

# **FUJITSU Software PRIMECLUSTER GL 4.5A10**

## **Installation Guide**

Linux

J2UL-2262-02ENZ0(00)  
August 2018

# Preface

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## Purpose

This manual explains how to install PRIMECLUSTER GL.

## 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 3000/2000 Series is abbreviated as PRIMEQUEST.

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## Revision History

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First edition

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# Chapter 1 Program components

The unit of the program that composes the system is called a package.  
This chapter explains about the packages of which this software is composed.

## PRIMERGY

- Red Hat Enterprise Linux 6 (for Intel64)
- Red Hat Enterprise Linux 7 (for Intel64)

## PRIMEQUEST

- Red Hat Enterprise Linux 6 (for Intel64)
- Red Hat Enterprise Linux 7 (for Intel64)

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

| No. | Component            | Package            | Version | Function                       |
|-----|----------------------|--------------------|---------|--------------------------------|
| 1   | Global Link Services | kmod-FJSVhanet-drv | 2.19    | High Available Network Support |
|     |                      | FJSVhanet          | 2.19    |                                |

## 1.2 Red Hat Enterprise Linux 7 (for Intel64) for PRIMERGY/ PRIMEQUEST

| No. | Component            | Package            | Version | Function                       |
|-----|----------------------|--------------------|---------|--------------------------------|
| 1   | Global Link Services | kmod-FJSVhanet-drv | 2.19    | High Available Network Support |
|     |                      | FJSVhanet          | 2.19    |                                |

# 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

| No. | Basic Software                                | Kernel  | Errata                            |
|-----|---|---|-----------------------------------|
| 1   | Red Hat Enterprise Linux 6.4<br>(for Intel64) | Supports<br>kernel-2.6.32-358.6.1.el6 or<br>later | RHSA-2013:0744-1 or later<br>(*1) |
| 2   | Red Hat Enterprise Linux 6.5<br>(for Intel64) | Supports<br>kernel-2.6.32-431.el6 or<br>later     |                                   |
| 3   | Red Hat Enterprise Linux 6.6<br>(for Intel64) | Supports<br>kernel-2.6.32-504.el6 or<br>later     |                                   |
| 4   | Red Hat Enterprise Linux 6.7<br>(for Intel64) | Supports<br>kernel-2.6.32-573.el6 or<br>later     | RHBA-2015:1827-1 or later<br>(*2) |
| 5   | Red Hat Enterprise Linux 6.8<br>(for Intel64) | Supports<br>kernel-2.6.32-642.el6 or<br>later     |                                   |
| 6   | Red Hat Enterprise Linux 6.9<br>(for Intel64) | Supports<br>kernel-2.6.32-696.el6 or<br>later     |                                   |
| 7   | Red Hat Enterprise Linux 7.2<br>(for Intel64) | Supports<br>kernel-3.10.0-327.el7 or<br>later     |                                   |
| 8   | Red Hat Enterprise Linux 7.3<br>(for Intel64) | Supports<br>kernel-3.10.0-514.el7 or<br>later     |                                   |
| 9   | Red Hat Enterprise Linux 7.4<br>(for Intel64) | Supports<br>kernel-3.10.0-693.el7 or<br>later     |                                   |

(\*1) Please apply to all the OS's where this software is installed.

(\*2) When bundling the bonding interface with Virtual NIC mode of Global Link Services (hereinafter GLS), please apply to the OS.

#### - PRIMEQUEST

| No. | Basic Software                                | Kernel  | Errata                            |
|-----|---|---|-----------------------------------|
| 1   | Red Hat Enterprise Linux 6.4<br>(for Intel64) | Supports<br>kernel-2.6.32-358.6.1.el6 or<br>later | RHSA-2013:0744-1 or later<br>(*1) |

| No. | Basic Software                                | Kernel  | Errata                            |
|-----|---|---|-----------------------------------|
| 2   | Red Hat Enterprise Linux 6.5<br>(for Intel64) | Supports<br>kernel-2.6.32-431.el6 or<br>later |                                   |
| 3   | Red Hat Enterprise Linux 6.6<br>(for Intel64) | Supports<br>kernel-2.6.32-504.el6 or<br>later |                                   |
| 4   | Red Hat Enterprise Linux 6.7<br>(for Intel64) | Supports<br>kernel-2.6.32-573.el6 or<br>later | RHBA-2015:1827-1 or later<br>(*2) |
| 5   | Red Hat Enterprise Linux 6.8<br>(for Intel64) | Supports<br>kernel-2.6.32-642.el6 or<br>later |                                   |
| 6   | Red Hat Enterprise Linux 6.9<br>(for Intel64) | Supports<br>kernel-2.6.32-696.el6 or<br>later |                                   |
| 7   | Red Hat Enterprise Linux 7.2<br>(for Intel64) | Supports<br>kernel-3.10.0-327.el7 or<br>later |                                   |
| 8   | Red Hat Enterprise Linux 7.3<br>(for Intel64) | Supports<br>kernel-3.10.0-514.el7 or<br>later |                                   |
| 9   | Red Hat Enterprise Linux 7.4<br>(for Intel64) | Supports<br>kernel-3.10.0-693.el7 or<br>later |                                   |

(\*1) Please apply to all the OS's where this software is installed.

