FUJITSU

# PRIMECLUSTER GLS 4.3A20

# Installation Guide

Linux

J2UL-1390-02ENZ0(01)
April 2013

# Preface

### Purpose

This manual explains how to install PRIMECLUSTER GLS.

### Target Readers

This manual is written for people who will install this product.
It is strongly recommended that you read the Software Release Guide from the product media before using this manual.
When setting up systems, it is assumed that readers have the basic knowledge required to configure the servers, storage and network devices to be installed.

### Organization

This manual consists of four chapters, and appendices. The contents of these chapters, the appendices are listed below.

| Title | Description |
|---|---|
| Chapter 1 Program components | Explains the packages of which this product is composed. |
| Chapter 2 Operation Environment | Explains the operational environment of this product. |
| Chapter 3 Installation | Explains how to install this product. |
| Chapter 4 Uninstallation | Explains how to uninstall this product. |
| Appendix A Troubleshooting | Explains how to address problems that occur. |
| Appendix B Necessary OS packages to be installed. | Explains about the necessary OS packages to be installed. |

### Notational Conventions

The notation in this manual conforms to the following conventions.

- References and character strings or values requiring emphasis are indicated using double quotes ( " ).
- Text to be entered by the user is indicated using bold text.
- Variables are indicated using italic text.

The following abbreviations are used in this manual:

- Global Link Services is abbreviated as GLS.
- Reliant Monitor Services is abbreviated as RMS.

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Date of publication and edition

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| December 2012, First edition | J2UL-1390-02ENZ0(00)/J2UL-1390-02ENZ2(00) |
| April 2013, 1.1 edition | J2UL-1390-02ENZ0(01)/J2UL-1390-02ENZ2(01) |



# Editing record

| Changes | Section | Manual code |
|---|---|---|
| Basic software prerequisites have been added. | 2.1 | J2UL-1390-02ENZ0(01)<br>J2UL-1390-02ENZ2(01) |
| The preparation procedure has been modified. | 3.1 | |
| The installation procedure has been modified. | 3.2 | |
| Appendix B Necessary OS packages to be installed has been added. | Appendix B | |

# Contents

# Chapter 1 Program components

A system consists of programs, and each program is referred to as a package.
This chapter explains about the packages of which this software is composed.

PRIMERGY

- Red Hat Enterprise Linux 5 (for x86)
- Red Hat Enterprise Linux 5 (for Intel64)
- Red Hat Enterprise Linux 5 (for x86) xen kernel
- Red Hat Enterprise Linux 5 (for Intel64) xen kernel
- Red Hat Enterprise Linux 6 (for x86)
- Red Hat Enterprise Linux 6 (for Intel64)

PRIMEQUEST

- Red Hat Enterprise Linux 5 (for x86)
- Red Hat Enterprise Linux 5 (for Intel64)
- Red Hat Enterprise Linux 5 (for x86) xen kernel
- Red Hat Enterprise Linux 5 (for Intel64) xen kernel
- Red Hat Enterprise Linux 6 (for x86)
- Red Hat Enterprise Linux 6 (for Intel64)

## 1.1 Red Hat Enterprise Linux 5 (for x86) for PRIMERGY/ PRIMEQUEST

| No. | Component | Package | Version | Function |
|---|---|---|---|---|
| 1 | Global Link Services(GLS) | kmod-FJSVhanet-drv-PAE | 2.13 | High Available Network Support |
| | | FJSVhanet | 2.13 | |

## 1.2 Red Hat Enterprise Linux 5 (for Intel64) for PRIMERGY/ PRIMEQUEST

| No. | Component | Package | Version | Function |
|---|---|---|---|---|
| 1 | Global Link Services(GLS) | kmod-FJSVhanet-drv | 2.13 | High Available Network Support |
| | | FJSVhanet | 2.13 | |

## 1.3 Red Hat Enterprise Linux 5 (for x86) xen kernel and Red Hat Enterprise Linux 5 (for Intel64) xen kernel for PRIMERGY/ PRIMEQUEST

| No. | Component | Package | Version | Function |
|---|---|---|---|---|
| 1 | Global Link Services(GLS) | kmod-FJSVhanet-drv-xen | 2.13 | High Available Network Support |

| No. | Component | Package | Version | Function |
|---|---|---|---|---|
| | | FJSVhanet | 2.13 | |

## 1.4 Red Hat Enterprise Linux 6 (for x86) for PRIMERGY/ PRIMEQUEST

| No. | Component | Package | Version | Function |
|---|---|---|---|---|
| 1 | Global Link Services(GLS) | kmod-FJSVhanet-drv | 2.13 | High Available Network Support |
| | | FJSVhanet | 2.13 | |

## 1.5 Red Hat Enterprise Linux 6 (for Intel64) for PRIMERGY/ PRIMEQUEST

| No. | Component | Package | Version | Function |
|---|---|---|---|---|
| 1 | Global Link Services(GLS) | kmod-FJSVhanet-drv | 2.13 | High Available Network Support |
| | | FJSVhanet | 2.13 | |

# Chapter 2 Operation Environment

This chapter explains the operation environment of this software.

