



Hewlett Packard
Enterprise

Technical Reference

HPE Serviceguard for Linux Certification Matrix

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How to use this document

This document comprises of two main sections

- Serviceguard for Linux Foundation Edition

This section describes OS, Server, Storage and Virtualization technologies support with the listed version of HPE Serviceguard for Linux (SG/LX) and refers to HPE Serviceguard for Linux support only. All other hardware and software components must be supported together independent of HPE Serviceguard for Linux. This matrix lists certified configurations for HPE Serviceguard for Linux versions A.12.00.00 and its updates

- Serviceguard for Linux Flex Storage Add-on Edition

This section describes various functionalities and versions of Serviceguard for Linux Flex Storage Add-on Edition. It also describes the compatible Serviceguard for Linux Foundation and OS versions.

Some browsers may cache a copy of this file, so if data seems to not be up to date, please refresh the page. The most recent version of this matrix can be found at <https://www.hpe.com/info/linux-serviceguard-docs>.

Other Resources

- HPE Serviceguard for Linux website: www.hpe.com/servers/sglx. Visit this site for access to all technical information, commercial information, manuals, white papers, data sheets, and customer references.
- Before upgrading to a higher version of Serviceguard for Linux please, read the target Serviceguard for Linux version's release notes (*HPE Serviceguard for Linux XX.YY.ZZ Release Notes*) at <https://www.hpe.com/info/linux-serviceguard-docs>
- For additional compatibility information regarding Serviceguard extension for SAP for Linux (SGeSAP/LX) versions prior to A.12.70.00, please refer to corresponding SGeSAP release notes: "*Serviceguard Extension for SAP Version B.xx.yy Release Notes for Linux*" available at <https://www.hpe.com/info/linux-serviceguard-docs>
- For HPE Serviceguard Contributed Toolkit Suite certification matrix please refer "HPE Serviceguard Toolkit Compatibility Matrix (HPUX and Linux)" at <https://www.hpe.com/info/linux-serviceguard-docs>
- For HPE Serviceguard for Linux (SGLX) support lifecycle, release, update mechanisms and product versions, please refer "HPE Serviceguard for Linux(SGLX)Support Letter" at https://support.hpe.com/hpesc/public/docDisplay?docId=emr_na-a00042064en_us
- 90 days FREE trial of HPE Serviceguard for Linux Premium Edition Software available at <https://www.hpe.com/us/en/resources/servers/serviceguard-linux-trial.html>

Serviceguard For Linux Foundation Edition

The certification in this section applies to all Base, Advanced, Enterprise and Premium Editions of HPE Serviceguard for Linux.
Refer section's 1 to 2 for HPE Serviceguard for Linux Base Edition.
Refer section's 1 to 3 for HPE Serviceguard for Linux Advance Edition.
Refer section's 1 to 4 for HPE Serviceguard for Linux Enterprise Edition.
Refer section's 1 to 5 for HPE Serviceguard for Linux Premium Edition.
Appendix A, B and C is applicable to all the above mentioned editions.

1 HPE Serviceguard for Linux A.12.xx.xx

1.1 Linux Distributions and Errata

The following Operating System distributions and kernel errata are supported with Serviceguard for Linux. The following conditions apply:

- Only x86_64 bit Operating Systems supported
- Support for Secure Boot on RedHat (RHEL7 and later) and SUSE Linux Enterprise Server(SLES 12 and later).
- All the kernel erratas are supported unless explicitly specified within one month of its release.
- All cluster nodes must have the same OS distribution.

1.1.1 Red Hat Enterprise Linux

The following Red Hat Enterprise Linux OS versions are supported with Serviceguard for Linux.

Table 1 Supported Red Hat Enterprise Linux OS Versions

Serviceguard for Linux	Linux (x86_64)	JAVA Runtime Environment	Volume Managers & File Systems ¹	Jetty	Browser ²		
A.12.80.05	RHEL 8 8.1 to 8.7	Open Java 8, update up to 345	LVM, VxVM ext3, ext4 NFS, XFS, VxFS	Bundled with product	Internet Explorer Version 9, 10, 11		
	RHEL 7 7.0 to 7.9	Open Java 8, update up to 265			Firefox Version 30, 42, 45, 53, 56, 60, 61, 65, 68, 80, 86, 90, 109 Chrome Version 35 to 109		
A.12.80.05 A.12.80.03 A.12.80.00 A.12.70.00 A.12.60.00	RHEL 8 8.1 to 8.6	Open Java 8, update up to 322			Bundled with product	Internet Explorer Version 9, 10, 11	
RHEL 7 7.0 to 7.9	Open Java 8, update up to 265	Firefox Version 30, 42, 45, 53, 56, 60, 61, 65, 68, 80					
RHEL 8 8.1	Open Java 8, update up to 242	Chrome Version 35 to 85					
A.12.60.00 A.12.50.00 A.12.40.00	RHEL 7 7.0 to 7.9	Open Java 7, Update 9 to 261 Open Java 8, update up to 262			Bundled with product	Internet Explorer Version 9, 10, 11	
RHEL 6 6.1 to 6.10	Open Java 7, Update 9 to 181 Open Java 8, update up to 171	Firefox Version 30, 42, 45, 53, 56, 60, 61, 65, 68, 72 Chrome version 35 to 81					
A.12.30.00 A.12.20.00 A.12.10.00	RHEL 7 7.0 to 7.6	Open Java 7 Update 9 to 191 Open Java 8, update up to 181			LVM, VxVM ext3, ext4 NFS, XFS, VxFS	Bundled with product	Internet Explorer Version 9, 10, 11
	RHEL 6 6.1 to 6.10	Open Java 7, Update 9 to 181 Open Java 8, update up to 171					Firefox Version 30, 42, 45, 53, 56, 60, 61, 65 Chrome version 35 to 72
A.12.00.51 A.12.00.50 A.12.00.41 A.12.00.40 A.12.00.30	RHEL 7 7.0 to 7.3	Open Java 7 Update 9 to 111 (Only with A.12.00.51) Open Java 7 Update 9 to 91 (with A.12.00.XX)			LVM, VxVM ext3, ext4 NFS, XFS, VxFS	Bundled with product	Internet Explorer Version 9, 10, 11

	RHEL 6 6.1 to 6.8	Open Java 7 Update 9 to 91 Oracle Java 7, Update 2 to 79	LVM, VxVM ext2, ext3, ext4 NFS, XFS, VxFS	9.2.0 to 9.2.16 9.1.0 to 9.1.5 8.1.2 to 8.1.17	Firefox Version 30, 42, 45 Chrome version 35 to 49
	RHEL 5 5.7 to 5.11	Oracle Java 7, Update 2 to 79			Internet Explorer Version 9, 10, 11 Firefox Version 30, 31 Chrome Version 35 to 40
A.12.00.22 A.12.00.21 A.12.00.20	RHEL 6 6.1 to 6.8	Open Java 7 Update 9 to 91 Oracle Java 7, Update 2 to 79			
	RHEL 5 5.7 to 5.11	Oracle Java 7, Update 2 to 79			

¹ VxVM and VxFS supported only on physical cluster nodes

² Serviceguard Manager requires minimum screen resolution of 1024 x 768 pixels for best experience.
For Serviceguard Manager 12.60.00 or below, Chrome browser is supported up to version 105.

1.1.2 SUSE Linux Enterprise Server

The following SUSE Linux Enterprise Server OS versions and kernel errata are supported with Serviceguard for Linux.

