NovaScale R630

Setup Guide

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Contents

Keep this User's Guide handy for quick reference when necessary.

Safety Indications

To use Fault Tolerant Server series safely, follow the instructions in this User's Guide.

This guide explains components that pose a danger, types of dangers caused by failing to follow the instructions, and actions taken to prevent them; such components are labeled warning.

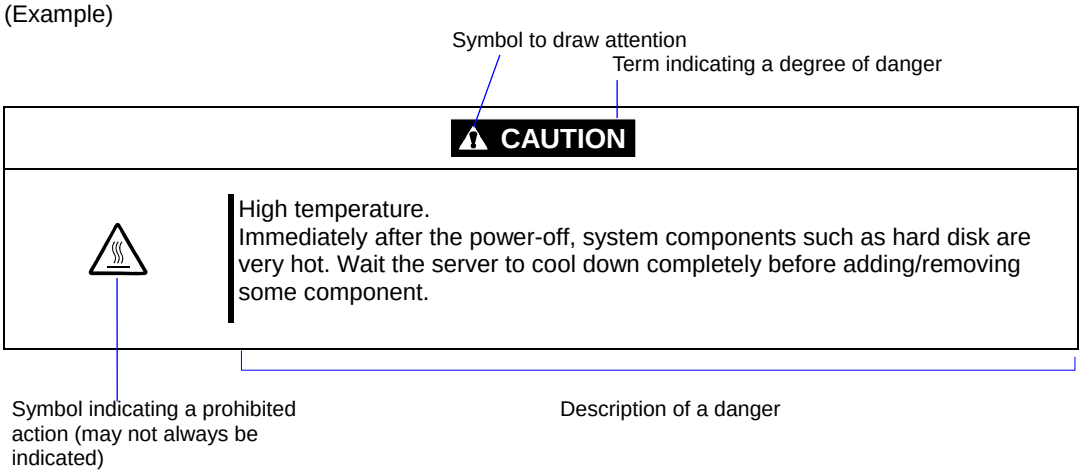
This guide and warning labels use “WARNING” and “CAUTION” to indicate a danger depending on the degree. These terms are defined as follows:

WARNING	Indicates a danger that could lead to a death or serious injury.
CAUTION	Indicates a danger that could lead to a burn, other injuries or damage to physical assets.

This guide uses the following three types of symbols to give indications and precautions against a danger. They are defined as follows:

	Indicates that there is a risk of a danger. Each image symbolizes a particular type of danger. (Attention)
	Indicates what you must not do. Each image symbolizes a particular type of prohibition. (Prohibited actions)
	Indicates what you must do. Each image symbolizes a particular type of action necessary to avoid a danger. (Mandatory actions)

(Example)

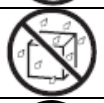


Symbols and its descriptions used in this User's Guide and warning labels are as follows:

Attention

	Indicates a risk of an electric shock.
	Indicates a risk of a personal injury due to heat.
	Indicates a risk of catching your fingers.
	Indicates a risk of a fire or smoke.
	Indicates a general precaution or warning that is not defined herein.
	Indicates a risk of losing eyesight due to laser beam.
	Indicates a risk of an explosion.
	Indicates a risk of a personal injury.

Prohibited actions

	Indicates a general prohibition that is not defined herein.
	Do no touch the indicated area. There is a risk of an electric shock or fire.
	Do not touch with wet hands. There is a risk of an electric shock.
	Keep from flame. There is a risk of a fire.
	Avoid using water or liquid nearby. If it spills on the equipment, there is a risk of an electric shock or fire.
	Do not disassemble, repair, or modify the equipment. There is a risk of an electric shock or fire.

Mandatory actions

	Unplug the server. There is a risk of an electric shock or fire.
	Indicates a general action to take that is not defined herein. Make sure to follow the instructions.

For detailed notes to set up the machine safely, refer to "NOTES FOR SAFE HANDLING" on page 1-2.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

CE Statement

Warning: This is a Class A product. In residential environment, this product may cause radio interference, in which case the user may be required to take adequate measures (EN55022).

This system is classified as a CLASS 1 LASER PRODUCT. This label id located on the internal DVD-ROM installed in your system.

NOTE: This product provides resistance against hardware faults with its redundant hardware modules. However, this does not mean complete fault-tolerance is assured. For example, there is a risk of system down when:

- A fatal fault occurs in software.
- Both modules within a redundant hardware pair break down.
- A fatal fault occurs in a non-redundant component, such as the clock generator circuitry or the interconnect backplane.
- The entire system is cut off from AC power.

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Preface

Welcome to the Fault Tolerant Server series.

Fault Tolerant Server series is a “fault-tolerant (ft)” server focusing on “high reliability” in terms of fault-tolerance, in addition to the “high performance,” “scalability,” and “general versatility”. In the event of trouble, its dual configuration will allow the system to instantaneously isolate the failed parts to assure non-stop running; operation will be moved smoothly from one module to the other, minimizing damage to it. You can use series in a mission-critical system where high availability is required. By the use of Linux operating system, it also provides outstanding openness for general-purpose applications, etc.

To make the best use of these features, read this User's Guide thoroughly to understand how to operate Fault Tolerant Server series.

About This User’s Guide

This User's Guide helps a user to properly setup and use the product. Consult this guide when you set up the product.

Keep this manual and the separate volume of User’s Guide handy.

This User's Guide is intended for users who have a good knowledge on the basic use of Linux operating systems and general I/O devices such as a keyboard and mouse.

How to Use This User's Guide

This guide explains the procedures you should perform before you begin system operation after you purchased the product. Read the guide in order from Chapter 1. If you perform procedures according to this guide, you will set up the product properly.

Chapter 4 describes how to install the operating system. Chapter 5 describes post-installation procedures. Chapter 6 explains how to troubleshoot if you cannot set up the product properly. Refer to “SYSTEM REPAIR” on page 6-1 for details about system configurations and repairs of this product. Refer to “TROUBLESHOOTING” on page 6-2 if you feel you failed to set up the product.

See this User’s Guide for details of this product’s operation, and functions and operations of the hardware and the system.

Additional symbols

The following symbols are used throughout this User's Guide in addition to the caution symbols described at the beginning.

IMPORTANT:	Important points or instructions to keep in mind when using the server or software
CHECK:	Something you need to make sure when using the server or software
TIPS:	Helpful information, something useful to know

About our Web Service

Information on Fault Tolerant Server series including modification modules is also available on the manufacturer web site.

Chapter 1

Before Using

This chapter includes information necessary for proper and safe operation of the server, the main unit and its accessories. Go through this chapter before you start setup of the product.

PRECAUTIONS FOR SAFETY

This section provides precautions for using the server safely. Read this section carefully to ensure proper and safe use of the server. For symbol meanings, see “Safety Indications” described in the previous section.

General

⚠ WARNING

Do not use the server in an operation where human lives are involved or high reliability is required.

This equipment is not intended for use in controlling or use with facilities or systems where human lives are involved or high reliability is required, including medical devices or nuclear, aerospace, transportation, and traffic control facilities. The manufacturer assumes no liability for any accidents or damage to physical assets resulting from the use of this equipment in such systems or facilities.

Do not continue to use the server if you detect smoke, odor, or noise.

If the server emits smoke, odor, or noise, immediately flip off the POWER switch, unplug the cords, and contact your sales agent. There is a risk of a fire.

Do not insert a wire or metal object.

Do not insert a wire or metal objects into a vent or disk drive slot. There is a risk of an electric shock.

⚠ CAUTION

Prevent water or foreign objects from getting into the server.

Do not let water or foreign objects (e.g., pins or paper clips) enter the server. There is a risk of a fire, electric shock, and breakdown. When such things accidentally enter the server, immediately turn off the power and unplug the cords. Contact your sales agent instead of trying to disassemble it yourself.

Use of Power Supply and Power Cord

⚠ WARNING

Do not handle power plugs with a wet hand.

Do not plug/unplug power cords with a wet hand. There is a risk of an electric shock.

Do not connect the ground wire to a gas pipe.

Never connect the ground wire to a gas pipe. There is a risk of a gas explosion.

⚠ CAUTION

Do not plug the cords in nonconforming outlets.

Use wall outlets with specified voltage and power type. There is a risk of a fire or current leakage.

Avoid installing the server where you may need extension cords. If the cords do not meet the power specifications, there is a risk of overheating that could lead to a fire.

Do not plug too many cords in a single outlet.

If the rated current is exceeded, there is a risk of overheating that could lead to a fire.

Do not plug the cords insecurely.

Insert the plug firmly into an outlet. There is a risk of heat or fire due to poor contact. If dust settles on the slots and it absorbs moisture, there is also a risk of heat or fire.

Do not use nonconforming power cords.

AC cord is to spend the thing of the next specifications:

You also have to observe the following prohibitions to prevent an electric shock or fire caused by damage to the cords.

