



# **SIOS Protection Suite for Linux**

**v9.2**

**SPS for Linux Release Notes**

**October 2017**

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# SIOS Protection Suite for Linux Release Notes

## Version 9.2

Important!!

**Read This Document Before Attempting To Install Or Use This Product!**

**This document contains last minute information that must be considered before, during and after installation.**

## Introduction

This release notes document is written for the person who installs, configures and/or administers the SIOS Protection Suite (SPS) for Linux product. The document contains important information not detailed in the formal LifeKeeper and DataKeeper documentation sets such as package versions and last-minute changes to instructions and procedures as well as a link to the Troubleshooting sections for product restrictions and troubleshooting hints and tips that were discovered through final product testing. It is important that you review this document before installing and configuring SPS software.

## SPS Product Descriptions

### LifeKeeper for Linux

The LifeKeeper product includes fault detection and recovery software that provides high availability for file systems, network addresses, applications and processes running on Linux. LifeKeeper supports the configuration and switchover of a given application across multiple servers. The servers on which the application is configured are assigned priorities to determine the sequence in which the application will move from server to server in the event of multiple failures.

LifeKeeper for Linux provides switchover protection for a range of system resources. Automatic recovery is supported for the following resource types:

- Processes and Applications
- Shared Storage Devices
- Network Attached Storage Devices
- LVM Volume Groups and Logical Volumes
- File Systems (ext3, ext4, vxfs, xfs and nfs) **Note:** btrfs is not currently supported by the SIOS Protection Suite for Linux. For the detailed information, see Troubleshooting > Known issues and restrictions.
- Communication Resources (TCP/IP)

- Database Applications ( Oracle, MySQL, ,SAP MaxDB, PostgreSQL, EnterpriseDB Postgres Plus Advanced Server/EDB Postgres Advanced Server, EnterpriseDB Postgres Plus Standard Server, Sybase)
- Web Server Resources (Apache, Apache SSL)
- Samba Resources (file)
- DataKeeper for Linux
- SAP Application Environment Resources
- Software RAID (md) Resources
- WebSphere MQ Resources
- Postfix Resources

LifeKeeper for Linux provides Disaster Recovery protection for the following resource types:

- Linux Multi-Site Cluster configurations in which data from a shared storage cluster is replicated to a disaster recovery site

### DataKeeper for Linux

The SIOS DataKeeper product:

- Provides volume-based synchronous and asynchronous data replication.
- Integrates into the LifeKeeper Graphical User Interface for administration and monitoring.
- Automatically resynchronizes data between source and target servers at system recovery.
- Monitors the health of underlying system components and performs local recovery in the event of failure.
- Allows manual resource switchovers and failovers of mirrored volumes.
- Can be easily upgraded to provide high availability clustering and automatic failover and recovery using a license key to enable new functionality.

## SPS Components

### SPS Core

SPS for Linux is bundled for, and only runs on, 64-bit systems (AMD64 and EM64T systems).

The SPS Core Package Cluster includes the following installable packages:

Package	Package Name	Description
LifeKeeper Core	steeleye-ik-9.2.0-6629.x86_64.rpm	The LifeKeeper package provides recovery software for failures associated with core system components such as memory, CPUs, the operating system, the SCSI disk subsystem and file systems.
DataKeeper Core	steeleye-ikDR-9.2.0-6629.noarch.rpm	The DataKeeper package provides data replication (synchronous or asynchronous mirrors with intent logging).
LifeKeeper GUI	steeleye-ikGUI-9.2.0-6629.x86_64.rpm	The LifeKeeper GUI package provides a graphical user interface for LifeKeeper and DataKeeper administration and status monitoring.
SPS IP Recovery Kit	steeleye-ikIP-9.2.0-6629.noarch.rpm	The SPS IP Recovery Kit provides recovery software for automatic switchover of IP addresses.
SPS Raw I/O Recovery Kit	steeleye-ikRAW-9.2.0-6629.noarch.rpm	The SPS Raw I/O Recovery Kit provides support for applications that use raw i/o to bypass kernel buffering.
LifeKeeper Man Pages	steeleye-ikMAN-9.2.0-6629.noarch.rpm	The LifeKeeper Man Page package provides reference manual pages for the SPS product.

