NEC

Installation Guide (Linux)

NEC Express Server
Express5800 Series

Express5800/R320e-E4
Express5800/R320e-M4
EXP320R, EXP320S

Chapter 1 Installing Operating System

Chapter 2 Installing Bundled Software

30.102.01-103.01
August 2016

Manuals

Manuals for this product are provided as booklets (📖) and as electronic manuals (PDF) in the EXPRESSBUILDER DVD (💿).

EXPRESSBUILDER

Safety Precautions and Regulatory Notices

	Describes points of caution to ensure the safe use of this server. **Read these cautions before using this server.**

User's Guide

Chapter 1: General Description	Overviews, names, and functions of the server components
Chapter 2: Preparations	Installation of additional options, connection of peripheral devices, and suitable location for this server
Chapter 3: Setup	System BIOS configurations and summary of EXPRESSBUILDER
Chapter 4: Appendix	Specifications

Installation Guide

Chapter 1: Installing Operating System	Installation of OS and drivers, and precautions for installation
Chapter 2: Installing Bundled Software	Installation of bundled software, such as NEC ESMPRO

Maintenance Guide

Chapter 1: Maintenance	Server maintenance, error messages, and troubleshooting
Chapter 2: Configuring and Upgrading the System	Changing hardware configuration, installing additional devices and setting up management tools
Chapter 3: Useful Features	The detail of system BIOS settings, SAS Configuration Utility, and EXPRESSBUILDER

Other manuals

The detail of NEC ESMPRO, BMC Configuration, and other features.

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Conventions Used in This Document

Notations used in the text

In addition to safety-related symbols urging caution, three other types of notations are used in this document. These notations have the following meanings.

Important	Indicates critical items that must be followed when handling hardware or operating software. If the procedures described are not followed, **hardware failure, data loss, and other serious malfunctions could occur**.
Note	Indicates items that must be confirmed when handling hardware or operating software.
Tips	Indicates information that is helpful to keep in mind when using this server.

Optical disk drive

This server is equipped with one of the following drives. These drives are referred to as *optical disk drive* in this document.

- DVD Super MULTI drive

Hard disk drive

Unless otherwise stated, *hard disk drive* described in this document refers to both of the following.

- Hard disk drive (HDD)
- Solid state drive (SSD)

Abbreviations of Operating Systems (Linux)

Linux Operating Systems are referred to as follows.

See *Chapter 1* (*1.1 Supported Linux OS)* in *Installation Guide (Linux)* for detailed information.

Notations in this document	Official names of Linux
RHEL 7.2	Red Hat Enterprise Linux 7.2(x86_64)

POST

POST described in this document refers to the following.

- Power On Self-Test

BMC

BMC described in this document refers to the following.

- Baseboard Management Controller

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Keep this document for future use.

Latest editions

This document was created based on the information available at the time of its creation. The screen images, messages and procedures are subject to change without notice. Substitute as appropriate when content has been modified.

The most recent version of the guide, as well as other related documents, is also available for download from the following website.

http://www.nec.com/

Safety notes

To use this server safely, read thoroughly *Safety Precautions and Regulatory Notices* that comes with your server.

NEC Express5800 Series
Express5800/R320e-E4, R320e-M4

1

Installing Operating System

This chapter describes how to install an operating system. Read through this chapter to set up the system correctly.

1. **Before Starting Setup**
   Describes overview of setup and precautions on installing an OS.

2. **Setting up**
   Describes how to set up an OS.

3. **Procedure for Changing the System Environment Settings**
   Describes the procedure for changing the system environment settings.

4. **Appendix**
   Describes the processing of the default setting script.

1. Before Starting Setup

This section describes overview of setup and precautions on installing an OS.

Important

- **OS is not installed to this machine at purchasing. The system must be set up after purchasing. Refer to this document while the system is set up again.**
- **The target reader of this manual is a customer who has a basic knowledge of Linux.**

1.1 Supported Linux OS

This machine is compatible with the BIOS boot mode and installation due to the minor release.

Minor release (architecture)	Boot mode	
	UEFI	Legacy
Red Hat Enterprise Linux 7.2(x86_64)	✓	–

✓ : Supported – : Not Supported

Note

For setting of the BIOS boot mode, see *"Chapter 3 (1. System BIOS)"* in *"Maintenance Guide"*.

1.2 Overview of Setup

This document describes how to set up the system by starting up the OS standard installer from the RHEL7.2 install media and installing it. The installation parameter of RHEL7.2 is input on the interactive installation program provided by Red Hat. After installing RHEL7.2, install application programs including the ft control software manually. Setup by using"EXPRESSBUILDER" coming with this product is not allowed.

Important

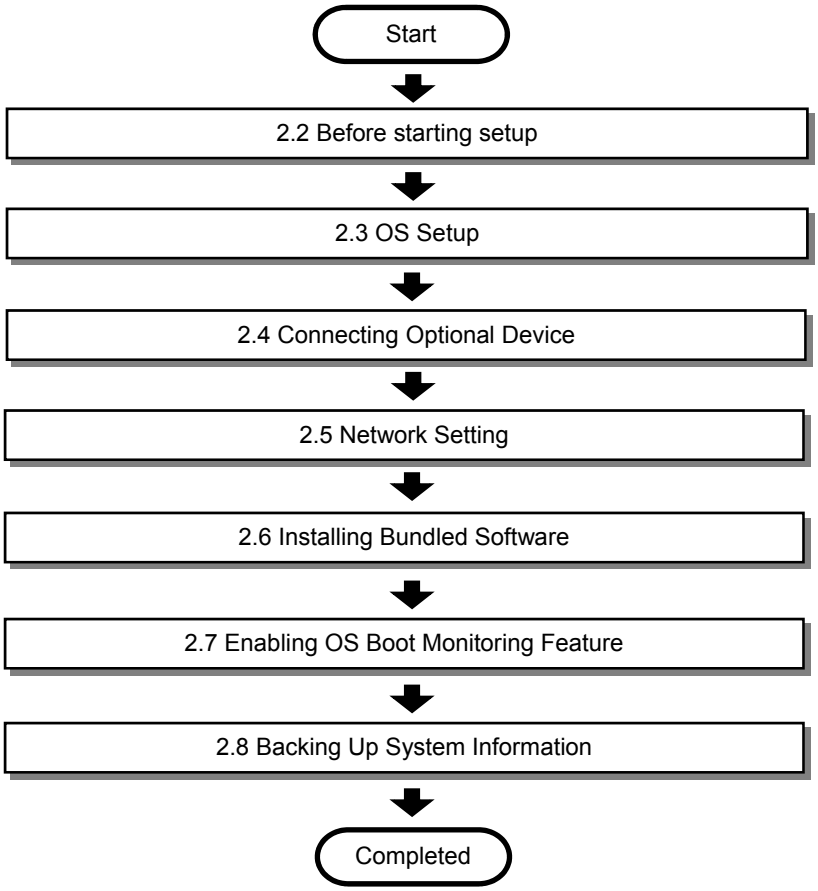
This document describes the procedure for establishing the environment recommended by NEC. If customers customize the system, fully study the system configuration in advance, and replace the description as required to set up the system.

2. Setting up

This section describes how to set up.

2.1 Setup Flow

Set up the system according to the following workflow.



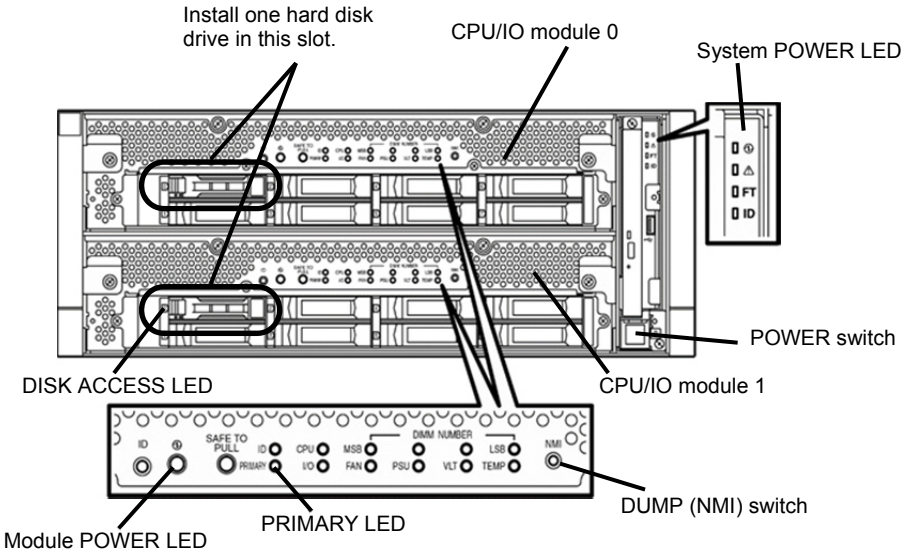
2.2 Before starting setup

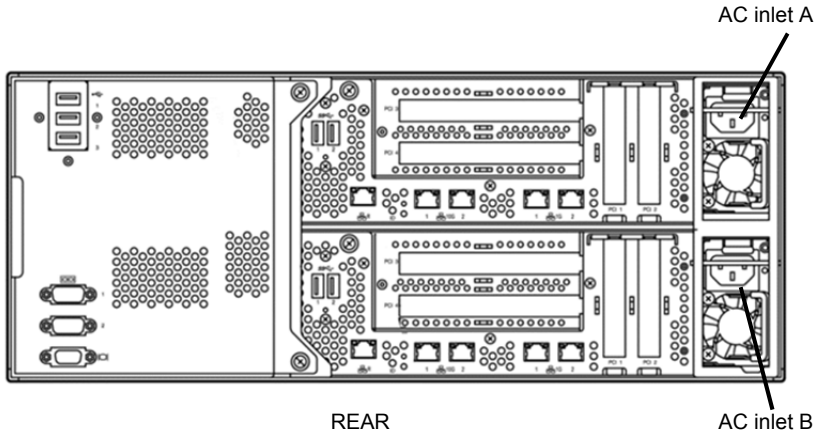
The required preparation before the setup is described here.

Important **You can set up OS on the internal hard disk drive only. OS setup on the external storage is not supported.**

2.2.1 Preparation for hardware

The location of components that are required for setup or confirmation is as shown in the figure below.





1. If the System POWER LED is on, shutdown the OS.
2. Pull the power cords of both CPU/IO modules out of the outlets while the System POWER LED is not lit.

3. Perform the preparation process for the server as shown below.
   - Disconnect all LAN cables.
   - Disconnect the cable from the connector on an SAS board if it is installed.
   - Disconnect the cable from the connector on a Fibre Channel board if it is installed.
   - Disconnect the USB cable if an USB device for Backup (i.e. external/internal RDX) is connected to USB port.
   - Install one hard disk drive in slot 0 of CPU/IO modules 0 and 1, respectively.

Important

- **Install only one hard disk drive in the slot specified here.**
- **If the hard disk drive is not a new one, physically format it. See *Chapter 3 (3. SAS Configuration Utility)* in *Maintenance Guide* for physical formatting.**

4. Make sure that preparations for setup on CPU/IO modules 0 and 1 are ready.

   As shown in the previous figure, install one hard disk drive in slot 0 of CPU/IO module 0 and another one in slot 0 of CPU/IO module 1. Do not install any hard disk drive in any other slots than specified.

5. Connect power cords to the server in the following order.

   (1) Connect a power cord to AC inlet A.

   (2) Connect a power cord to AC inlet B.

   (3) Make sure the PRIMARY LED on CPU/IO module 0 is lit.

Note

If you disconnect the power cord, wait at least 30 seconds before connect it again.

After performing step (1), wait for 15 seconds or longer, and then perform step (2).

2.2.2 Disabling OS Boot Monitoring Feature

Before starting setup process, the OS boot monitoring feature needs to be disabled.

Important **Be sure to disable OS boot monitoring feature before setting up the system for successful setup. This function is enabled by shipping default. If this setting is valid, setup cannot be performed correctly.**

Tips For details of operations for BIOS Setup Utility and parameters for boot monitoring feature, see *Chapter 3 (1. System BIOS)* in *Maintenance Guide*.

1. Turn on the display and the peripheral equipment connected to the server.

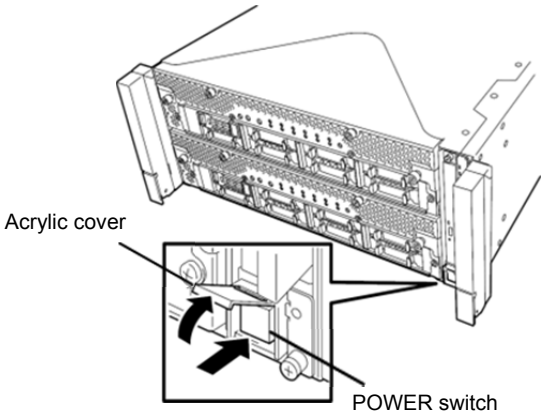
Note If the power cords are connected to a power controller like a UPS, make sure that it is powered on.

2. Remove the front bezel.
3. Press the POWER switch located on the front side of the server.

Note Check that the module POWER lamps of the CPU/IO module 0 and CPU/IO module 1 are blinking, and then turn the POWER switch of this system on.

Lift the acrylic cover, and press the POWER switch.

Important **Do not turn off the power before the "NEC" logo appears.**



After a while, the "NEC" logo will appear on the screen.

Tips While the "NEC" logo is displayed on the screen, the server performs a power-on self test (POST) to check itself. OS starts upon completion of POST.