- Do not pull on the cords.
- Do not pinch the cords.
- Do not bend the cords.
- Keep chemicals away from the cords.
- Do not twist the cords.
- Do not place any object on the cords.
- Do not use cords as bundled.
- Do not alter, modify, or repair the cords.
- Do not staple the cords.
- Do not use any damaged cord. (Replace it with a new one of the same specifications. For replacement procedures, contact your sales agent.)

Installation, Relocation, Storage and Connection

⚠ CAUTION

Do not install the server in an unsuitable place.

Install the server in such a place as specified in this User's Guide. Avoid the following locations. There is a risk of a fire.

- a dusty place
- a humid place located near a boiler, etc
- a place exposed to direct sunlight
- an unstable place

Do not use or store this product in a corrosive environment.

Avoid the usage or storage of this product in an environment which may be exposed to corrosive gases, such as those including but not limited to :
sulfur dioxide, hydrogen sulfide, nitrogen dioxide, chlorine, ammonia and/or ozone.
Avoid installing Fault Tolerant Server series in a dusty environment or one that may be exposed to corrosive materials such as sodium chloride and/or sulfur.
Avoid installing this product in an environment that may have excessive metal flakes or conductive particles in the air.
Such environments may cause corrosion or short circuits within this product, resulting in not only damage to this product, but may even lead to be a fire hazard.
If there are any concerns regarding the environment at the planned site of installation or storage, please contact your sales agent.

Do not use any non-designated interface cable.

Use only interface cables designated by the manufacturer; identify which component or connector to attach beforehand. If you use a wrong cable or make a wrong connection, there is a risk of short-circuit that could lead to a fire.

You also have to observe the following prohibitions about handling and connecting interface cables:

- Do not use any damaged cable connector.
- Do not step on the cable.
- Do not place any object on the cable.
- Do not use the server with loose cable connections.
- Do not use damaged cables.

Cleaning and Handling of Internal Devices

⚠ WARNING

Do not disassemble, repair, or alter the server.

Unless described herein, never attempt to disassemble, repair, or alter the server. There is a risk of an electric shock or fire as well as malfunction.

Do not look into the DVD-ROM drive.

The DVD-ROM drive uses a laser beam. Do not look or insert a mirror inside while the system is on. A laser beam is invisible; if your eyes get exposed to it, there is a risk of losing eyesight.

Do not detach a lithium battery yourself.

This equipment has a lithium battery. Do not detach it yourself. If the battery is exposed to fire or water, it could explode.
When the lithium battery is running down and the server does not work correctly, contact your sales agent instead of disassembling, replacing or recharging it yourself.

Disconnect the power plugs before cleaning the server.

Even though built-in options for the server can be replaced while the power cords are connected to power source, be sure to follow the instructions described in this User's Guide. Do not touch any internal device of the server unless instructed by this User's Guide. There is a risk of an electric shock.
Make sure to power off the server and disconnect the power plug from a power outlet before cleaning or installing/removing internal optional devices. Touching any internal device of the server with its power cords connected to power source may cause an electric shock even if the server is off-powered.
Disconnect the power plug from the outlet occasionally and clean the plug with a dry cloth. Heat will be generated if condensation is formed on a dusty plug, which may cause a fire.

⚠ CAUTION

High temperature

Immediately after powering off the system, system components such as hard disk may be very hot. Wait for the server to cool down completely before adding/removing components.

Make sure to completely insert cables and boards.

Completely insert all power cords, interface cables and/or boards. An incompletely inserted component may cause a contact failure, resulting in fire and/or smoke.

Protect the unused connectors with the protective cap.

The unused power cord connectors are covered with the protective cap to prevent short circuits and electrical hazards. When removing the power cord connector from the internal devices, attach the protective cap to the connector. Failure to follow this warning may cause a fire or an electric shock.

During Operation

⚠ CAUTION

Keep animals away.

Keep animals away from the server. Animal's waste or hair may get inside the server to cause a fire or electric shock.

Do not place any object on top of the server.

The object may fall off to cause injuries, damage to hardware and/or a fire.

Do not leave the DVD tray ejected.

Dust may get in the server to cause malfunction. The ejected tray may also become a cause of injuries.

Do not touch the server when it thunders.

Unplug the server when it threatens to thunder. If it starts to thunder before you unplug the server, do not touch the server or cables. There is a risk of a fire or electric shock.

Do not use a cellular phone or pager around the server.

Turn off your cellular phone or pager when you use the server. Their radio waves may cause the server to malfunction.

Rack-mount Model

⚠ WARNING

Do not install the server on a nonconforming rack.

Install the server on a 19-inch rack conforming to the EIA standard. Do not use the server without a rack or install it on a nonconforming rack. The server may not function properly, and there is a risk of damage to physical assets or injuries. For suitable racks, contact your sales agent.

Do not use the server in an unsuitable place.

Do not install a server rack in an unsuitable environment.
Other systems also may be affected, and the rack may fall over to cause a fire or injuries. For details about installation environment and quake-resistant engineering, see the attached manual or contact your sales agent.

⚠ CAUTION

Be careful not to hurt your fingers.

Exercise great care not to hurt your fingers on the rail when you mount/dismount the server into/from the rack.

Carry or install the server by more than 3 people.

To avoid a risk of injuries, users should not attempt to carry or install the server into a rack. Installation should be performed by trained maintenance personnel.

Do not install the server in such a manner that its weight is imposed on a single place.

To distribute the weight, use stabilizers or attach two or more racks. Unstable rack may fall down to cause injuries.

Do not assemble parts alone.

It takes at least two people to mount doors and trays to a rack. If you handle them alone, you may drop some parts to cause a breakage or injuries.

Do not pull a device out of the rack if the rack is unstable.

Before pulling out a device, make sure that the rack is fixed (by stabilizers or quake-resistant engineering).

Do not leave more than one device pulled out from the rack.

If you pull out more than one device, the rack may fall down. You can only pull out one device at a time.

Do not install excessive wiring.

To prevent burns, fires, and damage to the server, make sure that the rated load of the power branch circuit is not exceeded. For more information on installation and wiring of power-related facilities, contact your electrician or local power company.

Do not pull out a device during operation.

Do not pull out or remove a device while it is running. There is a risk of malfunction and a device may be detached from a rack to cause injuries.

UNPACKAGING

This product and various accessories are in the special shipping box. Take them out from the box and check the individual items. Store the box and unused accessories in a safe place.

Accessories

This product is shipped with various accessories. See the packing list to make sure everything is included and check the individual items. If any component is missing or damaged, contact your sales agent.

- Keep the accessories in a safe place. You will need them when you perform setup, addition of options, or replacement of failed components.
- To check EXPRESSBUILDER components, see the attached list.
- Be sure to fill out and mail the software registration card that is shipped with the operating system.
- Make backup copies of included floppy disks, if any. Keep the original disks as the master disks; use these copies in operation.
- Improper use of an included floppy disk or CD-ROM may alter your system environment. If you find something unclear, stop using them and contact your sales agent.

Chapter 2

About Operating System

This chapter gives essential information on the Linux system supported by the server and how to install it.

Red Hat Enterprise Linux AS 4.5

For installing an operating system on the Fault Tolerant Server, follow “Chapter 4: Linux Setup” for setup.

About supported OS

The supported OS is Red Hat Enterprise Linux AS 4.5. It is referred to as “Linux”.

About OS Installation

Installation is performed by Red Hat Enterprise Linux AS 4.5 and EXPRESSBUILDER CD-ROM.

IMPORTANT:

- The Fault Tolerant Server series is a precision instrument. It is recommended to ask maintenance personnel to set up.
- When installing OS, refer to “Chapter 4: Linux Setup” to set up.

Chapter 3

Installing Server

This chapter describes requirements for using the product properly and safely, the setup procedures to make Fault Tolerant Server series ready for use, and how to connect peripherals.

INSTALLATION

This section describes installation of the Fault Tolerant Server series.

Installing the device to the rack

Install this device to the rack.

Installing the device to our company's racks or to other company's racks is explained in this section.

⚠ WARNING

Observe the following precautions to use the server safely. There is a risk of a death or serious injury. For details, see "Notes for Safe Handling" in Chapter 1.

- Do not use the product with the unspecified rack.
- Do not use the product at non-designated places.

⚠ CAUTION

Observe the following precautions to use the server safely. There is a risk of a burn, personal injury, or damage to physical assets. For details, see "Notes for Safe Handling" in Chapter 1.

- Do not install or remove a rack alone.
- Do not install the server with the cover removed.
- Do not squeeze your fingers in the product.