**Note:** Beginning with the release of LifeKeeper 7.5, the steeleye-ikHLP rpm package is no longer included. The steeleye-ikHLP package contained online help material that could be launched from the LifeKeeper GUI. Online help is now available from SIOS Technical Documentation (<http://docs.us.sios.com>). This documentation can be launched from the **Help menu** on the LifeKeeper GUI.

**Note:** Beginning with the release of LifeKeeper 8.2, CCISS Recovery Kit (the steeleye-ikCCISS rpm package) is no longer included. If HP storage devices (CCISS) are used with DataKeeper and you are upgrading to v8.2 or later, you must configure the DEVNAME device\_pattern file prior to upgrading. (See DataKeeper Troubleshooting section.)

## SPS Optional Recovery Software

The following optional software provides resource definition and recovery software for the application versions listed:

Package	Package Name	Description
SPS Apache Web Server Recovery Kit	steeleye-ikAPA-9.2.0-6629.noarch.rpm	The SPS for Linux Apache Web Server Recovery Kit provides fault resilience for Apache Web Server software in an SPS environment.

Package	Package Name	Description
SPS SAP Recovery Kit	steeleye-1kSAP-9.2.0-6629.noarch.rpm	The SPS for Linux SAP Recovery Kit provides a mechanism to recover SAP NetWeaver from a failed primary server onto a backup server in an SPS environment working in conjunction with other SPS Recovery Kits to provide comprehensive failover protection.
SPS SAP MaxDB Recovery Kit	steeleye-1kSAPDB-9.2.0-6629.noarch.rpm	The SAP MaxDB Recovery Kit provides fault resilient protection for SAP MaxDB databases in an SPS for Linux environment.
SPS DB2 Recovery Kit	steeleye-1kDB2-9.2.0-6629.noarch.rpm	The SPS for Linux DB2 Recovery Kit provides fault resilient protection for DB2 database instances. SPS together with the DB2 Universal Database product family afford increased availability to DB2 operating environments by effectively recovering database server failures without significant down-time or human intervention.
SPS Oracle Recovery Kit	steeleye-1kORA-9.2.0-6629.noarch.rpm	The SPS for Linux Oracle Recovery Kit provides fault resilience for Oracle software in an SPS environment furnishing a mechanism to tie the data integrity of Oracle databases to the increased availability provided by SPS.
SPS MySQL Recovery Kit	steeleye-1kSQL-9.2.0-6629.noarch.rpm	The SPS for Linux MySQL Recovery Kit provides an easy way to add SPS fault-resilient protection for MySQL resources and databases enabling a failure on the primary database server to be recovered on a designated backup server without significant lost time or human intervention.
SPS PostgreSQL Recovery Kit	steeleye-1kPGSQL-9.2.0-6629.noarch.rpm	The SPS for Linux PostgreSQL Recovery Kit is an SQL compliant, object-relational database management system (ORDBMS) based on POSTGRES providing a mechanism for protecting PostgreSQL instances within SPS.
SPS Sybase ASE Recovery Kit	steeleye-1kSYBASE-9.2.0-6629.noarch.rpm	The SPS for Linux Sybase ASE Recovery Kit provides SPS resource protection for the Sybase ASE components Adaptive Server, Monitor Server, and Backup Server.
SPS Postfix Recovery Kit	steeleye-1kPOSTFIX-9.2.0-6629.noarch.rpm	The SPS for Linux Postfix Recovery Kit provides a mechanism to recover Postfix from a failed primary server to a backup server in an SPS environment.
SPS Samba Recovery Kit	steeleye-1kSMB-9.2.0-6629.noarch.rpm	The SPS for Linux Samba Recovery Kit provides fault resilient protection for Samba file and print shares on a Linux server existing in a heterogeneous network enabling a failure on the primary Samba server to be recovered on a designated backup server without significant lost time or human intervention.