## 2.1 Software environment

1. Basic software prerequisites

   Install the following software product:

   - PRIMERGY(x86,Intel64)

| No. | Basic Software | Remarks |
|---|---|---|
| 1 | Red Hat Enterprise Linux 5.3 (for x86) | Supports kernel-2.6.18-128.el5PAE, kernel-2.6.18-128.el5xen |
| 2 | Red Hat Enterprise Linux 5.4 (for x86) | Supports kernel-2.6.18-164.el5PAE, kernel-2.6.18-164.el5xen |
| 3 | Red Hat Enterprise Linux 5.5 (for x86) | Supports kernel-2.6.18-194.el5PAE, kernel-2.6.18-194.el5xen |
| 4 | Red Hat Enterprise Linux 5.6 (for x86) | Supports kernel-2.6.18-238.el5PAE, kernel-2.6.18-238.el5xen |
| 5 | Red Hat Enterprise Linux 5.7 (for x86) | Supports kernel-2.6.18-274.el5PAE, kernel-2.6.18-274.el5xen |
| 6 | Red Hat Enterprise Linux 5.8 (for x86) | Supports kernel-2.6.18-308.el5PAE, kernel-2.6.18-308.el5xen |
| 7 | Red Hat Enterprise Linux 5.9 (for x86) | Supports kernel-2.6.18-348.el5PAE, kernel-2.6.18-348.el5xen |
| 8 | Red Hat Enterprise Linux 6 (for x86) | Supports kernel-2.6.32-71.el6 |
| 9 | Red Hat Enterprise Linux 6.1 (for x86) | Supports kernel-2.6.32-131.0.15.el6 |
| 10 | Red Hat Enterprise Linux 6.2 (for x86) | Supports kernel-2.6.32-220.4.2.el6 (*1) |
| 11 | Red Hat Enterprise Linux 6.3 (for x86) | Supports kernel-2.6.32-279.el6 |
| 12 | Red Hat Enterprise Linux 6.4 (for x86) | Supports kernel-2.6.32-358.el6 |
| 13 | Red Hat Enterprise Linux 5.3 (for Intel64) | Supports kernel-2.6.18-128.el5, kernel-2.6.18-128.el5xen |
| 14 | Red Hat Enterprise Linux 5.4 (for Intel64) | Supports kernel-2.6.18-164.el5, kernel-2.6.18-164.el5xen |
| 15 | Red Hat Enterprise Linux 5.5 (for Intel64) | Supports kernel-2.6.18-194.el5, kernel-2.6.18-194.el5xen |

| No. | Basic Software | Remarks |
|---|---|---|
| 16 | Red Hat Enterprise Linux 5.6 (for Intel64) | Supports kernel-2.6.18-238.el5, kernel-2.6.18-238.el5xen |
| 17 | Red Hat Enterprise Linux 5.7 (for Intel64) | Supports kernel-2.6.18-274.el5, kernel-2.6.18-274.el5xen |
| 18 | Red Hat Enterprise Linux 5.8 (for Intel64) | Supports kernel-2.6.18-308.el5, kernel-2.6.18-308.el5xen |
| 19 | Red Hat Enterprise Linux 5.9 (for Intel64) | Supports kernel-2.6.18-348.el5, kernel-2.6.18-348.el5xen |
| 20 | Red Hat Enterprise Linux 6 (for Intel64) | Supports kernel-2.6.32-71.el6 |
| 21 | Red Hat Enterprise Linux 6.1 (for Intel64) | Supports kernel-2.6.32-131.0.15.el6 |
| 22 | Red Hat Enterprise Linux 6.2 (for Intel64) | Supports kernel-2.6.32-220.4.2.el6 (*1) |
| 23 | Red Hat Enterprise Linux 6.3 (for Intel64) | Supports kernel-2.6.32-279.el6 |
| 24 | Red Hat Enterprise Linux 6.4 (for Intel64) | Supports kernel-2.6.32-358.el6 |

(*1) Please apply errata with reference to "4. Required patches".