IMPORTANT:

Temperature increase inside the rack and airflow

If you install several components or the ventilation isn't good inside the rack, the internal temperature may increase due to heat emitted from the components. When the operating temperatures of The Fault Tolerant Server series (10 to 35°C) are exceeded, there is a risk of malfunction. You must take adequate precautions and measures for airflow inside the rack as well as in the room so that the internal temperature can be kept within this range during operation.

- Required tool

To install the device to the rack, a Phillips-head screw drive is required.

- Checking the place to install

Decide the place (height) to install. To keep balance, install it as low as you can on the rack. To install the rack, the height for 4U is required.

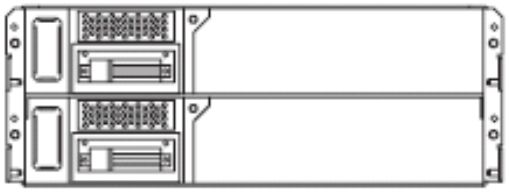
IMPORTANT:

To install this device to the rack, the space for 1U is required for installing the USB compatible floppy disk drive, in addition to the space for 4U.

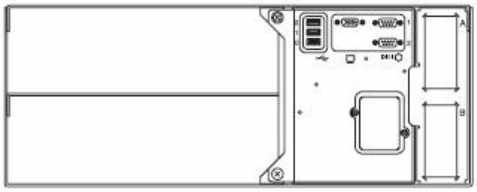
Next to the square hole of the rack, an imprinted mark is placed for 1U (This is the unit to show the height of the rack). This device is as high as 4U (about 176 mm), so install it between the imprinted marks that indicate the height of 4U.

- Installing this device

Follow the steps below to set the 4U chassis to the rack.



Front side of 4U chassis



Rear side of 4U chassis

IMPORTANT:

4U chassis weighs about 10 Kg. To mount, remove or replace it, be sure to hold it with two or more people.

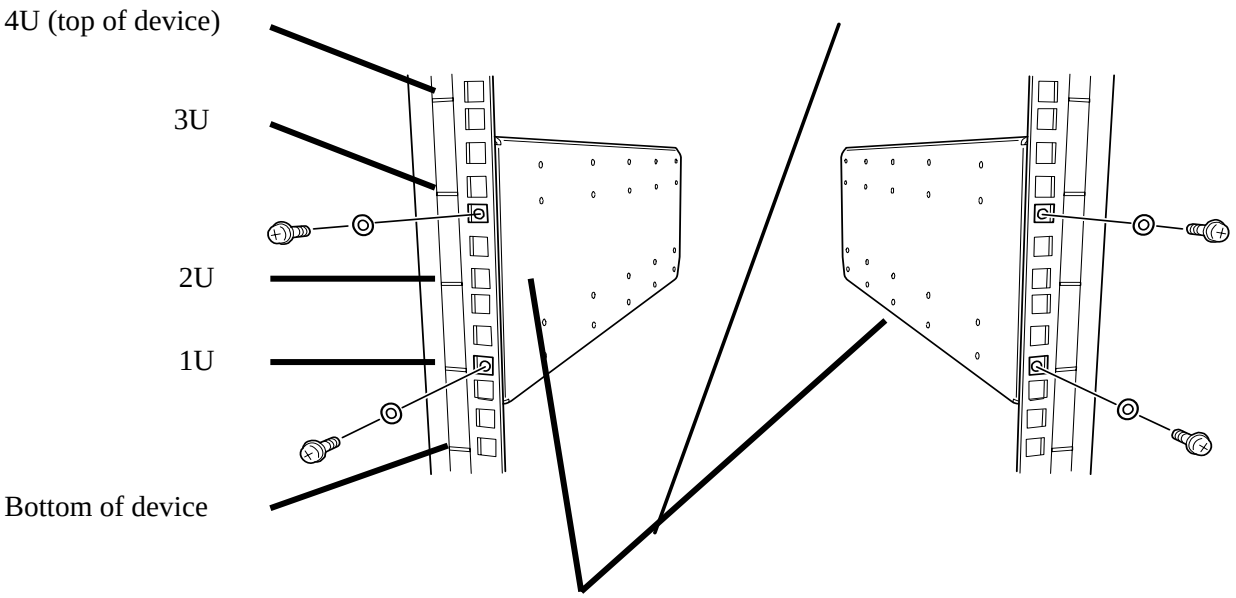
The following are the required accessories. Make sure you have them all.

- Bracket -2
- Panhead screw -4
- Washer for panhead screw -4
- Plate screw (short) -8
- Plate screw (long) -4
- Washer for plate screw -12

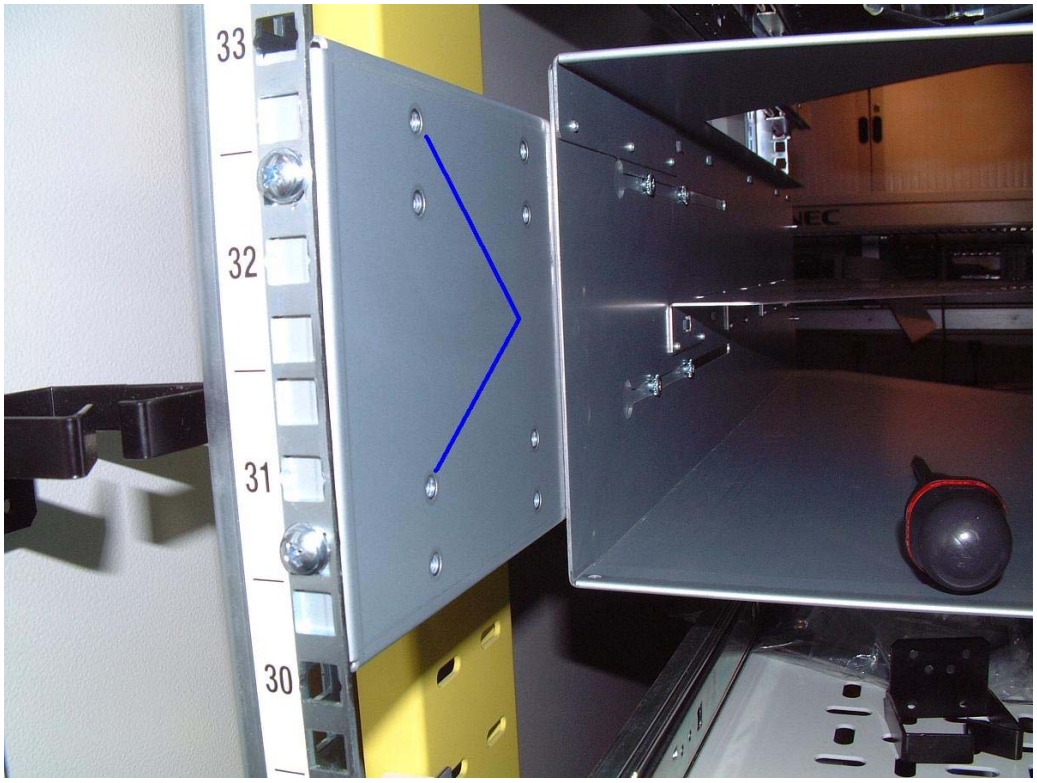
TIPS:

Core nuts (8 pieces) are not included. Use the core nuts that are attached to the rack.

1. If the rack has front and rear doors, read the instruction that comes with the rack, and open them.
2. Install the brackets from the rear side of the rack. Install the brackets with its flat side facing inside. Place them with washers for panhead screw that come with this device, and panhead screws symmetrically (total: 4). Fasten the screws tentatively not tightly.

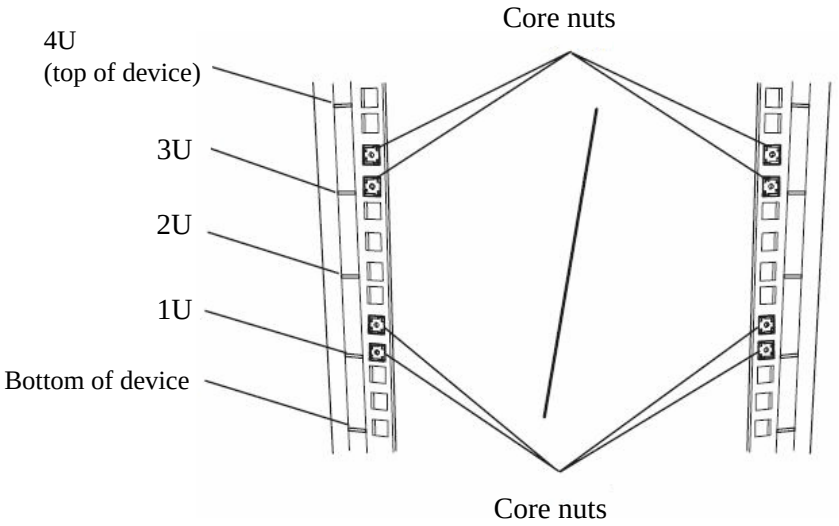


Bracket (flat sides are facing inside)