Package	Package Name	Description
SPS NFS Server Recovery Kit	steeleye-1kNFS-9.2.0-6629.noarch.rpm	The SPS for Linux NFS Server Recovery Kit provides fault resilience for Network File System (NFS) software in an SPS environment enabling a failure on the primary NFS server to be recovered on a designated backup server without significant lost time or human intervention.
SPS Network Attached Storage Recovery Kit	steeleye-1kNAS-9.2.0-6629.noarch.rpm	The SPS for Linux Network Attached Storage Recovery Kit provides fault resilience for Network File System (NFS) software in an SPS environment affording SPS users the opportunity to employ an exported NFS file system as the storage basis for SPS hierarchies.
SPS Logical Volume Manager (LVM) Recovery Kit	steeleye-1kLVM-9.2.0-6629.noarch.rpm	The SPS for Linux Logical Volume Manager (LVM) Recovery Kit provides logical volume support for other SPS recovery kits allowing SPS-protected applications to take advantage of the benefits offered by the Logical Volume Manager, including simplified storage management and the ability to dynamically re-size volumes as needs change.
SPS Software RAID (md) Recovery Kit	steeleye-1kMD-9.2.0-6629.noarch.rpm	The SPS for Linux Software RAID (md) Recovery Kit provides software RAID support for other SPS recovery kits allowing SPS-protected applications to take advantage of the benefits offered by software RAID, including lower cost data redundancy, data replication over a SAN and simplified storage management.
SPS PowerPath Recovery Kit	steeleye-1kPPATH-9.2.0-6629.noarch.rpm	The SPS PowerPath Recovery Kit protects applications that use EMC PowerPath multipath I/O devices.
SPS Device Mapper Multipath (DMMP) Recovery Kit	steeleye-1kDMMP-9.2.0-6629.noarch.rpm	The SPS Device Mapper Multipath (DMMP Recovery Kit) protects applications and file systems that use DMMP devices allowing SPS to operate with and protect these applications and file systems.
Hitachi Dynamic Link Manager Software (HDLM) Recovery Kit	steeleye-1kHDLM-9.2.0-6629.noarch.rpm	The Hitachi Dynamic Link Manager Software (HDLM) Recovery Kit protects applications that use Hitachi Dynamic Link Manager Software devices.
SPS NEC iStorage StoragePathSavior (NECSPS) Recovery Kit	steeleye-1kSPS-9.2.0-6629.noarch.rpm	The SPS NEC iStorage StoragePathSavior (NECSPS) Recovery Kit protects applications that use NEC iStorage StoragePathSavior v3.3 or later multipath I/O devices.
SIOS DataKeeper	steeleye-1kDR-9.2.0-6629.noarch.rpm	SIOS DataKeeper for Linux provides an integrated data mirroring capability for SPS environments enabling SPS resources to operate in shared and non-shared storage environments.



Package	Package Name	Description
SPS WebSphere MQ Recovery Kit	steeleye-lkMQS-9.2.0-6629.noarch.rpm	The SPS for Linux WebSphere MQ Recovery Kit provides fault resilient protection for WebSphere MQ queue managers and queue manager storage locations enabling a failure on a primary WebSphere MQ server or queue manager to be recovered on the primary server or a designated backup server without significant lost time or human intervention.
Quorum/Witness Package	steeleye-lkQWK-9.2.0-6629.noarch.rpm	The SPS Quorum/Witness Package allows a node to get a “second opinion” on the status of a failing node acting as an intermediary to determine which servers are part of the cluster. When determining when to fail over, the Witness Server allows resources to be brought in service on a backup server only in cases where it verifies the primary server has failed and is no longer part of the cluster.
Quick Service Protection	steeleye-lkQSP-9.2.0-6629.noarch.rpm	SPS Quick Service Protection supplies functionality to easily protect OS services.