Table 2 Supported SUSE Linux Enterprise Server OS Versions

Serviceguard for Linux	Linux (x86_64)	JAVA Runtime Environment	Volume Managers & File Systems ¹	Jetty	Browser ²
A.12.80.05 A.12.80.03	SLES 15 up to SP4	Open Java 8 Update up to 322	LVM, VxVM ext3, ext4, NFS, XFS, btrfs, VxFS	Bundled with Product	Internet Explorer Version 9, 10, 11
	A.12.80.05 A.12.80.03 A.12.80.00	SLES 15 up to SP3			Open Java 8 Update up to 282
A.12.80.05 A.12.80.03 A.12.80.00 A.12.70.00	SLES 12 up to SP5	Open Java 8 Update up to 222			Internet Explorer Version 9, 10, 11
A.12.70.00 A.12.60.00	SLES 15 up to SP2	Open Java 8 Update up to 242			Firefox Version 30, 42, 45, 53, 56, 60, 61, 65, 68, 69, 80, 86, 109 Chrome Version 35 to 109
	SLES 15 up to SP1	Open Java 8 Update up to 201			Internet Explorer Version 9, 10, 11
	SLES 12 up to SP5				Firefox Version 30, 42, 45, 53, 56, 60, 61, 65, 68, 69, 80
	SLES 12 up to SP5		Chrome version 35 to 85		
A.12.60.00 A.12.50.00	SLES 12 up to SP5	Open Java 7 Update 9 to 231 Open Java 8 Update up to 222 IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20	Internet Explorer Version 9, 10, 11		
A.12.40.00	SLES 15	Open Java 8 Update up to 161	Firefox Version 30, 42, 45, 53, 56, 60, 61, 65, 68, 69 Chrome version 35 to 77		
	SLES 12 up to SP4	Open Java 7 Update 9 to 181 Open Java 8 Update up to 181 IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20	Internet Explorer Version 9, 10, 11		
			LVM, VxVM ext2, ext3, ext4, NFS, XFS, btrfs, VxFS	Firefox Version 30, 42, 45, 53, 56, 60, 61, 65	
			LVM, VxVM ext2, ext3, NFS, XFS, btrfs, VxFS, ext4 (SLES12 only)	Chrome	

	SLES11 SP4, SP3, SP2	IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20			version 35 to 72
A.12.30.00 A.12.20.00	SLES 12 up to SP3	Open Java 7 Update 9 to 181 Open Java 8 Update up to 144 IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20			Internet Explorer Version 9,10,11 Firefox Version 30, 42, 45, 53, 56, 60 Chrome version 35 to 66
	SLES11 SP4, SP3, SP2	IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20			
A.12.10.00	SLES 12 up to SP2	Open Java 7 Update 9 to 141 Open Java 8 Update up to 131 IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20			Internet Explorer version 9,10,11 Firefox Version 30, 42,45,53 Chrome version 35 to 57
	SLES11 SP4, SP3, SP2	IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20			
A.12.00.51	SLES 12 up to SP2	Open Java 7 Update 9 to 111 IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20			
	SLES11 SP4, SP3, SP2	Oracle Java 7 Update 2 to 79 IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20			
A.12.00.50	SLES 12 up to SP1	Open Java 7, Update 9 to 91 IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20		9.2.0 to 9.2.16 9.1.0 to 9.1.5 8.1.2 to 8.1.17	Internet Explorer version 9,10,11 Firefox Version 30, 42, 45 Chrome version 35 to 49
	SLES11 SP4, SP3, SP2	Oracle Java 7 Update 2 to 79 IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20			
A.12.00.41 A.12.00.40 A.12.00.30	SLES 12	Open Java 7 Update 9 to 91 IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20			
	SLES11 SP4, SP3, SP2	Oracle Java 7 Update 2 to 79 IBM Java 7 up to 1.7.0_sr9.20 1.7.1_sr3.20			
A.12.00.22 A.12.00.21 A.12.00.20	SLES11 SP3, SP2	Oracle Java 7 Update 2 to 79	LVM, VxVM		Internet Explorer version 9, 10, 11 Firefox Version 30, 31 Chrome version 35 to 40
					8.1.2 to 8.1.17
A.12.00.10 A.12.00.00			ext2, ext3, NFS, XFS, btrfs, VxFS		

¹ VxVM and VxFS supported only on physical cluster nodes

² Serviceguard Manager requires minimum screen resolution of 1024 x 768 pixels for best experience.
For Serviceguard Manager 12.60.00 or below, Chrome browser is supported up to version 105.

1.1.3 Oracle Linux

The following Oracle Linux (OL) OS version with unbreakable enterprise kernel (UEK) is supported with Serviceguard for Linux.

Table2 Supported OLOS Version with UEK

Serviceguard for Linux	Linux (x86_64)	JAVA Runtime Environment	Volume Managers & File Systems ¹	Jetty	Browser ²			
A.12.80.05 A.12.80.03	OL 8.6, 8.7 UEK 7 <i>kernel-uek-5.15.0-0.30.19.el8uek onwards</i>	Open Java 8 update up to 352						
A.12.80.05 A.12.80.03 A.12.80.00 A.12.70.00	OL 8.6 UEK 6 <i>Kernel-5.4.17-2136.307.3.el8uek onwards</i>	Open Java 8 update up to 332	LVM, ext3, ext4, NFS, XFS	Bundled with product	Internet Explorer Version 9, 10, 11 Firefox Version 30, 42, 45, 53, 56, 60, 61, 65, 68, 72, 80, 86, 90, 109 Chrome Version 35 to 109			
	OL 8.5 UEK 6 <i>Kernel-5.4.17-2136.304.4.1.el8uek onwards</i>	Open Java 8 update up to 322						
	OL 8.4 UEK 6 <i>kernel-5.4.17-2102.201.3.el8uek onwards</i>	Open Java 8 update up to 302						
	OL 8.3 UEK 6 <i>kernel-uek-5.4.17-2011.7.4.el8uek onwards</i>							
	OL 7 7.9 UEK5 <i>kernel-uek-v4.14.35-1902.6.1 (UEK R5U2) onwards</i> UEK6 <i>kernel-uek-5.4.17-2011.6.2.el7uek onwards</i>							
	OL 8.6, 8.7 UEK 6 <i>Kernel-5.4.17-2136.307.3.1.el8uek onwards</i>	Open Java 8 update up to 332						
	OL 8.5 UEK 6 <i>Kernel-5.4.17-2136.304.4.1.el8uek onwards</i>	Open Java 8 update up to 322						
	OL 8.4 UEK 6 <i>kernel-5.4.17-2102.201.3.el8uek onwards</i>	Open Java 8 update up to 292						
	OL 8.3 UEK 6 <i>kernel-uek-5.4.17-2011.7.4.el8uek onwards</i>	Open Java 8 update up to 272						Internet Explorer Version 9, 10, 11 Firefox Version 30, 42, 45, 53, 56, 60, 61, 65, 68, 72, 80, 109 Chrome version 35 to 105
	A.12.60.00	OL 8.2 UEK 6 <i>kernel-uek-5.4.17-2011.1.2.el8uek onwards</i>				Open Java 8 update up to 265		
	OL 7 7.9 UEK5 <i>kernel-uek-v4.14.35-1902.6.1 (UEK R5U2) onwards</i> UEK6 <i>kernel-uek-5.4.17-2011.6.2.el7uek onwards</i>	Open Java 7 update up to 261 Open Java 8 update up to 262						

<p>A.12.60.00 A.12.50.00</p>	<p>OL 7 7.4 to 7.8 UEK4 <i>kernel-uek-4.1.12-94.3.9.el7uek onwards</i> UEK5 <i>kernel-uek-v4.14.35-1902.6.1 (UEK R5U2) onwards</i></p>	<p>Open Java 7 update up to 261 Open Java 8 update up to 242</p>		<p>Internet Explorer Version 9,10,11 Firefox Version 30, 42, 45, 53, 56, 60, 61, 65, 68, 72 Chrome version 35 to 81</p>
<p>A.12.40.00</p>	<p>OL 7 7.4 to 7.6 UEK4 <i>kernel-uek-4.1.12-94.3.9.el7uek onwards</i> UEK5 <i>kernel-uek-4.14.35-1818.1.6.el7uek (UEK R5GA) - kernel-uek-v4.14.35-1844.6.4(UEK R5U1)</i></p>	<p>Open Java 7 update up to 201 Open Java 8 update up to 191</p>		

¹ VxVM and VxFS supported only on physical cluster nodes

² Serviceguard Manager requires minimum screen resolution of 1024 x 768 pixels for best experience.
For Serviceguard Manager 12.60.00 or below, Chrome browser is supported up to version 105.