- PRIMEQUEST(x86,Intel64)

| No. | Basic Software | Remarks |
|---|---|---|
| 1 | Red Hat Enterprise Linux 5.3 (for x86) | Supports kernel-2.6.18-128.el5PAE, kernel-2.6.18-128.el5xen |
| 2 | Red Hat Enterprise Linux 5.4 (for x86) | Supports kernel-2.6.18-164.el5PAE, kernel-2.6.18-164.el5xen |
| 3 | Red Hat Enterprise Linux 5.5 (for x86) | Supports kernel-2.6.18-194.el5PAE, kernel-2.6.18-194.el5xen |
| 4 | Red Hat Enterprise Linux 5.6 (for x86) | Supports kernel-2.6.18-238.el5PAE, kernel-2.6.18-238.el5xen |
| 5 | Red Hat Enterprise Linux 5.7 (for x86) | Supports kernel-2.6.18-274.el5PAE, kernel-2.6.18-274.el5xen |
| 6 | Red Hat Enterprise Linux 5.8 (for x86) | Supports kernel-2.6.18-308.el5PAE, kernel-2.6.18-308.el5xen |
| 7 | Red Hat Enterprise Linux 5.9 (for x86) | Supports kernel-2.6.18-348.el5PAE, kernel-2.6.18-348.el5xen |
| 8 | Red Hat Enterprise Linux 6 (for x86) | Supports kernel-2.6.32-71.el6 |
| 9 | Red Hat Enterprise Linux 6.1 (for x86) | Supports kernel-2.6.32-131.0.15.el6 |

| No. | Basic Software | Remarks |
|---|---|---|
| 10 | Red Hat Enterprise Linux 6.2 (for x86) | Supports kernel-2.6.32-220.4.2.el6 (*1) |
| 11 | Red Hat Enterprise Linux 6.3 (for x86) | Supports kernel-2.6.32-279.el6 |
| 12 | Red Hat Enterprise Linux 6.4 (for x86) | Supports kernel-2.6.32-358.el6 |
| 13 | Red Hat Enterprise Linux 5.3 (for Intel64) | Supports kernel-2.6.18-128.el5, kernel-2.6.18-128.el5xen |
| 14 | Red Hat Enterprise Linux 5.4 (for Intel64) | Supports kernel-2.6.18-164.el5, kernel-2.6.18-164.el5xen |
| 15 | Red Hat Enterprise Linux 5.5 (for Intel64) | Supports kernel-2.6.18-194.el5, kernel-2.6.18-194.el5xen |
| 16 | Red Hat Enterprise Linux 5.6 (for Intel64) | Supports kernel-2.6.18-238.el5, kernel-2.6.18-238.el5xen |
| 17 | Red Hat Enterprise Linux 5.7 (for Intel64) | Supports kernel-2.6.18-274.el5, kernel-2.6.18-274.el5xen |
| 18 | Red Hat Enterprise Linux 5.8 (for Intel64) | Supports kernel-2.6.18-308.el5, kernel-2.6.18-308.el5xen |
| 19 | Red Hat Enterprise Linux 5.9 (for Intel64) | Supports kernel-2.6.18-348.el5, kernel-2.6.18-348.el5xen |
| 20 | Red Hat Enterprise Linux 6 (for Intel64) | Supports kernel-2.6.32-71.el6 |
| 21 | Red Hat Enterprise Linux 6.1 (for Intel64) | Supports kernel-2.6.32-131.0.15.el6 |
| 22 | Red Hat Enterprise Linux 6.2 (for Intel64) | Supports kernel-2.6.32-220.4.2.el6 (*1) |
| 23 | Red Hat Enterprise Linux 6.3 (for Intel64) | Supports kernel-2.6.32-279.el6 |
| 24 | Red Hat Enterprise Linux 6.4 (for Intel64) | Supports kernel-2.6.32-358.el6 |

For the supported versions of the kernel, please contact your local Fujitsu sales representative.

This software, when operating on the above software, requires additional packages to be added

besides the packages which are installed with a minimum OS option installation.

Please refer to "Appendix B. Necessary OS packages to be installed" for the necessary additional packages.

2. Required software

   None.

3. Exclusive software

   None.

4. Required patches

| No. | Software | ID/PTF | Remark |
|---|---|---|---|
| 1 | Red Hat Enterprise Linux 6.2 | RHBA-2012:0124-1 or later | Please apply to all the OS's where this software is installed. |

| No. | Software | ID/PTF | Remark |
|---|---|---|---|
| | | | In the KVM environment, whether this software is installed or not on the host OS, be sure to apply this patch to the host OS. |

## 2.2 Hardware environment

The following hardware requirements must be satisfied to operate this software.