## New Features of SIOS Protection Suite for Linux Version 9

Product	Feature
<b>New in Version 9.2</b>	
LifeKeeper Core	Support Red Hat Enterprise Linux 7.4
	SNMP trap can be sent to multiple targets
	<a href="#">Bug fixes</a>
IP	IP resources using real IP(primary IP address configured for NIC) can be created
PostgreSQL	Support PostgreSQL 9.6
	Support FUJITSU Software Enterprise Postgres 9.6 For the details, refer to the SPS Optional Recovery Software Requirements, PostgreSQL Recovery Kit Administration Guide > Administration.
MQ	Support IBM MQ 9.0 (Certified in December 2017)
MD, SAP, SAP MaxDB, Quorum/Witness, Route53, Install	<a href="#">Bug fixes</a>
<b>New in Version 9.1.2</b>	

Product	Feature
LifeKeeper Core	SUSE Linux Enterprise Server 12 SP2 is supported.
	CentOS7.3 is supported.
	Red Hat Enterprise Linux Version 6.9 is supported.
	UEK kernel of Oracle Linux Version 7.3 is supported.
	Bug fixes
PostgreSQL	Support PostgreSQL 9.6
	Support FUJITSU Software Enterprise Postgres 9.6 For the details, refer to the SPS Optional Recovery Software Requirements, PostgreSQL Recovery Kit Administration Guide > Administration.
Oracle	Oracle 12c R2 is supported.
DB2	DB2 11.1 is supported.
IP, QSP, MySQL, NFS	Bug fixes
<b>New in Version 9.1.1</b>	
LifeKeeper Core	SUSE Linux Enterprise Server 12 SP1 support. * SLES12.0 is not supported. * Btrfs is not supported.
	Red Hat Enterprise Linux Version 7.3 support.
	Oracle Linux Version 7.3 support. * UEK is not supported.
	vSphere 6.5 support.
	Bug Fixes
PostgreSQL	PostgreSQL 9.5 support EDB Postgres Advanced Server v9.5 support FUJITSU Software Symfoware Server (Open Interface) V12.2 support FUJITSU Software Symfoware Server (Postgres) V12.3 support FUJITSU Software Enterprise Postgres 9.5 support For the details, refer to the SPS Optional Recovery Software Requirements, PostgreSQL Recovery Kit Administration Guide > Administration.
Sybase ASE	Sybase ASE 16.0 support.
MySQL	MySQL 5.7 support on RHEL 7.x/CentOS 7.x/OEL 7.x. * MySQL 5.7 on other OS is already supported.
SAP	SAP 7.5 support.
<b>New in Version 9.1.0</b>	

Product	Feature
LifeKeeper Core	Red Hat Enterprise Linux 6.8 support (Certified in September 2016). CentOS 6.8, Oracle Linux 6.8 support (Certified in September 2016). *MD RecoveryKit is not supported on these OS.
	LifeKeeper API for Monitoring Added API to supply LifeKeeper status and log information.
	Quick Service Protection support Added functionality to easily protect OS services.
	Bug Fixes
<b>New in Version 9.0.2</b>	
LifeKeeper Core	Support of Red Hat Enterprise Linux Version 7.2. *SQL RK is not supported when running on RHEL 7.x/CentOS 7.x/OEL 7.x.
	Updated OpenSSL package to version to 1.0.1q
	Bug Fixes
MQ	Added support for Multi-version WebSphere MQ. With this support queue managers for 7.1, 7.5, and 8.x can all be protected on the same cluster node.
	Removed the Recovery Kit restriction that only the mqm user could be used for running MQ commands. With this change any user in the mqm group can be used by the Recovery Kit to run MQ commands.
	Bug Fixes
IP, Filesystem, DMMP, DataKeeper, EC2, Post-greSQL, Power Path, SAP, SAP DB/MaxDB, Oracle	Bug Fixes.
Licensing	Update to a newer version of FlexNet
<b>New in Version 9.0.1</b>	
LifeKeeper Core	Bug Fixes.
DataKeeper	Bug Fixes.
<b>New in Version 9.0</b>	