1.2 Servers

The following section provides details of x86 servers that are supported and compatible with Serviceguard for Linux 12.xx.xx with the following conditions:

- Servers must be of architecture x86_64.
- Only Linux OS supported by both the server and Serviceguard for Linux must be used.
 - For Linux OS supported by Serviceguard refer to [Linux Distributions and Errata](#) in this document.
 - Red Hat Enterprise Linux Certification and Support:
https://h17007.www1.hp.com/us/en/enterprise/servers/supportmatrix/redhat_linux.aspx#.VmZ-gHnovho
 - SUSE Linux Enterprise Server Certification and Support:
https://h17007.www1.hp.com/us/en/enterprise/servers/supportmatrix/suse_linux.aspx#.VmZ-eXnovho
 - VMware Certification and Support:
https://h17007.www1.hp.com/us/en/enterprise/servers/supportmatrix/vmware.aspx#.VmZ_p3novho
- Unless specifically stated, all configurations of any server listed are supported as long as the general Serviceguard configuration requirements are met. For configuration requirements and other details refer to “Managing HPE Serviceguard for Linux A.12.xx.xx” in www.hp.com/info/linux-serviceguard-docs

1.2.1 HPE Servers

Serviceguard for Linux 12.xx.xx is supported on the following Hewlett Packard Enterprise server

Table 3 Supported HPE Servers

HPE Servers	Models	Generations	Remarks
HPE Superdome Flex 280	Any	Any	Requires A.12.40.00 or above
HPE Superdome Flex	Any	Any	Requires A.12.00.40 or above
HPE Integrity Superdome X	Any	Any	Requires A.12.00.10 or above
HPE Integrity MC990 X	Any	Any	Requires A.12.00.40 or above
All HPE Servers (ML, DL, Synergy, etc.)	Any	Any	Any HPE manufactured Linux x86_64 servers (Intel & AMD 64-bit x86 architecture) with SGLX 12.xx.xx.
All HPE appliance that are based on any of the above listed servers	Any	Any	Any HPE appliance that is built using any HPE manufactured Linux x86 servers.

1.2.2 Non HPE Servers

HPE Serviceguard for Linux 12.xx.xx is compatible with any Linux x86-64 servers (Intel & AMD 64-bit x86 architecture) with the below mentioned conditions:

- HPE will resolve defects that are reproducible on HPE servers.
- HPE does not test Serviceguard products on 3rd party hardware. HPE may not be able to resolve issues that have a dependency on access to 3rd party hardware

1.3 Hyperconverged Systems

Hyperconverged System	Serviceguard Version	Remarks
HPE SimpliVity 380 HPE SimpliVity 380 Gen10 G	A.12.30.00 or above	<ul style="list-style-type: none"> • Supported only with VMware hypervisor with VMFS volumes • Quorum Server is the only supported arbitration method • Refer section 3.7 for SGeSAP support information with SimpliVity

1.4 Storage

The following section provides details of Storage Array's that are supported and compatible with Serviceguard for Linux with the following conditions:

HPE Serviceguard recommends that customers check the Linux/Storage vendor's latest hardware specification and/or hardware compatibility matrix as appropriate to ensure compatibility and optimum functionality. Certification of storage will only be valid till the published support life of the arrays itself.

1. Storage array has to be SCSI-3 Compliant. Refer to Storage Vendor documentation to verify and enable SCSI-3 compatibility.
2. Serviceguard automatically configures SCSI-3 Persistent Reservation Type 5 (WERO) based IO fencing for all shared storages in a package. The only exception is a cluster that comprises only VMware virtual machines as nodes and uses VMware VMFS datastore volumes for shared storage (*Dynamically linked storage*). Customers must never disable SCSI-3 Persistent Reservation from cluster/package configuration or on the storage without prior agreement from HPE. If disabled without prior agreement with HPE, the configuration is unsupported.
3. Only Block Storage and NFS is supported, Object Storage is not supported.
4. HPE FlexFabric is supported for shared storage access with following conditions:
 - a. FlexFabric Mezzanine adapter, FlexFabric LOM and FlexFabric CNA ports supported
 - b. Fibre Channel (FC) and Fibre Channel (FCoE) protocols are supported
 - c. iSCSI on FlexFabric ports are supported only on physical nodes in the cluster.
5. iSCSI devices are supported as shared storage with following conditions:
 - a. iSCSI Software Initiator is supported in clusters with virtual machines and/or physical server nodes.
 - b. iSCSI Hardware Initiator is supported in clusters with only physical server nodes
6. Device Mapper (DM-Multipath) storage multi-pathing is supported for shared storage with following conditions:
 - a. DM-Multipath is not supported with VMware ESXi guests in a cluster, however other physical nodes in the cluster can use DM-Multipath (Please upgrade to A.12.00.40 or higher to use VMware NMP)
 - b. DM-Multipath is supported with KVM guests using FC devices for shared storage (requires A.12.00.30 or above)
 - c. On RHEL7, RHEL8, OL7, OL8 only user-friendly named mapper device are supported.
 - d. Device Mapper Multipathing is supported with HPE 3PAR iSCSI devices only when there are 2 iSCSI ports on the array.
7. SAP's host auto-failover for HANA scale-out can only be configured under the condition that the storage technology uses one of SAP's default HANA storage connectors for fibre-channel connectivity (fcclient or fcclientLVM). Storage in CS500 and CS900 appliance configurations fall under that category. HANA scale-up clusters have no specific restrictions with regards to the storage setup.

Cluster Lock LUN

1. Cluster Lock LUN is supported only when all the nodes in the cluster have read write access to a common disk (shared disk), being presented from a single, non-virtualized, and non-replicated array.
2. Cluster Lock LUN is not supported with any other array-based technologies that do not satisfy above the criteria (point 4 mentioned above). Including but not limited to Multi array virtualization, Multi array-based replication.
Ex: HPE XP7 HA mode, HPE 3PAR- Peer Persistence, DELL EMC VPLEX etc.
3. The cluster will fail if the time it takes to acquire the disk lock exceeds 0.2 times the MEMBER_TIMEOUT. This means that if you use a disk-based quorum device (Lock LUN), you must be certain that the nodes in the cluster, the connection to the disk, and the disk itself can respond quickly enough to perform 10 disk writes within 0.2 times the MEMBER_TIMEOUT
4. VMFS Volumes are not supported for Lock LUN
5. Device Mapper (DM-Multipath) storage multi-pathing is supported for Lock LUN with following conditions:
 - a. DM-Multipath must be used for Lock LUN access on all nodes in the cluster.
 - b. When using DM Device Alias Names for Lock LUN, the alias name must be the same on all nodes.
 - c. On RHEL7, RHEL8, OL7, OL8 only user-friendly named mapper device are supported
 - d. On RHEL7, RHEL8, OL7, OL8 the cluster Lock LUN cannot have an alias name ending with a number

The following tables depict the requirements that satisfy Serviceguard High Availability and Extended Distance Cluster (XDC) needs.

Table 4 Supported Storage Connectivity Models for Cluster Shared Storage and Lock LUN

Purpose / Supported Connectivity	FC	FCOE	iSCSI	NFS	SAS
Cluster Shared Storage	Yes	Yes	Yes	Yes	No
Cluster Lock LUN	Yes	Yes	No	No	No
Non Shared storage <ul style="list-style-type: none"> SAP HANA System Replication * 	Yes	Yes	Yes	Yes	Yes
Non Shared storage <ul style="list-style-type: none"> Oracle Data guard ** 	Yes	Yes	Yes	Yes	Yes
Non Shared storage <ul style="list-style-type: none"> SQL Server on Linux AOAI 	Yes	Yes	Yes	NA	Yes

* All the SAP supported connectivity for Non-shared storage is supported.

** Requires A12.30.00 or above.

1.4.1 HPE Storage

Storage supported for SG/LX A.12.10.00 and later (for prior versions refer to [Appendix B](#))

HPE Serviceguard for Linux is supported with any Hewlett Packard Enterprise Storage Array that satisfy the criteria listed out in [1.4 Storage](#) with below mentioned conditions

Table 5 Supported HPE Storage for Cluster Shared Storage and Lock LUN for A.12.10.00 and later

Type of Storage	Array	Model	Cluster Shared Storage	Cluster Lock LUN
Any HPE Block Storage (XP, 3PAR, Primera, EVA, MSA, Store Virtual, Nimble)	Any	Any	Yes	Yes
NFS Filer	Any	Any	Yes	No
Others (Ex: Object)	Any	Any	No	No

Table 6 Supported Software based virtual storage solutions for Cluster shared storage

Vendor	Software	Cluster Shared Storage	Cluster Lock LUN	Remarks
Hewlett Packard Enterprise	Store Virtual VSA Software	Yes	No	Supported only with iSCSI Supported with Network RAID 10 Configuration. Multi-Site configuration is not supported

1.4.2 Non HPE Storage

Compatible Non HPE Storage supported for SG/LX A.12.10.00 and later (for prior versions refer to [Appendix C](#))

HPE Serviceguard for Linux 12.10.xx and later is compatible with any Storage Array that satisfy the criteria listed out in [1.4 Storage](#) with below mentioned conditions:

- HPE will resolve defects that are reproducible on HPE storage.
- HPE does not test Serviceguard products on 3rd party hardware. HPE may not be able to resolve issues that have a dependency on access to 3rd party hardware

Table 6 Compatible Non HPE Storage for Cluster Shared Storage and Lock LUN for A.12.10.00 and later

Type of Storage	Vendor	Array	Model	Cluster Shared Storage	Cluster Lock LUN
Block	Any	Any	Any	Yes	Yes
NFS Filer	Any	Any	Any	Yes	No
Others (Ex: Object)	Any	Any	Any	No	No

1.5 Virtualization Hypervisors

HPE Serviceguard for Linux supports configuring Virtual machines as cluster nodes. Virtual Machines created using VMware ESXi, Red Hat KVM, Red Hat Enterprise Virtualization and Hyper-V hypervisors are supported. HPE Serviceguard for Linux can be installed on virtual machines (guests) running Red Hat Enterprise Linux or SUSE Linux Enterprise Server or Oracle Linux operating systems.