For details, see *Chapter 3 (1.1 POST)* in *User's Guide*.

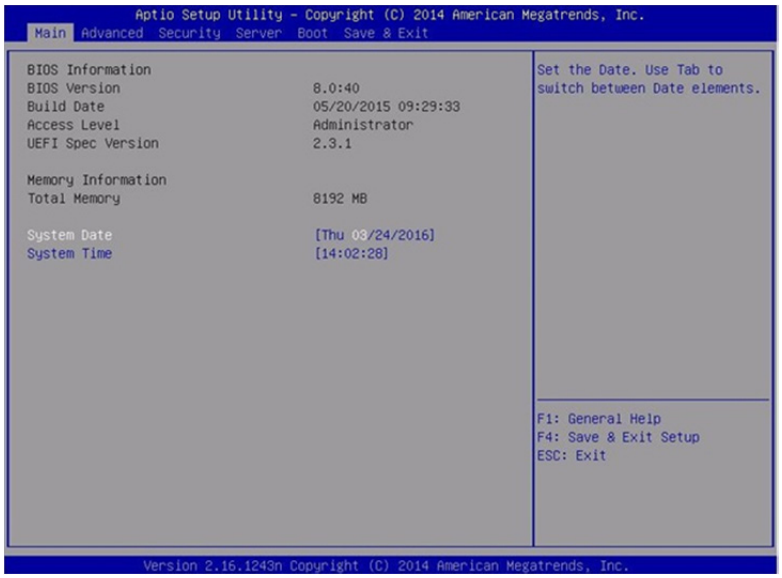
Note If the server finds errors during POST, it will interrupt POST and display the error message. See *Chapter 1 (6.2 POST Error Message)* in *Maintenance Guide*.

4. When POST proceeds, the following message appears at lower left of the screen.

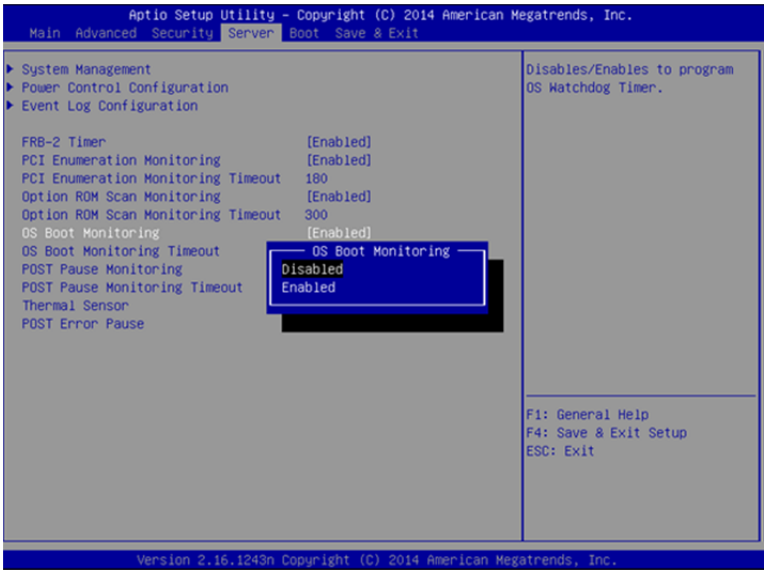
   `Press <F2> SETUP, ...` (The on-screen message depends on your system environment.)

   If you press <**F2**>, SETUP will start after POST, and the Main menu appears. (You can also start SETUP by pressing <**F2**> key while expanding option ROM.)

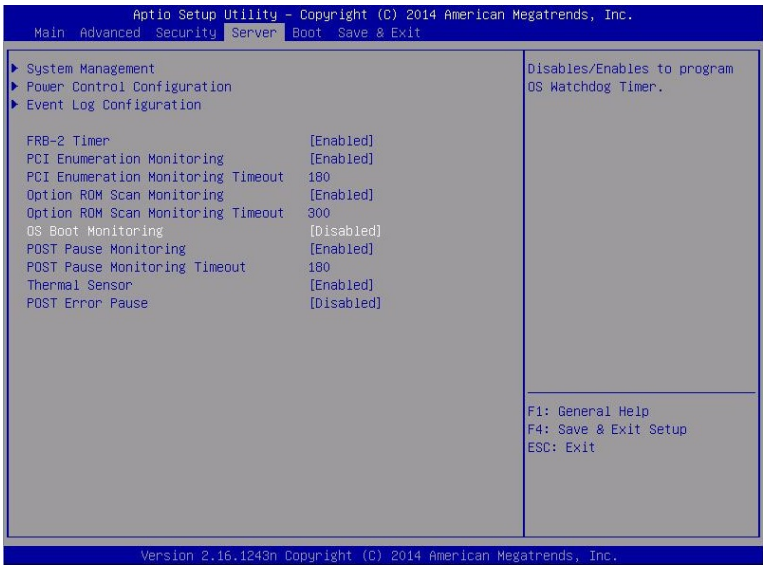
   Example:



5. When you move the cursor onto **Server**, the **Server** menu appears.
   Move the cursor onto **OS Boot Monitoring** and press **Enter**.
   Parameters are displayed



6. Among the parameters, choose **Disabled** and press **Enter**.
   When the <Enter> key is pressed, the current display of the configuration for OS Boot Monitoring will be changed to "Disabled".

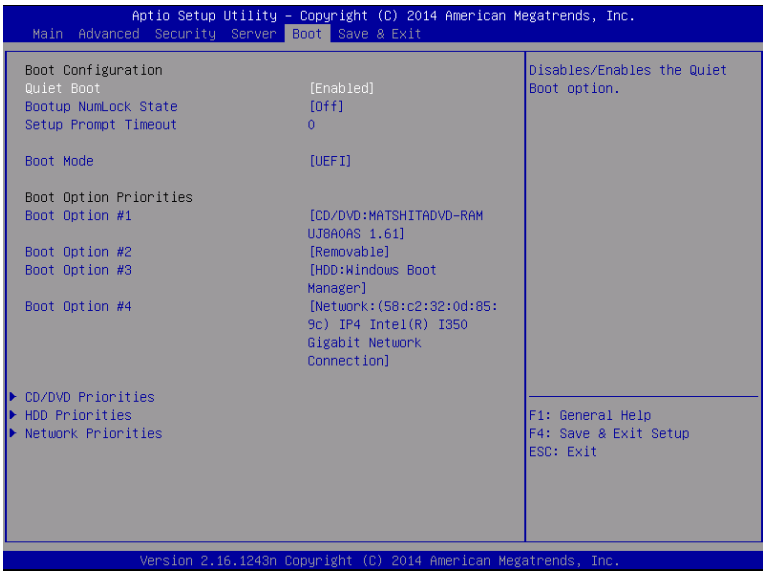


7. Now OS Boot Monitoring setting is completed.
   Continue to check Boot Mode Settings in next procedure (2.2.3 Checking Boot Mode Settings).

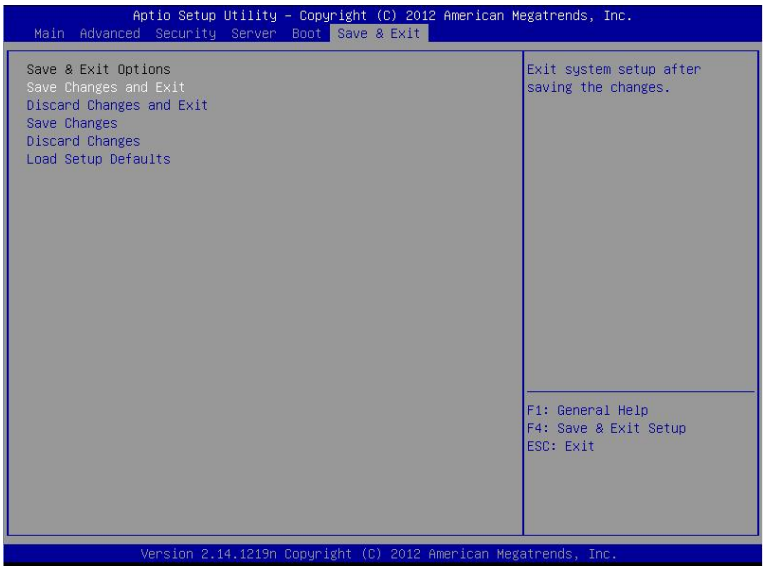
2.2.3 Checking Boot Mode Settings

Check Boot Mode settings before setup.

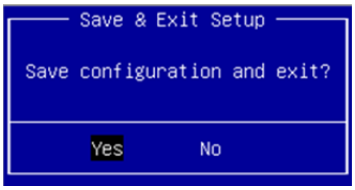
1. When you move the cursor onto **Boot**, the **Boot** menu appears.
   Check the settings of Boot Mode. If the mode is not [UEFI], change it to [UEFI].



2. Move the cursor onto **Save & Exit**, and the **Save & Exit** menu appears.



3. Select **Save changes and Exit** and press **Enter**.
   The following confirmation window appears.



4. On the confirmation window, select **Yes** and press **Enter.**
   Parameters are saved and SETUP is closed.

Now setting before setup is completed.

System reboots when SETUP completes.

2.2.4 Preparation for software

(1) Requirements for Setup

- **To be obtained from Red Hat, Inc.**

Note

- Download the file from Red Hat Network (**https://rhn.redhat.com/**). Check that the SHA256 check sum of the downloaded file matches the SHA256 check sum described in the download page by using the following command.

```
# sha256sum <filename>
```

- If the registration number (RHN-ID) is not registered, register it by referring to Chapter 1 (2.2.3 (2) Registration to Red Hat Network) of this manual.

– RHEL7.2 installation media (ISO image file)

Tips

Create the installation media from the Red Hat Enterprise Linux 7.2 (x86_64) ISO image file.

It is not required to create the installation media in the following cases.

- The installation media has been already created.

– Correction package

kernel-3.10.0-327.18.2.el7.x86_64.rpm
kernel-devel-3.10.0-327.18.2.el7.x86_64.rpm
kernel-doc-3.10.0-327.18.2.el7.noarch.rpm

Important

For the ft server, the combination of the kernel version and ft control software version has been determined. Apply kernel-3.10.0-327.18.2.el7.

glibc-2.17-106.el7_2.4.x86_64.rpm
glibc-common-2.17-106.el7_2.4.x86_64.rpm
glibc-devel-2.17-106.el7_2.4.x86_64.rpm
glibc-headers-2.17-106.el7_2.4.x86_64.rpm

Important

In glibc (GNU C library) included in the RHEL7.2 installation media, the vulnerability (CVE-2015-7547) that has an extremely serious impact has been found out. If this vulnerability is misused, the getaddrinfo() function may be used for illegal processing, and the desired code may be executed in some cases. This problem has been corrected in glibc-2.17-106.el7_2.4 or later.

openssl-1.0.1e-51.el7_2.4.x86_64.rpm
openssl-libs-1.0.1e-51.el7_2.4.x86_64.rpm

Important

In OpenSSL included in the RHEL7.2 installation media, the vulnerability (CVE-2016-0800, known as DROWN) that has an extremely serious impact has been found out. If this vulnerability is misused, the TLS session may be decrypted (decoded), and the information may be leaked. This problem has been corrected in openssl-1.0.1e-51.el7_2.4 or later.

dracut-033-360.el7_2.x86_64.rpm
dracut-config-rescue-033-360.el7_2.x86_64.rpm
dracut-network-033-360.el7_2.x86_64.rpm

Important **In dracut included in the RHEL7.2 installation media, it turns out that systemd may output an error message repeatedly at startup of OS, and the operation may stall. This problem has been corrected in dracut-033-360.el7_2 or later.**

nfs-utils-1.3.0-0.8.el7.x86_64.rpm

Important **In nfs-utils included in the RHEL7.2 installation media, it turns out that a large amount of error messages may be output to the system log. The correction package has not been provided as of April 2016. Downgrade the file to nfs-utils-1.3.0-0.8.el7.**

Tips If nfs-utils included in the RHEL7.2 installation media is not installed due to customization for a customer, it is not required to obtain this file.

libldb-1.1.25-1.el7_2.x86_64.rpm
libsmbclient-4.2.10-6.el7_2.x86_64.rpm
libtalloc-2.1.5-1.el7_2.x86_64.rpm
libtdb-1.3.8-1.el7_2.x86_64.rpm
libwbclient-4.2.10-6.el7_2.x86_64.rpm
pytalloc-2.1.5-1.el7_2.x86_64.rpm
samba-4.2.10-6.el7_2.x86_64.rpm
samba-client-4.2.10-6.el7_2.x86_64.rpm
samba-client-libs-4.2.10-6.el7_2.x86_64.rpm
samba-common-4.2.10-6.el7_2.noarch.rpm
samba-common-libs-4.2.10-6.el7_2.x86_64.rpm
samba-common-tools-4.2.10-6.el7_2.x86_64.rpm
samba-libs-4.2.10-6.el7_2.x86_64.rpm

Important **In Samba included in the RHEL7.2 installation media, the vulnerability (CVE-2015-5370, CVE-2016-2118, and other 6 cases, known as BADLOCK) that has an extremely serious impact has been found out. Installation of the DCE/RPC protocol of samba is vulnerable, and the samba server may crash, and the desired code may be executed in case of the illegal use. This problem has been corrected in samba-4.2.10-6.el7_2 or later.**

Tips If Samba included in the RHEL7.2 installation media is not installed due to customization for a customer, it is not required to obtain this file.