## Bug Fixes

Product	Feature
LifeKeeper Core	Red Hat Enterprise Linux Version 6 Update 7 support. (Certified in October 2015)
	Community ENTERprise Operating System (CentOS) Version 6 Update 7 support. (Certified in October 2015)
	Oracle Linux Version 6 Update 7 support. (Certified in October 2015)
	SUSE LINUX Enterprise Server 11 SP4 support. (Certified in October 2015)
	<a href="#">Chef support</a> (2 node Data Replication configuration with IP/FileSystem/Apache/MySQL/PostgreSQL ARKs are supported.)
	Added SPS for Linux <a href="#">Parameters List</a> , document detailing tunable values. Added the lkchkconf command.
	vSphere 6 support
	reiserfs filesystem type is no longer supported.
	Arks supported with Red Hat Enterprise Linux Version 7.0/7.1, Community ENTERprise Operating System (CentOS) Version 7.0/7.1, and Oracle Linux Version 7.0/7.1 are the same as LifeKeeper for Linux v8.4.1. (Arks to be supported are: PostgreSQL, MySQL, Oracle, DB2, Apache, Postfix, DMMP, LVM, NFS, NAS, Samba, MD, EC2, Route53, Openswan)
	Bug Fixes.
DataKeeper	The DK rewind feature is no longer supported in version 9. Prior to upgrading to version 9, you will need to deactivate all rewind configuration settings, and perform any necessary archival of data.
	Bug Fixes.
GUI	JRE 8u51 support. (JRE 7 is no longer supported.)
	Chrome Browser is no longer supported.
	Bug Fixes.

## Bug Fixes

The following is a list of the latest bug fixes and enhancements.

Bug	Description
7067	Improved Route53 removal process
7300	Queries for Quorum/Witness go directly to remote nodes
7336	LDAP user can be specified as SID when creating SAP resources

Bug	Description
7338	SAP MaxDB can be installed on the shared file system
7344	Corrected invalid SNMP object ID
7347	A problem that log output was sometimes not performed correctly has been fixed.
7353	Route53 Recovery Kit parameters values can be set at less than the default value
7359	Installation error for some environments has been fixed
7361	Updated the value of the Route53 Recovery Kit parameter, ROUTE53_CHANGEID_TRY_COUNT
7363	Applications fails fixed SUSE Linux Enterprise Server for SAP installation failure

## System Requirements

### SPS Product Requirements

SPS for Linux is supported on any Linux platform that satisfies the minimum requirements included in the Linux Configuration table. Also refer to the SPS Support Matrix for supported operating systems, applications and virtualization.

**Note:** SPS on a Linux server will not inter-operate with SPS for Windows.

Description	Requirement
Linux Operating System	See the Linux Configuration table for specific operating system information.

Description	Requirement
Virtual Environments	<p>SPS for Linux is hypervisor-independent when the guest operating system running within the virtual machine is one of the supported versions listed in the Linux Configuration table. SIOS Protection Suite for Linux has been deployed in the following virtual environments:</p> <ul style="list-style-type: none"> <li>• Citrix XenServer v5 or later</li> <li>• KVM</li> <li>• Oracle Virtual Machine (OVM)</li> <li>• VMware vSphere v4, v4.1, v5, v5.1, v5.5, v6.0 and v6.5</li> <li>• Amazon EC2</li> </ul> <p>vSAN configuration is supported for vSphere 6.5 except RDM which is not supported by VMWare.</p> <p>Please refer to "<i>LifeKeeper for Linux in VMware ESX Server Virtual Machines, Configuration Guidelines</i>" for more detailed configuration requirements and limitations.</p> <p>Fibre channel SAN and shared SCSI cluster configurations are not supported with SPS for Linux running in a KVM and Citrix XenServer virtual machine.</p> <p><b>Note:</b> Some Amazon EC2 configurations have issues when the Shutdown Strategy is set to "Do not Switchover Resources". For the detailed information, see Troubleshooting &gt; Known issues and restrictions.</p>
Memory	<p>The minimum memory requirement for a system supporting SPS is 512 MB. This is the minimum amount required by SPS supported Linux distributions. System memory should be sized for the applications that will be running on the SPS protected system as well. Refer to Application Configuration for further information.</p>
Disk Space	<p>The SPS Package Cluster requires the following disk space:</p> <p style="padding-left: 40px;">/opt – approx 100000-105000 (1024-byte) disk blocks (depending on kits installed)</p> <p style="padding-left: 40px;">/ - approx 110000 (1024-byte) disk blocks</p>

## SPS Optional Recovery Software Requirements

The following table shows the software requirements for the optional SPS recovery software.

See Application Configuration for additional requirements and/or restrictions that may apply to applications under SPS protection.

