



# **SIOS Protection Suite for Linux**

**v8.3.1**

**Release Notes**

**September 2014**

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Address correspondence to:  
[ip@us.sios.com](mailto:ip@us.sios.com)

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# SIOS Protection Suite for Linux Release Notes

## Version 8.3.1

**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, reiserfs, vxfs, xfs and nfs) **Note:** `btrfs` is not currently supported by the SIOS Protection Suite for Linux
- Communication Resources (TCP/IP)
- Database Applications (Oracle, MySQL, DB2, SAP MaxDB, PostgreSQL, EnterpriseDB Postgres Plus)

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-lk-8.3.1-6397.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.

Package	Package Name	Description
DataKeeper Core	steeleye-lkDR-8.3.1-6397.noarch.rpm	The DataKeeper package provides data replication (synchronous or asynchronous mirrors with intent logging).
LifeKeeper GUI	steeleye-lkGUI-8.3.1-6397.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-lkIP-8.3.1-6397.noarch.rpm	The SPS IP Recovery Kit provides recovery software for automatic switchover of IP addresses.
SPS Raw I/O Recovery Kit	steeleye-lkRAW-8.3.1-6397.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-lkMAN-8.3.1-6397.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-lkHLP rpm package is no longer included. The steeleye-lkHLP 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-lkCCISS 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-lkAPA-8.3.1-6397.noarch.rpm	The SPS for Linux Apache Web Server Recovery Kit provides fault resilience for Apache Web Server software in an SPS environment.
SPS SAP Recovery Kit	steeleye-lkSAP-8.3.1-6397.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.

Package	Package Name	Description
SPS SAP MaxDB Recovery Kit	steeleye- lkSAPDB-8.3.1- 6397.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-lkDB2- 8.3.1- 6397.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-lkORA- 8.3.1- 6397.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-lkSQL- 8.3.1- 6397.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- lkPGSQL-8.3.1- 6397.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- lkSYBASE- 8.3.1- 6397.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- lkPOSTFIX- 8.3.1- 6397.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-lkSMB- 8.3.1- 6397.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.
SPS NFS Server Recovery Kit	steeleye-lkNFS- 8.3.1- 6397.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.



Package	Package Name	Description
SPS Network Attached Storage Recovery Kit	steeleye-ikNAS-8.3.1-6397.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-ikLVM-8.3.1-6397.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-ikMD-8.3.1-6397.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-ikPPATH-8.3.1-6397.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-ikDMMP-8.3.1-6397.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-ikHDLM-8.3.1-6397.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-ikSPS-8.3.1-6397.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-ikDR-8.3.1-6397.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-1kMQS-8.3.1-6397.noarch.rpm	<p>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.</p> <p><b>Note:</b> This recovery kit does not support running multiple versions of MQ on the same server (e.g. MQ Versions 7.0.1 Fix Pack 6 and 7.1 and later versions); however, protecting multiple queue managers within a single MQ installation as well as the use of the DataPath parameter in the <code>mqs.ini</code> is supported.</p>
Quorum/Witness Package	steeleye-1kQWK-8.3.1-6397.noarch.rpm	<p>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.</p>

## New Features of SIOS Protection Suite for Linux Version 8

Product	Feature
<b>New in This Release (8.3.1)</b>	
LifeKeeper Core	Java SE Runtime Environment 7u67 (x64) support.
	Added information message for temporary or transient communication path failures.
	Bug Fixes.
<b>New in This Release (8.3)</b>	
LifeKeeper Core	Unbreakable Enterprise Kernel Release 3 for Oracle Linux support.
	lkstop -n functionality can be returned to pre-v8.0 behavior by setting <code>LKSTOP_FAILOVER_N=1</code> in <code>/etc/default/LifeKeeper</code> . Prior to v8.0, <code>lkstop -n</code> would initiate a failover even when the "Shutdown Strategy" setting was "Do not Switchover Resources".
	Bug Fixes.
Oracle	Bug Fixes.
Postfix	Added support to allow Postfix to listen on all IP addresses.
MD	Bug Fixes.