- Accessories of the server
  - Installation Guide (Linux) (This manual)
  - ft Server Control Software 11.0.2 for Red Hat Enterprise Linux 7.2 Install CD
- Prepare the following as needed:
  - Environment that allows writing to DVD (for creating install media)
  - A blank DVD (for creating install media or storing correction package)

(2) Registration to Red Hat Network

To use Red Hat Enterprise Linux, you must have RHN-ID (registration number for Red Hat Network). If you do not have RHN-ID or it has expired, the software channel corresponding to subscription is not displayed.

2.3 OS Setup

This section describes how to set up an OS.

Important

- **This document describes the procedure for establishing the environment recommended by NEC. If customers customize the system, fully study the system configuration in advance, and replace the description as required to set up the system.**
- **It is recommended to make a backup copy of user data as needed.**

2.3.1 Installing Red Hat Enterprise Linux 7.2

Install Red Hat Enterprise Linux 7.2 according to the following procedure.

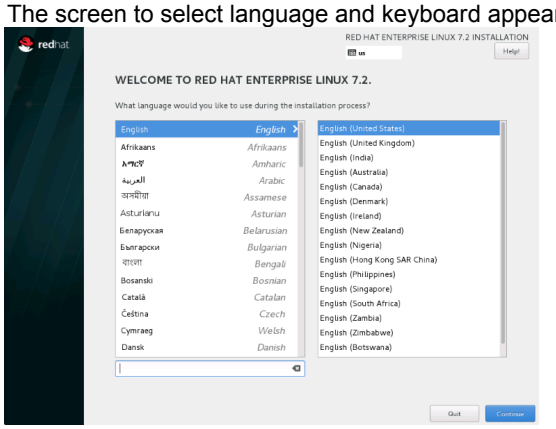
1. Turn the power of this system ON, and then set the RHEL7.2 installation media to the optical disk drive.

2. The boot screen appears. Select [Test this media & install Red Hat Enterprise Linux 7.2] if you check the installation media. If you do not check the installation media, select [Install Red Hat Enterprise Linux 7.2]. Then, press the <Enter> key.

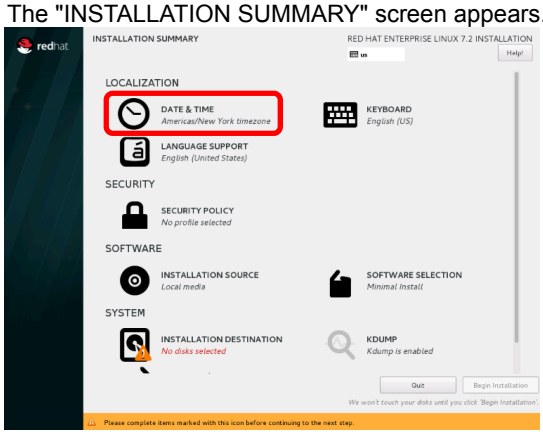
Tips

- If nothing is input for a certain amount of time, [Test this media & install Red Hat Enterprise Linux 7.2] is selected automatically, and the next screen appears after executing the installation media check.
- It is recommended to check the installation media for a problem. Checking the media takes several or several tens of minutes.

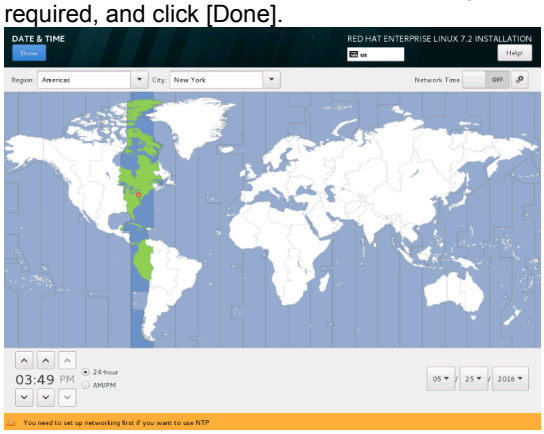
3. The screen to select language and keyboard appears. Select [English], and click [Continue].



4. The "INSTALLATION SUMMARY" screen appears. Click [DATE & TIME].



5. The "DATE & TIME" screen appears. Change the date and time displayed at the bottom of the screen as required, and click [Done].



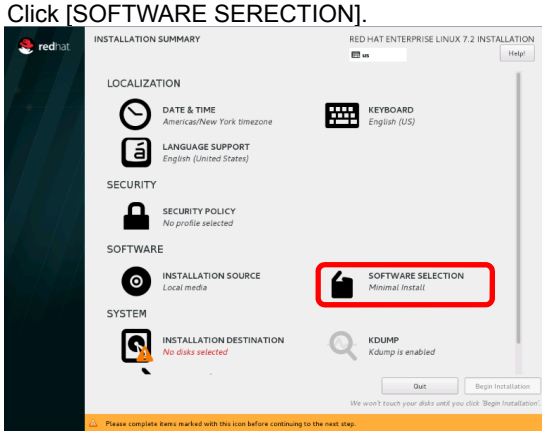
Note

The date and time specified here is converted to Universal Time Coordinated (UTC), and reflected to the hardware clock when the installer exits. Do not change the UTC setting also after installation.

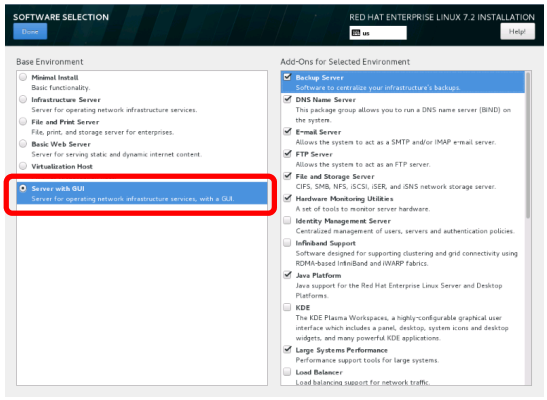
Tips

The time displayed here may be about seven minutes fast or slow by default even though it is set in BIOS setting. Set the correct time again.

6. Click [SOFTWARE SERECTION].



7. The "SOFTWARE SERECTION" screen appears. Select [Server with GUI] for "Base Environment", select the module marked with for "Add-Ons for Selected Environment", and click [Done].

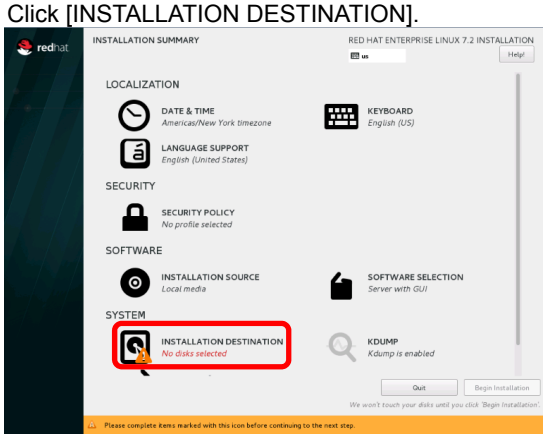


Backup Server	✓
DNS Name Server	✓
E-mail Server	✓
FTP Server	✓
File and Storage Server	✓
Hardware Monitoring Utility	✓
Identify Management Server	
Infiniband Support	
Java Platform	✓
KDE	
Large Systems Performance	✓
Load Balancer	
Mainframe Access	
MariaDB Database Server	
Network File System Client	✓
Performance Tools	✓
PostgreSQL Database Server	✓
Print Server	✓
Remote Management for Linux	✓
Virtualization Client	
Virtualization Hypervisor	
Virtualization Tools	
Compatibility Libraries	✓
Development Tools	✓
Security Tools	✓
Smart Card Support	

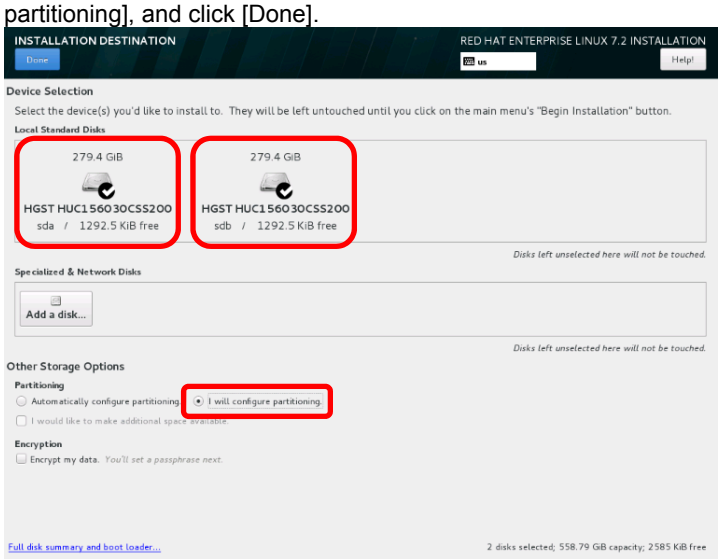
Tips

- The required package for the ft control software is automatically installed. See Chapter 1 (*2.3.3 Installing the required package*) of this manual.
- Select [Server with GUI] for "Base Environment" to use the graphical target (graphical login mode).
- For the specified base environment or packages included in add-on, check the "repodata/*-comps-Server.x86_64.xml" file of the installation media. This file describes the available environment (<environment> tag) and add-on (<group> tag) in the XML format.
- The installation media includes the package group and package that cannot be installed from the Red Hat installation program selection screen. For the package group and how to add the package, see Chapter 1 (*3.1 Adding the Package Group and Package*) of this manual.
- If [Minimal Install] is selected, the required hard disk drive capacity is 5 GB. I all the selectable add-ons are selected, the capacity is 10 GB.

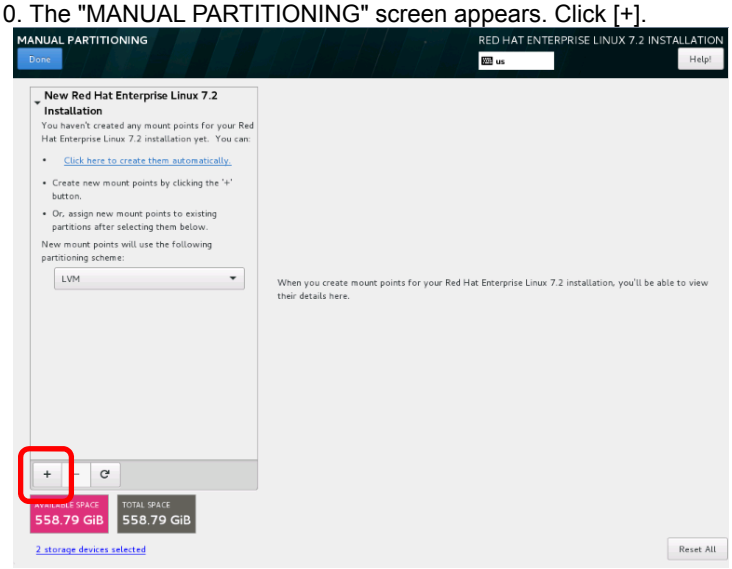
8. Click [INSTALLATION DESTINATION].



9. Select 2 units of the devices at the installation destination from the local standard disk, select [[I will configure partitioning], and click [Done].



10. The "MANUAL PARTITIONING" screen appears. Click [+].



The recommended system partition configuration is listed below.

System partition configuration	Size *1	File system *2	
Pattern 1			
/boot/efi	200MB	EFI System Partition	
/boot	1024MB	ext4	*3
/var/crash	16GB	ext4	*4
swap	*5	swap	
/	32GB	ext4	
Free space	The rest of the disk	—	*6
Pattern 2			
/boot/efi	200MB	EFI System Partition	
/boot	1024MB	ext4	*3
/var/crash	16GB	ext4	*4
swap	*5	swap	
/	32GB	ext4	
/home	The rest of the disk	ext4	
Pattern 3			
/boot/efi	200MB	EFI System Partition	
/boot	1024MB	ext4	*3
/var/crash	16GB	ext4	*4
swap	*5	swap	
/	The rest of the disk	ext4	

*1 The actually secured partition size may be slightly different from value in the table since the partition is secured in accordance with the border of the hard disk drive cylinder.

*2 Although the default file system is xfs, it is recommended to use ext4 that has a good record with the operation.

*3 This partition must have sufficient free space to additionally install the latest kernel in which the security or bug is corrected. It is recommended to secure the partition size 300 MB to 500 MB at least.

*4 Be sure to create the /var/crash partition, and secure 16 GB of the size regardless of the mounted memory space.

*5 The following table shows the recommended swap partition size in accordance with the memory space mounted in this machine.

Mounted memory space	swap partition size
8 GB or less	Mounted memory space
More than 8 GB and 64 GB or less	Half of the mounted memory space
More than 64 GB	Depends on the workload.

Note

- If the mounted memory space is larger, swap is hardly used in some cases. Determine the size according to the purpose of using the system and the workload during the operation.
- The free command enables you to check the swap use status during the operation. If the usage rate of swap is higher, expand the swap area and add the memory.