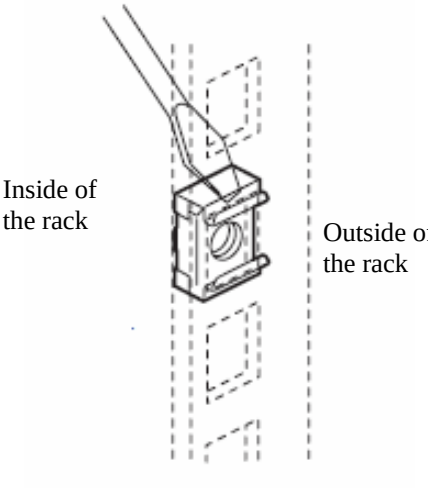


3. Fix the core nuts to the front side of the rack.

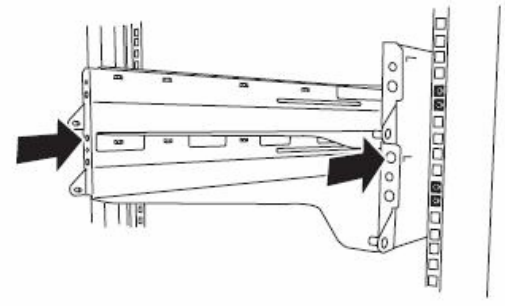
Attach them symmetrically (total: 8 core nuts).



Fix a core nut from inside of the rack.
Hook either of the clips of the core nut to a square hole of the rack, and hook the other clip to a hole by a flat-blade screwdriver.

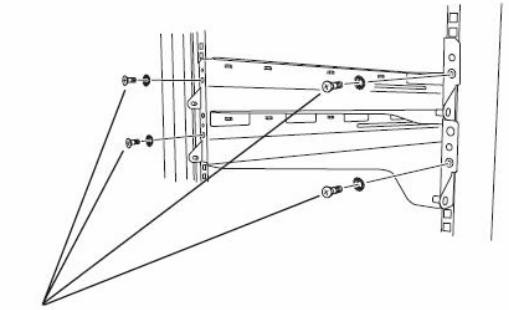


4. Insert the 4U chassis from the front side of the rack.



5. Tentatively fasten the washers for plate screw and plate screws (short) on 4 places to the on the front and back sides (total: 8 places) from the rear.

6. Fasten tightly the washers for plate screw and plate screws (long) on the 2 places on the right and left sides (total: 4) from the front.

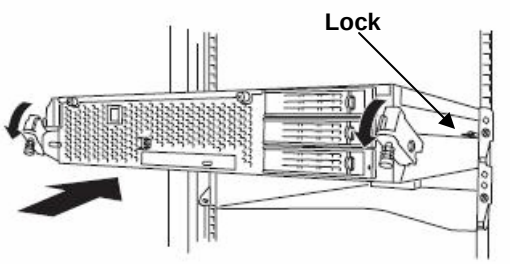


Washers and plate screws (long)

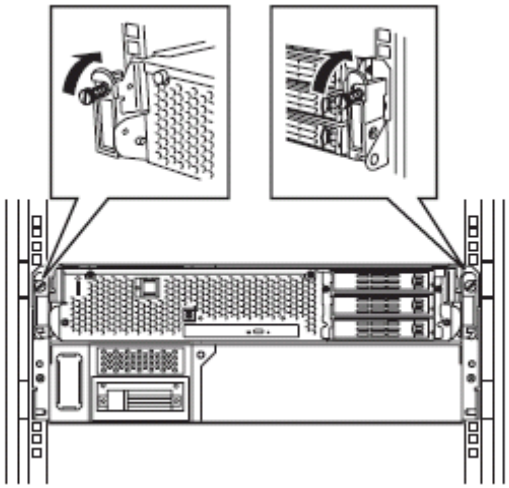
7. Fasten tightly the 4 round screws on the back side and the 8 plate screws on the side panels (which you fastened tentatively).

8. Mount the CPU/IO module 0.

   Mount the module while lowering the lock so the module stacks on the way.



9. Fasten the levers on the left and right sides with screws.



10. Mount the CPU/IO module 1 in the same way.

Unmounting the device from the rack

Follow the steps below and unmount the device from the rack.

⚠ CAUTION

Observe the following precautions to use the server safely. There is a risk of a burn, personal injury, or damage to physical assets. For details, see “Notes for Safe Handling” in Chapter 1.

- Do not carry or install a rack alone.
- Do not squeeze your fingers in the product
- Do not impose a weight on the device when it is pulled out from the rack.
- Do not pull a device out of the rack if the rack is unstable.
- Do not leave more than one device pulled out from the rack.
- Do not pull the device from the rack while it is operating.

1. Check that the device is powered off, and remove all the power cords and interface cables that are connected to the device.
2. Remove the front bezel.
3. Loosen the screws on the left and right sides of the front panel of the CPU/IO module and release the lock by pulling the ejector toward you.
4. Pull out the CPU/IO module gently from the rack.

IMPORTANT:

- When the device is pulled out, do not load anything on its top. It is dangerous, since the device may fall.
- Do not hold the handle on the front side or the convex part on the back side. To move the device, hold the bottom.
- Since the device is locked and can not be pulled out, pull it out after releasing the lock by lowering the lock on the side of the CPU/IO module.

5. When you unmount 4U chassis from the rack, hold it tightly.

To remove the mechanical parts of the rack, see the installation procedure.

Connect peripheral devices to Fault Tolerant Server series

The server is provided with connectors for wide variety of peripheral devices on its front and rear. The figure on the next page illustrates available peripheral devices for the server in the standard configuration, and locations of the connectors for the devices. After connecting the peripheral devices, connect the provided power cords with the server, and then plug the power cords into the power outlet.

⚠ WARNING

Observe the following precautions to use the server safely. There is a risk of a death or serious injury. For details, see “Notes for Safe Handling” in Chapter 1.

- Do not hold the power plug with a wet hand.
- Do not connect the ground wire to a gas pipe.

⚠ CAUTION

Observe the following precautions instructions to use the equipment safely. There is a risk of a burn, personal injury, or damage to physical assets. For details, see “Notes for Safe Handling” in Chapter 1.

- Do not plug the power cord in a nonconforming outlet.
- Do not plug too many cords in a single outlet.
- Do not plug the cord insecurely.
- Do not use nonconforming power cords.

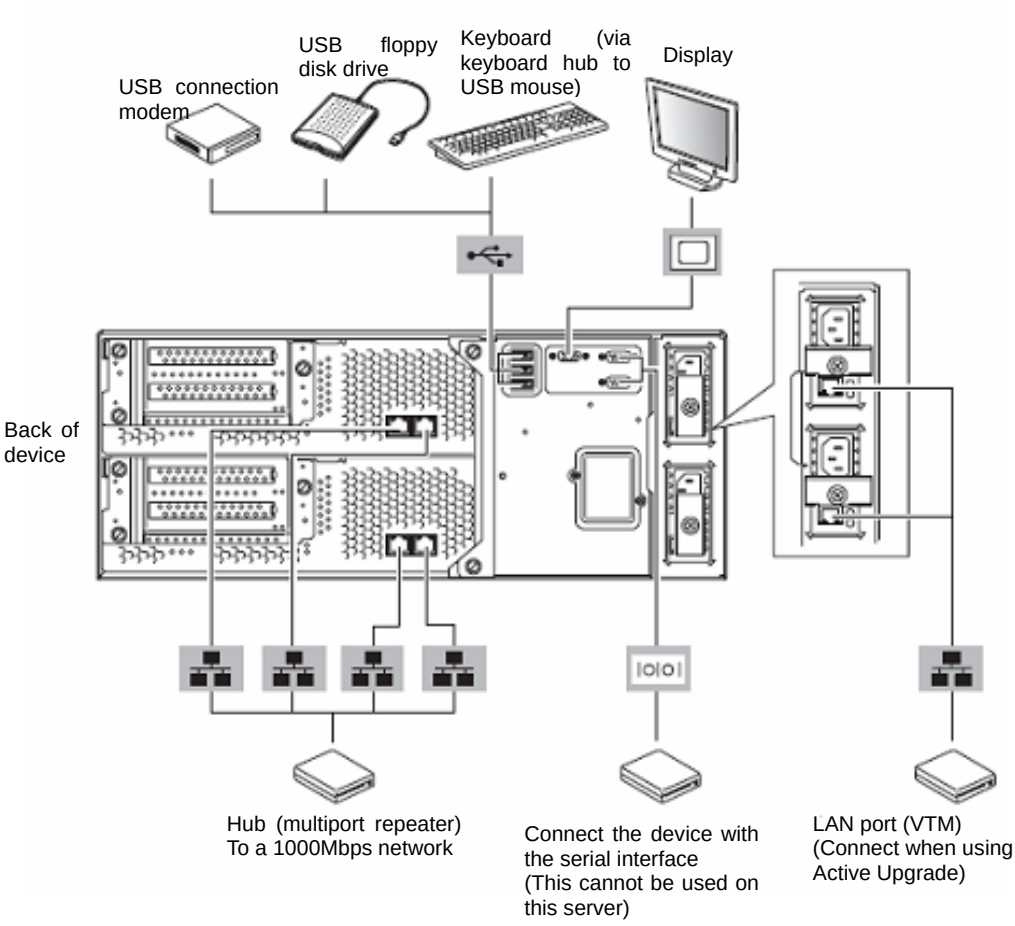
IMPORTANT:

- Power off the server before connecting peripheral devices, with the exception of peripherals with USB interface. Connecting a powered peripheral device to the powered server will cause malfunctions and failures.
- To connect a third-party peripheral device or interface cable to the server, check with your sales agent to see if they are compatible with Fault Tolerant Server series. Some third-party devices may not be used with the server.
- The total cable length of SCSI device connections is up to 6 m, including the internal SCSI cables.
- The serial port connectors are reserved for maintenance.
- Place the USB floppy disk drive on the server. Space of 1U is needed to put it on the server.