HPE Serviceguard recommends that customers check the Hypervisor vendor's latest compatibility matrix as appropriate to ensure compatibility and optimum functionality.

The following conditions apply:

- Cluster with Virtual Machines as nodes from different types of hypervisors is not supported
- Hybrid Clusters with mix of both physical servers as nodes and virtual machines as nodes are supported

1.5.1 VMware

Table 7 Supported VMware ESX/ESXi Versions

Supported ESX/ESXi Version	SG/LX Version required	Supported Guest OS
7.0	A.12.00.00 and later. For VMware feature and Serviceguard Version compatibility refer the below table.	All Linux OS supported by Serviceguard for Linux as listed in Linux Distributions and Errata are supported.
6.7		
4.1, 5.5, 6.0		

Table 8 Supported VMware Features and Versions

VMware Features	Minimum ESX/ESXi Version required	Minimum SG/LX Version required	Supported SGLX Quorum Mechanism	Notes
vMotion	ESX/ESXi 4.1	A.12.00.00	Quorum Server	<ol style="list-style-type: none"> For VMFS volumes the supported JRE versions can be referred at Linux Distributions and Errata Note: When using IBM Java, use IBM Java 1.7.1_sr3.0 and above only Serviceguard depends on JAVA to communicate with vCenter/ESXi. Please check the VMware documents to verify the supported JAVA versions for a given ESXi/ vCenter version. VMware NMP and DRS is not supported with RDM - Statically linked Storage only. VMFS Volumes - Dynamically linked storage (DLS) on RHEL7.6 and later is supported starting from Serviceguard version A.12.40.00. Serviceguard supports VMware vVols in all the deployments except the array-based replication environments. Use of SCSI controller slot higher than 15 is supported with Dynamically linked storage (DLS) from Serviceguard version A.12.60.00 and later. For more details on using Clustered VMDK, SLS with Multipathing support and vVol Storage Configurations with SGLX, refer to the VMware KB articles: for vSphere 7.x KB 89510 and for vSphere 6.x KB 85901.
RDM - Statically linked storage ³ . (SLS)	ESX/ESXi 4.1	A.12.00.00	Quorum Server Cluster Lock LUN	
VMFS Volumes ^{1,2,4,6} - Dynamically linked storage. (DLS)	ESX/ESXi 5.5	A.12.00.40	Quorum Server Cluster Lock LUN (RDM Devices Only)	
	ESX/ESXi 6.5	A.12.10.00		
	ESX/ESXi 7.0	A.12.60.00		
VMware NMP	ESX/ESXi 5.5	A.12.00.40	Quorum Server Cluster Lock LUN (RDM Devices only)	
DRS	ESX/ESXi 5.5	A.12.00.40	Quorum Server	
SRM	ESX/ESXi 5.5	A.12.10.00	Quorum Server Cluster Lock LUN (RDM Devices only)	
vVols ^{5,7}	ESX/ESXi 6.7	A.12.50.00	Quorum Server Cluster Lock LUN (RDM and vVol Devices only)	
Clustered VMDK ⁷	ESX/ESXi 7.0	A.12.80.00	Quorum Server Cluster Lock LUN	
SLS With Multipath ⁷	ESX/ESXi 6.5	A.12.80.00	Quorum Server Cluster Lock LUN	

- iSCSI device is also one of the supported shared storage. iSCSI devices can be directly presented to guests.
- For more details on using SG/LX in VMware environments please refer to "Using Serviceguard for Linux with VMware Virtual Machines" Whitepaper at <https://www.hpe.com/info/linux-serviceguard-docs>.
- To configure shared storage with VMware virtual machines please refer to "Managing HPE Serviceguard for Linux A.12.00.40", Section 3.7.5 "Using VMware Virtual Machine File System Disks", available at <https://www.hpe.com/info/linux-serviceguard-docs>

1.5.2 Linux Virtualization

Table 9 Supported Red Hat KVM, SLES KVM and RHEV Versions

Linux Virtualization	Supported Host OS Version	Supported Guest OS as Serviceguard Nodes	Minimum SG/LX Version required on Guest	Supported Shared Storage	Quorum Mechanism	Multipathing
Red Hat KVM Version	RHEL 8 ² 8.1 to 8.7	All Linux OS supported by Serviceguard ¹ , except SLES 12	A.12.50.00	iSCSI, FC	Quorum Server Cluster Lock LUN	Yes
	RHEL 7 7.1 to 7.9		A.12.00.30			
	RHEL 6 6.3 to 6.10		A.12.00.00	iSCSI	Quorum Server	No
SLES KVM Version	SLES 12 up to SP5	A.12.00.30				
	SLES 15 up to SP4	A.12.40.00				
Red Hat Enterprise Virtualization	3.x, 4.x	A.12.00.00				
Oracle Linux KVM	OL 7 7.7 and later		A.12.50.00			

¹For list of all Linux OS supported by Serviceguard for Linux refer [Linux Distributions and Errata](#).

² Only Cluster Across Box (host exclusive) mode is supported i.e., only one guest per host can participate in a Serviceguard cluster. For more information refer to [KVM whitepaper](#)

- Supported with application/software based replications. Example Oracle Data Guard, DRBD, etc.
- Only "Hypervisor default, e1000, rtl8139 and virtio" are supported as Guest Network Interface "Device Model"
- Live Migration is not supported
- Please refer to whitepaper "HPE Serviceguard for Linux with Red Hat, SUSE Linux Enterprise Server KVM and RHEV guests" at www.hpe.com/info/linux-serviceguard-docs for installation and configuration details

1.5.3 Windows Virtualization

Table 10 Supported Hyper-V Versions

Supported Host OS Version	Supported Guest OS as Serviceguard Nodes	Minimum SG/LX Version required on Guest	Supported Shared Storage	Quorum Mechanism	Multipathing
Windows Server 2012 R2, 2016 and 2019	All Linux OS supported by Serviceguard ¹ .	A.12.20.00	iSCSI	Quorum Server	No

¹For list of all Linux OS supported by Serviceguard for Linux refer [Linux Distributions and Errata](#).

1.6 Deployments in Cloud

HPE Serviceguard for Linux supports configuring cloud instances as cluster nodes. Cloud Instances created using Amazon Web Services and Microsoft Azure are supported. HPE Serviceguard for Linux can be installed on cloud instances running Red Hat Enterprise Linux or SUSE Linux Enterprise Server or Oracle Enterprise Linux operating systems.

HPE Serviceguard recommends that customers check the Cloud vendor's latest compatibility matrix as appropriate to ensure compatibility and optimum functionality.

The following conditions apply:

- Nodes of a cluster when deployed in cloud should be from a single cloud vendor and cannot be mixed with instances from other cloud vendors or those that are situated on premise.
- Layer 4 Load Balancer provided by the cloud vendor is used to support Relocatable IP or Virtual IP in a Serviceguard package for clients to connect with the applications protected by Serviceguard.
- When cluster nodes span across different regions, Serviceguard requires Cloud Based DNS load balancing service to support Relocatable IP or Virtual IP in a Serviceguard package for clients to connect with the applications. In Azure it is supported with Traffic Manager and in AWS it is Route53.
- Supported only with Non-shared storage:
 - Applications with in-built data replications
 - SAP HANA scale-up with HANA System Replication
 - Oracle with Oracle Data Guard
 - Microsoft SQL Server Always On Availability groups
 - Applications using Serviceguard for Linux Flex Storage Add-on that provides HPE Software based storage replication solution using DRBD for non-shared storages.

Table 11 Supported Cloud Vendors

Supported Cloud Vendor	Minimum SG/LX Version required on cloud instance	Quorum Mechanism	Notes
Amazon Web Services	A.12.80.00	Quorum Server	1 SAP HANA scale-out is not supported. 2 To use Quarantine without relocatable/virtual IP, the HANA data access network must be configured as a hdb_replication_subnet in the package configuration. This prevents simultaneous usage of a cross-subnet configuration. 3 Easy deployment of Microsoft SQL Server workloads is not supported 4 For list of all Linux OS supported by Serviceguard for Linux in a cloud environment refer Linux Distributions and Errata .
Microsoft Azure	A.12.80.00		

2 Quorum Server

The following section provides compatibility information for the Serviceguard Quorum Server (QS) software. This software is bundled with Serviceguard for Linux Base, Advanced and Enterprise editions.