*6 The partitions can be created freely in this free space. For the procedure for adding the partitions, see the following sections.
- *Chapter 1 (3.3 Adding Partitions)* in this manual
- *Chapter 1 (3.4 Expanding the swap Area)* in this manual

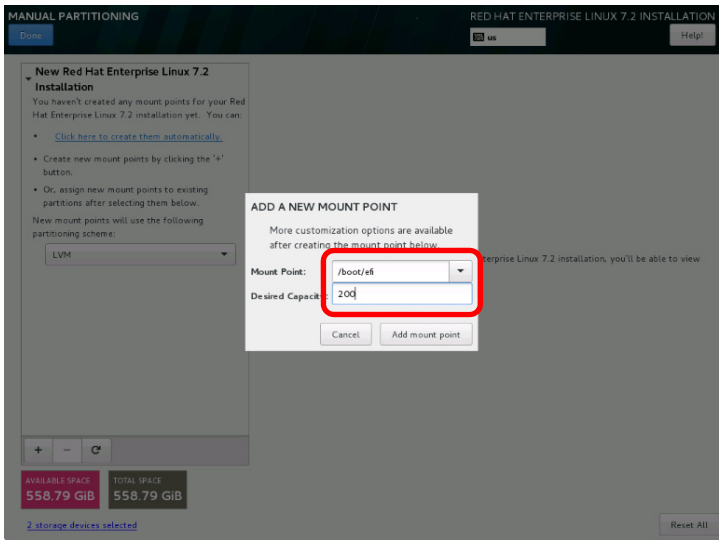
Important

- **For the partitions created by all the built-in hard disks, the software RAID1 consisting of the CPU/IO module 0 and CPU/IO module 1 with the same slot numbers must be configured. Only RAID1 is supported for the built-in hard disk including the system partition. RAID1 or RAID1+0 is supported for the built-in hard disk excluding the system partition. For the built-in hard disk excluding the system partition, see *Chapter 2 (1. Hard Disk Drive Duplexing)* in the maintenance manual.**
- **T**he built-in hard disk including the system partition **does** not support **the use of LVM**. Configure RAID1 or RAID1+0 before using the built-in hard disk excluding the system partition. Please note that the configuration to create RAID furthermore on the LVM logical volume is not supported. LVM provides the advanced storage function and the procedure for management or recovery in case of a failure is complex. It is recommended to use LVC only if it is required.

Tips

- The number of the partition created during the installation is automatically allocated by the Red Hat installation program. Therefore, the numbers may not be allocated in the same order as creation of the partition.
- Use the parted command or df command to display the partition information or free space of the hard disk drive.

The "ADD A NEW MOUNT POINT" screen appears. Set [Mount Point] and [Desired Capacity], and click [Add mount point].

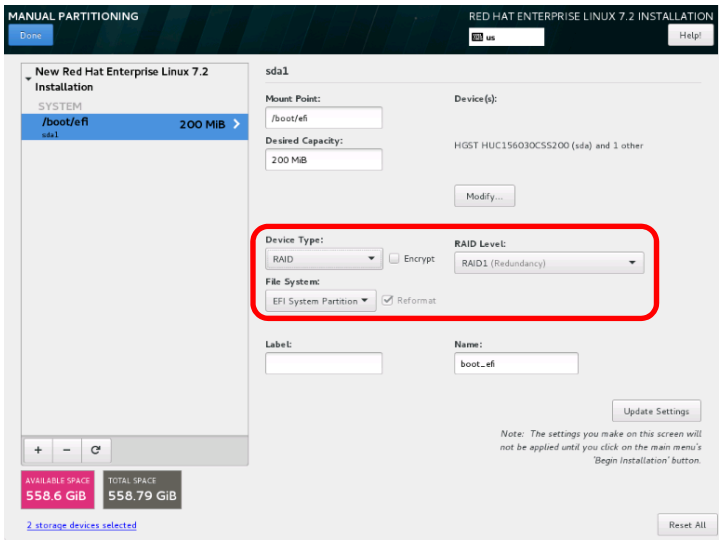


Important **Do not allocate the /usr partition to the partitions other than the / (root) partition since the boot process becomes complex.**

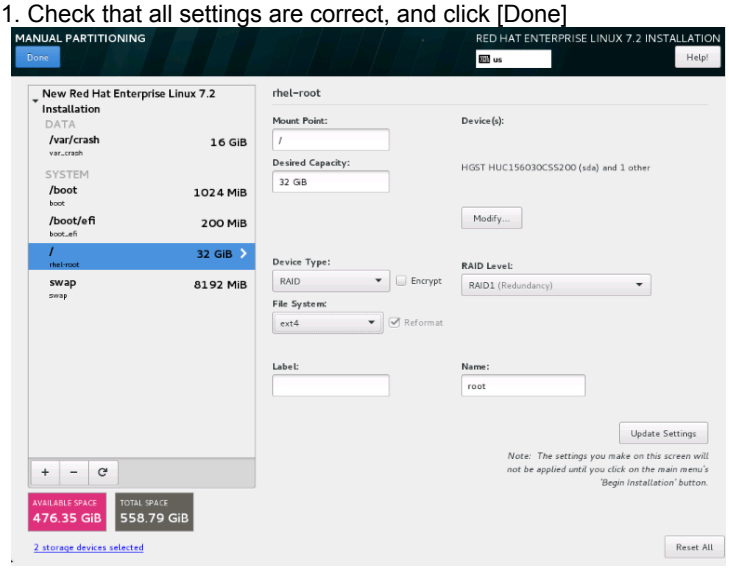
Note As the mount point of EFI System Partition , be sure to set /boot/efi.

Tips If [Desired Capacity] is blank, all the remaining spaces are used.

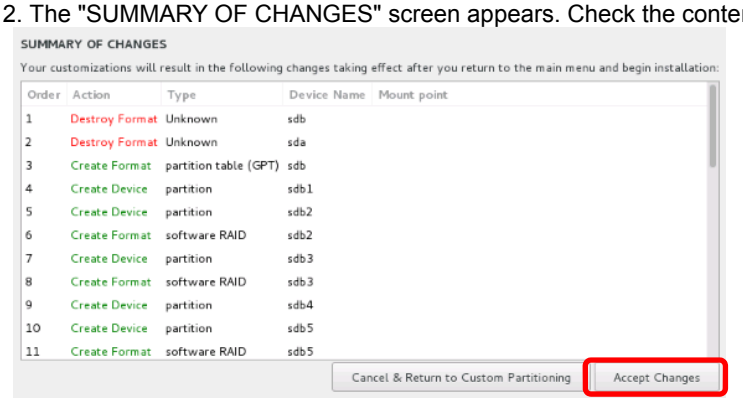
For [Device Type], make sure to select “RAID1 (Redundancy)” for [RAID Level], and set [File System]. Create all partitions according to the same procedure.



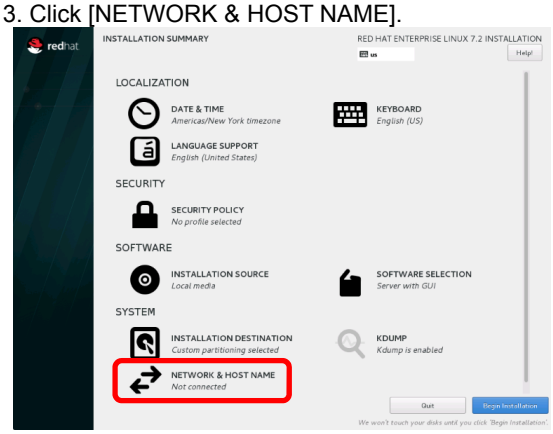
11. Check that all settings are correct, and click [Done]



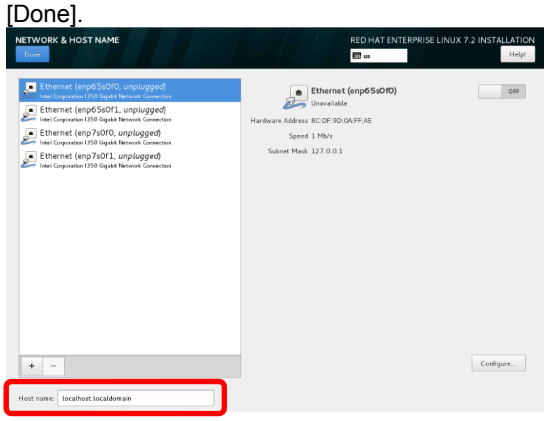
12. The "SUMMARY OF CHANGES" screen appears. Check the contents, and click [Accept Changes].



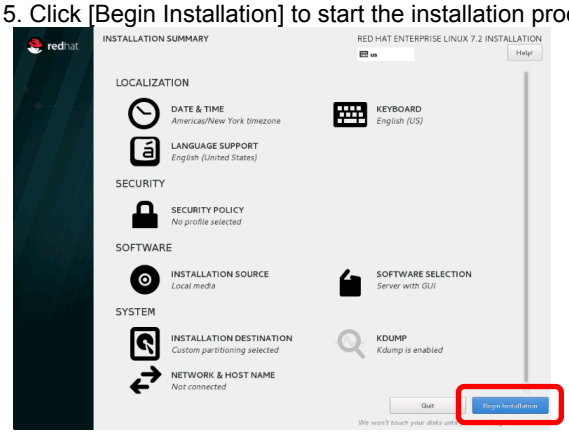
13. Click [NETWORK & HOST NAME].



14. The "NETWORK & HOST NAME" screen appears. Specify the desired host name in [Host name], and click [Done].



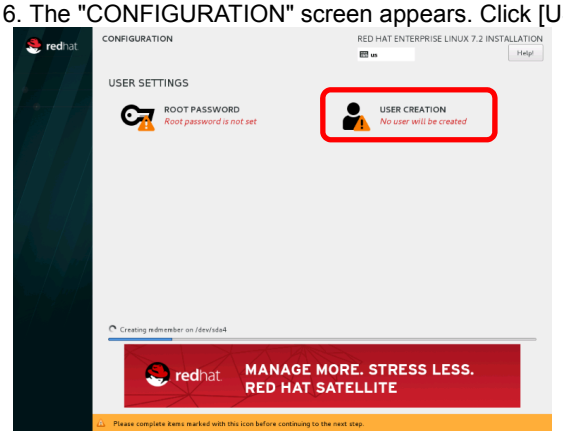
15. Click [Begin Installation] to start the installation process.



Note

KDUMP can be set automatically according to the subsequent steps. Do not change the KDUMP setting before and after installation.

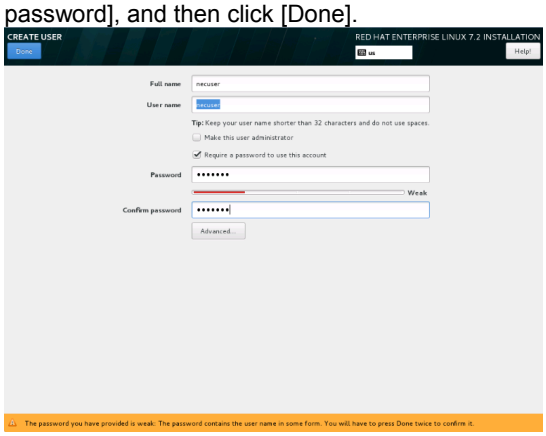
16. The "CONFIGURATION" screen appears. Click [USER CREATION].



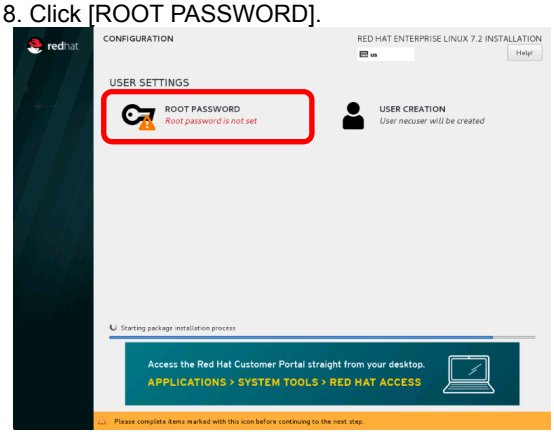
Tips

If the root password is set before creating the user, the user may not be created during the installation.

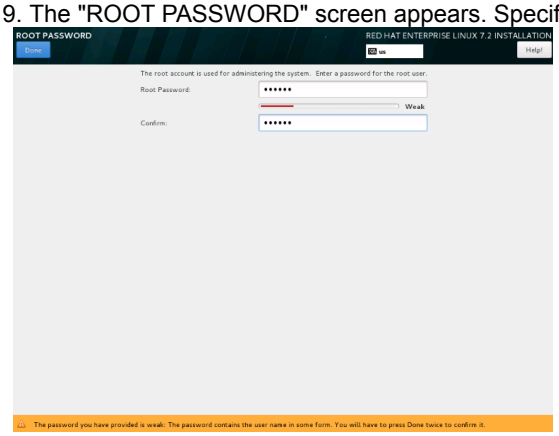
17. The "CREATE USER" screen appears. Specify [Full name], [User name], [Password], and [Confirm password], and then click [Done].



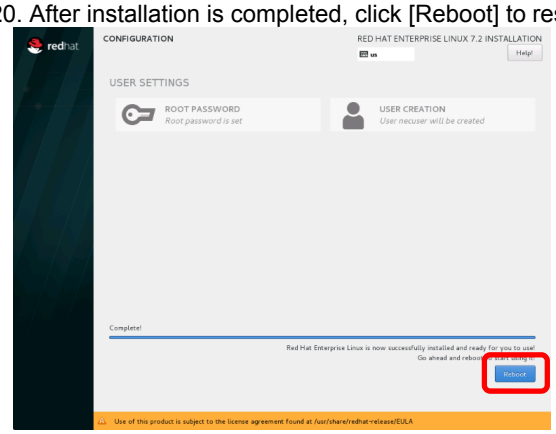
18. Click [ROOT PASSWORD].



