Preface

About This Manual
This manual provides notes on PRIMERGY operation with Linux installed. Be sure to read this manual before using Linux.

Intended Readers
This manual is intended for persons who operate PRIMERGY.

Organization of This Manual
This manual consists of the following chapters:

Chapter 1 Notes on Operation
This chapter provides notes on operation after installation. Be sure to read this chapter before operating PRIMERGY with Linux installed.

Chapter 2 Addition of Peripheral Devices and Option Cards
This chapter explains the procedures for adding peripheral devices and cards after installation and provides notes on adding these options. Read this chapter as required.

Chapter 3 Others
This chapter explains other functions and provides other notes such as notes on limits.

Operation Verification
The operations of the products described in this manual have been confirmed by Fujitsu. Please note, however, that these operations are subject to change without prior notice.

Support & Service
A support service (SupportDesk Product basic service), available for a fee, provides customers using Linux with an enhanced sense of security and confidence. Customers concluding a support and service agreement are entitled to receive support in such areas as assistance with queries regarding this manual and questions and problems that may come up during the installation and operation of this product. Please consider taking advantage of this service option by concluding a support and service agreement with us.

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1. Notes on Operation

1.1 Assignment of Device Names
Linux assigns device names to a variety of devices, such as the hard disk drive, in the order that it recognizes them during its startup sequence. If the system is restarted after a device such as a hard disk drive or controller fails, the assigned device names may be changed because the system cannot recognize a device that has failed.

Example: When hard disk drives are connected to SCSI ID 1, 2, and 3, device names /dev/sda, /dev/sdb, and /dev/sdc are assigned respectively to the disk drives. If /dev/sdb fails under this condition, the device previously assigned /dev/sdc/ is moved up by one and recognized as /dev/sdb after the system is restarted.

If an assigned device is unexpectedly changed, it may prevent the system from starting or, in the worst case, may damage your data. If a device fault is detected, therefore, Fujitsu recommends starting the system in rescue mode and checking for hardware faults before restarting the system (*1). Repair the hardware fault, restore the system by means such as the backup tape, and then restart the system.

*1 Using installation CD 1/4, start the system in rescue mode.
See Section 1.4, "Starting the System in Rescue Mode."

After starting the system, use the fdisk command to check whether the relevant hard disk drive can be recognized, and take necessary steps such as checking for hardware error messages in /var/log/messages.

1.2 Installation of Red Hat Enterprise Linux AS (v.3 for x86) Packages
Red Hat Enterprise Linux provides installation types so that the optimum system can be constructed according to the use purpose. For this reason, packages required for your purposes might not be installed. If a required package has not been installed, log in as the root and install it by executing the following procedure:

Install the necessary packages by using the installation CDs (1/4 to 4/4) that have been created according to the Installation Procedure included in the driver kit.
# mount -r /dev/cdrom /mnt/cdrom
# cd /mnt/cdrom/RedHat/RPMS
# rpm -ivh <package_file>
Example: To install package "make"
# rpm -ivh make-3.79.1-17.i386.rpm
# cd /
# umount /mnt/cdrom
# eject
* Remove the CD.
1.3 Installing and Setting Up Global Array Manager (GAM)
When using the system in a configuration containing onboard SCSI-RAID, use Global Array Manager as a RAID management tool.

For details on how to install GAM-Client (Windows), see "Outline of Installation Procedure for Global Array Manager-Client," which is an attachment.

The GAM-Server (Linux) installation procedure is explained below.

[Notes]
1) The screen display may become unstable during GAM installation or GAM service startup.
   This is not an operational problem.
2) Specify the port numbers shown below for GAM service.
   Take care when configuring firewall settings.

   Port numbers: 157,158

(1) To install GAM-Server (Linux), insert the driver CD into the CD-ROM drive, and enter commands as follows:
   # mount -r /dev/cdrom /mnt/cdrom
   # cd /mnt/cdrom/UTY/GAM/Linux
   # rpm -ivh gam-server-6.02-18.i386.rpm
   # rpm -ivh gam-agent-6.02-18.i386.rpm
   # rpm -ivh 1030SNMPAgent-2.2-1.i386.rpm
   # cd /
   # umount /mnt/cdrom
   # eject
* Remove the CD.