## SPS Optional Recovery Software Requirements

Product	Requirement(s)
SPS Apache Web Server Recovery Kit	Apache Web Server v2, v2.2 and v2.4
SAP Recovery Kit	SAP 7.0 including Enhancement Package 1,2 and 3 SAP 7.3 including Enhancement Package 1 SAP 7.4 SAP 7.5 SAP 7.51
SPS SAP MaxDB Recovery Kit	SAP MaxDB v7.5, v7.6, v7.7, v7.8 and v7.9 LifeKeeper v6 or later Core Package Cluster
SPS Postfix Recovery Kit	Postfix software provided with the supported Linux distributions installed and configured on each server. The same version of Postfix should be installed on each server.  LifeKeeper v6 or later Core Package Cluster
SPS Oracle Recovery Kit	Oracle Database Standard Edition and Enterprise Edition v10g R2, v11g, v11g R2, v12c and v12c R2 (excluding ASM and pluggable database)  Oracle Database Standard Edition One (SE1) v10g R2, v11g, v11g R2, v12c and v12c R2 (excluding ASM and pluggable database)  Oracle Database Standard Edition 2 (SE2) v12c and v12c R2(except AWS EC2 system. See Known Issues and Restrictions > Oracle Recovery Kit. Also, excluding ASM and pluggable database)
SPS DB2 Recovery Kit	IBM DB2 Universal Database v9, v9.5, v9.7, v10.1, v10.5 and v11.1  IBM DB2 Enterprise Server Edition (ESE) v9, v9.5, v9.7, v10.1, v10.5 and v11.1  IBM DB2 Workgroup Server Edition (WSE) v9, v9.5, v9.7, v10.1, v10.5 and v11.1  IBM DB2 Express Edition v9, v9.5, v9.7, v10.1, v10.5 and v11.1  LifeKeeper v6 or later Core Package Cluster  SPS NFS Server Recovery Kit v5.1 or later ( <i>for DB2 EEE and DB2 ESE with multiple partitions only</i> )
SPS MySQL Recovery Kit	MySQL and MySQL Enterprise v5.1, v5.5, v5.6 and v5.7  MariaDB v5.5 and v10.0

## SPS Optional Recovery Software Requirements

Product	Requirement(s)
SPS PostgreSQL Recovery Kit	<p>PostgreSQL v8.3, v8.4, v9, v9.1, v9.2, v9.3, v9.4, v9.5 and v9.6</p> <p>EnterpriseDB Postgres Plus Standard Server v8.4 and v9</p> <p>EnterpriseDB Postgres Plus Advanced Server v8.3, v8.4, v9.1, v9.2, v9.3 and v9.4</p> <p>EDB Postgres Advanced Server v9.5</p> <p>EnterpriseDB Postgres Plus Solutions Pack v9.1, v9.2 and v9.3</p> <p>The following edition of FUJITSU Software Symfoware Server.</p> <p>Symfoware Server V12.2</p> <ul style="list-style-type: none"> <li>• Symfoware Server (Open Interface) V12.2 Enterprise Edition</li> <li>• Symfoware Server (Open Interface) V12.2 Standard Edition</li> </ul> <p>Symfoware Server V12.3</p> <ul style="list-style-type: none"> <li>• Symfoware Server (Postgres) V12.3 Enterprise Edition</li> <li>• Symfoware Server (Postgres) V12.3 Standard Edition</li> <li>• Symfoware Server (Postgres) V12.3 Lite Edition</li> </ul> <p>The following edition of FUJITSU Software Enterprise Postgres 9.5</p> <ul style="list-style-type: none"> <li>• FUJITSU Software Enterprise Postgres 9.5 Advanced Edition</li> <li>• FUJITSU Software Enterprise Postgres 9.5 Standard Edition</li> </ul> <p>The following edition of FUJITSU Software Enterprise Postgres 9.6</p> <ul style="list-style-type: none"> <li>• FUJITSU Software Enterprise Postgres 9.6 Standard Edition</li> </ul>
SPS Sybase ASE Recovery Kit	Sybase ASE 15.5, 15.7 and 16.0
SPS Samba Recovery Kit	Standard Samba file services provided with the supported Linux distributions
SPS NFS Server Recovery Kit	<p>Linux kernel version 2.6 or later</p> <p>The NFS Server and client packages must be installed on SLES systems.</p>
SPS Network Attached Storage Recovery Kit	NFS version of Mounted NFS file systems from an NFS server or Network Attached Storage (NAS) device v2, v3 and v4
SPS Logical Volume Manager (LVM) Recovery Kit	Linux Logical Volume Manager (LVM) Version 1 or 2 volume groups and logical volumes
SPS Software RAID (md) Recovery Kit	<p>Software RAID devices based on md</p> <p><b>Note:</b> The MD Recovery Kit cannot be used in conjunction with SIOS DataKeeper.</p>