19. The "ROOT PASSWORD" screen appears. Specify [Root Password] and [Confirm], and then click [Done].



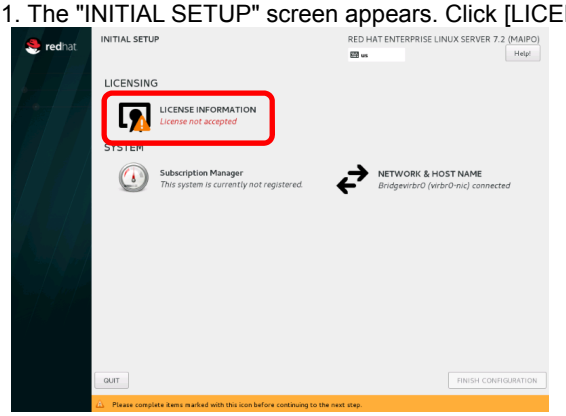
20. After installation is completed, click [Reboot] to restart the system. Then, remove the installation media.



Note

If any item other than [Server with GUI] is selected, proceed to the steps described in *Chapter 1 (2.3.2 Installing the recommended package)* in this manual.

21. The "INITIAL SETUP" screen appears. Click [LICENSE INFORMATION].

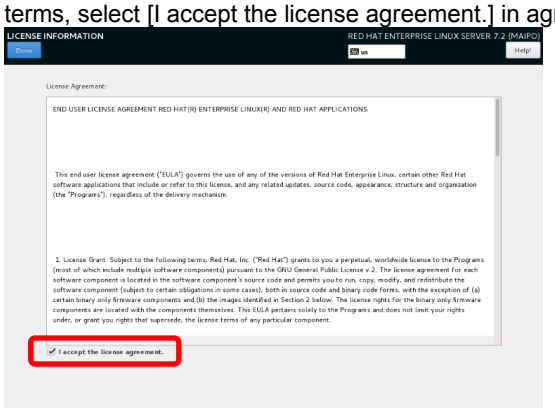


Tips

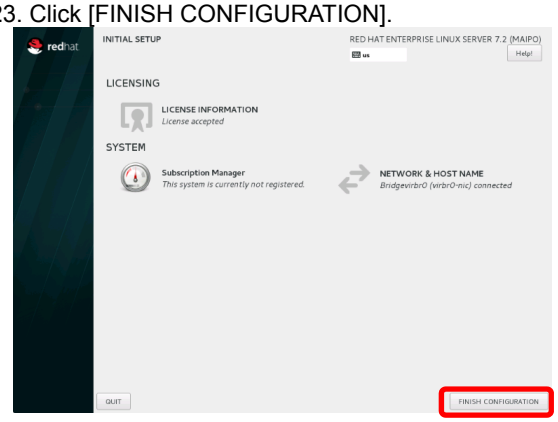
[LICENSE INFORMATION] on the "INITIAL SETUP" screen may appear in CUI. In this case, follow the following procedure.

1. Input <1> of "1) [!] License information" , and press the <Enter> key.
2. Input <1> of "1) Read the License Agreement" , and press the <Enter> key.
3. Read the license terms and conditions. If you agree to the terms, enter <2> of "[ ] 2) I accept the license agreement." in agreement, and press the <Enter> key.
4. Confirm that "[x] 2) I accept the license agreement." Is checked, input <c>, and press the <Enter> key.
5. Confirm that "1) [x] License information" is checked, input <c>, and press the <Enter> key.

22. The "LICENSE INFORMATION" screen appears. Read the license terms and conditions. If you agree to the terms, select [I accept the license agreement.] in agreement, and click [Done].



23. Click [FINISH CONFIGURATION].



2.3.2 Installing the recommended package

Individually install the package recommended by NEC according to the following procedure.

1. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

2. Install the following packages additionally by using the yum command. For how to add the package, see *Chapter 1 (3.1 Adding the Package Group and Package)*of this manual.

   ltrace、dump、ntp、virt-manager、httpd、squid、mcelog、OpenIPMI

Tips

To install the above packages additionally by using the yum command, add "--setopt=multilib_policy=best".

2.3.3 Installing the required package

Install the packages required for the ft control software according to the following procedure.

Tips

The package may not be mounted automatically depending on the environment. Mount it to the desired position in this case. If the mounting destination is different, replace it as required.

1. Set the ft control software installation CD to the optical disk drive. The package is mounted automatically after a while.

2. Execute the following command to copy the file.

```
# /bin/cp -f /run/media/root/FT1102052/ftsys/pkginst.sh /tmp
```

3. Remove the ft control software installation CD from the optical disk drive, and insert the RHEL7.2 installation media. The package is mounted automatically after a while.

4. Execute the following command to install the package.

```
# /tmp/pkginst.sh
```

5. After installation is completed, the following message appears.

```
The install has completed.
```

6. Remove the RHEL7.2 installation media from the optical disk drive.

2.3.4 Applying Initial Configuration Script

Initial Configuration Script provides various settings for stable operation of the system. Be sure to apply the initial configuration script according to the steps below.

See *Chapter 1 (4.1 Processing detail of initial configuration script)* for details of initial configuration script.

1. Set the ft Server Control Software Install CD to optical disk drive. After a while, the drive will be automatically mounted.

Tips

If the optical disk drive is not mounted automatically depending on your environment, mount it on the desired location manually. If the mount destination differs, substitute it for the actual destination appropriately.

2. Run the following command to apply initial configuration script.

```
# /run/media/root/FT1102052/ftsys/nec_setup.sh
```

3. The following message appears when the configuration is applied. The system needs to be rebooted, however, proceed to the next step.

```
Update done.

Finished successfully.
Please reboot your system.
```

2.3.5 Updating packages

Follow the steps below to update packages.

1. Store the package you have downloaded from Red Hat Network in the desired directory, and go to that directory.
2. Run the following command to update packages.

```
# rpm -Uvh --oldpackage nfs-utils-1.3.0-0.8.el7.x86_64.rpm
```

Tips If nfs-utils included in the RHEL7.2 installation media is not installed due to customization by a customer, it is not required to apply this file.

3. Run the following command to update packages.

```
# rpm -Uvh samba-* lib* pytalloc-2.1.5-1.el7_2.x86_64.rpm
```

Tips If Samba included in the RHEL7.2 installation media is not installed due to customization by a customer, it is not required to apply this file.

4. Run the following command to update packages.

```
# rpm -Uvh glibc-*
# rpm -Uvh dracut-*
# rpm -Uvh openssl-*
# rpm -Uvh kernel-doc-3.10.0-327.18.2.el7.noarch.rpm
# rpm -Uvh kernel-devel-3.10.0-327.18.2.el7.x86_64.rpm
# rpm -Uvh kernel-3.10.0-327.18.2.el7.x86_64.rpm
```

5. Run the following command to reboot the system.

```
# systemctl reboot
```

2.3.6 Installing ft Server Control Software

Follow the steps below to install ft Server Control Software.

1. Login the system with root user. If you login with graphical mode, select [Others...] to login.
2. Set the ft Server Control Software Install CD to optical disk drive. After a while, the drive will be automatically mounted.

Tips

If the optical disk drive is not mounted automatically depending on your environment, mount it on the desired location manually. If the mount destination differs, substitute it for the actual destination appropriately.

3. Run the following command to install ft Server Control Software.

```
# /run/media/root/FT1102052/ftsys/install.sh
```

4. The following message appears when installation completes. Press the <Enter> key to reboot the system.

```
Enter YES to reboot now or NO to allow a manual reboot later: [YES]
```

Tips

Start up the multi-user target (text login mode) after reboot. If you temporarily use the graphical target (graphical login mode) environment, execute the following command after login.

startx

The indication on screen may be corrupted when the system is shutdown or rebooted. However, end processing is normally terminated.

5. Eject the ft Server Control Software Install CD from the optical disk drive.
6. After a while, system FT LED turns on. For details, see *Chapter 1 (6.1 Error Messages by LED Indication)* in *Maintenance Guide*.

2.3.7 Before installing NEC ESMPRO Agent

Take the steps below before starting installation of NEC ESMPRO Agent.

1. Login the system with root user.
2. When monitoring the server using NEC ESMPRO Agent from NEC ESMPRO Manager, use SNMP. To perform remote shutdown, local polling, and to change threshold from NEC ESMPRO Manager, modify the SNMP environment file (/etc/snmp/snmpd.conf) to set a community privilege to "read write" for ESMPRO MIB, and restart snmpd. If these features are not used, the community privilege can be "read".

When NEC ESMPRO Agent is installed by using rpm command, it adds the following information to snmpd.conf to cope with SNMP request from ESMPRO MIB and Ethernet Like MIB.

```
dlmod ntpass /opt/nec/esmpro_sa/lib/ntpass.so
ntpass .1.3.6.1.4.1.119.2.2.4.4              (ESMPRO MIB)
ntpass .1.3.6.1.2.1.10.7                     (Ethernet Like MIB)
```

In the following example, "read write" privilege is given to every MIB(.1) in default community (public).

```
####
# First, map the community name "public" into a "security name"

#       sec.name  source          community
com2sec notConfigUser  default       public

####
# Second, map the security name into a group name:

#       groupName      securityModel securityName
group   notConfigGroup v1           notConfigUser
group   notConfigGroup v2c          notConfigUser

####
# Third, create a view for us to let the group have rights to:
#       name           incl/excl     subtree         mask(optional)
#view    systemview     included   .1.3.6.1.2.1.1
#view    systemview     included   .1.3.6.1.2.1.25.1.1
view    all            included      .1               80

####
# Finally, grant the group read-only access to the systemview view.
#       group          context sec.model sec.level prefix read   write  notif
#access  notConfigGroup ""      any       noauth    exact  systemview none none
 access  notConfigGroup ""      any       noauth    exact  all    all    none
```

For detailed information, refer to help of snmpd.conf.

Use man command to open snmpd.conf file.

```
# man snmpd.conf
```

2.3.8 Installing NEC ESMPRO Agent

Tips

"/mnt" indicates the mounting destination of the optical disk drive. The optical disk drive may be mounted automatically to the destinations other than "/mnt". In this case, execute the following command, and unmount the drive temporarily or replace the mounting destination as required.

umount /dev/cdrom

Follow the steps below to install NEC ESMPRO Agent.

1. Login the system with root user.
2. Insert the ft Server Control Software Install CD into optical disk drive of the server, and mount it by running the following command.

```
# mount /dev/cdrom /mnt
```

3. Move to the directory where NEC ESMPRO Agent is stored, and execute install script.

```
# cd /mnt/esmpro_sa/
# sh ./pp_install -s OFF -l en_US.UTF-8
```

4. Remove the ft Server Control Software Install CD from optical disk drive of the server.

```
# cd / ; eject /mnt
```

If eject command fails to eject CD, unmount it, and remove the ft Server Control Software Install CD from optical disk drive manually.

5. Restart the system.

```
# systemctl reboot
```

2.3.9 Setting required after installing NEC ESMPRO Agent

NEC ESMPRO Manager uses the following network port when it monitors the server where NEC ESMPRO Agent is installed.

When configuring access control on your server, allow these ports as accessible.

As for "Auto-assign" in the table, OS assigns available port within the certain range. Accordingly, these ports cannot be fixed. The available range is described in the following file.

```
# cat /proc/sys/net/ipv4/ip_local_port_range
```

Tips If you use an example of opening the port by using iptables, you have to install iptables-services in advance.

Between NEC ESMPRO Agent and NEC ESMPRO Manager

Features	NEC ESMPRO Agent	Direction	NEC ESMPRO Manager	Remarks
Automatic registration (SNMP) Server monitoring (SNMP)	161/udp	← →	161/udp	snmp
Report to Manager (SNMP)	Auto-assign	→	162/udp	snmp-trap
Report to Manager (TCP/IP in Band, TCP/IP Out-of-Band)	Auto-assign	→ ←	31134/tcp	

* If left and right arrows are shown in Direction column, an upper arrow shows the direction at start-up, and the lower shows the return.
* Port numbers not used by SNMP can be changed on alert setting screen.
* Shown below is an example of ports opened by using iptables. Setting must be saved finally.

```
# iptables -I INPUT  -p udp --dport 161 -s <IP address of NEC ESMPRO Manager> -j ACCEPT
# iptables -I OUTPUT -p udp --dport 161 -j ACCEPT
# iptables -I OUTPUT -p udp --dport 162 -j ACCEPT
# iptables -I OUTPUT -p tcp --dport 31134 -j ACCEPT

# service iptables save
```

Between NEC ESMPRO Agent and a mail server

Features	NEC ESMPRO Agent	Direction	Mail Server	Remarks
Express Report Service (E-mail)	Auto-assign	→ ←	25/tcp	smtp
		→ ←	110/tcp	pop3

* In the direction column, the upper arrow indicates the direction in which the communication started and the lower arrow indicates the returning communication.
* The port to be used can be changed from the report setting screen.
* An example of opening the port by using iptables is shown below. Save the setting at the end.

```
# iptables -I OUTPUT -p tcp --dport 25 -j ACCEPT
# iptables -I OUTPUT -p tcp --dport 110 -j ACCEPT

# service iptables save
```

Between NEC ESMPRO Agent and an https server

Features	ESMPRO/SA	Direction	HTTPS server	Remarks
Express Report Service (HTTPS)	Auto-assign	→ ←	443/tcp	https

* In thedirection column, the upper arrow indicates the direction in which the communication started and the lower arrow indicates the returning communication.
* The port number to be used can be changed from the report setting screen.
* An example of opening the port by using `iptables is` shown below. Save the setting at the end.

```
# iptables -I OUTPUT -p tcp --dport 443 -j ACCEPT

# service iptables save
```

NEC ESMPRO Agent uses the following internal ports. When configuring access control on your server using iptables or TCP Wrapper, allow these ports as accessible.