1. Memory

   512MB or more of memory is required.

2. Required hardware

   None.

3. Related hardware

   None.

## 2.3 Static disk resources

This section explains static disk space requirements for this software.

### 2.3.1 Required disk space

The following table lists the disk space requirements for installing this software. If necessary, expand the size of the relevant file systems.

| No. | Directory | Disk space (in MB) | Remarks |
|---|---|---|---|
| 1 | / | 0.1 | |
| 2 | /var | 0.1 | |
| 3 | /opt | 42.0 | |

### 2.3.2 Required work area

None.

## 2.4 Dynamic disk resources

This section explains dynamic disk space requirements for this software.

### 2.4.1 Required disk space

When this software is operated in the following environment, the additional disk space shown below is required for each directory as well as the disk space required for installing this software as described in "2.3 Static disk resources". If free space is insufficient, expand the size of the relevant file system.

| No. | Directory | Disk space (in MB) | Operation |
|---|---|---|---|
| 1 | /var | 13.0 | When you are running PRIMECLUSTER GLS. (The execution log is preserved.) |

## 2.5 Required memory

The following table shows the memory required when this software is operated in the following environment:

| No. | Memory (in MB) | Operation |
|---|---|---|
| 1 | 8.6 | When it is a dual network using the Redundant Line Control Function (NIC switching mode). |
| 2 | 9.4 | When it is a dual network using the Redundant Line Control Function (Fast switching mode). |
| 3 | 9.8 | When it is a dual network using the Redundant Line Control Function (Virtual NIC mode). |
| 4 | 30.6 | When it is a dual network using the Redundant Line Control Function (GS linkage mode). |

# Chapter 3 Installation

This chapter explains the installation of this software.

You can install this software on each node where basic and required software is installed. For details about error messages during installation, see "Appendix A Troubleshooting".

## 3.1 Preparations

1. Prerequisites

   1. Time required

      It takes approximately 10 minutes to install this software.

   2. OS version check

      Execute the following command, and confirm whether it is the one corresponding to the version of software from which the version of OS has been described to "2.1 Software environment".

      ```
      # uname -r <Return>
      ```

   3. Kernel header

      Before installing this software, it is necessary to install the kernel header that supports OS of the system. Check if the kernel header is installed on the system by executing the following command:

      ```
       Red Hat Enterprise Linux 5 (for x86)
      ```

      ```
      # rpm -qi kernel-PAE-devel <Return>
      ```

      ```
      Red Hat Enterprise Linux 5 (for Intel64)
      Red Hat Enterprise Linux 6 (for x86)
      Red Hat Enterprise Linux 6 (for Intel64)
      ```

      ```
      # rpm -qi kernel-devel <Return>
      ```

      ```
      Red Hat Enterprise Linux 5 (for x86) xen kernel
      Red Hat Enterprise Linux 5 (for Intel64) xen kernel
      ```

      ```
      # rpm -qi kernel-xen-devel <Return>
      ```

      If the command encounters an error, or the kernel source version different than the system OS, install the kernel source according to the OS document.

   4. Compiler(gcc) installation

      Before installing this software, check that the gcc package is installed and that the version of the package is the same as the version of gcc that compiles the kernel.
      Check the version of the gcc package by executing the following command:

      ```
      # gcc --version <Return>
      gcc (GCC) 4.4.4 20100726 (Red Hat 4.4.4-13)
      ```

      Check the version of gcc that compiles the running kernel by executing the following command:

      ```
      # cat /proc/version <Return>
      Linux version 2.6.32-71.el6.x86_64 (mockbuild@x86-007.build.bos.
      redhat.com) (gcc version 4.4.4 20100726 (Red Hat 4.4.4-13) (GCC) )
      #1 SMP Wed Sep 1 01:33:01 EDT 2010
      ```

      The first and second numbers of the version (e.g. "4.4" for "4.4.4") must be the same between both gcc.

5. Patch download

   Before installing this software, download the latest PRIMECLUSTER patch by UpdateSite format and update information file from Updatesite.

2. Package check

   1. Check if a previous version of this software is installed.

      ```
      # rpm -qi FJSVhanet <Return>
      ```

   2. If the name of the installed package is displayed by the above operation, the package is already installed. After saving the configuration files, remove the displayed package from the system. See "3. Saving the Configuration files" for how to save a configuration files, and see "Chapter 4 Uninstallation" for how to remove a package.

   3. Before installing this software, check that enough disk space is available, For the disk size used by this software, see "2.3 Static disk resources" If there is insufficient space available, reconfigure the disk partition.

