Implementing Red Hat Enterprise Linux 6 on HP ProLiant servers

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Abstract

This white paper provides the information you need to install Red Hat Enterprise Linux 6 on HP ProLiant servers. Key topics addressed in this paper include:

- Supported configurations on HP ProLiant servers
- Recommended system configuration and server platforms
- Supported software, storage options, and network adapters
- Procedures for installations
- Known issues and workarounds

You can obtain more information at the following HP website:
hp.com/go/linux

Red Hat provides Red Hat Enterprise Linux 6 in the following architectures:

- i386 (PAE enabled in i386)
- AMD64/Intel® 64

Note

To obtain an evaluation version of the Red Hat Enterprise Linux 6 OS, see the following Red Hat website:
https://access.redhat.com/downloads

A paid subscription is required for downloading from the Red Hat Software and Download Center. However, a free evaluation subscription can be requested at the same site.

This link and other Red Hat links given in this paper will take you outside the Hewlett-Packard website. HP does not control and is not responsible for information outside HP.com.

Introduction to Red Hat Enterprise Linux 6

Red Hat Enterprise Linux 6 is the newest generation of the Red Hat Enterprise Linux OS. In this release, Red Hat integrates improvements across the server, systems, and overall Red Hat open source experience. The improvements and enhancements include updates to virtualization; greater scalability and efficiency; environmentally sustainable IT; and much more. For a complete list of improvements, enhancements, and fixes, refer to the Red Hat Enterprise documentation at:
https://access.redhat.com/knowledge/docs/manuals/enterprise/

New features

New hpsa driver supporting SCSI-based controllers
Among the new features of Red Hat Enterprise Linux 6 is the new Linux hpsa device driver from HP. The hpsa driver is an SCSI-based driver for the latest controllers such as HP Smart Array controllers. It replaces the cciss driver, which was based on block technology. As an SCSI-based driver, the hpsa brings enhanced capabilities by using tools available through the SCSI interface. For example, the hpsa driver presents logical disk devices in the standard SCSI namespace, providing greater compatibility with system tools and utilities designed to work with SCSI storage. The hpsa driver will automatically bind to newer Smart Array controllers, legacy controllers will continue to be supported by the traditional cciss driver. For more information about the hpsa driver, see the document Migrating to hpsa: A SCSI-based Linux device driver for HP Smart Array Controllers.

Processor Clocking Control for enhanced power management
Red Hat Enterprise Linux 6 also features the Processor Clocking Control (PCC) driver that facilitates power management collaboration between the operating system and the platform. The PCC is enabled by default on HP platforms with firmware supporting the PCC interface.

If necessary, you can disable the PCC interface in the system BIOS by setting the Collaborative Power Control setting in the ROM-Based Setup Utility (RBSU) to “Disabled”. For more information about using RBSU, see the HP ROM-Based Setup Utility User Guide.

For more information about PCC and the pcc-cpufreq power management driver, see the following documentation:
• Processor Clocking Control (PCC) Interface Specification
• HP ProLiant Server Power Management for Red Hat Enterprise Linux 6.x white paper:
• Linux kernel PCC (pcc-cpufreq) driver documentation

Fully-integrated virtualization using KVM hypervisor technology
Red Hat Enterprise Linux 6 provides fully integrated kernel-based virtualization services by incorporating the KVM hypervisor into the kernel. This allows for consistency across the physical and virtual systems. Virtualized KVM guests can be run as managed services, enabling failover (including between physical and virtual hosts). For more information about KVM, see the Red Hat website: http://www.redhat.com

New utility provides consistent, informative device naming for network interfaces
Red Hat Enterprise Linux 6 introduces the biosdevname utility, which enables consistent device naming for network interfaces. Traditionally, network interfaces in Linux are named ethn (such as eth0); as such, modern server platforms with multiple network adapters often present non-deterministic and counterintuitive naming of these network interfaces. In many cases, the names do not correspond to actual labels on the chassis. In contrast, the biosdevname utility assigns names to network interfaces based on their physical location. The names are more directive and intuitive.

The biosdevname utility is disabled by default; you must select it during installation. Prior to enabling biosdevname and adopting the new naming convention, you should carefully evaluate your needs and the effect that the new network device nomenclature will have on your existing environments. For more information about biosdevname, see the Linux NIC Enumeration on HP ProLiant Gen8 Servers white paper.

Recommended ProLiant server platforms
The following tables list the minimum system, storage, and virtualization memory requirements (as determined by Red Hat) for installing Red Hat Enterprise Linux 6.