(\*2) When bundling the bonding interface with Virtual NIC mode of GLS, please apply to the OS.

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

To operate this software, the following software products are required:

- VMware environment

| No. | Software       | Package | Version<br>and/or level  | Remarks |
|-----|----------------|---------|--------------------------|---------|
| 1   | VMware vSphere |         | 5.5<br>6.0<br>6.5<br>6.7 |         |

- Red Hat OpenStack Platform environment

| No. | Software                         | Package | Version<br>and/or level | Remarks |
|-----|----------------------------------|---------|-------------------------|---------|
| 1   | Red Hat<br>OpenStack<br>Platform |         | 10 or later             |         |

3. Exclusive software

None.

## 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   | /         | 3.1                |         |
| 2   | /usr      | 0.0                |         |
| 3   | /var      | 0.2                |         |
| 4   | /var/opt  | 0.1                |         |
| 5   | /etc/opt  | 0.3                |         |
| 6   | /opt      | 17.1               |         |

### 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 GLS.<br>(The execution log is preserved.)                          |
| 2   | /tmp      | 50.0               | When FJQSS (Information Collection Tool) of GLS is executed for collecting information. |



## 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.

## Note

To use PRIMECLUSTER GL in combination with PRIMECLUSTER Clustering Base in FUJITSU Cloud Service K5 environment, refer to the installation guide of PRIMECLUSTER Clustering Base and install both products at the same time.

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. Check the auto startup of the NetworkManager service.

PRIMECLUSTER does not support the NetworkManager service.  
Check the auto startup of the NetworkManager service setting.

[Red Hat Enterprise Linux 6]

Check that the setting of auto startup of the NetworkManager service is "off" using the following command.

```
# /sbin/chkconfig --list NetworkManager <Return>
NetworkManager 0:off 1:off 2:off 3:off 4:off 5:off 6:off
```

If there is runlevel that is in "on", disable the NetworkManager service using the following command.

```
# /sbin/service NetworkManager stop
# /sbin/chkconfig NetworkManager off
```

[Red Hat Enterprise Linux 7]

Check that the setting of auto startup of the NetworkManager service is "disabled" using the following command.

```
# /usr/bin/systemctl is-enabled NetworkManager.service <Return>
disabled
```

If the setting is "enabled", disable the NetworkManager service using the following command.

```
# /usr/bin/systemctl stop NetworkManager.service <Return>
# /usr/bin/systemctl disable NetworkManager.service <Return>
```

## 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 the root user.

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

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

[Red Hat Enterprise Linux 6]

Edit the contents of the id entry of the /etc/inittab file using vi(1) etc. as shown below to start the system in single-user mode.



- The default runlevel varies depending on the environment when the patch is applied (3 in the example below).
- Put down the default target before upgrading as you can restore the system to the state prior to upgrading later.

[Before Modification]

```
# 3 - Full multiuser mode
# 4 - unused
# 5 - X11
# 6 - reboot (Do NOT set initdefault to this)
#
id:3:initdefault:
```

[After Modification]

```
# 3 - Full multiuser mode
# 4 - unused
# 5 - X11
# 6 - reboot (Do NOT set initdefault to this)
#
id:1:initdefault:
```

Start the system again in single-user mode.

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

[Red Hat Enterprise Linux 7]

Check the default target.

### Note

- The default target before upgrading ([multi-user.target] in the following example) varies depending on the system.
- Put down the default target before upgrading as you can restore the system to the state prior to upgrading later.

```
# systemctl get-default <Return>
multi-user.target
```

The default target changes in single-user mode.

```
# systemctl set-default rescue.target <Return>
```

Start the system again in single-user mode.

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

3. Insert the DVD in the DVD-ROM drive.

```
# mount -t iso9660 -r /dev/<device file name> <DVD-ROM mount point> <Return>
```

<DVDROM\_DIR> will be used as the mount point.

4. Execute the CLI installer.

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

Installation of PRIMECLUSTER started.

PRODUCT : GLS
.
.

The installation finished successfully.
```

5. Eject the DVD.