Between NEC ESMPRO Agent and another NEC ESMPRO Agent

Feature	Port number
rpcbind	111/tcp
	111/udp
NEC ESMPRO Agent	Auto-assign

2.3.10 Troubleshooting

If the OS setup does not progress normally, see the following check list.

[?] **RHEL7.2 cannot be installed as described in this manual.**

→ Check that the BIOS boot mode is set to UEFI . For details, see *Chapter 1 (2.2.3 Checking Boot Mode Settings)*.

→ Check that the module POWER lamps of the CPU/IO module 0 and CPU/IO module 1 are lit.
Check that the PRIMARY lamp of the CPU/IO module 0 is lit.
Check that the hard disk drive is mounted only to the slot 0 of the CPU/IO module 0 and CPU/IO module 1, and the hard disk drive is physically formatted.
For details, see *Chapter 1 (2.2.1 Preparation for hardware)* in this manual.

[?] **The system suddenly restarts during the setup processing.**

→ Check that the BIOS startup monitoring feature is invalid. For details, see *Chapter 1 (2.2.2 Disabling OS Boot Monitoring Feature)* in this manual.

[?] **An error or warning message is output during the setup processing.**

→ Although an error or warning message may be output due to the temporary system conditions, the setup is completed successfully if the system FT LED is lit as described on "*2.3.6 Installing ft Server Control Software"* in this manual. For the message output after completion of setup, see *Chapter 1 (8.3 Problems When Starting OS)* in "*Maintenance Guide*".

2.4 Connecting Optional Device

2.4.1 PCI board

If there is an uninstalled PCI board, install it by referring to the following procedure.

- *Chapter 2 (5.7 PCI Card)* in "*Maintenance Guide*"

If the LAN board is installed, duplicate it by referring to the following procedure.

- *Chapter 2 (2. Network Duplexing)* in "*Maintenance Guide*"

If the FC board is installed, duplicate it by referring to the following procedure.

- *Chapter 2 (5.7.5 (2) N8803-040 Fibre Channel 1ch Board set)* in "*Maintenance Guide*"

2.4.2 Hard disk drive

If there is an uninstalled hard disk drive, install and duplicate it by referring to the following procedure.

- *Chapter 2 (5.3 2.5-inch Hard Disk Drive)* in "*Maintenance Guide*"
- *Chapter 2 (1. Hard Disk Drive Duplexing)* in "*Maintenance Guide*"

2.4.3 Other

If there is an unconnected USB device for backup (i.e. external/internal RDX), connect the USB cable by referring to the manual attached to the USB device.

If LAN cable connected to Management LAN conector was removed in Chapter 1 (2.2.1 Preparation for hardware), connect it if needed.

2.5 Network Setting

Network setting is described here.

Important **Be sure to use the vndctl command if setting the IP address, subnet mask, and default gateway. For details, see *Chapter 2 (2. Network Duplexing)* in "*Maintenance Guide*".**

2.5.1 Overview of network setting

The network duplexing is configured as a pair of the CPU/IO module 0 and CPU/IO module 1 and the network interface of the PCI slot corresponding to each module. The network interface is named according to the naming rule described below.

PCI slot and network interface name

PCI slot	Port	CPU/IO module 0	CPU/IO module 1	Slot number of the vndctl command
1G LAN connector	#1	eth100600	eth110600	1
	#2	eth100601	eth110601	2
10G LAN connector	#1	eth101200	eth111200	3
	#2	eth101201	eth111201	4
PCI slot 1	#1	eth100100	eth110100	5
	#2	eth100101	eth110101	6
PCI slot 2	#1	eth100200	eth110200	7
	#2	eth100201	eth110201	8
PCI slot 3*	#1	eth100300	eth110300	9
	#2	eth100301	eth110301	10
PCI slot 4*	#1	eth100400	eth110400	11
	#2	eth100401	eth110401	12

* For R320e-E4, 10G LAN connector, PCI slot 3, and PCI slot 4 do not exist.

2.5.2 Network setting method

An example of setting the following items is described here.

Slot number of the vndctl command : 1
IP address : 192.168.0.10
Subnet mask : 255.255.255.0
Default gateway : 192.168.0.1

1. Install the LAN cable.

2. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

3. Execute the following command to disable the coupled interface.

```
# vndctl down 1
```

Note For the 1G LAN connector, the coupled interface that sets eth100600 and eth110600 tobond0 and eth100601 and eth110601 tobond1 is enabled during the OS set up.

4. Execute the following command to set the network. Items marked with * must be input by a user. The default gateway can be omitted by pressing the <ENTER> key without inputting.

```
# vndctl config 1
[Virtual Network Setting]
*Boot Protocol? [none/dhcp/bootp] none
*IP address? 192.168.0.10
*Netmask? 255.255.255.0
*Default gateway (IP)? 192.168.0.1

*Are you sure to set it? [y/n] y

NAME=bond0
DEVICE=bond0
TYPE=Bond
ONBOOT=yes
BOOTPROTO=none
BONDING_OPTS="miimon=100 mode=active-backup"
IPADDR=192.168.0.10
NETMASK=255.255.255.0
GATEWAY=192.168.0.1
```

5. Execute the following command to enable the coupled interface.

```
# vndctl up 1
```

6. Execute the following command to check that IP address appears in bond0 and Status of eth100600 and eth110600 is DUPLEX.

```
# vndctl status
--Virtual Network Status--
BondingDevice Slot Status  InetAddress     RXErrors TXErrors Collisions
bond0         1    ONLINE  192.168.0.10    0        0        0
bond1         2    ONLINE  -               0        0        0

Slot        RealDevice Status           Interface LinkState LinkSpeed
1    top    eth100600  DUPLEX           UP        LINK      1000Mb/s-FD
     bottom eth110600  DUPLEX           UP        LINK      1000Mb/s-FD
2    top    eth100601  DUPLEX           UP        LINK      1000Mb/s-FD
     bottom eth110601  DUPLEX           UP        LINK      1000Mb/s-FD
```

2.6 Installing Bundled Software

2.6.1 Installing bundled software (see Chapter 2)

Install the bundled software and configure it according to Chapter 2.

2.6.2 How to check the kernel and ft control software version

Check the kernel and ft control software version by the following command

The version of the kernel being operated :

```
# uname -r
```

The version of the ft control software being operated:

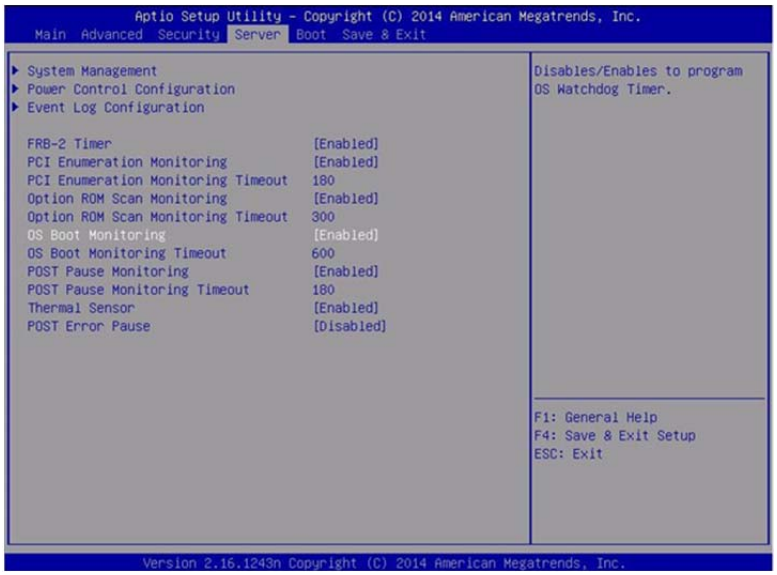
```
# rpm -q ft-eulas
```

2.7 Enabling OS Boot Monitoring Feature

Enables OS Boot Monitoring feature.

Set OS Boot Monitoring feature to **Enabled** on BIOS SETUP referring to *Chapter 1 (2.2.2 Disabling OS Boot Monitoring Feature)*. Then, specify the timeout time for **OS Boot Monitoring Timeout** parameter appropriately.

Tips Specify the timeout time in seconds. Default setting is 600 seconds (10 minutes).



2.8 Backing Up System Information

It is recommended to write down your system information when you finish system setup.

With backup copy of system information, the information and settings that are specific to your server can be restored after the server is repaired. Take the steps below to make a backup copy of your system information:

2.8.1 BIOS SETUP

Power on the server.

While the following message is displayed on POST, press the <F2> key.

Press <F2> SETUP, <F4> ROM Utility, <F12> Network

Write down the new parameter values upon completion of POST.

Example)

[Advanced]-[PCI Configuration]-[SAS Option ROM Scan]

[Advanced]-[PCI Configuration]-[PCIx Slot Option ROM]

[Security]

[Server]-[OS Boot Monitoring]

[Server]-[AC-LINK]

[Server]-[Power On Delay Time]

[Boot]-[Boot Option Priorities]

When you select [Save & Exit]-[Save Changes and Exit], the following message appears.

Save configuration and exit?

Click [Yes] to restart the server.

2.8.2 System information

Run POST.
While the following message appears, press <F4>.

Press <F2> SETUP, <F4> ROM Utility, <F12> Network

When POST completes, the keyboard selection menu appears.
If you select your keyboard layout, the following menu will appear.

Off-line TOOL MENU
Maintenance Utility BMC Configuration Exit

Choose **Maintenance Utility** – **System Information Viewer** – **Display System Information** – **System Information**. Write down the following system information.

[Product Name]

[FR Number]

[Serial Number]

Press <Esc> several times until the following menu appears.

Off-line TOOL MENU
Maintenance Utility BMC Configuration Exit

2.8.3 BMC Configuration

Choose **BMC Configuration** – **BMC Configuration**. Write down the BMC Configurations that have changed.

< Example >

[Network : CPU/IO module0]-[Property]

[Network : CPU/IO module1]-[Property]

[User Management]-[User Account]

Press <Esc> several times until the following menu appears.

Off-line TOOL MENU
Maintenance Utility BMC Configuration Exit

Choose “Exit” to exit.

3. Procedure for Changing the System Environment Setting

The procedure for changing the system environment setting is described here.

3.1 Adding the Package Group and Package

Install the package group and package additionally according to the following procedure.

Tips

"/mnt" indicates the mounting destination of the optical disk drive. The optical disk drive may be mounted automatically to the destinations other than "/mnt". In this case, execute the following command, and unmount the drive temporarily or replace the mounting destination as required.

```
# umount /dev/cdrom
```

1. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

2. If the GPG public key (GNU Privacy Guard) of Red Hat is not imported, execute this command to import it.

```
# rpm --import /etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release
```

3. Set the RHEL7.2 installation media to the optical disk drive, and execute the following command to mount the installation media.

```
# mount /dev/cdrom /mnt
```

4. Create the "/etc/yum.repos.d/dvd.repo" file, open it with the editor, and add the following line.

```
[dvd]
name=RHEL7DVD
baseurl=file:///mnt
enabled=1
gpgcheck=1
```

5. Execute the following command, and check the lists of "Environment Groups" and package group "Groups".

```
# LANG=C yum grouplist hidden
Loaded plugins: langpacks, product-id, search-disabled-repos, subscription-
              : manager
This system is not registered to Red Hat Subscription Management. You can use subscription-manager to
register.
Available Environment Groups:
   Minimal Install
   Infrastructure Server
   File and Print Server
   Basic Web Server
   Virtualization Host
   Server with GUI
Available Groups:
   Additional Development
   Anaconda Tools
   Backup Client
   Backup Server
   Base
     .
     .
     .
```

6. Execute the following command, and check the package included in the package group (the package group "Web Server" is specified here). Among the packages in "Mandatory Packages:" and "Default Packages:", the packages with "+" at the head of the package name are installed. The packages displayed in "Optional Packages:" must be installed with the package name specified. For the installation with the package group specified, proceed to step 7. For the installation with the package specified, proceed to step 8.

```
# LANG=C yum groupinfo "Web Server" *Specify the package group name
Loaded plugins: langpacks, product-id, search-disabled-repos, subscription-
              : manager
This system is not registered to Red Hat Subscription Management. You can use subscription-manager to
register.

Group: Web Server
 Group-Id: web-server
 Description: Allows the system to act as a web server, and run Perl and Python web applications.
 Mandatory Packages:
    httpd
 Default Packages:
   +crypto-utils
   +httpd-manual
   +mod_fcgid
   +mod_ssl
 Optional Packages:
   certmonger
   libmemcached
   memcached
   mod_auth_kerb
   mod_auth_mellon
   mod_nss
   mod_revocator
   mod_security
   mod_security_crs
   perl-CGI
   perl-CGI-Session
   python-memcached
   squid
```

