

FUJITSU Software

PRIMECLUSTER GLS 4.3A30B

A decorative horizontal band with a red-to-dark-red gradient, featuring abstract, glowing white and red lines that swirl and intersect, creating a sense of motion and technology.

Installation Guide

Linux

J2UL-1390-05ENZ0(00)
June 2014

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.
- PRIMEQUEST 2000/1000 Series is abbreviated as PRIMEQUEST.

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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	2.14-x	High Available Network Support
		FJSVhanet	2.14-1	

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	2.14-x	High Available Network Support
		FJSVhanet	2.14-1	

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	2.14-x	High Available Network Support

No.	Component	Package	Version	Function
		FJSVhanet	2.14-1	

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	2.14-x	High Available Network Support
		FJSVhanet	2.14-1	

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	2.14-x	High Available Network Support
		FJSVhanet	2.14-1	

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 5.10 (for x86)	Supports kernel-2.6.18-371.el5PAE, kernel-2.6.18-371.el5xen
9	Red Hat Enterprise Linux 6 (for x86)	Supports kernel-2.6.32-71.el6
10	Red Hat Enterprise Linux 6.1 (for x86)	Supports kernel-2.6.32-131.0.15.el6
11	Red Hat Enterprise Linux 6.2 (for x86)	Supports kernel-2.6.32-220.4.2.el6 (*1)
12	Red Hat Enterprise Linux 6.3 (for x86)	Supports kernel-2.6.32-279.22.1.el6 (*1)
13	Red Hat Enterprise Linux 6.4 (for x86)	Supports kernel-2.6.32-358.6.1.el6 (*1)
14	Red Hat Enterprise Linux 5.3 (for Intel64)	Supports kernel-2.6.18-128.el5, kernel-2.6.18-128.el5xen

No.	Basic Software	Remarks
15	Red Hat Enterprise Linux 5.4 (for Intel64)	Supports kernel-2.6.18-164.el5, kernel-2.6.18-164.el5xen
16	Red Hat Enterprise Linux 5.5 (for Intel64)	Supports kernel-2.6.18-194.el5, kernel-2.6.18-194.el5xen
17	Red Hat Enterprise Linux 5.6 (for Intel64)	Supports kernel-2.6.18-238.el5, kernel-2.6.18-238.el5xen
18	Red Hat Enterprise Linux 5.7 (for Intel64)	Supports kernel-2.6.18-274.el5, kernel-2.6.18-274.el5xen
19	Red Hat Enterprise Linux 5.8 (for Intel64)	Supports kernel-2.6.18-308.el5, kernel-2.6.18-308.el5xen
20	Red Hat Enterprise Linux 5.9 (for Intel64)	Supports kernel-2.6.18-348.el5, kernel-2.6.18-348.el5xen
21	Red Hat Enterprise Linux 5.10 (for Intel64)	Supports kernel-2.6.18-371.el5, kernel-2.6.18-371.el5xen
22	Red Hat Enterprise Linux 6 (for Intel64)	Supports kernel-2.6.32-71.el6
23	Red Hat Enterprise Linux 6.1 (for Intel64)	Supports kernel-2.6.32-131.0.15.el6
24	Red Hat Enterprise Linux 6.2 (for Intel64)	Supports kernel-2.6.32-220.4.2.el6 (*1)
25	Red Hat Enterprise Linux 6.3 (for Intel64)	Supports kernel-2.6.32-279.22.1.el6 (*1)
26	Red Hat Enterprise Linux 6.4 (for Intel64)	Supports kernel-2.6.32-358.6.1.el6 (*1)

(*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

No.	Basic Software	Remarks
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 5.10 (for x86)	Supports kernel-2.6.18-371.el5PAE, kernel-2.6.18-371.el5xen
9	Red Hat Enterprise Linux 6 (for x86)	Supports kernel-2.6.32-71.el6
10	Red Hat Enterprise Linux 6.1 (for x86)	Supports kernel-2.6.32-131.0.15.el6
11	Red Hat Enterprise Linux 6.2 (for x86)	Supports kernel-2.6.32-220.4.2.el6 (*1)
12	Red Hat Enterprise Linux 6.3 (for x86)	Supports kernel-2.6.32-279.22.1.el6 (*1)
13	Red Hat Enterprise Linux 6.4 (for x86)	Supports kernel-2.6.32-358.6.1.el6 (*1)
14	Red Hat Enterprise Linux 5.3 (for Intel64)	Supports kernel-2.6.18-128.el5, kernel-2.6.18-128.el5xen
15	Red Hat Enterprise Linux 5.4 (for Intel64)	Supports kernel-2.6.18-164.el5, kernel-2.6.18-164.el5xen
16	Red Hat Enterprise Linux 5.5 (for Intel64)	Supports kernel-2.6.18-194.el5, kernel-2.6.18-194.el5xen
17	Red Hat Enterprise Linux 5.6 (for Intel64)	Supports kernel-2.6.18-238.el5, kernel-2.6.18-238.el5xen
18	Red Hat Enterprise Linux 5.7 (for Intel64)	Supports kernel-2.6.18-274.el5, kernel-2.6.18-274.el5xen
19	Red Hat Enterprise Linux 5.8 (for Intel64)	Supports kernel-2.6.18-308.el5, kernel-2.6.18-308.el5xen
20	Red Hat Enterprise Linux 5.9 (for Intel64)	Supports kernel-2.6.18-348.el5, kernel-2.6.18-348.el5xen
21	Red Hat Enterprise Linux 5.10 (for Intel64)	Supports kernel-2.6.18-371.el5, kernel-2.6.18-371.el5xen
22	Red Hat Enterprise Linux 6 (for Intel64)	Supports kernel-2.6.32-71.el6
23	Red Hat Enterprise Linux 6.1 (for Intel64)	Supports kernel-2.6.32-131.0.15.el6
24	Red Hat Enterprise Linux 6.2 (for Intel64)	Supports kernel-2.6.32-220.4.2.el6 (*1)
25	Red Hat Enterprise Linux 6.3 (for Intel64)	Supports kernel-2.6.32-279.22.1.el6 (*1)
26	Red Hat Enterprise Linux 6.4 (for Intel64)	Supports kernel-2.6.32-358.6.1.el6 (*1)

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. 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	Red Hat Enterprise Linux 6.3	RHSA-2013:0223-1 or later	Please apply to all the OS's where this software is installed.
3	Red Hat Enterprise Linux 6.4	RHSA-2013:0744-1 or later	Please apply to all the OS's where this software is installed.

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. 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.

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.

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
setuptools	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
mttools	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
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
subversion	x86_64

Package	Architecture
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
httpd	i686

Package	Architecture
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
nfs-utils	i686

Package	Architecture
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
setuptools	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
parted	x86_64

Package	Architecture
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.