3. Saving the configuration files

   1. This software contains several configuration files. Before upgrading this software, save the configuration files by executing the command listed below. For detailed information about the command, refer to "4.6.1 Backing up Configuration Files" in PRIMECLUSTER Global Link Services Configuration and Administration Guide: Redundant Line Control Function.

      ```
      # /opt/FJSVhanet/usr/sbin/hanetbackup -d save_destination_directory <Return>
      ```

## 3.2 Installation

1. Login to the system and become a root user.

   ```
   # su <Return>
   Password:password <Return>
   ```

2. The system is changed to the single user mode.

   ```
   # shutdown now <Return>
   ```

3. Insert CD in the CD-ROM drive.

   ```
   # mount /media/cdrom <Return>
   ```

   <CDROM_DIR> will be used as the mount point.

4. Execute the CLI installer.

   ```
   # cd <CDROM_DIR>/Tool <Return>
   # ./cluster_install -e PCL-GLS <Return>

   Installation of PRIMECLUSTER started.

   PRODUCT : GLS

         .
         .

   The installation finished successfully.
   ```

5. Eject CD.

   ```
   # cd / <Return>
   # umount /media/cdrom <Return>
   # eject <Return>
   ```

6. Please apply the patch for PRIMECLUSTER.

   Please refer to the update information file of each patch for installation instructions and points of concern, etc.

## 3.3 Environment configuration

1. If the configuration files have been saved, execute the following command to restore them:
   Refer to "4.6.2 Restoring Configuration Files" in PRIMECLUSTER Global Link Services Configuration and Administration Guide: Redundant Line Control Function.

```
# cd /save destination_directory <Return>
# /opt/FJSVhanet/usr/sbin/hanetrestore -f name_of_saved_file <Return>
```

2. Reboot the system.

```
# shutdown -r now <Return>
```

# Chapter 4 Uninstallation

This chapter explains the uninstallation of this software.

## 4.1 Preparation

Before uninstalling, if you are applying patch for PRIMECLUSTER by UpdateSite format, remove them by UpdateAdvisor (middleware). For details, see help information on UpdateAdvisor(middleware) and the update information file of the patch.

## 4.2 Uninstallation

1. Login to the system as a root user.

```
# su <Return>
Password:password <Return>
```

2. Boot the system in single user mode.

```
# shutdown now <Return>
```

3. Insert CD and mount the CD-ROM device.

```
# mount /media/cdrom <Return>
```

<*CDROM_DIR*> will be used as the mount point.

4. Execute the CLI uninstaller.

```
# cd <CDROM_DIR>/Tool <Return>
# ./cluster_uninstall -e PCL-GLS <Return>
Are you sure to remove PRIMECLUSTER from your system (y or n) ? y <Return>

  .
  .

The uninstallation finished successfully.
```

5. In PRIMECLUSTER Global Link Services: Redundant Line Control Function, when using the user command execution function and script files remains, the directory under /etc/opt/FJSVhanet/script is not deleted.
   Delete this directory after saving or deleting script files.

```
# rm -r /etc/opt/FJSVhanet <Return>
```

6. Eject CD, then reboot the system by executing the "shutdown(8)" command.

```
# cd / <Return>
# umount /media/cdrom <Return>
# eject <Return>
# shutdown -r now <Return>
```

# Appendix A Troubleshooting

This chapter explains how to address problems that occur.

## A.1 Error messages

The following section describes the messages display during the installation of this software and the recommended procedure of handling these messages.

### Compilation failed.

#### Description

Failed to compile GLS virtual driver (sha).

#### Workaround

Ensure the Operating System you're using is compatible. For the compatitiblity matrix refer to "2.1 Software environment". Also, verify your system environment is suitable for compile by referring to "3.1 Preparations" section. Once you have verify your system is appropriate, remove this product by the following command and reinstall the product.

```
# rpm -e FJSVhanet-2.11-* <Return>
```

### RMS is running.

#### Description

You can not uninstall or upgrade a package while RMS is running.

#### Workaround

You must switch to a single user mode before running any package operations.

### /lib/modules/`uname -r`/build/include/linux not present.

#### Description

A kernel header does not exist for the Operating System.

#### Workaround

Make sure the kernel header(kernel-devel package) you've installed has the same kernel version displayed by the "uname -r" command. If the kernel version is different, install the correct version of the kernel and remove this product. Once GLS is successfully removed from your system, reinstall GLS into your system.

## A.2 When segmentation violation causes an installation failure

If segmentation violation is due to the rpm(8) command, take the following corrective steps. If the problem still remains unresolved, contact Fujitsu customer support engineers.