(2) For user accounts in Linux, create "gamroot" as a user account with GAM administrator authority and then create user accounts (e.g., "gamuser") with user authority. (If a user account with user authority has already been created, another account need not be created.)
   # adduser gamroot
   # passwd gamroot
   Changing password for user gamroot
   New-password <<<--- Enter a password.
   Retype new password <<<--- Re-enter the same password for confirmation.
   passwd: all authentication tokens updated successfully
* Create a user account with user authority in the same way as explained above.
(3) Edit three lines as shown below in the /etc/sysconfig/gam file. Events can be posted to GAM-Client after this editing is completed.

```bash
# vi /etc/sysconfig/gam
```

**[Before editing]**
```
START_GAMEVENT=n
GAMEVENT_OPTIONS=""
```

**[After editing]**
```
START_GAMEEVENT=y  # Change "n" to "y".
GAMEVENT_OPTIONS="-h ip-address"  # Specify the IP address of the management Windows system on which GAM-Client is installed.
```

**[Before editing]**
```
START_GAMEVLOG=n
```

**[After editing]**
```
START_GAMEVLOG=y  # Change "n" to "y".
```

(4) Restart the system.
```
# shutdown -r now
```

* The following message may be displayed after the system starts. It does not indicate an operational problem.

**[Message]**
```
gamagent: gamagent: Connection refused
gamagent connect failure
```

### 1.4 Teaming tool

The teaming tool virtually groups multiple Ethernet controllers to improve the fault tolerance function. For details, see the following:

**[BX620 S2]**

Teaming tool: Bonding
Operation: Read the following file stored in Bonding on the driver CD:
```
- bonding_guide.txt
```
1.5 Starting the System in Rescue Mode

Using only one of the installation CDs that have been created according to the Installation Procedure included in the driver kit, you can start the system in rescue mode. This may enable system recovery in the event of a problem that prevents the system from starting normally.

This section explains only how to start the system as one that has minimum functionality.

Start the system in rescue mode as follows:

(1) Start the system from installation CD 1/4 that was created according to the Installation Procedure included in the driver kit. Enter the appropriate response in the following window, and press the [Enter] key.

```
boot: linux rescue noprobe
```

(2) In the Choose a Language window, select "English" and select "OK."

```
Choose a Language

What language would you like to use during the installation process?

...........
Dutch
Select ---> English
French
...........

OK
```
(3) In the Keyboard Type window, select "jp106" and select "OK."
If an accessory keyboard such as of a flat display (PG-R1DP3) is used, select "us" here.

(4) In the following window, select " Add Device."
(5) In the Driver List window, select the drivers for the devices installed in the system, and select "OK." The following drivers must be selected:

Two drivers must be selected. Select drivers as follows:
1. Select the driver shown below, and select "OK."
   "LSI Logic Fusion MPT Base Driver (mptbase)"
2. The Device Selection window is displayed. Select "AddDevice."
3. A list of drivers is displayed. Select the driver shown below, and select "OK."
   "LSI Logic Fusion MPT SCSI Driver (mptscsih)"

An example of selecting the driver for SCSI-RAID is shown below:

(6) Make sure that the selected driver is displayed in the following window, and select "Done."

```
Select Device Driver to Load

Please select the driver below which you wish to load. If it does not appear and you have a driver disk, press F2.

............
LSI Logic Fusion MPT Base Driver (mptbase)  <-- Select
............
[   ] Specify optional module arguments

OK  Back
```

```
Devices

The following devices have been found on your system.
USB Mass Storage driver for Linux (usb-storage)
LSI Logic Fusion MPT Base Driver (mptbase)
LSI Logic Fusion MPT SCSI Driver (mptscsih)

Done  Add Device
```
(7) The Setup Networking window is displayed. Select "No" because network settings need not be configured at this time.

Setup Networking

Do you want to start the network interfaces on this system?

Yes  No

(8) Select "Continue" in the Rescue window.

Rescue

The rescue environment will now attempt to find your Red Hat Linux ………….
…………
…………
and you will go directly to a command shell.

Continue  Read-Only  Skip

(9) If the root partition (/) in the existing Linux system has been mounted successfully under /mnt/sysimage, this is reported in the Rescue window. Select "OK."

Rescue

Your system has been mounted under /mnt/sysimage.

Press <return> to get a shell. If you would like to make your system the root environment, run the command:

   chroot /mnt/sysimage

The system will reboot automatically when you exit from the shell.

   OK
(10) When the prompt is displayed, enter the chroot command to change the root path to the hard disk drive.

    sh-2.05b#  chroot /mnt/sysimage

(11) This completes startup in rescue mode. To exit rescue mode, enter the exit command twice.

    sh-2.05b#  exit  --- Exit from the chroot environment.
    sh-2.05b#  exit  --- Exit from the rescue mode.

1.6 Power-off at Shutdown
Power is not automatically turned off at shutdown.
When [Power down] is displayed on the console screen, press the power switch to turn off the power.