Product	Feature
Recovery Kit for EC2, Route 53, Openswan	Amazon EC2 Cross Region Support (Amazon EC2 Cross Region Quick Start Guide will be available soon).
<b>New in This Release (8.2.1)</b>	
LifeKeeper Core	Red Hat Enterprise Linux Version 6 Update 5 support.
	Community ENTERprise Operating System (CentOS) Version 6 Update 5 support.
	Oracle Linux Version 6 Update 5 support.
	VMware vSphere v5.5 support.
Oracle	Support for Oracle 12c excluding ASM and pluggable database.
PostgreSQL	Support for EnterpriseDB Postgres Plus Advanced Server 9.3.
WebSphere MQ	Support for WebSphere MQ v7.5.
LifeKeeper Core	Bug Fixes.
NFS	Bug Fixes.
PostgreSQL	Bug Fixes.
<b>New in This Release (8.2.0)</b>	
LifeKeeper Core	Red Hat Enterprise Linux Version 5 Update 10 support.
	Community ENTERprise Operating System (CentOS) Version 5 Update 10 support.
	Oracle Enterprise Linux Version 5 Update 10 support.
	SLES 11 SP3 support.
SPS SAP Recovery Kit	Support for SAP 7.4.
PostgreSQL	Support for PostgreSQL 9.3 and EnterpriseDB Postgres Plus Solutions Pack 9.3.
DB2	Support for IBM DB2 Universal Database v10.5, IBM DB2 Enterprise Server Edition (ESE) v10.5, IBM DB2 Workgroup Server Edition (WSE) v10.5 and IBM DB2 Express Edition v10.5.
LifeKeeper Apache Web Server Recovery Kit	Added support to allow Apache to listen on all IP addresses.
Recovery Kit for EC2	The Recovery Kit for EC2 extends LifeKeeper into the cloud by providing support for Frontend Clusters via the management of Elastic IP availability from the Internet as well as support for Backend Clusters through Route Table management that allows access to LifeKeeper-protect IP resources from clients within the Amazon VPC.
LifeKeeper Core	Bug Fixes.
DataKeeper	Bug Fixes.

Product	Feature
Postfix	Bug Fixes.
New in Version (8.1.3)	
DataKeeper	Bug fixes.
New in Version (8.1.2)	
LifeKeeper Core	Red Hat Enterprise Linux Version 5 Update 9 and Version 6 Update 4 support.
	Community ENTerprise Operating System (CentOS) Version 5 Update 9 and Version 6 Update 4 support.
	Oracle Enterprise Linux Version 5 Update 9 support.
	Oracle Linux Version 6 Update 3 and Version 6 Update 4 support.
	Bug fixes.
DataKeeper	New <code>mirror_resize</code> command supports the ability to resize your DataKeeper mirror without having to delete and recreate the resource.
	The existing <code>mirror_action</code> command now supports optional <b>source</b> and <b>target</b> arguments.
	Bug fixes.
PostgreSQL	Support for EnterpriseDB Postgres Plus Advanced Server 9.2.
	Bug fixes.
MySQL	Support for MySQL Version 5.6.
Sybase	Support for Sybase ASE Version 15.7.
NFS	Bug fixes.
Samba	Bug fixes.
New in Version 8.1.1	
LifeKeeper Core	GUI authentication with Pluggable Authentication Module (PAM). Users are now authenticated against the same user database that the system uses and privilege levels are assigned based on group membership.  <b>Note:</b> The <code>lkpasswd</code> command no longer administers LifeKeeper GUI user passwords and permissions.
	Red Hat Enterprise Linux Version 6 Update 3 support.
	Community ENTerprise Operating System (CentOS) Version 6 Update 3 support.
	Bug fixes.