1. Reboot the system by executing the shutdown(8) command.

   ```
   # shutdown -r now <Return>
   ```

2. Delete PRIMECLUSTER from the system according to "4.2 Uninstallation".

3. Execute the following command.

   ```
   # rpm --rebuilddb <Return>
   ```

4. Install PRIMECLUSTER again.

# Appendix B Necessary OS packages to be installed

When operating this software on Red Hat Enterprise Linux, in addition to the packages that are installed with a minimum OS option installation, the following packages are used.

## B.1 For Red Hat Enterprise Linux 5 (for x86)

| Package | Architecture |
|---|---|
| OpenIPMI | i386 |
| OpenIPMI-libs | i386 |
| OpenIPMI-tools | i386 |
| alsa-lib | i386 |
| at | i386 |
| attr | i386 |
| autoconf | noarch |
| bc | i386 |
| bind | i386 |
| bind-utils | i386 |
| compat-gcc-34-g77 | i386 |
| compat-libstdc++-33 | i386 |
| cpp | i386 |
| crash | i386 |
| cups | i386 |
| cvs | i386 |
| dhcp | i386 |
| docbook-utils | noarch |
| dump | i386 |
| eject | i386 |
| gcc | i386 |
| gcc-c++ | i386 |
| gdb | i386 |
| ghostscript | i386 |
| groff | i386 |
| httpd | i386 |
| indent | i386 |
| kernel-PAE | i686 |
| kernel-PAE-devel | i686 |
| kernel-devel | i686 |
| kernel-headers | i386 |
| kernel-xen-devel | i686 |
| kexec-tools | i386 |

| Package | Architecture |
|---|---|
| krb5-workstation | i386 |
| libICE | i386 |
| libSM | i386 |
| libX11 | i386 |
| libXau | i386 |
| libXdmcp | i386 |
| libXext | i386 |
| libXi | i386 |
| libXrender | i386 |
| libXt | i386 |
| libXtst | i386 |
| lsof | i386 |
| lv | i386 |
| m4 | i386 |
| mailx | i386 |
| make | i386 |
| man | i386 |
| mgetty | i386 |
| mlocate | i386 |
| mt-st | i386 |
| mtools | i386 |
| mtr | i386 |
| nc | i386 |
| net-snmp | i386 |
| net-snmp-utils | i386 |
| nfs-utils | i386 |
| ntp | i386 |
| opensp | i386 |
| openssh | i386 |
| openssh-clients | i386 |
| parted | i386 |
| patch | i386 |
| perl | i386 |
| perl-libwww-perl | noarch |
| pinfo | i386 |
| postfix | i386 |
| procmail | i386 |
| psacct | i386 |
| pstack | i386 |

| Package | Architecture |
|---|---|
| quota | i386 |
| rcs | i386 |
| rdist | i386 |
| rsh | i386 |
| samba-common | i386 |
| screen | i386 |
| setarch | i386 |
| setuptool | i386 |
| sox | i386 |
| strace | i386 |
| subversion | i386 |
| symlinks | i386 |
| time | i386 |
| tree | i386 |
| tux | i386 |
| vconfig | i386 |
| xinetd | i386 |
| xorg-x11-apps | i386 |
| xorg-x11-server-utils | i386 |
| xterm | i386 |

## B.2 For Red Hat Enterprise Linux 5 (for Intel64)

| Package | Architecture |
|---|---|
| OpenIPMI | x86_64 |
| OpenIPMI-libs | x86_64 |
| OpenIPMI-tools | x86_64 |
| alsa-lib | i386 |
| alsa-lib | x86_64 |
| at | x86_64 |
| attr | x86_64 |
| audit-libs | i386 |
| autoconf | noarch |
| bc | x86_64 |
| bind | x86_64 |
| bind-utils | x86_64 |
| compat-gcc-34-g77 | x86_64 |
| compat-libstdc++-33 | i386 |
| compat-libstdc++-33 | noarch |
| cpp | x86_64 |