IMPORTANT:

Connection of optional devices

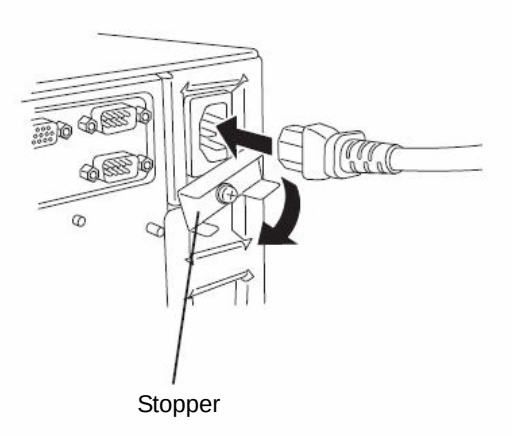
- In the case of standard configuration, you need to complete setup of the operating system before mounting optional PCI cards or hard disks that you purchased separately.
- If the Fibre Channel controller (Optical) is mounted, be sure to connect the cables to the FC array unit before going on to the next step.



Rotate the stopper in clockwise direction, and insert the power cords to the AC inlets of the power unit.

Connect the plug at the other end of the power cord to a wall outlet with parallel double-pole grounds provided or to an uninterruptible power supply (UPS).

To use the functions of the server, you should connect the server to the UPS.



IMPORTANT:

- Be sure to use both of the power cords to make the server fault-tolerant.
- When AC is powered on, the fans in power supply unit starts to rotate.
- After connecting the power cords, wait at least 30 seconds before pressing the power switch.

To connect the power cords from the server to an uninterruptible power supply (UPS), use service outlets on the rear of the UPS.

The UPS service outlets are categorized into two groups: SWITCH OUT and UN-SWITCH OUT. (They may be called "OUTPUT1" and "OUTPUT2".)

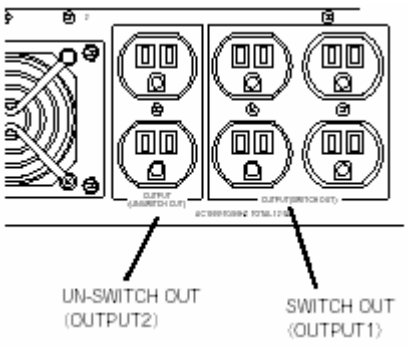
To restrict the power supply from ESMPRO/AutomaticRunningController, connect the power cable to SWITCH OUT.

For constant power supply, connect the power cords to a UN-SWITCH OUT outlet. (Connect the modem that is in service for 24 hours to this outlet.)

When the power cords from the server are connected to a UPS, change the BIOS setup of the server to link with power supply from the UPS.

Select [AC-LINK] from [Server] on the BIOS setup utility and change parameters. See the separate volume of User's Guide for details.

<Example>



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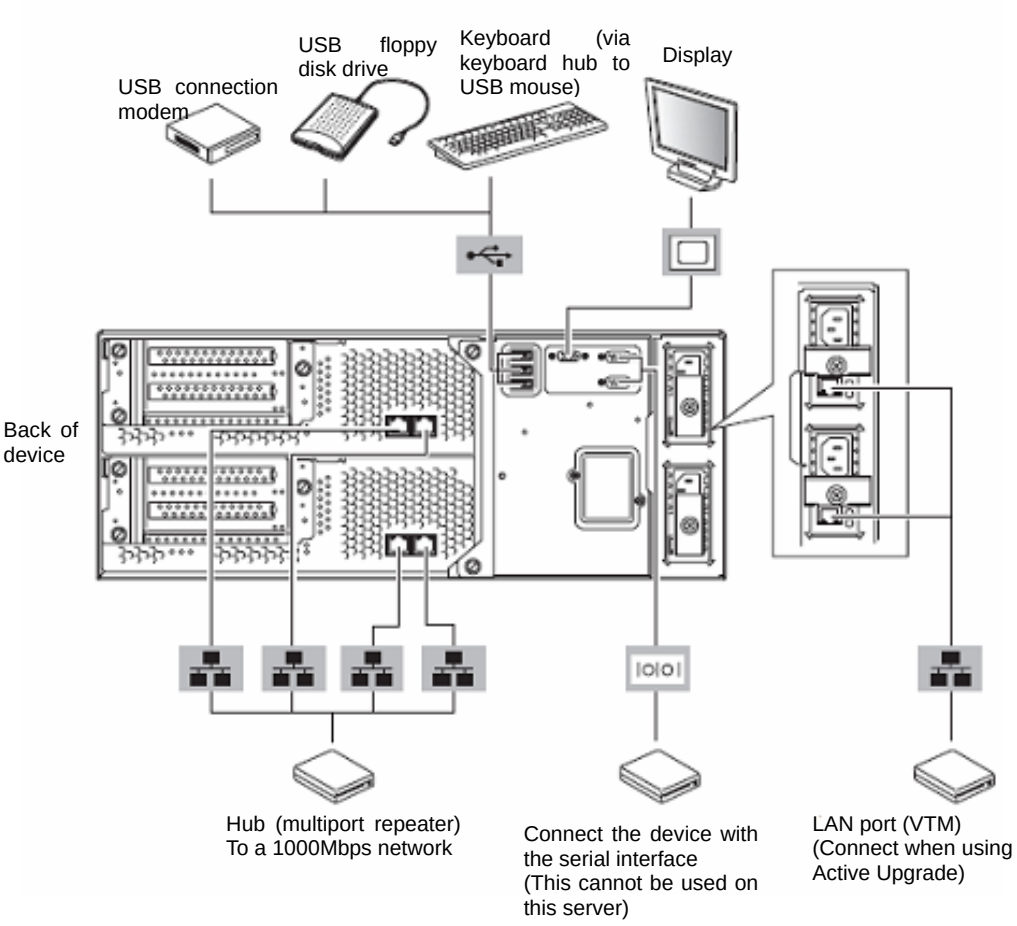


Chapter 4

Linux Setup

This chapter describes procedures for configuring OS Boot Monitoring function, setting dual LAN configuration, setting dual disk configuration and so on.

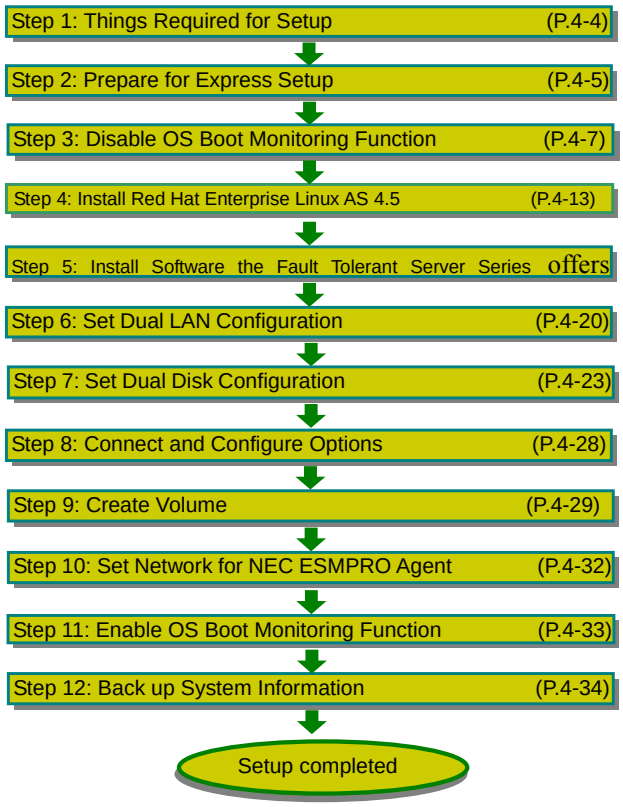
Before starting Setup

Read this section before starting setup.