Minimum system requirements

Table 1. Memory requirements

<table>
<thead>
<tr>
<th>I386, AMD64/Intel64</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>1 GB per logical CPU</td>
</tr>
<tr>
<td>Recommended</td>
<td>2 GB</td>
</tr>
</tbody>
</table>

Table 2. Storage requirements

<table>
<thead>
<tr>
<th>I386, AMD64/Intel64</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>1 GB</td>
</tr>
<tr>
<td>Recommended</td>
<td>5 GB</td>
</tr>
</tbody>
</table>

Table 3. Virtualization memory requirements (per guest)

<table>
<thead>
<tr>
<th>I386, AMD64/Intel64</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>1 GB per logical CPU</td>
</tr>
<tr>
<td>Recommended</td>
<td>64 GB</td>
</tr>
</tbody>
</table>

Networking requirements

FCoE
Red Hat Enterprise Linux 6 provides new support for software Fibre Channel over Ethernet (FCoE).
Supported configurations

If your server meets the recommended system requirements that are established by Red Hat, Red Hat Enterprise Linux 6 should install and run on any HP server that is listed in the “Recommended system configuration” section of this document.

Recommended system configuration

This section lists the recommended system configurations established by Red Hat for Red Hat Enterprise Linux 6 bare-metal installations and those that are supported by HP. For information about installing Red Hat Enterprise Linux 6 in a virtualized environment, refer to the Red Hat Enterprise Virtualization documentation at the following Red Hat website:
https://access.redhat.com/knowledge/docs/manuals/enterprise/

Note

Before installing Red Hat Enterprise Linux 6, update the corresponding iLO firmware as follows:
- iLO 2  2.01 (or later)
- iLO 3  1.10 (or later)
- iLO 4  1.01 (or later)

Important

To help ensure successful installation and use of Red Hat Enterprise Linux 6 on your HP ProLiant server, comply with the system requirements recommended in this white paper and also refer to the Red Hat documentation at:
https://access.redhat.com/knowledge/docs/manuals/enterprise/

Do not use this white paper as the sole source of installation information.

For the most recent supported hardware configurations, refer to the following HP ProLiant Servers website:
hp.com/go/rhelcert

You may also refer to the Red Hat Hardware Catalog website:
http://hardware.redhat.com/hcl/

To determine the required ROM version and the supported HP ProLiant servers, refer to the following web resources for assistance:
- HP software and drivers:
- Red Hat on HP ProLiant support matrix:
  http://www.hp.com/go/rhelcert

Supported components for HP ProLiant servers

Software drivers

HP recommends using the drivers contained in the Red Hat Enterprise Linux media, when applicable. Other software and firmware smart components required for HP-specific customers are provided through HP Service Pack for ProLiant (SPP).

The HP Service Pack for ProLiant (SPP) replaces the ProLiant Support Pack (PSP) and Smart Update Firmware DVD. It provides the HP ProLiant server and blade server drivers, utilities, and management agents that were previously available from the PSP. The SPP also includes firmware, which was previously available on the Smart Update Firmware DVD.

The SPP ISO includes:
- A boot environment
- HP Smart Update Manager (HP SUM), the SPP deployment tool
- Driver, software, and firmware components for HP ProLiant servers and blade servers

HP Service Pack for ProLiant documentation can be found at the following website:
Overview information about HP SPP downloads and the current downloadable version are available from the HP Service Pack for ProLiant website:


Storage, tape, and network options

For a list of supported HP ProLiant options such as Server Smart Arrays, NICs, tapes, and SCSI Controllers, refer to the QuickSpecs for the supported server. QuickSpecs are available from the following HP website:

hp.com/go/quickspecs

HP may provide updated NIC drivers in the SPP as needed. HP-branded drivers are not available in the Red Hat Enterprise Linux 6 distribution. However, corresponding NIC drivers from Intel, Broadcom, Emulex, QLogic, and Mellanox are in the distribution and can be used instead.

Red Hat Enterprise Linux 6 installation for 32-bit and 64-bit architectures on ProLiant servers

Red Hat Enterprise Linux 6 can be installed by any of a number of means, including local media, remote media via HP Integrated Lights-Out Virtual Media, and through a network-based NFS or PXE server. This white paper provides instructions for installing the OS from local media and from a PXE network connection.

HP also introduces Intelligent Provisioning, an essential single-server deployment tool embedded in HP ProLiant Gen8 servers. Intelligent Provisioning simplifies HP ProLiant server setup, providing a reliable and consistent way to deploy HP ProLiant server configurations. More information is available at the following website:

hp.com/go/intelligentprovisioning

Preinstallation tasks

To prepare for installation, ensure that:

- The server selected for installation is a supported system platform. Verify this by referring to the Red Hat Enterprise Linux support matrix at the following website:
  hp.com/go/rhelcert  (Click Red Hat Enterprise Linux (RHEL) under Support & Certification Matrices
- At the same website, examine Minimum Supported Red Hat Updates for HP ProLiant Servers and related Technical Exceptions by clicking Red Hat Enterprise Linux (RHEL) under ProLiant technical Exception Matrices.
- For information about additional options added to the server for the supported HP ProLiant or BladeSystem server Smart Arrays, NICs, and SCSI Controllers, refer to the supported server’s HP Quickspecs at the following website:
  hp.com/go/quickspecs
- Be aware of known issues related to HP ProLiant Servers and Red Hat Enterprise Linux, reported in this white paper in “Appendix A: Known issues and workarounds”.
- Obtain the latest ROM, available from the following HP Business Support Center website:
  hp.com/go/bizsupport  (Click Download drivers and software, then advance to your server and select the Red Hat Enterprise Linux OS)
- Update to the latest firmware and options for the server. Download the SPP from the HP Software Delivery Repository website:
  http://downloads.linux.hp.com/SDR

Instructions for installing the SPP can be found in this white paper in the “Installing the Service Pack for ProLiant” section.

- Use the ROM-Based Setup Utility (RBSU) to set the date/time and configure the boot controller order (if necessary).
- Decide on array type: software or hardware.
- Configure the RAID settings for the server. HP recommends using the Array Configuration Utility to configure RAID settings. Information about using this utility and about other methods available for configuring RAID settings is available in the Configuring Arrays on HP Smart Array Controllers Reference Guide.
- If using the HP Dynamic Array controller, refer to the HP Dynamic Smart Array RAID Controller User Guide for information about configuration, installation, operation, and support.
- Ensure enough disk space is available for installation. For disk space requirements, see the “Minimum system requirements” section in this white paper.
- Choose an installation method: DVD, hard drive, NFS, URL (HTTP/FTP).
- Choose a boot method: local media, network, or the HP Integrated Lights-Out Virtual Media
- Prepare driver updates, if needed, during installation.
Installation procedures

To install Red Hat Enterprise Linux 6 (for 32-bit and 64-bit architectures), complete the steps provided in this section.

Installing using local media
1. Make sure the server has a DVD drive (either native or attached).

   **Note**
   A license key may be required to use iLO Virtual Media with HP ProLiant Servers. For instructions on using iLO Virtual Media to install the OS, see the [HP ILO 4 User Guide](http://www.hp.com/go/ilo) available from the following website: hp.com/go/ilo
   (First click the **HP ILO Information Library** link on the right side of the page. In the **User Guides** section of the **HP ILO Information Library** page, open the guide by selecting the preferred language from the drop-down menu to the right of the **HP ILO 4 User Guide** title.)

2. To begin the installation, insert the Red Hat Enterprise Linux 6 media into the DVD drive and boot the server from the DVD.
3. Select the method of installation: text or GUI
   A. For text-based installations, you may enter the appropriate kernel options, if applicable.
   B. For GUI-based installations, follow the on-screen instructions.
4. Select the preferred Boot Menu option. The default option is "Install or upgrade an existing system."¹
5. Continue following the on-screen instructions to complete the installation.

Installing using PXE boot via network
1. Make sure a properly configured PXE server and network adapter that supports PXE are available.
2. If a driver update diskette is required to support a driver that is not in the distribution, ensure the driver is added to the PXE server. Instructions on how to add a driver update to the PXE server are found at [https://access.redhat.com/kb/docs/DOC-17783](https://access.redhat.com/kb/docs/DOC-17783) (to view this Red Hat Knowledgebase article, you need a Red Hat Network subscription).
3. Ensure the computer is configured to boot from the network adapter. In most cases, you can do this by inspecting and modifying the system’s BIOS settings.
4. Power on the server to be configured.
5. When the PXE menu appears, select the number that corresponds to the desired option.
6. Follow the on-screen instructions until “Configure TCP/IP” is displayed. Perform the appropriate network configuration for your environment. The default is DHCP.
7. Enter the server and path to the server where the Red Hat Enterprise Linux 6 image resides.
8. Select the preferred Boot Menu option. The default option is "Install or upgrade an existing system."¹
9. Continue following the on-screen instructions to complete the installation.

Upgrading from a previous Red Hat Enterprise Linux release to Red Hat Enterprise Linux 6

Red Hat does not currently support upgrading from an earlier major version of Red Hat Enterprise Linux 6.

Installing the Service Pack for ProLiant

You can download and install the HP Service Pack for ProLiant by using the HP Software Delivery Repository, as described in this section.

¹ For known issues, see "Appendix A: Known issues and workarounds" in this white paper.
Getting SPP updates from the HP Software Delivery Repository (SDR)

HP offers a repository hosting the Service Pack for ProLiant and management components from HP. The repository offers multiple means for acquiring the SPP, including direct download and mirroring. If your system has direct access to the network repository, you can configure your system to query the repository for installing and updating any specified components as needed.