- One QS can provide arbitration services for multiple Serviceguard for Linux and Serviceguard for HP-UX clusters (300 Nodes).
- The QS software can run on any x86_64 Server and x86_64 Hypervisor based Virtual Machine running in Traditional Data Center and Cloud (Private or Public).

NOTE: When deploying Quorum Server in public/private cloud:

1. Ensure that the Quorum Server network latency parameters are configured appropriately. Refer Quorum Server specific parameters under "Cluster Configuration Parameters" section in Managing HPE Serviceguard for Linux available at <https://www.hpe.com/info/linux-serviceguard-docs>
 2. Ensure that the Quorum Server IP address(es) remain same across reboots
-

Table 12 Quorum server compatibility

Serviceguard Quorum Server (QS) Version	Compatible Base OS	Notes
A.12.60.00	RHEL 8.x RHEL 7.x SLES 12 (SP0 and later) SLES 15 OL 7.4 and later OL 8.2	
A.12.50.00 or later	RHEL 8.x RHEL 7.x RHEL 6.x SLES 12 (SP0 and later) SLES 15 (up to SP1) OL 7.4 and later	
A.12.40.00	RHEL 7.x RHEL 6.x SLES 12 (SP0 and later) SLES 11 (SP2 and later) SLES 15 OL 7.4 and later	<ul style="list-style-type: none"> • Smart Quorum is supported from A.12.00.30 and later. • Smart Quorum is supported with clusters running Serviceguard for Linux A.12.00.30 (Enterprise Edition only) and later. • Following are the compatible Serviceguard versions, <ul style="list-style-type: none"> • Serviceguard for Linux A.11.18 to A.12.00.xx • Serviceguard for HP-UX A.11.16 to A.11.20
A.12.00.30 or later	RHEL 7.x RHEL 6.1 and later RHEL 5.7 and later SLES 12 (SP0 and later) SLES 11 (SP2 and later)	
A.12.00.00	RHEL 6.1 and later RHEL 5.7 and later SLES 11 (SP2 and later)	

3 Serviceguard for Linux Advanced Edition

Serviceguard Advanced Edition provides out-of-box toolkits to deploy different applications in Serviceguard cluster. Following toolkits are available with Serviceguard,

- Toolkits for Databases
 - [Oracle](#)
 - [Sybase ASE and SAP Sybase Replication](#)
 - [Enterprise DB PPAS](#)
 - [IBM Db2](#)
 - [Microsoft SQL Server](#)
 - [Serviceguard Extension for SAP](#)

- Toolkits for Virtualization
 - [KVM \(Kernel-based Virtual Machine\)](#)

- Toolkits for Business Applications
 - [Serviceguard Extension for SAP NetWeaver](#)

3.1 Serviceguard for Linux Toolkit for Oracle

Application Version	Serviceguard for Linux Advanced Edition	Notes
12c [R1, R2], 18c, 19c, 21c ¹	A.12.00.20 and later	<ul style="list-style-type: none"> Support for Oracle ASM 12c [R1, R2], 18c, 19c, 21c: <ul style="list-style-type: none"> Support for HPE Application Tuner Express (ATX) version 1.0.1-84 or later (Compatible with SGLX A.12.00.51 or later). Support for failover of Oracle 12c Multitenant Container Database (CDB) on failure of specified critical Pluggable databases configured in CDB. Support for Multitenant Container Database (CDB) with oracle 12c
11g [R1, R2]	A.12.00.00 and later	<p>Note: The CDB can have multiple Pluggable Databases (PDB). Serviceguard will start, stop and monitor the PDB's. In case of PDB failure Serviceguard will only issue log warnings and e-mail alerts (if configured). No failover will be initiated. Failover will be initiated only in case of CDB failure.</p> <ul style="list-style-type: none"> Support for Easy Deployment from SG Manager with oracle 12c
10g [R1, R2]	A.12.00.00 and later	11gR2: <ul style="list-style-type: none"> Support for Oracle 11gR2 single instance databases.

Notes:

¹ Easy deployment feature for 21c can be utilised by executing the steps mentioned in the CR QXCR1001815216.

3.2 Serviceguard for Linux Toolkit for Sybase ASE and SAP Sybase Replication

Application Version	Serviceguard for Linux Advanced Edition	Notes
<p>Sybase ASE 16.x Sybase Replication Server 16.x</p> <p>Sybase ASE 15.7.0, 15.7.1 ESD#2 ESD#3 or ESD#4 or SP110 and SP120</p> <p>Sybase Replication Server 15.7.1 ESD#2</p>	<p>A.12.00.00 and later</p>	<ul style="list-style-type: none">• Sybase ASE Standalone (single instance, non-Cluster Edition) supported.• Sybase Replication Server is supported only with SGeSAP and Sybase ASE. <p>NOTE:</p> <ul style="list-style-type: none">• Not supported on OL 7 and OL 8

3.3 Serviceguard for Linux Toolkit for Enterprise DB PPAS

Application Version	Serviceguard for Linux Advanced Edition	Notes
13.x 12.x 11.x 10.x 9.5 9.4 9.2 9.1.x 9.0.x	A.12.00.00 and later	NOTE: <ul style="list-style-type: none">• Not supported on SLES 15, OL 7 and OL 8• EDB 13.x supported only with RH 7 and RH 8

3.4 Serviceguard for Linux Toolkit for IBM Db2

Application Version	Serviceguard for Linux Advanced Edition	Notes
10.x	A.12.20.00 and later	
11.x	A.12.20.00 and later	NOTE: <ul style="list-style-type: none">• Not supported on OL 7 and OL 8.

3.5 Serviceguard for Linux Toolkit for Microsoft SQL Server on Linux

Application Version	Serviceguard for Linux Advanced Edition	Notes
SQL Server 2017 on Linux	A.12.20.00 and later	<ul style="list-style-type: none">• Support for Always ON Availability Groups (AOAI) and Always ON Failover Cluster Instance (AOFI) for SQL Server on Linux <p>NOTE:</p> <ul style="list-style-type: none">• Not supported on SLES 15, OL 7 and OL 8
SQL Server 2019 on Linux	A.12.40.00 and later	

3.6 Serviceguard for Linux Toolkit for KVM

Application Version	Serviceguard for Linux Advanced Edition	Notes
RHEL8	A.12.50.00 and later	<ul style="list-style-type: none">• Live Migration not supported NOTE: <ul style="list-style-type: none">• Not supported on OL 7.x, OL 8.x
RHEL7	A.12.00.50 and later	
RHEL6	A.12.00.50 and later	
SLES12	A.12.00.50 and later	
SLES15	A.12.40.00 and later	

3.7 Serviceguard Extension for SAP

3.7.1 SAP NetWeaver

SAP kernel versions	Serviceguard for Linux Advanced Edition	Supported Linux Distro	Notes
7.85, 7.89	A.12.80.03 and later		<ul style="list-style-type: none"> • Serviceguard Extension for SAP for Linux (HPE SGeSAP/LX) clusters SAP NetWeaver-based SAP applications based on the NetWeaver kernel versions mentioned to the left. In particular, coverage includes but is not restricted to support for clusters with S/4 HANA 1610, 1709, 1809, 1909, 2020, 2021 and 2022 applications. • SAP Enqueue Server Architecture (ENSA) 1 and 2 are supported. • For support information regarding Serviceguard extension for SAP for Linux (SGeSAP/LX) versions 12.60 and older, please refer to corresponding SGeSAP release notes: "Serviceguard Extension for SAP Version B.xx.yy Release Notes for Linux" available at https://www.hpe.com/info/linux-serviceguard-docs • The combination with HPE Serviceguard Flex Storage Add-on is supported for NetWeaver Instance directories starting from A.12.80.00. Central NetWeaver directories can likewise be based on HA NFS tk/DRBD. • The Linux Distro listed is applicable for the respective SUSE Linux Enterprise Server for SAP Applications (SLES4SAP) and Red Hat Enterprise Linux for SAP Applications (RHEL4SAP). • Serviceguard releases older than SG 12.80.03 are incompatible with SAP kernel patches that can enable systemd integration of the SAP startup framework. <p>SAP Netweaver and S/4 kernel patch levels with systemd integration are released on SLES15 and RHEL8 only. They include patch levels starting from 7.22 PL1119, 7.53 PL1011, 7.77 PL441, 7.81 PL241, 7.85 PL115 (see SAP note 3139184). Quick fixes to restore interoperability with Serviceguard are available from HPE support.</p>
7.81 7.73, 7.77 7.50, 7.51, 7.52, 7.53 7.40, 7.41, 7.42, 7.45, 7.49 7.20, 7.20_EXT, 7.21, 7.22	A.12.80.xx	SLES 15 <i>uptoSP4</i> SLES 12 <i>uptoSP5</i> RHEL 8 <i>8.1 to 8.6</i> RHEL 7 <i>7.0 to 7.9</i>	
	A.12.70.xx	SLES 15 <i>uptoSP2</i> SLES 12 <i>uptoSP5</i> RHEL 8 <i>8.1 to 8.2</i> RHEL 7 <i>7.0 to 7.9</i>	