Use Red Hat Enterprise Linux AS 4.5for OS installation and the EXPRESSBUILDER CD-ROM for installation of the software provided by this device.

SETUP FLOW

The right flow-chart illustrates the flow of the setup procedures for the Fault Tolerant Server. Corresponding page numbers are shown in parentheses.



Step 1: Things Required for Setup

The following explains the setup procedure using the Express Setup program:

IMPORTANT:

- The Fault Tolerant Server series is a delicate equipment. It is recommended to ask engineer from maintenance service provider with good knowledge for setup.

You need the following to install Operating System:

- Red Hat Enterprise Linux AS 4.5 install CD-ROM (Disk 1 of 5)
- Red Hat Enterprise Linux AS 4.5 install CD-ROM (Disk 2 of 5)
- Red Hat Enterprise Linux AS 4.5 install CD-ROM (Disk 3 of 5)
- Red Hat Enterprise Linux AS 4.5 install CD-ROM (Disk 4 of 5)
- Red Hat Enterprise Linux AS 4.5 install CD-ROM (Disk 5 of 5)
- EXPRESSBUILDER (CD-ROM)
- User's Guide (Setup) (this manual)
- User's Guide

Step 2: Prepare for Express Setup

Before install LINUX server, be sure to do the following. If these preparations are not done, setup cannot be performed properly.

Prepare the Fault Tolerant Server series

With the power of the Fault Tolerant Server series off, follow the steps below:

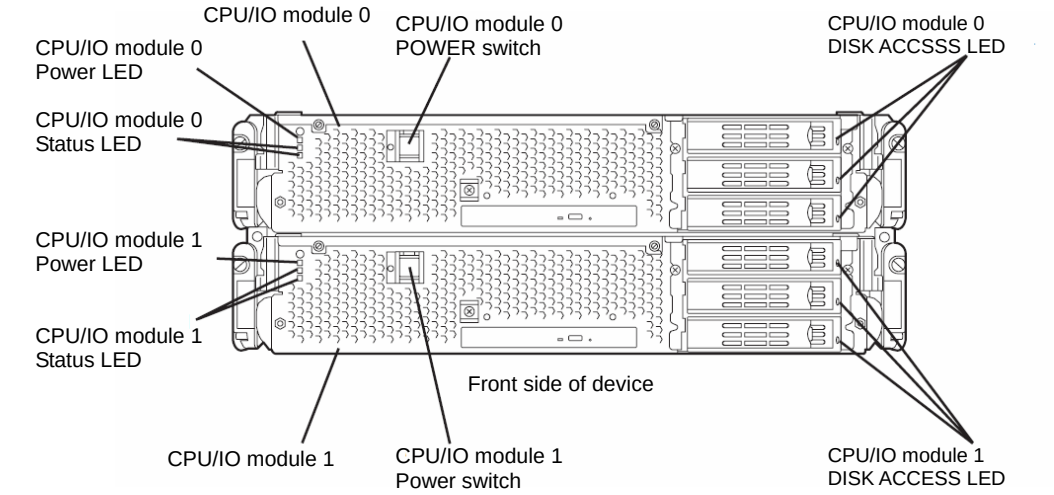
1. Prepare the Fault Tolerant Server series.

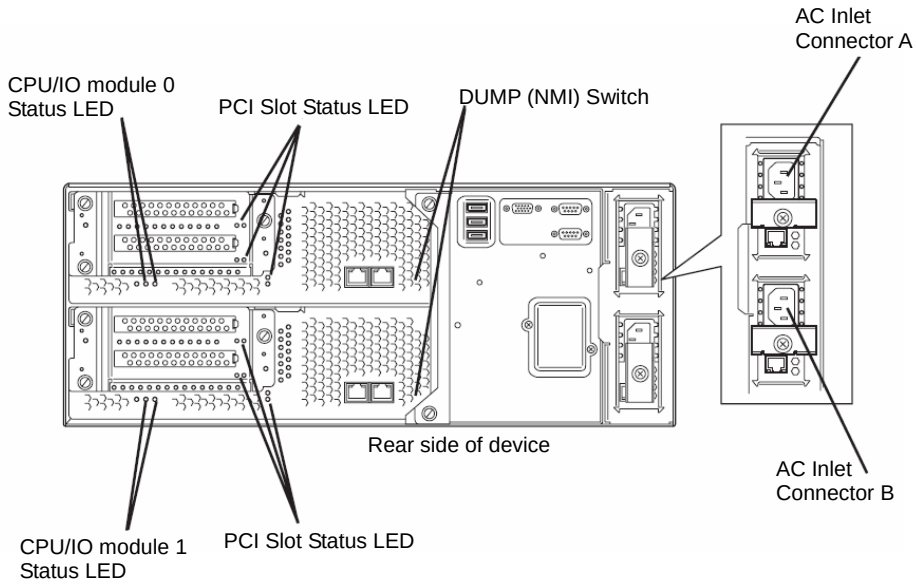
Follow the instructions below to prepare.

- Remove all the optional PCI boards and peripheral equipments.
- Remove all the LAN cables.

2. Prepare the installation from the CPU/IO module 0.

The location of the parts required for operations and check are shown below:





<When the AC power is on (The power cords are plugged to the wall outlet)>

(1) Confirm the POWER LED of the CPU/IO module.

- If the POWER LED is lit, shut down the OS and unplug the AC power cord after the POWER LED turns off.
- If the POWER LED is turned off, unplug the AC power cord.

(2) Execute the operation to be taken when AC power supply is turned off.

<When the AC power is off (The power cord is not plugged into the outlet)>

Connect the power cords to the Fault Tolerant Server series in the following order:

(1) Connect the power cord to the AC inlet A connector.

(2) Connect the power cord to the AC inlet B connector.

(3) Make sure that the CPU/IO module status LED is turned off.

Preparation is now completed.

Step 3: Disable OS Boot Monitoring Function

Check whether the power is ON and make settings for properly performing setup for later on.
This equipment has a function to monitor the main unit at startup. (Enabled in the configuration at shipment)
When reinstalling the operating system, this monitoring function needs to be disabled. Otherwise the installation may not be done properly. Follow the steps in this section and make proper settings.

IMPORTANT:

If you skip the settings described here, the system will be restarted forcefully while OS setup screen is shown and the setup will be unsuccessful. BIOS may repeat OS setup in an invalid manner. In this case, you will need to restart the setup procedures from the beginning.

TIPS:

For details of operations for BIOS Setup Utility and parameters, see the separate volume of User's Guide.

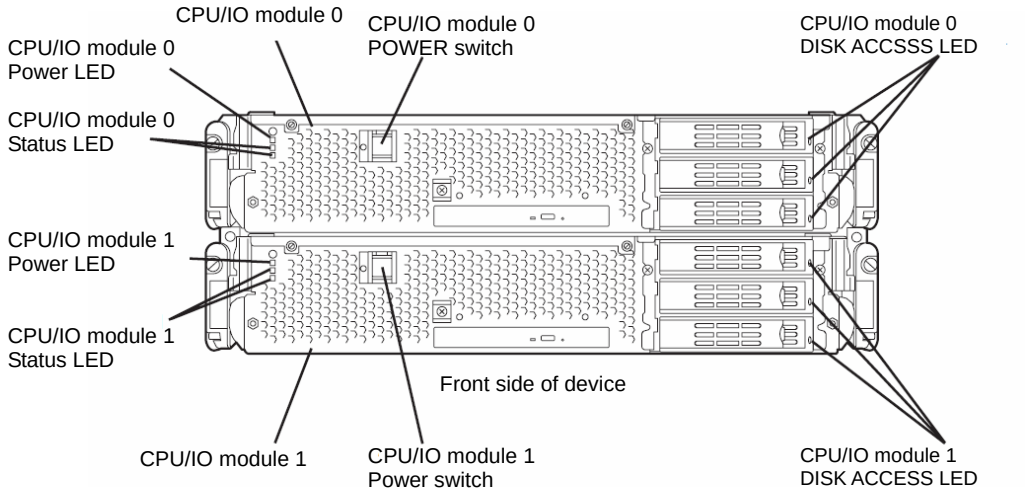
<Procedure for Changing BIOS settings>

1. Turn on the display and the peripheral equipment connected to the the Fault Tolerant Server series.

   CHECK:

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

2. Detach the front bezel.
3. Press the POWER switch which is located on the front side of the server. (This is the side on which the in-built LED is lit.)



IMPORTANT:

Do not turn off the power before the full screen logo appears.

After a while, the full screen logo will appear on the screen.

While the logo is displayed on the screen, the Fault Tolerant Server series is performing a power-on self test (POST) to check itself. For details, see the separate volume of User's Guide.