7. Execute the following command, specify the package group, and install it (the package group "Web Server" is specified here).

```
# LANG=C yum groupinstall "Web Server"
Loaded plugins: langpacks, product-id, search-disabled-repos, subscription-
              : manager
This system is not registered to Red Hat Subscription Management. You can use subscription-manager to
register.
Resolving Dependencies
--> Running transaction check
---> Package crypto-utils.x86_64 0:2.4.1-42.el7 will be installed
--> Processing Dependency: perl(Newt) for package: crypto-utils-2.4.1-42.el7.x86_64
---> Package httpd-manual.noarch 0:2.4.6-40.el7 will be installed
---> Package mod_fcgid.x86_64 0:2.3.9-4.el7 will be installed
---> Package mod_ssl.x86_64 1:2.4.6-40.el7 will be installed
--> Running transaction check
---> Package perl-Newt.x86_64 0:1.08-36.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================
 Package              Arch           Version                  Repository   Size
================================================================================
Installing for group install "Web Server":
 crypto-utils         x86_64         2.4.1-42.el7             dvd           78 k
 httpd-manual         noarch         2.4.6-40.el7             dvd          1.3 M
 mod_fcgid            x86_64         2.3.9-4.el7              dvd           79 k
 mod_ssl              x86_64         1:2.4.6-40.el7           dvd          103 k
Installing for dependencies:
 perl-Newt            x86_64         1.08-36.el7              dvd           64 k

Transaction Summary
================================================================================
Install  4 Packages (+1 Dependent package)

Total download size: 1.6 M
Installed size: 6.2 M
Is this ok [y/d/N]: y  *Input  'y'
Downloading packages:
--------------------------------------------------------------------------------
Total                                              393 kB/s | 1.6 MB  00:04
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : perl-Newt-1.08-36.el7.x86_64                                 1/5

  (omitted)

  Verifying  : 1:mod_ssl-2.4.6-40.el7.x86_64                                5/5

Installed:
  crypto-utils.x86_64 0:2.4.1-42.el7     httpd-manual.noarch 0:2.4.6-40.el7
  mod_fcgid.x86_64 0:2.3.9-4.el7         mod_ssl.x86_64 1:2.4.6-40.el7

Dependency Installed:
  perl-Newt.x86_64 0:1.08-36.el7

Complete!
```

8. Execute the following command, specify the package, and install it (the package "squid" is specified here).

```
# LANG=C yum install squid
Loaded plugins: langpacks, product-id, search-disabled-repos, subscription-
              : manager
This system is not registered to Red Hat Subscription Management. You can use subscription-manager to
register.
Resolving Dependencies
--> Running transaction check
---> Package squid.x86_64 7:3.3.8-26.el7 will be installed
--> Processing Dependency: libecap.so.2()(64bit) for package: 7:squid-3.3.8-26.el7.x86_64
--> Running transaction check
---> Package libecap.x86_64 0:0.2.0-9.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================
 Package          Arch            Version                    Repository    Size
================================================================================
Installing:
 squid            x86_64          7:3.3.8-26.el7             dvd          2.6 M
Installing for dependencies:
 libecap          x86_64          0.2.0-9.el7                dvd           20 k

Transaction Summary
================================================================================
Install  1 Package (+1 Dependent package)

Total download size: 2.6 M
Installed size: 8.6 M
Is this ok [y/d/N]: y  *input  “y”
Downloading packages:
--------------------------------------------------------------------------------
Total                                              3.1 MB/s | 2.6 MB  00:00
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : libecap-0.2.0-9.el7.x86_64                                   1/2
  Installing : 7:squid-3.3.8-26.el7.x86_64                                  2/2
  Verifying  : 7:squid-3.3.8-26.el7.x86_64                                  1/2
  Verifying  : libecap-0.2.0-9.el7.x86_64                                   2/2

Installed:
  squid.x86_64 7:3.3.8-26.el7

Dependency Installed:
  libecap.x86_64 0:0.2.0-9.el7

Complete!
```

9. After finishing all works, execute the following command, delete the local repository file created in "/etc/yum.repos.d", and remove the RHEL7.2 installation media from the optical disk drive.

```
# rm -f /etc/yum.repos.d/dvd.repo
```

3.2 Changing the Default Target

Change the default target at the system startup according to the following procedure.

Install the base environment of the server ([Server with GUI]) in advance to start up the graphical target (graphical login mode).

3.2.1 Changing to the graphical target (graphical login mode)

1. Log in by using the root user.

2. Execute the following command to change the setting to the graphical target (graphical login mode).

```
# systemctl set-default graphical.target
```

3. Execute the following command to restart this system.

```
# systemctl reboot
```

3.2.2 Changing to the multi-user target (text login mode)

1. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

2. Execute the following command to change the setting to the multi-user target (text login mode).

```
# systemctl set-default multi-user.target
```

3. Execute the following command to restart this system.

```
# systemctl reboot
```

3.3 Adding Partitions

Perform the following procedure to create an additional partition in a free space of a hard disk drive installed in slot0 of CPU/IO module 0 and CPU/IO module 1. In the following example, a RAID1 device (/dev/md/data) is created in a partition of 10GB and that partition is set as “/mnt/data”.

Important

- **If the partition is wrongly operated, the system may not start up or data may be lost. Be sure to back up the important data before starting the work. Especially, the results of the sub command executed by the parted command will be reflected to the disk immediately. Take extreme care when operating it.**
- **LVM is not supported.**

1. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

2. Execute the following command to set the slot 0 of the CPU/IO 0.

```
# parted /dev/disk/by-dpid/disk-104001
GNU Parted 3.1
Using /dev/sdq
Welcome to GNU Parted! Type 'help' to view a list of commands.
(parted)
```

Tips The (parted) command prompt appears, and the internal command of parted can be received.

3. Execute the print sub command to check the partition status.

```
(parted) print
Model: HGST HUC156030CSS200 (scsi)
Disk /dev/sdq: 300GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name  Flags
 1      1049kB  17.2GB  17.2GB                     raid
 2      17.2GB  25.8GB  8598MB                     raid
 3      25.8GB  26.9GB  1075MB  ext4               raid
 4      26.9GB  27.1GB  211MB   fat16              raid
 5      27.1GB  61.5GB  34.4GB                     raid
```

4. Execute the mkpart sub command to create the partition.

```
(parted) mkpart
Partition name? []?        * Input the desired partition name.
File system type? [ext2]?  * Input the <Enter> key.
Start? 61.5GB              * Input the partition start position.
End? 71.5GB                * Input the partition end position.
```

Tips The unit of the partition start/end is MB. GB can be used as a unit as described above.

5. Execute the print sub command to check the status of the created partition.

```
(parted) print
Model: HGST HUC156030CSS200 (scsi)
Disk /dev/sdq: 300GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name  Flags
 1      1049kB  17.2GB  17.2GB                     raid
 2      17.2GB  25.8GB  8598MB                     raid
 3      25.8GB  26.9GB  1075MB  ext4               raid
 4      26.9GB  27.1GB  211MB   fat16              raid
 5      27.1GB  61.5GB  34.4GB                     raid
 6      61.5GB  71.5GB  10.0GB                           * Created partition
```

6. Execute the toggle sub command to set raid to Flags.

```
(parted) toggle
Partition number? 6       * Input the number of the created partition.
Flag to Invert? raid      * Input "raid".
```

7. Execute the print sub command to check that raid is set to Flags.

```
(parted) print
Model: HGST HUC156030CSS200 (scsi)
Disk /dev/sdq: 300GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name  Flags
 1      1049kB  17.2GB  17.2GB                     raid
 2      17.2GB  25.8GB  8598MB                     raid
 3      25.8GB  26.9GB  1075MB  ext4               raid
 4      26.9GB  27.1GB  211MB   fat16              raid
 5      27.1GB  61.5GB  34.4GB                     raid
 6      61.5GB  71.5GB  10.0GB                     raid  * raid is set.
```

8. Execute the quit sub command to exit parted and save the setting.

```
(parted) quit
```

9. Execute the following command to set the slot 0 of the CPU/IO 1. Create the partition with the same size as the slot 0 of the CPU/IO module 0 (steps 3 to 8).

```
# parted /dev/disk/by-dpid/disk-114001
```

10. Execute the following command and restart the system to reflect the updated partition information to the system.

```
# systemctl reboot
```

11. Execute the following command to create the RAID1 device.

```
# mdadm -C /dev/md/data -l1 -n2 -b internal /dev/disk/by-dpid/disk-1[01]4001-part6
                                                                          ↑
  (omitted)                                                  * Specify the number of the created
partition.

Continue creating array? y  * Input "y".
```

12. Execute "1 List RAID Arrays" of the ftdiskadm command to check that the RAID1device has been created.

```
[List RAID Arrays]
Name  Partition       Status          Member
================================================================================
< Mirroring Array (RAID1)   >
md122                 DUPLEX            (1)104001-part6       (9)114001-part6
md123 /var/crash      DUPLEX            (1)104001-part2       (9)114001-part2
md124 /boot/efi       DUPLEX            (1)104001-part5       (9)114001-part5
md125 swap            DUPLEX            (1)104001-part3       (9)114001-part3
md126 /boot           DUPLEX            (1)104001-part4       (9)114001-part4
md127 /               DUPLEX            (1)104001-part1       (9)114001-part1
```

Tips For the ftdiskadm command, see *Chapter 2 (1.2 How to Duplicate the Hard Disk Drive)* in *"Maintenance Guide"*.

13. Execute the following command to create the ext4 file system.

```
# mkfs.ext4 /dev/md/data
```

14. Execute the following command to update "/etc/mdadm.conf".

```
# cp -a /etc/mdadm.conf /etc/mdadm.conf.bak
# sed -i -e '/^ARRAY/d' /etc/mdadm.conf
# mdadm --detail --scan -v | grep '^ARRAY' >> /etc/mdadm.conf
```

15. Execute the following command to update the initial RAM disk image to be used at the system startup.

```
# mv /boot/initramfs-`uname -r`.img /boot/initramfs-`uname -r`.img.bak
# dracut /boot/initramfs-`uname -r`.img `uname -r`
```

16. Execute the following command to newly create the "/mnt/data" directory.

```
# mkdir -p /mnt/data
```

17. Set so that the partition can be mounted automatically at startup.

    Execute the following command to check the UUID value.

```
# blkid /dev/md/data
/dev/md/data: UUID="xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx" ・・・
```

    Open "/etc/fstab" through the editor, and add the following line.

```
UUID=xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx /mnt/data ext4 defaults 1 2
```

18. Check that the partition is mounted automatically after restarting.

```
# systemctl reboot
```

3.4 Expanding the swap Area

Expand the swap area according to the following procedure.

3.4.1 Using the swap partition

If there is a free space in the hard disk drive of the slot 0 of the CPU/IO module 0 and CPU/IO module 1, the partition for swap can be created, and the swap area can be expanded.

1. Create the partition by referring to steps 1 to 12 of *Chapter 1 (3.3 Adding Partitions)* in this manual. The case where the partition "/dev/md/swap2"is created is described here.

2. Execute the following command to create the swap area.

```
# mkswap /dev/md/swap2
```

3. Set so that the partition can be mounted automatically at startup.

   Execute the following command to check the UUID value.

```
# blkid /dev/md/swap2
/dev/md/swap2: UUID="xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx" ・・・
```

   Open "/etc/fstab" with the editor, and add the following line.

```
UUID=xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx swap swap defaults 0 0
```

4. Execute the following command to update "/etc/mdadm.conf".

```
# cp -a /etc/mdadm.conf /etc/mdadm.conf.bak
# sed -i -e '/^ARRAY/d' /etc/mdadm.conf
# mdadm --detail --scan -v | grep '^ARRAY' >> /etc/mdadm.conf
```

5. Execute the following command to update the initial RAM disk image to be used at the system startup.

```
# mv /boot/initramfs-`uname -r`.img /boot/initramfs-`uname -r`.img.bak
# dracut /boot/initramfs-`uname -r`.img `uname -r`
```

6. Execute the following command to disable all swaps.

```
# swapoff -a
```

7. Execute the following command to enable all swaps.

```
# swapon -a
```

8. Execute the following command to check swap is enabled.

```
# swapon -s
```

3.4.2 Using the swap file

If the swap partition cannot be secured, the swap file can be created and the swap area can be expanded. The procedure for creating the swap file with the file name "swap file" and 1 GB capacity in the root directory is described here.

1. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

2. Execute the following command to create the file for swap.

```
# dd if=/dev/zero of=/swapfile bs=1024 count=1048576
```

3. Execute the following command to create the swap area.

```
# mkswap /swapfile
```

4. Execute the following command to change the permission "/swapfile".

```
# chmod 0600 /swapfile
```

5. Set so that the partition can be mounted automatically at startup.

   Open "/etc/fstab" with the editor, and add the following line.

```
/swapfile swap swap defaults 0 0
```

6. Execute the following command to disable all swaps.

```
# swapoff -a
```

7. Execute the following command to enable all swaps.

```
# swapon -a
```

8. Execute the following command to check that swap is enabled.

```
# swapon -s
```

3.5 Setting SELinux

SELinux is set to "Disabled" by default. Change the SELinux setting as required according to the following procedure.

Tips

If the SELinux setting is not "Disabled", set the appropriate security context by the SELinux policy setting file. Otherwise, the security violation warning may be issued or an error may occur while the software is used, and the system may not operate normally. Fully understand the SELinux security context before changing the setting.

1. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

2. Execute the following command to check the SELinux current setting.

   If the current setting is "Disabled", the following message appears.

```
# getenforce
Disabled
```

   If the current setting is "Enforcing", the following message appears.

```
# getenforce
Enforcing
```

   If the current setting is "Permissive", the following message appears.

```
# getenforce
Permissive
```

3. Open "/etc/sysconfig/selinux" with the editor, and search for the following line.

```
SELINUX=<current_setting>
```

4. Edit the above line and save the file.

   Change the line as shown below for "Disabled".

```
SELINUX=disabled
```

   Change the line as shown below for "Enforcing".

```
SELINUX=enforcing
```

   Change the line as shown below for "Permissive".

```
SELINUX=permissive
```

5. Execute the following command to restart this system.

```
# systemctl reboot
```

4. Appendix

This section describes processing detail of initial configuration script.