Product	Requirement(s)
EMC PowerPath	PowerPath for Linux v5.3 or later The sg3_utils Sg3_utils package must be installed.
Device Mapper Multipath (DMMP)	The device-mapper-multipath package attached to the operating system. The sg3_utils package must be installed.
Hitachi Dynamic Link Manager Software (HDLM)	Please see > <i>Hitachi Dynamic Link Manager Software Multipath I/O Configurations and Linux Distribution Requirements</i> . The sg3_utils package must be installed.
NEC iStorage Storage Path Savior (NECSPS)	iStorage StoragePathSavior for Linux v3.3 or later For the supported Linux kernel and distribution, please refer to the support information of StoragePathSystem for Linux. The sg3_utils package must be installed on Red Hat and SLES. LifeKeeper v6 or later Core Package Cluster
WebSphere MQ Resources	WebSphere MQ v7.1 and v7.5 IBM MQ v8.0 and v9.0 See Known Issues and Restrictions > Installation.
Quorum/Witness Package	All nodes which will participate in a quorum/witness mode cluster, including witness-only nodes, should be installed with the Quorum/Witness Server Support Package for SPS.

## Client Platforms and Browsers

The SPS web client can run on any platform that provides support for Java Runtime Environment JRE8 update 51. The currently supported browsers are Firefox and Internet Explorer running on Linux, Windows 2008 R2, Windows 7, Windows 8 or Windows Vista with JRE8 update 51. Other recent platforms and browsers will likely work with the SPS web client, but they have not been tested by SIOS Technology Corp. In addition, particular features of each browser have not been tested.

You should specify all the hostnames and addresses in your cluster in the client machine's local hosts file (usually */etc/hosts* or *C:\windows\system32\drivers\etc\hosts*). This minimizes the client connection time and allows the client to connect even in the event of a Domain Name Server (DNS) failure.

## Installation and Configuration

See the SIOS Protection Suite Installation Guide for complete installation and configuration information.

### Upgrades

LifeKeeper can be upgraded to Version 9.2.x from either LifeKeeper Version 9.0.x or Version 9.1.x. If upgrading from a version other than 9.0.x or 9.1.x, the older version will need to be uninstalled, and SIOS Protection Suite for Linux will have to be reinstalled. An alternative to uninstalling the older version would be to upgrade from the older version to 9.0.x or 9.1.x, then perform the upgrade to 9.2.x.

### Storage and Adapter Options

For a list of the disk array storage models and adapters currently supported by SPS in shared storage configurations as well as their type of certification, see the Storage and Adapter Options topic. Details about driver versions and other configuration requirements for these arrays and adapters are listed in the Storage and Adapter Configuration topic.

### Technical Notes

We strongly recommend that you read the Technical Notes section concerning configuration and operational issues related to your SPS environment.

### Location of *pdksh* Has Changed

The location of *pdksh* installed by the SPS setup script in versions prior to 8.1 has changed. The *pdksh* was previously located at */usr/bin/ksh*. It is now located at */opt/LifeKeeper/bin/ksh*. Any customer written scripts that relied on the *pdksh* version installed by the SPS setup (*/usr/bin/ksh*) should be modified to reflect the new path.

### Known Issues

See Known Issues and Restrictions in the Troubleshooting section of SIOS Protection Suite for Linux Technical Documentation and the DataKeeper Troubleshooting section.