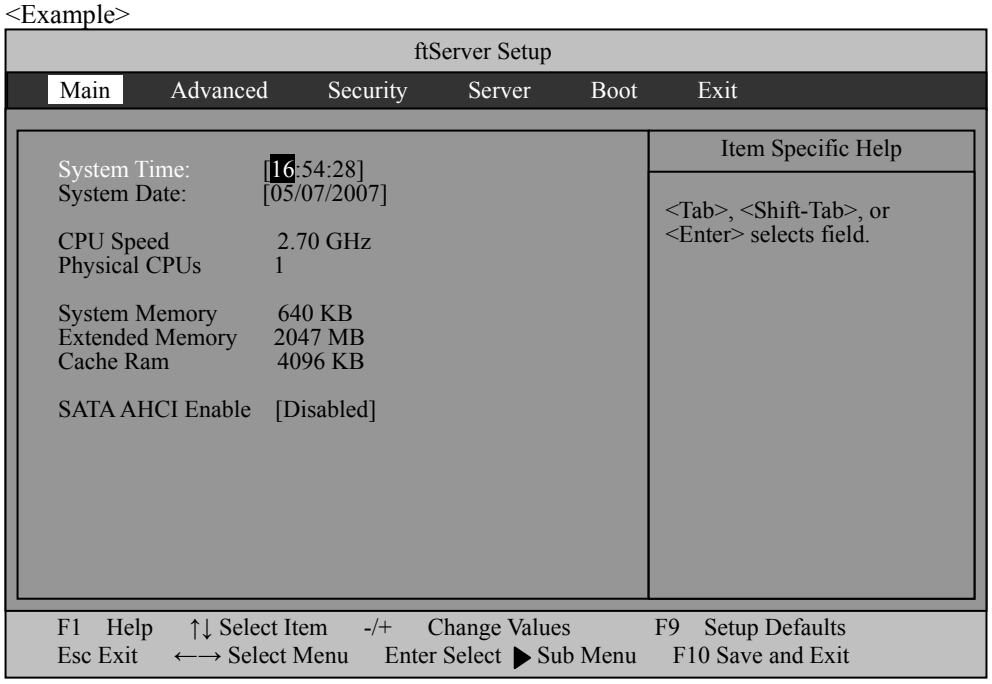
CHECK:

If the server finds errors during POST, it will interrupt POST and display the error message. See the separate volume of User's Guide.

4. When the message “Press <F2> to enter SETUP” or “Press <F2> to enter SETUP or Press <F12> to boot from Network” is displayed on the display screen, press **F2**.

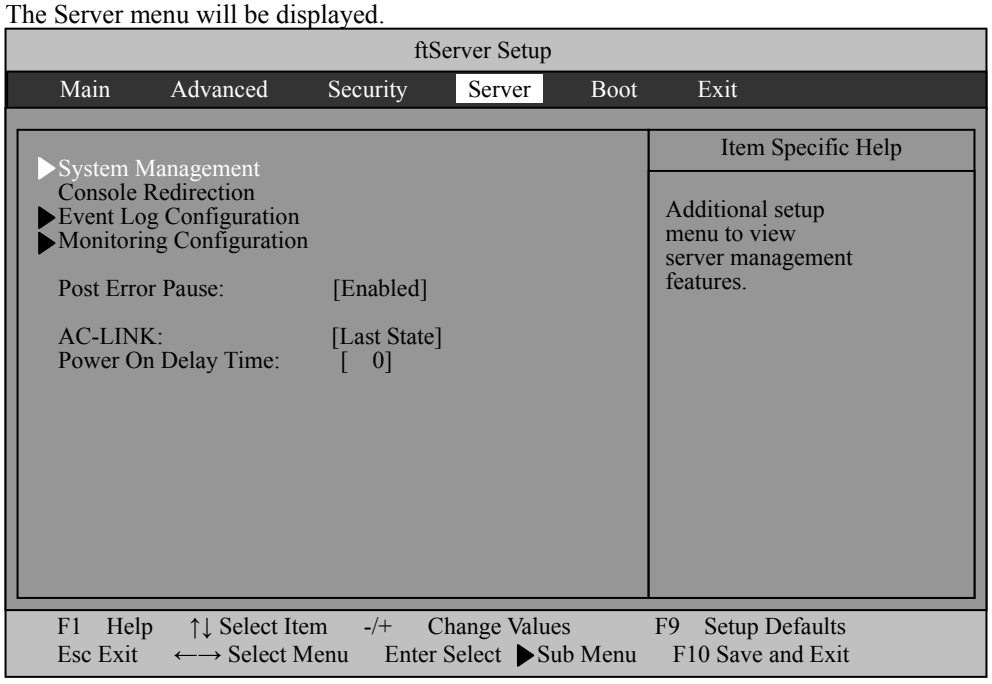
   The BIOS Setup Utility “SETUP” starts and the Main menu is displayed on the screen.

   <Example>



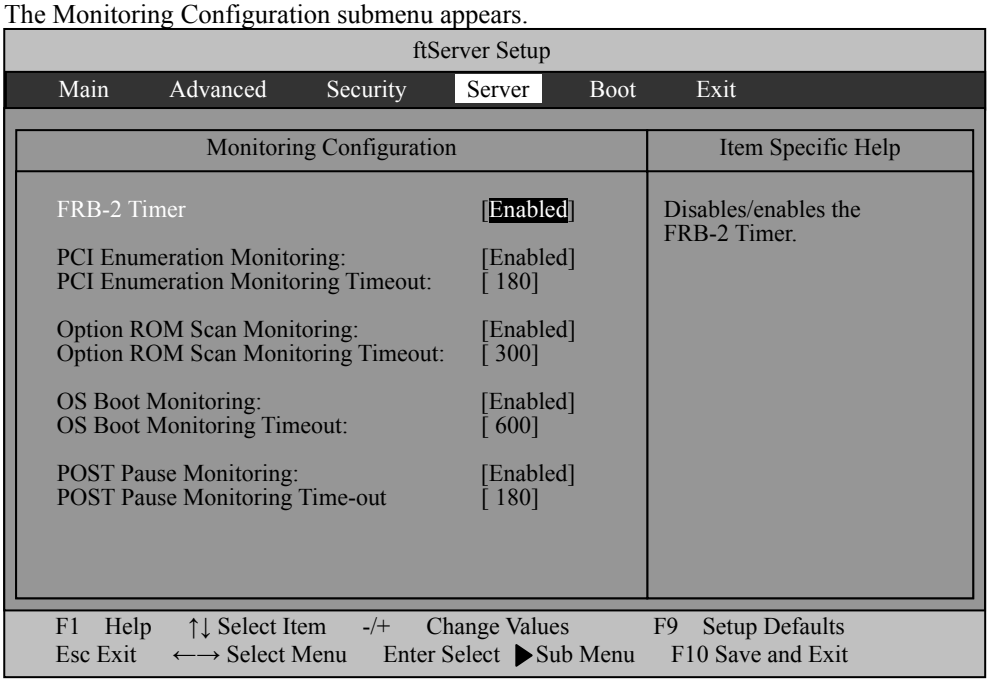
5. Move the cursor onto "Server" and select “Server.”

   The Server menu will be displayed.



6. Move the cursor onto “Monitoring Configuration” and press **Enter**.

The Monitoring Configuration submenu appears.