Note that the power is automatically turned off when the system is shut down in an environment in which ServerView is installed.
2. Addition of Peripheral Devices and Option Cards

2.1 Adding a SCSI Disk

The number of LUNs is set to 1 by default. To add a SCSI disk, shared disk, or tape library, log in as the root and define the number of LUNs as shown below. Multiple LUN referencing is enabled after the system is started next.

(1) Add the following lines to /etc/modules.conf:

```
alias scsi_hostadapter aic7xxx
options scsi_mod max_scsi_luns=N
```

* N is the number of LUNs. Define the appropriate number.

(2) Enter the mkinitrd command to create initrd.

To create initrd, enter the mkinitrd command appropriate for the type of kernel used.
* Enter the following command to check the type of kernel used:

```
# uname  -r
```

[2.4.21-20.EL (kernel for single CPU)]
```
# cp /boot/initrd-2.4.21-20.EL.img  /boot/initrd-2.4.21-20.EL.img.bak
# mkinitrd  -f  /boot/initrd-2.4.21-20.EL.img  2.4.21-20.EL
```

[2.4.21-20.ELsmp (kernel for multi-CPU)]
```
# cp /boot/initrd-2.4.21-20.ELsmp.img  /boot/initrd-2.4.21-20.ELsmp.img.bak
# mkinitrd  -f  /boot/initrd-2.4.21-20.ELsmp.img  2.4.21-20.ELsmp
```

(3) Restart the system.

Enter the following command to restart the system.
```
# shutdown  -r  now
```
2.2 Adding Option Cards

If one of the optional cards listed in the following table has been added after system installation, Kudzu is automatically started at system startup. Therefore, when adding a LAN daughter card (PG-LND101) or LAN card (PG-1862), select [Ignore]. When adding the other type of card, select [configure].

Login as the root at system startup, and perform the following operations. This section explains the operations that enable the system to automatically recognize the added card at each subsequent system startup.

The table lists models and the option cards supported by them.

<table>
<thead>
<tr>
<th>Option Card</th>
<th>Model</th>
<th>Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN daughter card</td>
<td>PG-LND101</td>
<td>V</td>
</tr>
<tr>
<td>Fibre channel daughter card</td>
<td>PG-FCD101</td>
<td>V</td>
</tr>
<tr>
<td>SCSI card</td>
<td>PG-128</td>
<td>V</td>
</tr>
<tr>
<td>LAN card</td>
<td>PG-1862</td>
<td>V</td>
</tr>
</tbody>
</table>

V: Supported

[SCSI card (PG-128) is added]

Perform the operation described below.

1. Enter the mkinitrd command to create initrd.
   To create initrd, enter the mkinitrd command appropriate for the type of kernel used.
   * Enter the following command to check the type of kernel used:
     ```
     # uname -r
     ```
   Command execution examples are shown below.
   [2.4.21-20.EL (kernel for single CPU)]
   ```
   # cp /boot/initrd-2.4.21-20.EL.img /boot/initrd-2.4.21-20.EL.img.bak
   # mkinitrd -f /boot/initrd-2.4.21-20.EL.img 2.4.21-20.EL
   ```
   [2.4.21-20.ELsmp (kernel for multi-CPU)]
   ```
   # cp /boot/initrd-2.4.21-20.ELsmp.img /boot/initrd-2.4.21-20.ELsmp.img.bak
   # mkinitrd -f /boot/initrd-2.4.21-20.ELsmp.img 2.4.21-20.ELsmp
   ```

2. Restart the system.
   Enter the following command to restart the system.
   ```
   # shutdown -r now
   ```

[LAN daughter card (PG-LND101) or LAN card (PG-1862) is added]

Perform the operation described below.

1. Add the following to /etc/modules.conf:
   ```
   alias eth0 e1000
   alias eth1 e1000
   alias eth2 e1000  
   alias eth3 e1000
   ```
(2) Configure the all network settings.

```
# netconfig -d ethN  (N is an integer which is equal to or more than 0)
```

* If LAN daughter card (PG-LND101) or LAN card (PG-1862) is mounted:
  - eth0 <--- LAN daughter card or LAN card
  - eth1 <--- LAN daughter card or LAN card
  - eth2 <--- onboard LAN
  - eth3 <--- onboard LAN

(3) Enter the mkinitrd command to create initrd.

To create initrd, enter the mkinitrd command appropriate for the type of kernel used.

* Enter the following command to check the type of kernel used:
```
# uname -r
```

Command execution examples are shown below.

[2.4.21-20.EL (kernel for single CPU)]
```
# cp /boot/initrd-2.4.21-20.EL.img /boot/initrd-2.4.21-20.EL.img.bak
# mkinitrd -f /boot/initrd-2.4.21-20.EL.img 2.4.21-20.EL
```

[2.4.21-20.ELsmp (kernel for multi-CPU)]
```
# cp /boot/initrd-2.4.21-20.ELsmp.img /boot/initrd-2.4.21-20.ELsmp.img.bak
# mkinitrd -f /boot/initrd-2.4.21-20.ELsmp.img 2.4.21-20.ELsmp
```

(4) Restart the system.