3.7.2 Databases for SAP NetWeaver

Database Version	Serviceguard for Linux Advanced Edition	Notes
SAP Sybase ASE 16.0 SP3	A.12.80.xx A.12.70.xx	<ul style="list-style-type: none">• SAP use case-specific implementations of cluster packages for several legacy database technologies can optionally be used for the single-instance database technologies listed to the left.• For information regarding SAP HANA database cluster solutions refer to section 4.4 and section 5.1.
IBM DB/2 11.5	A.12.80.xx	
IBM DB/2 10.5, 11.1	A.12.80.xx A.12.70.xx	
Oracle RDBMS 11gR2, 12cR1, 12cR2, 19c	A.12.80.xx A.12.70.xx	
SAP MAXDB/liveCache 7.9	A.12.80.xx A.12.70.xx	

4 Serviceguard for Linux Enterprise edition

Serviceguard Enterprise Edition supports several Disaster Recovery solutions to deploy different applications in Serviceguard cluster. Following solutions are available with Serviceguard,

- DR Solutions based on Host Based Mirroring
 - [MD \(Multiple Devices\) device driver](#)
 - [LVM mirroring](#)
 - [VxVM mirroring](#)
- DR solutions based on DB Native replication
 - [Oracle Data Guard](#)
 - [Microsoft SQL Server \(Always On Availability groups\)](#)
 - [Oracle ASM mirroring](#)
 - [Serviceguard Extension for SAP HANA](#)
- DR solutions based on Array based replication
 - [3PAR Remote Copy](#)
 - [Primera Remote Copy](#)
 - [Continuous Access EVA](#)
 - [EMC SRDF](#)
 - [XP Continuous Access](#)

Notes:

The only supported cluster arbitration mechanism is Quorum Server or arbitrator nodes at the Third Site. Cluster Lock LUN, Cluster Lock Disk, Dual Lock Disk is not supported.

4.1 Extended Distance Clusters (XDC)

The following section provides compatibility information about various host based mirroring software that can be used for replication in a Serviceguard Extended Distance Cluster (XDC). The Serviceguard XDC functionality is available with the Serviceguard for Linux Enterprise and Premium edition.

Mirroring Technology	Serviceguard for Linux Enterprise Edition	Notes
MD RAID RAID 1	A.12.00.00 and later	<ul style="list-style-type: none">• MD RAID with A.12.00.21 is supported only up to RHEL 6.5• On RHEL 7.3, LVM RAID1 Mirroring is supported from A.12.00.51 and later• LVM RAID 1 Mirroring is supported only on<ul style="list-style-type: none">◦ RHEL (RHEL 6.6 and later)◦ OL (OL 7.4 and later)• LVM RAID 1 Mirroring is supported on RHEL 8 from A.12.60.00 onwards.• VxVM RAID1 is supported only on physical systems.
LVM RAID 1	A.12.00.21 and later	
VxVM RAID 1	A.12.00.00 and later	

4.2 Serviceguard HA and DR Solutions for Oracle Products

4.2.1 Serviceguard for Linux Toolkit for Oracle Data Guard

Application Version	Serviceguard for Linux Enterprise Edition	Notes
Oracle 12c [R1, R2], 18c, 19c, 21c ¹	A.12.00.50 and later	SGLX Specific Notes <ul style="list-style-type: none">• Support for HPE Application Tuner Express (ATX) version 1.0.1-84 or later• Following features are supported from A.12.50.1 onwards<ul style="list-style-type: none">○ Two standby solution○ Protected DB replica○ Farsync monitoring○ Read IP management

4.2.2 Serviceguard for Linux with Oracle ASM Mirroring

Application Version	Serviceguard for Linux Enterprise Edition	Notes
Oracle 12c [R1, R2], 18c, 19c, 21c ¹	A.12.20.00 and later	
Oracle 11g [R2]		

Notes:

¹ Easy deployment feature for 21c can be utilised by executing the steps mentioned in the CR QXCR1001815216.

4.3 Serviceguard for Linux Toolkit for Microsoft SQL Server on Linux

Application Version	Serviceguard for Linux Enterprise Edition	Notes
SQL Server 2017 on Linux	A.12.20.00 and later	<ul style="list-style-type: none">• Support for Always ON Availability Groups (AOAG) and Always ON Failover Cluster Instance (AOFI) for SQL Server on Linux
SQL Server 2019 on Linux	A.12.40.00 and later	<p>NOTE:</p> <ul style="list-style-type: none">• Not supported on SLES 15, OL 7 and OL 8

4.4 Serviceguard Extension for SAP HANA

SAP HANA SPS / revisions	Serviceguard for Linux Enterprise Edition	Supported Linux Distro	Notes
SAP HANA2 SPS06 revisions SAP HANA2 SPS05 revisions SAP HANA2 SPS04 revisions ¹ (rev48 or higher recommended) SAP HANA1 SPS12 revisions ² (rev 122.16 or higher)	A.12.80.xx	SLES 15 <i>up to SP4</i> SLES 12 <i>up to SP5</i> RHEL 8 <i>8.1 to 8.6</i> RHEL 7 <i>7.0 to 7.9</i>	<ul style="list-style-type: none"> Serviceguard Extension for SAP for Linux (HPE SGeSAP/LX) clusters SAP HANA System Replication instance pairs in scale-up and scale-out installations. For information regarding SAP NetWeaver cluster solutions refer to section 3.7. For information regarding full SAP HANA multi-target and multi-tier clustering support refer to section 5.1. Multi-target and multi-tier HANA instance co-existence outside of the cluster is supported also with Serviceguard for Linux Enterprise Edition.
SAP HANA2 SPS05 revisions SAP HANA2 SPS04 revisions ¹ (rev48 or higher recommended) SAP HANA1 SPS12 revisions ² (rev 122.16 or higher)	A.12.70.xx ³	SLES 15 <i>up to SP2</i> SLES 12 <i>up to SP5</i> RHEL 8 <i>8.1 to 8.4</i> RHEL 7 <i>7.0 to 7.9</i>	<ul style="list-style-type: none"> For support information regarding Serviceguard extension for SAP for Linux (SGeSAP/LX) versions 12.60 and older, please refer to corresponding SGeSAP release notes: "Serviceguard Extension for SAP Version B.xx.yy Release Notes for Linux" available at https://www.hpe.com/info/linux-serviceguard-docs The Linux Distro listed is applicable for the respective SUSE Linux Enterprise Server for SAP Applications (SLES4SAP) and Red Hat Enterprise Linux for SAP Applications (RHEL4SAP).

Notes:

¹ HANA Dynamic Tiering clusters require HANA 2.0 SPS04 Rev 2.00.044 or higher

² The HPE Serviceguard Quarantine feature is not supported with SAP HANA1.

³ HPE Serviceguard A.12.70.xx is not supported with HANA with Python3. To use Python3 with HANA, upgrade Serviceguard version to A.12.80.xx or higher. Support for HANA2 SPS05 is no longer available with SG 12.70.xx starting rev 59.04 since SAP ends support of Python2 with it.