4.1 Processing detail of initial configuration script

The following processings are executed by initial configuration script.

1. Change of default setting of SELinux

Change setting of SELinux from "Enforcing" (OS's default setting) to "Disabled" so that SELinux is to be used only when it is necessary.

・Changing the setting

Change SELinux to the setting other than "Disabled" as required by referring to *Chapter 1 (3.5 Setting SELinux)* in this manual.

2. Change of activation of service

Stop services that required by unsupported hardware or not to be used for server.

- avahi-daemon
- bluetooth
- cups
- smartd

In system environment where the package group of Virtualization Platform is not installed, stop libvirt-guests service to suppress the unnecessary message issued at shutdown.

3. Stopping the clock synchronization

The following two services are available as the clock synchronization service. The both services are stopped at the initial setting so that you can choose either of services can be selected.

- ntpd
- chronyd

4. Exclude update target of yum

To exclude the kernel-related module from update target of yum, add "kernel-*" to exclude line of "/etc/yum.conf".

5. Installation of 32-bit library

When installing the library package that provides both 32-bit and 64-bit version in x86_64 environment by using yum, add "multilib_policy=all" to "/etc/yum.conf" to install 32-bit library together with 64-bit library.

・Changing the installation setting of 32-bit library

If 32-bit library is not installed at the update of yum, delete "multilib_policy=all" from "/etc/yum.conf".

Before change

```
[main]
multilib_policy=all
```

↓

After change

```
[main]
```

6. Interval of information collection

Change interval to collect sysstat information from 10 minutes (default) to 1 minute so that system status can be obtained more precisely at the occurrence of failure.

・Changing the setting (Example: Changing to 10 minutes set by default)

Edit the "/etc/cron.d/sysstat" file as described below.

Before change

```
# Run system activity accounting tool every 1 minutes
*/1 * * * * root /usr/lib64/sa/sa1 1 1
```

↓

After change

```
# Run system activity accounting tool every 10 minutes
*/10 * * * * root /usr/lib64/sa/sa1 1 1
```

* For the detailed format of the "/etc/cron.d/sysstat" file, refer to "man 5 crontab".

7. Deleting the unnecessary packages

To prevent the dump files collected when the panic occurs from being copied to the "/var/tmp/abrt" directory, delete the following message.

– abrt-addon-vmcore

– abrt-cli

– abrt-desktop

– abrt-console-notification

8. Disabling the <Ctrl>+<Alt>+<Delete> keys

To prevent the wrong operation, disable the system restart by using the <Ctrl>+<Alt>+<Delete> keys.

Changing the setting

Execute the following command.

Enabling the <Ctrl>+<Alt>+<Delete> keys

```
# systemctl unmask ctrl-alt-del.target
```

Disabling the <Ctrl>+<Alt>+<Delete> keys

```
# systemctl mask ctrl-alt-del.target
```

9. Enabling the process accounting (psacct) service

Enable the psacct service for a server trouble to collect the log information of up to 10 generations.

・Enabling/disabling the psacct service

Execute the following command.

Disabling the psacct service

```
# systemctl disable psacct
```

Enabling the psacct service

```
# systemctl enable psacct
```

・Change the number of the generations for the log information

Change "10" in the following line in the "/etc/logrotate.d/psacct" file to the desired value.

Before change

```
# rotate 10
```

↓

After change (Changing to 31 generations)

```
# rotate 31
```

10. Perpetuation of the systemd-journald log

Create the "/var/log/journal" directory so that the journal log of systemd even when the system is restarted.

11. Monitoring the signal

To monitor the process signal transmission, set the following contents in the "/etc/audit/rules.d/audit.rules" file.

```
-a always,exit -F arch=b64 -S kill,rt_sigqueueinfo,tkill -F a1=0x1 -k signal_send
-a always,exit -F arch=b32 -S kill,rt_sigqueueinfo,tkill -F a1=0x1 -k signal_send
-a always,exit -F arch=b64 -S tgkill,rt_tgsigqueueinfo -F a2=0x1 -k signal_send
-a always,exit -F arch=b32 -S tgkill,rt_tgsigqueueinfo -F a2=0x1 -k signal_send
-a always,exit -F arch=b64 -S kill,rt_sigqueueinfo,tkill -F a1=0x2 -k signal_send
-a always,exit -F arch=b32 -S kill,rt_sigqueueinfo,tkill -F a1=0x2 -k signal_send
-a always,exit -F arch=b64 -S tgkill,rt_tgsigqueueinfo -F a2=0x2 -k signal_send
-a always,exit -F arch=b32 -S tgkill,rt_tgsigqueueinfo -F a2=0x2 -k signal_send
-a always,exit -F arch=b64 -S kill,rt_sigqueueinfo,tkill -F a1=0x6 -k signal_send
-a always,exit -F arch=b32 -S kill,rt_sigqueueinfo,tkill -F a1=0x6 -k signal_send
-a always,exit -F arch=b64 -S tgkill,rt_tgsigqueueinfo -F a2=0x6 -k signal_send
-a always,exit -F arch=b32 -S tgkill,rt_tgsigqueueinfo -F a2=0x6 -k signal_send
-a always,exit -F arch=b64 -S kill,rt_sigqueueinfo,tkill -F a1=0x9 -k signal_send
-a always,exit -F arch=b32 -S kill,rt_sigqueueinfo,tkill -F a1=0x9 -k signal_send
-a always,exit -F arch=b64 -S tgkill,rt_tgsigqueueinfo -F a2=0x9 -k signal_send
-a always,exit -F arch=b32 -S tgkill,rt_tgsigqueueinfo -F a2=0x9 -k signal_send
-a always,exit -F arch=b64 -S kill,rt_sigqueueinfo,tkill -F a1=0xa -k signal_send
-a always,exit -F arch=b32 -S kill,rt_sigqueueinfo,tkill -F a1=0xa -k signal_send
-a always,exit -F arch=b64 -S tgkill,rt_tgsigqueueinfo -F a2=0xa -k signal_send
-a always,exit -F arch=b32 -S tgkill,rt_tgsigqueueinfo -F a2=0xa -k signal_send
-a always,exit -F arch=b64 -S kill,rt_sigqueueinfo,tkill -F a1=0xc -k signal_send
-a always,exit -F arch=b32 -S kill,rt_sigqueueinfo,tkill -F a1=0xc -k signal_send
-a always,exit -F arch=b64 -S tgkill,rt_tgsigqueueinfo -F a2=0xc -k signal_send
-a always,exit -F arch=b32 -S tgkill,rt_tgsigqueueinfo -F a2=0xc -k signal_send
-a always,exit -F arch=b64 -S kill,rt_sigqueueinfo,tkill -F a1=0xd -k signal_send
-a always,exit -F arch=b32 -S kill,rt_sigqueueinfo,tkill -F a1=0xd -k signal_send
-a always,exit -F arch=b64 -S tgkill,rt_tgsigqueueinfo -F a2=0xd -k signal_send
-a always,exit -F arch=b32 -S tgkill,rt_tgsigqueueinfo -F a2=0xd -k signal_send
-a always,exit -F arch=b64 -S kill,rt_sigqueueinfo,tkill -F a1=0xf -k signal_send
-a always,exit -F arch=b32 -S kill,rt_sigqueueinfo,tkill -F a1=0xf -k signal_send
-a always,exit -F arch=b64 -S tgkill,rt_tgsigqueueinfo -F a2=0xf -k signal_send
-a always,exit -F arch=b32 -S tgkill,rt_tgsigqueueinfo -F a2=0xf -k signal_send
```

12. Prevention of the OS existence check in all disks

This prevents all disks from performing unnecessary I/O when executing the grub2-mkconfig command.

Checking the OS existence check in all disks

Delete the following line in the "/etc/default/grub" file.

```
GRUB_DISABLE_OS_PROBER="true"
```

13. Saving the root user command history

Add the following setting to the "/root/.bashrc" file to correctly understand the operation status when a system problem occurs.

```
unset HISTCONTROL        # Saving the duplicated command history
HISTSIZE=20000           # Setting the maximum history count to 20000
HISTTIMEFORMAT=" %F %T " # Displaying the date and time when displaying the history
```

14. Add the "acpi_pad" module to the blacklist.

Add the following setting to the "/etc/modprobe.d/nec.conf" file to add "acpi_pad" module to the blacklist and disable it.

```
blacklist acpi_pad
```

15. Changing the default setting of systemd

If systemd runs while the default setting remains unchanged, a problem occurs in the semaphore of the IPC (interprocess communication) or the shared memory. Add the setting to the "/etc/systemd/logind.conf" file to avoid this problem.

```
RemoveIPC=no
```

16. Creation of backup file

If the file is modified while running initial configuration script, the backup file immediately before applying the script is created in the following directory.

```
/opt/nec/setup/backup/rhel7_2_x86_64_nec_setup _<date>_<Boot kernel>
```

* Depending on an environment where the initial configuration script is to be applied, it may not need to modify the file. In such a case, no directory or no file is created under the backup directory.

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2

Installing Bundled Software

This chapter provides brief explanation of bundled software and how to install them.

1. **Bundled Software for the Server**
   Describes the bundled software to be installed in the server system.

2. **Bundled Software for "PC for Management**
   Describes the bundled software to be installed in "PC for management" that is used to monitor and manage the server system.

1. Bundled Software for the Server

This section introduces the software bundled in the server package. For details, refer to the software documents.

1.1 NEC ESMPRO Agent (Linux)

NEC ESMPRO Agent (Linux) is an application used to monitor the server.

NEC ESMPRO Agent (Linux) is stored in ft Server Constol Software Install CD. For how to install it, see *Chapter 1 (2.3.7 Before installing NEC ESMPRO Agent)*, *(2.3.8 Installing NEC ESMPRO Agent)*, and *(2.3.9 Setting required after installing NEC ESMPRO Agent)*.

2. Bundled Software for "PC for Management"

This section describes the bundled software required to configure "PC for Management" used to manage the server system.

2.1 NEC ESMPRO Manager

NEC ESMPRO Manager remotely controls and monitors the server hardware.

To use these features, install the bundled software such as NEC ESMPRO Agent on the server.

For details about the system requirements of NEC ESMPRO Manager and how to install it, see "*NEC ESMPRO Manager Installation Guide*" in EXPRESSBUILDER.

Glossary

Terms	Description
BIOS Setup Utility (SETUP)	Software for setting BIOS. You can run this software by pressing <F2> key during POST.
BMC	Baseboard Management Controller (BMC) is a built-in controller that supports the IPMI version 2.0 protocol. BMC can manage the server hardware.
BMC Configuration Utility	Software for setting BIOS or BMC. You can use as Windows application or run this software when pressing <F4> key during POST.
CPU module	A CPU subsystem logically configured in a CPU/IO module. It includes CPUs and memory.
CPU/IO module	A module that includes CPUs (processors), memory, PCI boards, a cooling fan, hard disk drives and power supply units.
DUMP Switch	A switch that is used for collecting the memory dump if an error occurs. You can specify the destination of the dump by using the OS function.
EXPRESSBUILDER	Standard software with a feature that makes it easier to install Windows OS in Windows model. This also includes several useful applications and instruction manuals. (When installing OS other than Windows in ft server, the feature that helps easy OS installation is not available.)
EXPRESSSCOPE ENGINE 3	A name of BMC for NEC Express5800 series.
Express Report Service	Software that can report the server failure to the contact center by E-mail or modem. This software is installed with NEC ESMPRO Agent to the server.
Express Report Service (HTTPS)	Software that can report the server failure to the contact center by HTTPS.
ExpressUpdate	A feature for updating BIOS, firmware, driver, or software of the server. This feature is available when NEC ESMPRO Manager cooperates with EXPRESSSCOPE ENGINE 3 and ExpressUpdate Agent.
ExpressUpdate Agent	Software for performing ExpressUpdate. This is installed to the server.
Flash FDD	An optional USB device that can use as a floppy disk drive.
NEC ESMPRO	Standard software for the server management. This consists of several applications for managing or monitoring.
NEC ESMPRO Agent	Software for monitoring the server. This works with NEC ESMPRO Manager and resides as the OS service.
NEC ESMPRO Agent Extension	Software for performing the scheduled operations. This works with NEC ESMPRO Manager.
NEC ESMPRO Manager	Software for managing plural servers on network.
OS standard installer	An installer that stored in Windows installation disc. Use this installer if you want to install the OS manually.
Offline tools	Software that can confirm or change IPMI data such as SEL, SDR, or FRU. You can start Offline tools when pressing <F4> key during POST.
PC for Management	A computer for managing the server on network. A general Windows/Linux computer can be used as "PC for Management".
PCI module	An I/O subsystem logically configured in a CPU/IO module. It includes hard disk drives, PCI cards, BMC and 1G/10G LAN.
Product Info Collection Utility	Software for collecting several hardware/software statuses or event logs. You can easily collect the data for the server maintenance by using this software.
Windows OS parameter file	A file that saved settings for installing Windows. You can install with the saved settings in this file when setting Windows with EXPRESSBUILDER.

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NEC Express Server

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Installation Guide (Linux)

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