Enter the following command to restart the system.
```
# shutdown -r now
```
Perform the operation described below.

(1) Edit /etc/modules.conf.
Add the following two lines to /etc/modules.conf:

```
  options qla2300 qlport_down_retry=20 ql2xfailover=0 ql2xmaxqdepth=xx
  options scsi_mod max_scsi_luns=128
```

Specify the calculated value of xx in ql2xmaxqdepth=xx as follows:

- ETERNUS6000
  [40]
- ETERNUS3000 (excluding Model50)
  [40 ÷ number of Fibre Channel cards connected to one FC-CA (FC port)]
  For example, if two Fibre Channel cards are connected to one FC-CA,
  specify ql2xmaxqdepth=20.
  If the calculated value is equal to or less than 8, specify 8.
- ETERNUS3000 Model50 or ETERNUS GR710, 720 and 730
  [30 ÷ number of Fibre Channel cards connected to one FC-CA (FC port)]
  For example, if two Fibre Channel cards are connected to one FC-CA,
  specify ql2xmaxqdepth=15.
  If the calculated value is equal to or less than 8, specify 8.

(2) Create an initial RAM disk, and register it with a boot loader.
Execute the mkinitrd command to create initrd.

```
# mkinitrd  initial RAM disk image  kernel version
```

Create an initial RAM disk image in the /boot directory (if an existing file has the same
name, delete it in advance).
The kernel version can be checked using uname -r.
The following is an example:

```
# mkinitrd  /boot/initrd-pgfcd101.img  2.4.21-20.ELsmp
```

Register the created initial RAM disk with a boot loader.
For the registration procedure, see the documents for the boot loader used (LILO or
GRUB).

If the GR multipath driver is already installed, re-create the initial RAM disk (initrd)
while referring to the Installation Guide that comes with the GR multipath driver.

(3) Restart the system
Restart the system as follows:

```
# shutdown  -r  now
```
3. Others

3.1 Sound Function

No sound function is supported.

3.2 PCI Hot Plug Function

The PCI hot plug function is not supported.

3.3 Usable Kernels

The kernels that can be used vary depending on the hardware conditions. See the table below for the kernels that can be used. Note that middleware specifications might limit the kernel to be selected. In this case, select the kernel in accordance with the middleware specifications.

<table>
<thead>
<tr>
<th>Hardware conditions</th>
<th>Number of logical CPUs (*1)</th>
<th>Kernel to be selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 4 GB</td>
<td>1CPU</td>
<td>Kernel for single CPU</td>
</tr>
<tr>
<td>More than 4 GB</td>
<td>No conditions</td>
<td>Kernel for multi-CPU</td>
</tr>
</tbody>
</table>

(*1) Even when only one CPU is installed, the number of logical CPUs is 2 if Hyper Threading = Enabled.

3.4 Distribution Limitations

Operation is not guaranteed if one of the following CPU, memory, and file system limitations is exceeded:

- Maximum number of logical CPUs: 4
- Maximum memory size: 12 GB
- File system: Less than 1 TB

3.5 Installation Procedure

For information on the procedure for installing Red Hat Enterprise Linux AS (v.3 for x86), see the Installation Procedure included in the "Installation Kit" downloaded from Download Search.

-- END --
Attachment Outline of Global Array Manager Client Installation

* Perform this operation only when an onboard SCSI-RAID is mounted.

1. Insert the driver CD into the CD-ROM drive in the management Windows system.

2. Execute setup.exe in RHEL3\UTY\GAM\Windows on the driver CD.

3. When the "Welcome" window is displayed, click "Next."

4. The "Software License Agreement" window is displayed. Read the statements and click "Yes" if you accept the terms of this agreement.

5. The "Select Components" window (Figure 1) is displayed. Confirm that the check box before "Global Array Manager Client" is selected. Clear the "Global Array Manager Server" and "SAN Array Manager Client" check boxes, and click "Next."

* "SAN Array Manager Client" is not supported. Do not install it.

6. The "Choose Destination Location" window is displayed. Click "Browse," specify the location that you want as the installation destination, and click "Next."

* If GAM-Client is already installed, a message confirming whether to overwrite is displayed. Click "OK" to continue.

7. A dialog box for specifying the GAM-Client installation destination is displayed. Click "Next." and the setup program starts copying files.

8. The "Setup Complete" window is displayed. Click "Finish" to exit the GAM-Client installation wizard.

-- END --