Product	Feature
DB2	Support for IBM DB2 Universal Database v10.1, IBM DB2 Enterprise Server Edition (ESE) v10.1, IBM DB2 Workgroup Server Edition (WSE) v10.1 and IBM DB2 Express Edition v10.1.
	Logging format improvements and consolidation.
	Bug fixes.
PostgreSQL	Support for PostgreSQL 9.2 and EnterpriseDB Postgres Plus Solutions Pack 9.2.
	Bug fixes.
MD, DataKeeper, Oracle and Postfix	Bug fixes.
Apache, LVM, IP, MySQL, MQ, NAS, NFS, Samba, SAP, SAP MaxDB and Sybase	Version number increment in package name change only.
<b>New in Version 8.1</b>	
LifeKeeper Core	SUSE SLES 11 SP2 support.
	Standardized initialization of LifeKeeper.
	Interactive menu-driven installation and unattended installation of SPS Recovery Kits. The SPS for Linux software, including optional SPS Recovery Kits, is contained within a single image file (sps.img). Previously, recovery kits were installed from their individual image files. Now, during the core installation, you will be presented with a complete, up-to-date, selectable list of available recovery kits to be installed immediately.
	General maintenance.
DataKeeper	General maintenance.
DMMP	Logging format improvements and consolidation.
	General maintenance.
PostgreSQL	Support for PostgreSQL 9.1, EnterpriseDB Postgres Plus Solutions Pack 9.1 and EnterpriseDB Postgres Plus Advanced Server 9.1.
WebSphere MQ	Tunable in <code>/etc/default/LifeKeeper</code> to optionally run <code>amqiclen</code> .
	Optional start of Command Server by the Queue Manager.
	Use of <code>DataPath</code> variable to determine file system paths to protect.
	Tunable to delay running of <code>amqiclen</code> .
	Tunable to specify the command arguments to <code>amqiclen</code> .
	Independent protection level for Command Server.
<b>New in Version 8</b>	

## Bug Fixes

Product	Feature
LifeKeeper Core	Red Hat Enterprise Linux Version 5 Update 8 support.
	Red Hat Enterprise Linux Version 6 Update 2 support.
	Oracle Enterprise Linux Version 5 Update 8 support (Non-UEK kernels).
	The Community ENTerprise Operating System (CentOS) Version 6 Update 2 support.
	Logging subsystem enhancements including central log location with syslog, syslog-ng and rsyslog, unique message IDs for each event and consistent, documented log entry format for simplified parsing by systems management tools.
	New, searchable Message Catalog providing, where appropriate, additional explanation of the cause of the error code and necessary action to resolve the issue.
	Simplified installation via a single image file.
	General maintenance.
Oracle	Improved performance and extensibility.
	Performance improvements in Create and Extend actions.
	Enhancements such as the ability to create an Oracle hierarchy on root file system in LifeKeeper Single Server Protection and the ability to define a custom path for <code>listener.ora</code> and <code>oratab</code> .
	Logging format improvements and consolidation.
	General maintenance.

## Bug Fixes

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

Bug	Description
7018	Fixed process hang issues caused by a LifeKeeper communication protocol error that occurs after running for an extended period of time.

## 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.
Virtual Environments	<p>SPS for Linux is architected to be hypervisor-independent as long as the guest operating system running within the virtual machine is one of the supported versions listed in the Linux Configuration Table. The following virtual environments are examples of where SIOS Protection Suite for Linux has been deployed:</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, and v5.5</li> <li>• Amazon EC2</li> </ul> <p>Please refer to the document "<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>
Memory	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.
Disk Space	<p>The SPS Package Cluster requires the following disk space:</p> <p>/opt – approx 100000-105000 (1024-byte) disk blocks (depending on kits installed)</p> <p>/ - 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.