| Package | Architecture |
|---|---|
| crash | x86_64 |
| cups | x86_64 |
| cvs | x86_64 |
| dhcp | x86_64 |
| docbook-utils | noarch |
| dump | x86_64 |
| eject | x86_64 |
| gcc | x86_64 |
| gcc-c++ | x86_64 |
| gdb | x86_64 |
| ghostscript | x86_64 |
| groff | x86_64 |
| httpd | x86_64 |
| indent | x86_64 |
| iptables | x86_64 |
| kernel-devel | x86_64 |
| kernel-headers | x86_64 |
| kernel-xen | x86_64 |
| kernel-xen-devel | x86_64 |
| kexec-tools | x86_64 |
| krb5-workstation | x86_64 |
| libICE | x86_64 |
| libSM | x86_64 |
| libX11 | i386 |
| libX11 | x86_64 |
| libXau | i386 |
| libXau | x86_64 |
| libXdmcp | i386 |
| libXdmcp | x86_64 |
| libXext | i386 |
| libXext | x86_64 |
| libXi | i386 |
| libXi | x86_64 |
| libXrender | i386 |
| libXrender | x86_64 |
| libXt | x86_64 |
| libXtst | i386 |
| libXtst | x86_64 |
| libstdc++ | i386 |

| Package | Architecture |
|---|---|
| lsof | x86_64 |
| lv | x86_64 |
| m4 | x86_64 |
| mailx | x86_64 |
| make | x86_64 |
| man | x86_64 |
| mgetty | x86_64 |
| mlocate | x86_64 |
| mt-st | x86_64 |
| mtools | x86_64 |
| mtr | x86_64 |
| nc | x86_64 |
| net-snmp | x86_64 |
| net-snmp-utils | x86_64 |
| nfs-utils | x86_64 |
| ntp | x86_64 |
| opensp | x86_64 |
| openssh | x86_64 |
| openssh-clients | x86_64 |
| pam | i386 |
| parted | x86_64 |
| patch | x86_64 |
| perl | x86_64 |
| perl-libwww-perl | noarch |
| pinfo | x86_64 |
| postfix | x86_64 |
| procmail | x86_64 |
| psacct | x86_64 |
| pstack | x86_64 |
| quota | x86_64 |
| rcs | x86_64 |
| rdist | x86_64 |
| rsh | x86_64 |
| samba-common | x86_64 |
| screen | x86_64 |
| setarch | x86_64 |
| setuptool | x86_64 |
| sox | x86_64 |
| strace | x86_64 |

| Package | Architecture |
|---|---|
| subversion | x86_64 |
| symlinks | x86_64 |
| time | x86_64 |
| tree | x86_64 |
| tux | x86_64 |
| vconfig | x86_64 |
| xinetd | x86_64 |
| xorg-x11-apps | x86_64 |
| xorg-x11-server-utils | x86_64 |
| xterm | x86_64 |

## B.3 For Red Hat Enterprise Linux 6 (for x86)

| Package | Architecture |
|---|---|
| OpenIPMI | i686 |
| OpenIPMI-libs | i686 |
| alsa-lib | i686 |
| at | i686 |
| autoconf | noarch |
| bc | i686 |
| bind | i686 |
| bind-utils | i686 |
| compat-libstdc++-33 | i686 |
| cpp | i686 |
| crash | i686 |
| cvs | i686 |
| dhcp | i686 |
| docbook-utils | noarch |
| dump | i686 |
| ebtables | i686 |
| ed | i686 |
| eject | i686 |
| fontconfig | i686 |
| freetype | i686 |
| ftp | i686 |
| gcc | i686 |
| gdb | i686 |
| ghostscript | i686 |
| graphviz | i686 |
| hdparm | i686 |

| Package | Architecture |
|---|---|
| httpd | i686 |
| httpd-tools | i686 |
| indent | i686 |
| ipmitool | i686 |
| iw | i686 |
| kernel-devel | i686 |
| kernel-headers | i686 |
| kexec-tools | i686 |
| libICE | i686 |
| libSM | i686 |
| libX11 | i686 |
| libXau | i686 |
| libXext | i686 |
| libXft | i686 |
| libXi | i686 |
| libXmu | i686 |
| libXp | i686 |
| libXrender | i686 |
| libXt | i686 |
| libXtst | i686 |
| libjpeg/libjpeg-turbo(*1) | i686 |
| libpng | i686 |
| libproxy-bin | i686 |
| libreport | i686 |
| libvirt-client | i686 |
| libxcb | i686 |
| lsof | i686 |
| lvm2 | i686 |
| make | i686 |
| man | i686 |
| mlocate | i686 |
| mod_wsgi | i686 |
| mt-st | i686 |
| mtools | i686 |
| mtr | i686 |
| mysql-server | i686 |
| nc | i686 |
| net-snmp | i686 |
| net-snmp-utils | i686 |