```
# cd / <Return>
# umount <DVDROM_DIR> <Return>
# eject <Return>
```

6. Download patch(es)

Download the latest PRIMECLUSTER patch(es) and update information file from Updatesite.

7. Apply the patch(es) for this software.

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

## 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" and "7.19 hanetrestore Command" in PRIMECLUSTER Global Link Services Configuration and Administration Guide: Redundant Line Control Function.

```
# cd /save_destination_directory <Return>
# /opt/FJShanet/usr/sbin/hanetrestore -f name_of_saved_file <Return>
```

2. Reboot the system.

[Red Hat Enterprise Linux 6]

Edit the contents of the id entry of the /etc/inittab file, which has been changed in Step 2, to the original contents to start the system in multi-user mode.

[Before Modification]

```
# 3 - Full multiuser mode
# 4 - unused
# 5 - X11
# 6 - reboot (Do NOT set initdefault to this)
#
id:1:initdefault:
```

[After Modification]

```
# 3 - Full multiuser mode
# 4 - unused
# 5 - X11
# 6 - reboot (Do NOT set initdefault to this)
#
id:3:initdefault:
```

Start the system again.

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

[Red Hat Enterprise Linux 7]

The default target changes in multi-user mode.

```
# systemctl set-default multi-user.target <Return>
```

Start the system again.

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

# Chapter 4 Uninstallation

This chapter explains the uninstallation of this software.

## Note

- To use PRIMECLUSTER GL in combination with PRIMECLUSTER Clustering Base, refer to the installation guide of PRIMECLUSTER Clustering Base and uninstall both products at the same time.

## 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 the root user.

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

2. Boot the system in single user mode.

[Red Hat Enterprise Linux 6]

Edit the contents of the id entry of the /etc/inittab file using vi(1) etc. as shown below to start the system in single-user mode.

## Note

- The default runlevel varies depending on the environment when the patch is applied (3 in the example below).
- Put down the default target before upgrading as you can restore the system to the state prior to upgrading later.

[Before Modification]

```
# 3 - Full multiuser mode
# 4 - unused
# 5 - X11
# 6 - reboot (Do NOT set initdefault to this)
#
id:3:initdefault:
```

[After Modification]

```
# 3 - Full multiuser mode
# 4 - unused
# 5 - X11
# 6 - reboot (Do NOT set initdefault to this)
#
id:1:initdefault:
```

Start the system again in single-user mode.

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

[Red Hat Enterprise Linux 7]

Check the default target.

## Note

- The default target before upgrading ([multi-user.target] in the following example) varies depending on the system.
- Put down the default target before upgrading as you can restore the system to the state prior to upgrading later.

```
# systemctl get-default <Return>
multi-user.target
```

The default target changes in single-user mode.

```
# systemctl set-default rescue.target <Return>
```

Start the system again in single-user mode.

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

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

```
# mount -t iso9660 -r /dev/<device file name> <DVD-ROM mount point> <Return>
```

<DVDROM\_DIR> will be used as the mount point.

4. Execute the CLI uninstaller.

```
# cd <DVDROM_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.

```
# cd /etc/opt <Return>
# rm -rf FJSVhanet <Return>
```

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

```
# cd / <Return>
# umount <DVDROM_DIR> <Return>
# eject <Return>
```

### [Red Hat Enterprise Linux 6]

Edit the contents of the id entry of the /etc/inittab file, which has been changed in Step 2, to the original contents to start the system in multi-user mode.

[Before Modification]

```
# 3 - Full multiuser mode
# 4 - unused
# 5 - X11
# 6 - reboot (Do NOT set initdefault to this)
#
id:1:initdefault:
```

[After Modification]

```
# 3 - Full multiuser mode
# 4 - unused
# 5 - X11
# 6 - reboot (Do NOT set initdefault to this)
#
id:3:initdefault:
```

Start the system again.

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

[Red Hat Enterprise Linux 7]

The default target changes in multi-user mode.

```
# systemctl set-default multi-user.target <Return>
```