Product	Requirement(s)
SPS Apache Web Server Recovery Kit	Apache Web Server v2, v2.2 and v2.4
SAP Recovery Kit	<p>SAP v7 Enhancement Package 1 and 2, SAP v7.1, SAP v7.3 and SAP v7.4</p> <p>SPS NFS Server Recovery Kit v8.1</p> <p>SPS Network Attached Storage Recovery Kit v8.1</p>

## SPS Optional Recovery Software Requirements

Product	Requirement(s)
SPS SAP MaxDB Recovery Kit	SAP MaxDB v7.5, v7.6, v7.7 and v7.8 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 Standard Edition and Enterprise Edition v10g R2, v11g, v11g R2 and v12c Oracle Standard Edition One v10g R2, v11g, v11g R2 and v12c
SPS DB2 Recovery Kit	IBM DB2 Universal Database v9, v9.5, v9.7, v10.1 and v10.5 IBM DB2 Enterprise Server Edition (ESE) v9, v9.5, v9.7, v10.1 and v10.5 IBM DB2 Workgroup Server Edition (WSE) v9, v9.5, v9.7, v10.1 and v10.5 IBM DB2 Express Edition v9, v9.5, v9.7, v10.1 and v10.5 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 and v5.6
SPS PostgreSQL Recovery Kit	PostgreSQL v8.3, v8.4, v9, v9.1, v9.2 and v9.3 EnterpriseDB Postgres Plus Standard Server v8.4 and v9 EnterpriseDB Postgres Plus Advanced Server v8.3, v8.4, v9.1, v9.2, and v9.3 EnterpriseDB Postgres Plus Solutions Pack v9.1, v9.2 and v9.3
SPS Sybase ASE Recovery Kit	Sybase ASE 15.5 and 15.7
SPS Samba Recovery Kit	Standard Samba file services provided with the supported Linux distributions
SPS NFS Server Recovery Kit	Linux kernel version 2.6 or later The NFS Server and client packages must be installed on SLES systems.
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



Product	Requirement(s)
SPS Software RAID (md) Recovery Kit	Software RAID devices based on md <b>Note:</b> The MD Recovery Kit cannot be used in conjunction with SIOS DataKeeper.
EMC PowerPath	A 2.6 based Linux kernel and distribution <b>PowerPath Kit v6.4.0-2:</b> PowerPath for Linux v5.3 or later <b>Prior to the PowerPath Kit v6.4.0-2:</b> PowerPath for Linux v4.4, v4.5, v5 or v5.1  The <code>sg3_utils</code> rpm is required on Red Hat and SLES.  LifeKeeper v6 or later Core Package Cluster
Device Mapper Multipath (DMMP)	A 2.6 based Linux kernel and distribution multipath tools 0.4.5 or later  The <code>sg3_utils</code> rpm is required on Red Hat and SLES.
Hitachi Dynamic Link Manager Software (HDLM)	Please see <i>Hitachi Dynamic Link Manager Software Multipath I/O Configurations and Linux Distribution Requirements</i> .  The <code>sg3_utils</code> rpm is required on Red Hat and SLES.
NEC iStorage Storage Path Savior (NECSPS)	iStorage StoragePathSavior for Linux v3.3 or later  RHEL5 RHEL6  SPS driver package (for RHEL4 or RHEL5)  sps-L, sps-S or sps-E The <code>sg3_utils</code> rpm is required on Red Hat and SLES.  LifeKeeper v6 or later Core Package Cluster
WebSphere MQ Resources	WebSphere MQ v6, v7, v7.1 and v7.5  <b>Note:</b> This recovery kit does not support running multiple versions of MQ on the same server (e.g. MQ Versions 7.0.1 Fix Pack 6 and 7.1 and later versions); however, protecting multiple queue managers within a single MQ installation as well as the use of the DataPath parameter in the <code>mqs.ini</code> is supported.
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 JRE7 update 45 or JRE7 update 67. The currently supported configurations are Firefox, Internet Explorer and Chrome on Linux, Windows 2008 R2, Windows 7, Windows 8 or Windows Vista with JRE7 update 45 or

JRE7 update 67. Other recent platforms and browsers will likely work with the SPS web client, but they have not been tested by SIOS Technology Corp.

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 8.3.x from either LifeKeeper Version 8.1.x or Version 8.2.x. If upgrading from a version other than 8.1.x or 8.2.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 8.1.x or 8.2.x, then perform the upgrade to 8.3.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.

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