with Serviceguard, and these devices can be supported for use in Serviceguard clusters **if an allowance is granted for the configuration by HP**. These devices are listed in the Third Party Storage Interoperability matrix at: http://www.hp.com/products1/unixserverconnectivity/mass_storage_devices.html.

There you will find a matrix of third party mass storage devices supported on HP-UX, which also indicates whether or not the device is supported for Serviceguard. Please note that the mass storage devices listed as supported with Serviceguard on this web page are not fully-supported in that HP has not fully tested them and cannot guarantee that they meet all of Serviceguard's HA requirements. For support of a cluster with these third party mass storage devices, the third party device vendors, rather than HP, will take the lead in the support of their mass storage devices with Serviceguard.

If you wish to obtain support for a mass storage device listed in the Third Party Storage Interoperability matrix, HP please contact your HP representative and request to have an **allowance** for support of the device.