| Package | Architecture |
|---|---|
| nfs-utils | i686 |
| ntp | i686 |
| openmotif | i686 |
| openmotif22 | i686 |
| opensp | i686 |
| openssh-clients | i686 |
| parted | i686 |
| patch | i686 |
| pciutils | i686 |
| perl | i686 |
| perl-libwww-perl | noarch |
| pinfo | i686 |
| prelink | i686 |
| procmail | i686 |
| psacct | i686 |
| quota | i686 |
| rpcbind | i686 |
| rsh | i686 |
| samba-common | i686 |
| setuptool | i686 |
| strace | i686 |
| subversion | i686 |
| sysstat | i686 |
| tcpdump | i686 |
| telnet | i686 |
| time | i686 |
| tree | i686 |
| vconfig | i686 |
| vim-common | i686 |
| xinetd | i686 |
| xorg-x11-apps | i686 |
| xorg-x11-server-Xorg | i686 |
| xorg-x11-server-utils | i686 |
| xterm | i686 |
| xz | i686 |

(*1) For Red Hat Enterprise Linux 6.3 or earlier, use the libjpeg package.
For Red Hat Enterprise Linux 6.4 or later, use the libjpeg-turbo package.

## B.4 For Red Hat Enterprise Linux 6 (for Intel64)

| Package | Architecture |
|---|---|
| OpenIPMI | x86_64 |
| OpenIPMI-libs | x86_64 |
| PyQt4 | x86_64 |
| PyQt4-devel | i686 |
| PyQt4-devel | x86_64 |
| alsa-lib | i686 |
| alsa-lib | x86_64 |
| at | x86_64 |
| audit-libs | i686 |
| autoconf | noarch |
| bc | x86_64 |
| bind | x86_64 |
| bind-utils | x86_64 |
| compat-libstdc++-33 | i686 |
| compat-libstdc++-33 | x86_64 |
| cpp | x86_64 |
| crash | x86_64 |
| cvs | x86_64 |
| device-mapper | x86_64 |
| dhcp | x86_64 |
| docbook-utils | noarch |
| dump | x86_64 |
| ebtables | x86_64 |
| ed | x86_64 |
| eject | x86_64 |
| fontconfig | i686 |
| freetype | x86_64 |
| gcc | x86_64 |
| gdb | x86_64 |
| ghostscript | x86_64 |
| glibc | i686 |
| hdparm | x86_64 |
| httpd | x86_64 |
| indent | x86_64 |
| ipmitool | x86_64 |
| kernel-devel | x86_64 |
| kernel-headers | x86_64 |
| kexec-tools | x86_64 |
| libICE | x86_64 |

| Package | Architecture |
|---|---|
| libSM | x86_64 |
| libX11 | i686 |
| libX11 | x86_64 |
| libXau | i686 |
| libXau | x86_64 |
| libXext | i686 |
| libXext | x86_64 |
| libXft | x86_64 |
| libXi | i686 |
| libXi | x86_64 |
| libXmu | x86_64 |
| libXp | x86_64 |
| libXrender | x86_64 |
| libXt | x86_64 |
| libXtst | i686 |
| libXtst | x86_64 |
| libgcc | i686 |
| libjpeg/libjpeg-turbo(*1) | x86_64 |
| libpng | x86_64 |
| libstdc++ | i686 |
| libxcb | x86_64 |
| lsof | x86_64 |
| lvm2 | x86_64 |
| make | x86_64 |
| man | x86_64 |
| mlocate | x86_64 |
| mt-st | x86_64 |
| mtools | x86_64 |
| mtr | x86_64 |
| nc | x86_64 |
| net-snmp | x86_64 |
| net-snmp-utils | x86_64 |
| nfs-utils | x86_64 |
| ntp | x86_64 |
| openmotif | x86_64 |
| openmotif22 | x86_64 |
| opensp | i686 |
| openssh-clients | x86_64 |
| pam | i686 |

| Package | Architecture |
|---|---|
| parted | x86_64 |
| patch | x86_64 |
| pciutils | x86_64 |
| perl | x86_64 |
| perl-libwww-perl | noarch |
| pinfo | x86_64 |
| prelink | x86_64 |
| psacct | x86_64 |
| quota | x86_64 |
| rsh | x86_64 |
| ruby | x86_64 |
| samba-common | x86_64 |
| setuptool | x86_64 |
| strace | x86_64 |
| subversion | x86_64 |
| sysstat | x86_64 |
| tcpdump | x86_64 |
| time | x86_64 |
| tree | x86_64 |
| vconfig | x86_64 |
| xinetd | x86_64 |
| xorg-x11-apps | x86_64 |
| xorg-x11-server-utils | x86_64 |
| xterm | x86_64 |

(*1) For Red Hat Enterprise Linux 6.3 or earlier, use the libjpeg package.
For Red Hat Enterprise Linux 6.4 or later, use the libjpeg-turbo package.