Detailed information on the Software Delivery Repository and retrieval methods can be found at:
http://downloads.linux.hp.com/SDR

HP Server Support Guide for Service Pack for ProLiant is available at:
http://www.hp.com/go/spp/documentation

HP Smart Update Manager (HP SUM)

HP Service Pack for ProLiant (SPP) is deployed using HP SUM. HP SUM enables consolidated maintenance and distribution of firmware and software components. HP SUM allows for software deployment for multiple HP ProLiant servers from a single GUI. HP SUM detects the installed hardware and current versions of firmware and software in use on targeted servers. It installs only the required and user-selected components. The default configuration is to install all available components. Prior to launching HP SUM, ensure that all necessary RPMs are installed and that minimum requirements for operation are met. For a list of required RPMs and minimum requirements, see the HP SUM release notes.

Information on HP Smart Update Manager (HP SUM) can be found on the following website:

The HP Smart Update Manager User Guide and HP Smart Update Manager Release Notes are available from the following website:

Installing the ServicePack for ProLiant (SPP)

You can install the Service Pack for ProLiant (SPP) through the Software Delivery Repository or from the deliverable downloaded from HP.com. Prior to installing the SPP, ensure any necessary RPMs are installed. For a list of RPMs required for installation, see the release notes for HP SPP or HP SUM.

For more detail on each of the Linux management components available from HP, see the Managing ProLiant Servers with Linux HOWTO.

Deploying SPP with HP SUM

1. Verify that minimum requirements for HP SUM in Red Hat Enterprise Linux 6 are met. A list of platform-specific compatibility libraries are found in the HP SUM help file. The HP SUM help file (hpsum_welcome_help_en.htm) can be viewed in a web browser without starting HP SUM.
2. Start HP SUM.
3. In the Source Selection screen, verify that the directory path in the Directory field has the location of the smart components in the SPP, and then select Start Inventory. HP SUM performs an inventory of the available updates and discovers the hardware and software installed on the local system. After the inventory and discovery processes finish, the Select Installation Hosts screen appears.
4. Select either the local host or one (or more) remote hosts for SPP deployment. The Select Bundle Filter screen displays the SPP bundle information.
5. Select the bundle and the appropriate filter options. For remote deployments, additional screens enable you to update information on a per-host basis.
6. After selecting the bundle for all hosts being updated, access the Select Items to be Installed screen to complete the following tasks:
   A. Select the components to be installed.
   B. Review failed dependencies before installation.
   C. Review the revision history of the components.
7. To proceed with the installation, click Install. After installation completes, the Installation Results screen appears.
8. If any components did not install successfully, complete the following steps:
A. Review the installation logs for information about any failures.
B. Exit HP SUM.
C. Make the required update to the environment.
D. Restart installation of the SPP.

For more information about HP SUM and other installation methods, see the *HP Smart Update Manager User Guide* available at the following website:
Appendix A: Known issues and workarounds

ProLiant servers with Red Hat Enterprise Linux 6
For processor-specific issues, see the Linux for ProLiant Processor Notes website: http://h18004.www1.hp.com/products/servers/linux/processor-notes.html

Red Hat Enterprise Linux 6 with the Service Pack for ProLiant (SPP)
For known issues with related HP SPP releases, see the following website: http://h18004.www1.hp.com/products/servers/service_packs/en/ca.2012.10.0.html
For more information

For additional information, refer to the resources listed below.

<table>
<thead>
<tr>
<th>Resource description</th>
<th>Web address</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP and Red Hat partnership website</td>
<td>hp.com/go/redhat</td>
</tr>
<tr>
<td></td>
<td>hp.com/go/proliantrhel</td>
</tr>
<tr>
<td>Red Hat website</td>
<td><a href="http://www.redhat.com">www.redhat.com</a></td>
</tr>
<tr>
<td>Red Hat Software and Download website</td>
<td><a href="https://access.redhat.com/downloads">https://access.redhat.com/downloads</a></td>
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<td>Red Hat Product Documentation website</td>
<td><a href="https://access.redhat.com/knowledge/docs/manuals/enterprise/">https://access.redhat.com/knowledge/docs/manuals/enterprise/</a></td>
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<td>Red Hat Hardware Hardware Catalog website</td>
<td><a href="http://hardware.redhat.com/hci/">http://hardware.redhat.com/hci/</a></td>
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<td></td>
<td>(in particular, see <a href="https://hardware.redhat.com/RHEL6/SYSTEMS">https://hardware.redhat.com/RHEL6/SYSTEMS</a>)</td>
</tr>
<tr>
<td>HP ProLiant and BladeSystem servers support and certification matrices, and technical exception matrices</td>
<td>hp.com/go/rhelcert</td>
</tr>
</tbody>
</table>

Call to action

Please contact your HP representative or go to the following webpage:
http://www8.hp.com/us/en/contact-hp/contact.html#

Send comments about this paper to docsfeedback@hp.com.