4.5 Serviceguard Metrocluster with 3PAR Remote Copy

3PAR Inform OS	Serviceguard for Linux Enterprise Edition	Notes
3.3.x	A.12.00.51 and later	Supported HPE 3PAR features <ul style="list-style-type: none"> 3PAR Synchronous Long Distance (SLD) replication with A.12.30.00 and Inform OS 3.3.x 3PAR Peer Persistence with A.12.00.40 and later 3PAR Asynchronous Streaming Mode Synchronous Replication mode Fully Provisioned and Thinly Provisioned Virtual Volumes 3PAR Virtual Domains Support for Asynchronous Periodic Replication mode N-1 or 1-N Remote Copy Configuration with below mentioned condition: In a N-1 or 1-N Remote Copy topology, 3PAR allows only one of the pairs to be bi-directional, rest of the pairs will be unidirectional. 3Par recommends not to use the unidirectional pairs for Disaster Recovery. So, one can configure Metrocluster or Continentalclusters only between the arrays that are in a bidirectional configuration within a N-1 or 1-N Remote Copy setup. 3PAR Remote Copy Failsafe mode is supported from Inform OS version
3.2.x	A.12.00.00 and later	SGLX Specific Notes <ul style="list-style-type: none"> Support for use of VMware Virtual Machine File System (VMFS) based storage in 3PAR Metrocluster packages. Support for Recovery Point Objective (RPO) Sensitive failover with 3PAR Metrocluster packages Easy Deployment of Metrocluster Packages using Serviceguard Manager B.12.00.00 cmppreparestg command over 3PAR Remote Copy Volume Group disks
3.1.x	A.12.00.00 and later	Restrictions & Unsupported Configurations <ul style="list-style-type: none"> RHEL 5.7 to 5.11 Not Supported with Inform OS 3.3.1 HPE 3PAR Inform OS CLI required only with RHEL 5.x Asynchronous streaming remote copy mode not supported with Inform OS 3.2.2 & earlier. Unidirectional Remote Copy configuration
2.3.1 mu2	A.12.00.00 and later	<ul style="list-style-type: none"> 3PAR Remote Copy volume groups configured with fail_wrt_on_err policy. RHEL 6 KVM – Guest as Serviceguard Metrocluster Node not supported Command preview "cmdprev" not supported 3.1.3 Onwards. (Note: With Inform OS 3.2.1 HP Serviceguard Metrocluster for 3 PAR requires MU1 or later to support failsafe mode).

- This table represents what has been certified and is supported. If other storage, firmware or software versions are available but not indicated in this table, it is currently not supported. The table will be updated when new versions are certified.
- Refer to 3PAR documentation to get information on supported versions of HP 3PAR Inform OS CLI on respective Operating Systems.
- Note: mu refers to maintenance update.
- Note: HP Metrocluster 3PAR package will have impact if the HP 3PAR storage system is upgraded to any of the following 3PAR OS versions
 2.3.1 MU5Patch35
 3.1.1 MU3Patch27
 3.1.2MU3Patch16
 Please refer the respective release notes for more details.
- Note: 3PAR arrays allow a maximum 64 to 256 CLI connections based on array model and InformOS version. Metrocluster for Linux uses CLI for array communication. Each Metrocluster package needs at least one CLI session. Please refer to your 3PAR array documentation for maximum supported CLI sessions. Ensure that sufficient CLI sessions will be available for Metrocluster packages during failover. Refer to the section "Managing CLI Connections to 3PAR array" in the manual for more information.
- When using 3PAR Inform CLI Version 3.1.2, there may be a considerable increase in the failover times of the Metrocluster packages. This is owing to a known faulty behavior during client connections with 3PAR OS Inform CLI version 3.1.2. This issue has been fixed in 3PAR OS Inform CLI version 3.1.3. Customers are advised to move to 3PAR OS Inform CLI version 3.1.3.

4.6 Serviceguard Metrocluster with Primera Remote Copy

Alletra 9000/ Primera Inform / OS	Serviceguard for Linux Enterprise Edition	Notes
<p>Primera 4.0, 4.1, 4.2, 4.3, 4.4, 4.5</p> <p>Alletra 9000 9.3, 9.4, 9.5</p>	<p>A.12.60.00 and later</p>	<p>Supported HPE Primera/ HPE Alletra 9000</p> <ul style="list-style-type: none"> • A package can be configured with Remote Copy replication with mixed storage arrays i.e., HPE Primera, HPE Alletra 9000, HPE 3PAR storage arrays. Refer to support matrix of respective storage arrays for specific details • Synchronous Long Distance (SLD) replication • Peer Persistence • Asynchronous periodic mode • Fully Provisioned and Thinly Provisioned Virtual Volumes • Virtual Domains • Support for Asynchronous Periodic Replication mode <p>SGLX Specific Notes</p> <ul style="list-style-type: none"> • Support for use of VMware Virtual Machine File System (VMFS) based storage in Primera Metrocluster packages. • Support for Recovery Point Objective (RPO) Sensitive failover with Primera Metrocluster packages • Easy Deployment of Metrocluster Packages using Serviceguard Manager B.12.00.00 • cmpreparestg command over Primera Remote Copy Volume Group disks • DRR feature is not supported with Inform OS 4.3 for Primera, and Alletra OS 9.3 for Alletra 9000 (due to defect 332839) <p>Restrictions & Unsupported Configurations</p> <ul style="list-style-type: none"> • Unidirectional Remote Copy configuration

4.7 Serviceguard Metrocluster with Continuous Access EVA

EVA Firmware	Serviceguard for Linux Enterprise Edition	Software on Windows Management Server	Notes
<p>XCS 1000X000</p> <p>XCS 11001100</p> <p>XCS 11200000</p> <p>XCS 11300000</p>	<p>A.12.00.00 and later</p>	<ul style="list-style-type: none"> • CV EVA v9.4 SMI-S EVA v9.4 • P6000 CV 10.0 SMI-S P6000 v10.0 • P6000 CV v10.1 SMI-S P6000 v10.1 • P6000 CV v10.2 SMI-S P6000 v10.2 • P6000 CV v10.3 SMI-S P6000 v10.3 	<ul style="list-style-type: none"> • Synchronous Replication mode • Enhanced Asynchronous Replication mode <p>The following features are not supported with in A.12.00.00:</p> <ul style="list-style-type: none"> • Configuring Metrocluster package with secure connection to Management Server is not supported on RHEL 6.1. • VxVM and VxFS <p>NOTE:</p> <ul style="list-style-type: none"> • Not supported on SLES 15, OL 7, OL 8, and RHEL 8

4.8 Serviceguard Metrocluster with EMC SRDF

RAID Manager Version ¹	Serviceguard for Linux Enterprise Edition	Notes
V 8.x V 9.x		<ul style="list-style-type: none"> • All features as supported by B.01.00.00 • SRDF Synchronous & Asynchronous data replication on DMX, DMX-3, DMX-4, VMAX and PowerMAX series (Asynchronous replication on Symmetrix DMX requires microcode level 5671 or higher) • Support for RDF (Remote Data Facility) group numbers > 64 • SRDF Consistency Groups (for M by N configurations), Synchronous and Asynchronous data replication • SRDF Control Operations: Disaster restart – failover, Disaster recovery failback • SRDF Swap: R1/R2 personality swap on static and dynamic RDF devices • SRDF Domino mode • Use of BCV protection • DWDM up to 300km • Support for Data Replication Storage Failover • Support for controlled failback.
V.7.6.1.0	A.12.00.50 and later	<ul style="list-style-type: none"> • Support for Cross-Subnet Configurations • Support for SONET/SDH as heartbeat and SRDF links • Support for Virtual Provisioning Volumes Persistent Reservations (PR) <p>Following Features not supported in 12.00.50:</p> <ul style="list-style-type: none"> • Cannot be deployed on Virtual Machines (VMware, KVM, RHEV) • cmpreparestg command over SRDF Device Group disks <p>Notes:</p> <ul style="list-style-type: none"> • MxN configurations not supported with Symmetrix 3 • R1/R2 swapping not supported with Symmetrix 3, 4, 4.8 • M by N configurations cannot be used with R1/R2 swapping • Not supported on SLES15, OL 7, OL 8, and RHEL 8

Notes:

microcode versions listed below are supported unless stated explicitly

- Symmetrix VMAX Series: microcode 5874, 5875, 5876, 5977 or later
- Symmetrix "7" (DMX3 and DMX4 Series): microcode 5771, 5772, 5773
- Symmetrix "6" (DMX Series): microcode 5670
- For SRDF/A: microcode 5671 or later
- For Consistency Group support: microcode 5267.42.29 or later
- For R1/R2 personality swap: microcode 5567.52.29 or later

4.9 Serviceguard Metrocluster with XP Continuous Access

RAID Manager Version ¹	Serviceguard for Linux Enterprise Edition	Notes
XP Arrays: - 01.22.06 or later	A.12.00.00 and later	<ul style="list-style-type: none"> • Continuous Access Synchronous replication • Continuous Access Journal replication • Continuous Access Asynchronous replication with XP arrays • Device Group Monitor • Data Replication Storage Failover Preview (cmdrprev command) • Remote Command Device
P9500 arrays: - 01.24.13 or later ²	A.12.00.00 and later	<ul style="list-style-type: none"> • Virtual Command Device <p>Not supported:</p> <ul style="list-style-type: none"> • Site Controller packages in A.12.00.00 • Three Data Center Disaster Recovery (3DC DR) solution • VxVM and VxFS is not supported in A.12.00.00

Notes:

¹This table represents what has been certified and is supported. If other storage, microcode or Raid Manager versions are available but not indicated in this table, it is currently not supported by Metrocluster with Continuous Access for P9000 and XP. Following XP/P9000 Platform are supported and refer to HPE XP storage documents for certified version of Raid Manager & Microcode version details.