Start the system again.

```
# 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.

### ERROR: Failed to install FJQSS<Information Collection Tool>

#### Description

Installation of FJQSS failed.

#### Workaround

Collect the following information then contact your Fujitsu system engineers.  
- /tmp/fjqssinstaller.log

### ERROR: The installation of following package(s) failed. <PackageName>

#### Description

The installation of <PackageName> failed. You may have tried to install in the kernel version of OS not supported.

#### Workaround

Please confirm whether there is required patch of PRIMECLUSTER corresponding to the kernel version of OS. If the patch is existing, please apply the patch and execute "rpm -V --nodigest --nofiles --noscripts --nosignature <PackageName >" afterwards. When nothing is output, it means the execution of the CLI installer succeeded. Please perform the subsequent procedure.  
If the above action fails to solve the problem, put down the message then contact your Fujitsu system engineers.

### 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 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       |
| eatables            | x86_64       |
| ed                  | x86_64       |
| eject               | x86_64       |
| fontconfig          | i686         |
| fontconfig          | x86_64       |
| freetype            | x86_64       |
| gcc                 | x86_64       |
| gdb                 | x86_64       |
| ghostscript         | x86_64       |
| glibc               | i686         |
| hdparm              | x86_64       |

| Package               | Architecture |
|-----------------------|--------------|
| httpd                 | x86_64       |
| indent                | x86_64       |
| ipmitool              | x86_64       |
| iscsi-initiator-utils | x86_64       |
| kernel-devel          | x86_64       |
| kernel-headers        | x86_64       |
| kexec-tools           | x86_64       |
| libICE                | x86_64       |
| 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-turbo         | x86_64       |
| libpng                | x86_64       |
| libstdc++             | i686         |
| libvirt-client        | x86_64       |
| 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       |

| Package               | Architecture |
|-----------------------|--------------|
| 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       |
| openssl098e           | x86_64       |
| 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       |
| rpcbind               | x86_64       |
| rsh                   | x86_64       |
| ruby                  | x86_64       |
| samba-common          | x86_64       |
| scsi-target-utils     | x86_64       |
| setuptools            | 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       |
| zip                   | x86_64       |

## **B.2 For Red Hat Enterprise Linux 7 (for Intel64)**

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| Package                 | Architecture |
|-------------------------|--------------|
| ImageMagick             | x86_64       |
| OpenIPMI                | x86_64       |
| OpenIPMI-libs           | x86_64       |
| PyQt4-devel             | x86_64       |
| alsa-lib                | i686         |
| at                      | x86_64       |
| audit-libs              | i686         |
| autoconf                | noarch       |
| bc                      | x86_64       |
| bind                    | x86_64       |
| bind-utils              | x86_64       |
| cpp                     | x86_64       |
| crash                   | x86_64       |
| device-mapper-multipath | x86_64       |
| dialog                  | x86_64       |
| docbook-utils           | noarch       |
| ed                      | x86_64       |
| efibootmgr              | x86_64       |
| fontconfig              | i686         |
| fontconfig              | x86_64       |
| gcc                     | x86_64       |
| gdb                     | x86_64       |
| ghostscript             | x86_64       |
| glibc                   | i686         |
| graphviz                | x86_64       |
| httpd                   | x86_64       |
| httpd-tools             | x86_64       |
| indent                  | x86_64       |
| ipmitool                | x86_64       |
| iscsi-initiator-utils   | x86_64       |
| iw                      | x86_64       |
| kernel-devel            | x86_64       |
| kernel-headers          | x86_64       |
| libICE                  | x86_64       |
| libSM                   | x86_64       |
| libX11                  | i686         |
| libX11                  | x86_64       |
| libXau                  | i686         |
| libXau                  | x86_64       |

| Package          | Architecture |
|------------------|--------------|
| 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-turbo    | x86_64       |
| libpng           | x86_64       |
| libreport        | x86_64       |
| libstdc++        | i686         |
| libvirt-client   | x86_64       |
| libxcb           | x86_64       |
| lsof             | x86_64       |
| m4               | x86_64       |
| mlocate          | x86_64       |
| motif            | x86_64       |
| motif-devel      | x86_64       |
| mt-st            | x86_64       |
| mtools           | x86_64       |
| mtr              | x86_64       |
| net-snmp         | x86_64       |
| net-snmp-utils   | x86_64       |
| nfs-utils        | x86_64       |
| ntp(*1)          | x86_64       |
| opensp           | i686         |
| pam-devel        | x86_64       |
| patch            | x86_64       |
| pciutils         | x86_64       |
| perl             | x86_64       |
| perl-libwww-perl | noarch       |
| pinfo            | x86_64       |
| prelink          | x86_64       |
| psacct           | x86_64       |

| Package               | Architecture |
|-----------------------|--------------|
| psmisc                | x86_64       |
| quota                 | x86_64       |
| rpcbind               | x86_64       |
| ruby                  | x86_64       |
| samba-common          | noarch       |
| setuptools            | x86_64       |
| strace                | x86_64       |
| subversion            | x86_64       |
| sysstat               | x86_64       |
| targetcli             | noarch       |
| tcpdump               | x86_64       |
| time                  | x86_64       |
| xorg-x11-server-utils | x86_64       |
| xterm                 | x86_64       |

(\*1) If you use chrony this is not necessary.