- XP20000/XP24000
- P9500
- XP 7, XP8

²The following features introduced in HP Storage P9000 RAID Manager are not supported with Metrocluster: Virtual Command Device via LAN, Copy Group configuration based on RAID, User Authentication based on Command Device. The User Authentication for the Command Device Security must be disabled in a Metrocluster environment.

5 Serviceguard for Linux Premium Edition

5.1 Serviceguard Extension for SAP Multi-Target HANA

SAP HANA SPS / revisions	Serviceguard for Linux Premium Edition	Supported Linux Distro	Notes
SAP HANA2 SPS04 revisions (rev48 or higher) ¹ SAP HANA2 SPS05 revisions ² SAP HANA2 SPS06 revisions ²	A.12.80.xx	SLES 15 <i>uptoSP4</i> SLES 12 <i>uptoSP5</i> RHEL 8 <i>8.1 to 8.6</i> RHEL 7 <i>7.0 to 7.9</i>	<ul style="list-style-type: none"> • Serviceguard Extension for SAP for Linux (HPE SGeSAP/LX) clusters three (or four) SAP HANA scale-up instances of the same SAP System using two tier-2 HANA System Replications. The optional fourth instance will be added in tier-3. • For information regarding SAP NetWeaver application cluster support refer to section 3.7.
SAP HANA2 SPS04 revisions (rev48 or higher) ¹ SAP HANA2 SPS05 revisions ²	A.12.70.xx	SLES 15 <i>uptoSP2</i> SLES 12 <i>uptoSP5</i> RHEL 8 <i>8.1 to 8.4</i> RHEL 7 <i>7.0 to 7.9</i>	<ul style="list-style-type: none"> • For information regarding SAP HANA clustering without multi-target configurations refer to section 4.4. • The Linux Distro listed is applicable for the respective SUSE Linux Enterprise Server for SAP Applications (SLES4SAP) and Red Hat Enterprise Linux for SAP Applications (RHEL4SAP).

Notes:

¹Does not support features Multi-SID, Safesync, Quarantine and Active/Active

²Does not support the features Multi-SID, Safesync and Quarantine. Active-active is supported starting with SGLX 12.80.

Appendix

A. Serviceguard Releases and Patch information

Serviceguard for Linux versions up to A.12.50.03 are available as patch releases. In addition, versions 12.00.00, 12.00.30 and 12.10.00, which are also called Market Release. Going forward, releases having only the defects fixes will be released via patches and release containing enhancements will be available through update releases.

Update releases can be found at any of the following locations,

- HPE Software Updates and Licensing Portal <https://myenterpriselicence.hpe.com/>
- HPE Software Delivery Repository <https://downloads.linux.hpe.com/SDR/project/sglx/>

The table below provides details about the patch releases for Serviceguard for Linux Base, Advanced and Enterprise bundles.

Serviceguard for Linux	Base Patch	Advanced Patch	Enterprise Patch	Premium Patch
A.12.80.05	BB094-11015 -patch-128005	BB095-11015 -patch-128005	BB097-11015 -patch-128005	R7Q02-11015 -patch-128005
A.12.80.03	BB094-11007 -patch-128003	BB095-11007 -patch-128003	BB097-11007 -patch-128003	R7Q02-11002 -patch-128003
A.12.50.03	BB094-11007 -patch-125003	BB095-11007 -patch-125003	BB097-11007 -patch-125003	NA
A.12.10.00	SGLX_00537	SGLX_00538	SGLX_00539	NA
A.12.00.51	SGLX_00534	SGLX_00535	SGLX_00536	NA
A.12.00.50	SGLX_00529	SGLX_00530	SGLX_00531	NA
A.12.00.41	NA	SGLX_00527	SGLX_00528	NA
A.12.00.40	SGLX_00524	SGLX_00525	SGLX_00526	NA
A.12.00.30	SGLX_00518	SGLX_00519	SGLX_00520	NA
A.12.00.22	NA	SGLX_00516	SGLX_00517	NA
A.12.00.21	SGLX_00509	SGLX_00510	SGLX_00511	NA
A.12.00.20	SGLX_00494	SGLX_00495	SGLX_00496	NA
A.12.00.10	SGLX_00489	SGLX_00490	SGLX_00491	NA

B. Storage supported from A.12.00.00 to SG/LX A.12.00.51

Supported HPE Storage for Cluster Shared Storage and Lock LUN from A.12.00.00 to A.12.00.51

Vendor	Array	Model	Remarks
Hewlett Packard Enterprise	3PAR StoreServ 20000	20850, 20800, 20450	Device Mapper Multipathing is supported with 3PAR iSCSI devices only when there are 2 iSCSI ports on the array.
	3PAR StoreServ 10000	10800, 10400	Device Mapper Multipathing is supported with 3PAR iSCSI devices only when there are 2 iSCSI ports on the array.
	3PAR StoreServ 8000	8450, 8440, 8400, 8200	Device Mapper Multipathing is supported with 3PAR iSCSI devices only when there are 2 iSCSI ports on the array.
	3PAR StoreServ 7000	7450, 7400, 7200	Device Mapper Multipathing is supported with 3PAR iSCSI devices only when there are 2 iSCSI ports on the array.
	3PART Class	T800, T400	
	3PARF Class	F400, F200	
	XP	XP7, XP24000, XP20000, P9500	
	StoreVirtual	4330, 4130	iSCSI Only
	StorageWorks MSA	P2000G3, MSA 1040, 2040	
EVA/P6000	HP EVA 4x00 / 6x00 / 8x00, HP EVA 6300/P6350, HP EVA P6500/P6550	HPE EVA supported with firmware v3.01 or later.	

C. Compatible Non HPE Storage supported up to SG/LX A.12.00.51

Compatible Non HPE Storage for Cluster Shared Storage and Lock LUN up to A.12.00.51

Vendor	Array	Model	Remarks
EMC	Symmetrix	Symmetrix DMX: 6, 6.5, 7.0 Symmetrix VMAX & VMAXe Series (All arrays with microcode level 5874.xx.xx or later)	
	VNX Series	VNX 5K, VNX7K	Block Storage Only
	CLARiiON	CX, AX	
Hitachi	Universal Storage Platform	VM, V, VSP, H24000, H20000	
	TagmaStore	USP11000, USP600, USP100, NSC55	
	Virtual Storage Platform	G1000, VX7, VP9500	
NetApp	NetApp FAS	FAS2000, FAS 3000, FAS 6000, FAS 8000	Only NFS (filer) option supported
IBM	SAN Volume Controller		iSCSI Not Supported

Serviceguard For Linux Flex Storage Add-on Edition

The following section provides compatibility information for HPE Serviceguard for Linux Flex Storage Add-on. HPE Serviceguard for Linux Flex Storage Add-on provides HPE Software based storage replication solution using DRBD for non-shared storages. DRBD is a software-based, shared-nothing, replicated storage solution for replicating data on block devices (hard disks, partitions, logical volumes etc.) between SGLX cluster nodes.

6. HPE Serviceguard for Linux Flex Storage Add-on B.1.x.y

The following sections describes the compatible SGLX versions, Operating System distributions and kernel errata supported with Serviceguard for Linux Flex Storage Add-on. The following conditions apply:

- Only x86_64 bit Operating Systems supported
- For the listed Operating systems distribution versions(major and minor), all the kernel erratas are supported unless explicitly specified within one month of its release.
- All cluster nodes must have the same OS distribution
- Supports up to three DRBD replicas

HPE SGLX Flex Storage Add-on	Minimum SGLX Version	DRBD Versions	Supported Linux Distro
B.1.0.0	A.12.80.00	9.0.x (9.0.30) and 9.1.x (9.1.3)	RedHat 7.6 up to 7.9 RedHat 8.1 up to 8.4 SLES 12 SP3 up to SP5 SLES 15 SP0 up to SP3