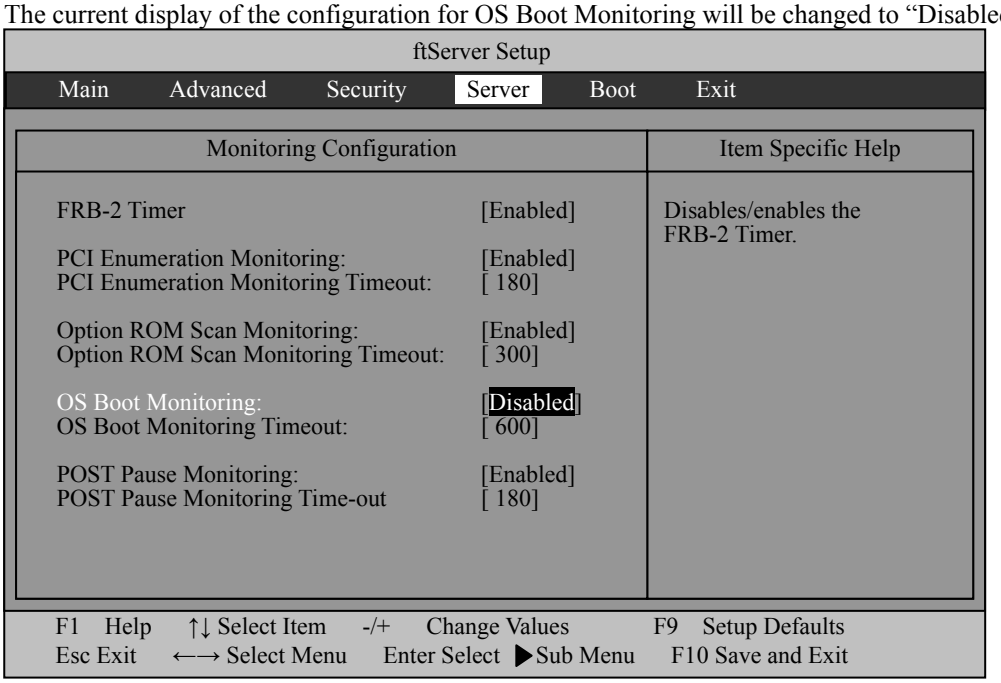


7. Move the cursor onto “OS Boot Monitoring” and press **Enter**.

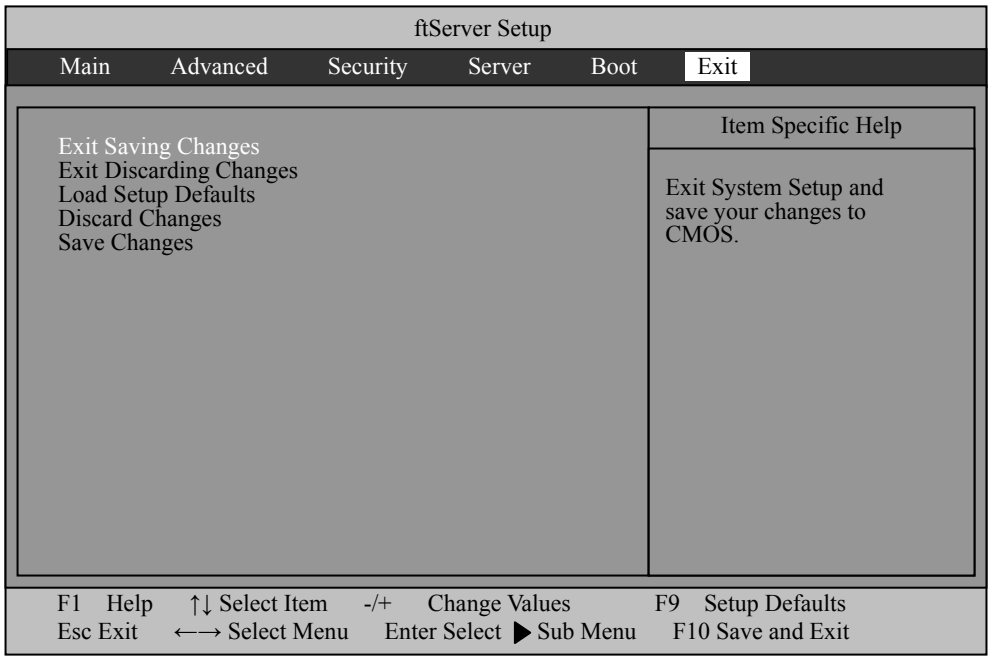
Parameters will be displayed.

8. Among the parameters, choose “Disabled” and press **Enter**.

The current display of the configuration for OS Boot Monitoring will be changed to “Disabled.”

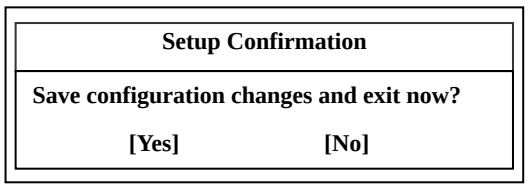


9. Press the **Esc** key to go back to the Server menu, and then move the cursor and select "Exit" to display the Exit menu.



10. Move the cursor onto “Exit Saving Changes” and press **Enter**.

The confirmation window will appear.



11. Select “Yes” and press **Enter**.

After the configuration data is saved and SETUP is terminated, the system is rebooted.
This is the end of steps for switching OS Boot Monitoring function.

TIPS:

After the procedure above is completed, power off this server to prepare for installation. Then, referring to “Step 4: Install Red Hat Enterprise Linux AS 4.5

Step 4: Install Red Hat Enterprise Linux AS 4.5

In the Fault Tolerant Server series, all the internal disks configure RAID1 by software. RAID consists of pairs of hard disk drives, which are CPU/IO module – Slot 1 and CPU/IO module 1 – Slot 1, Slot CPU/IO module 0 – Slot 2 and CPU/IO module 1 – Slot 2, and Slot CPU/IO module 0 – Slot 3 and CPU/IO module 1 – Slot 3.

Follow the steps below to install Red Hat Enterprise Linux AS 4.5.

> **TIPS:**
>
> Since it is difficult to change partition layout after installation, it is recommended to consider partition layout in advance in view of future system operation.

1. Turn on the Fault Tolerant Server series.

2. Insert the startup CD-ROM (Disk 1 of 5) into the DVD-ROM drive.

3. Reset (i.e. press CTRL+ALT+DELETE) or turn off/on the power to restart.

4. When the boot screen is displayed, enter the following kernel parameters and press ENTER.

   boot : linux nmi_watchdog=0 reboot=warm i8042.noaux

   After this, consult the Red Hat Enterprise Linux AS 4.5 manual to install Red Hat Enterprise Linux AS 4.5 in reference to the following partition configurations and packages.

> **IMPORTANT:**
>
> - Make sure to create a software RAID partition exactly as one of the following patterns; otherwise, the ft server might not function correctly.

Mount Point	File System Type	RAID	Size
Pattern 1 [Number of disks=2 (put Slot1 of CPU/IO module 0 and Slot1 of CPU/IO module 1)]			
/boot	ext2	md0(RAID Level=1,Device=sda1,sdb1)	256MB
/var/crash	ext3	md1(RAID Level=1,Device=sda2,sdb2)	28GB
/	ext3	md2(RAID Level=1,Device=sda3,sdb3)	15GB
swap	swap	md3(RAID Level=1,Device=sda4,sdb4)	24GB
(Unused)	-	-	All rests
Pattern 2 [Number of disks=2 (put Slot1 of CPU/IO module 0 and Slot1 of CPU/IO module 1)]			
/boot	ext2	md0(RAID Level=1,Device=sda1,sdb1)	256MB
/var/crash	ext3	md1(RAID Level=1,Device=sda2,sdb2)	28GB
/	ext3	md2(RAID Level=1,Device=sda3,sdb3)	15GB
swap	swap	md3(RAID Level=1,Device=sda4,sdb4)	24GB
/home	ext3	md4(RAID Level=1,Device=sda6,sdb6)	All rests
Pattern 3 [Number of disks=2 (put Slot1 of CPU/IO module 0 and Slot1 of CPU/IO module 1)]			
/boot	ext2	md0(RAID Level=1,Device=sda1,sdb1)	256MB
/var/crash	ext3	md1(RAID Level=1,Device=sda2,sdb2)	28GB
/	ext3	md2(RAID Level=1,Device=sda3,sdb3)	All rests
swap	swap	md3(RAID Level=1,Device=sda4,sdb4)	24GB

CHECK:

Device names change depending on the number of the hard disk drives to be mounted. Check the device name of each hard disk drive.

	Device name		
Slot number\disk number	**2**	**4**	**6**
CPU/IO module 0 – Slot 3	-	-	sdc
CPU/IO module 0 – Slot 2	-	sdb	sdb
CPU/IO module 0 – Slot 1	sda	sda	sda
CPU/IO module 1 – Slot 3	-	-	sdf
CPU/IO module 1 – Slot 2	-	sdd	sde
CPU/IO module 1 – Slot 1	sdb	sdc	sdd

IMPORTANT:

- The disk pair of software RAID must be configured in combination of corresponding slot numbers. The corresponding slot numbers are as follows. See the above CHECK column for each device name.

  Slot 1 of CPU/IO module 0 and slot 1 of CPU/IO module 1

  Slot 2 of CPU/IO module 0 and slot 2 of CPU/IO module 1

  Slot 3 of CPU/IO module 0 and slot 3 of CPU/IO module 1

- Configure all partitions (including SWAP partition) with software RAID (LEVEL=1, number of disks=2, number of spare=0)

IMPORTANT:

The following packages are required for operating ft Server Control Software.

- apr-0.9.4-24.5.x86_64.rpm
- apr-util-0.9.4-21.x86_64.rpm
- compat-db-4.1.25-9.x86_64.rpm
- curl-7.12.1-11.el4.x86_64.rpm
- e2fsprogs-1.35-12.5.el4.i386.rpm
- e2fsprogs-1.35-12.5.el4.x86_64.rpm
- firstboot-1.3.39-6.noarch.rpm
- fontconfig-devel-2.2.3-7.x86_64.rpm
- gcc-3.4.6-8.x86_64.rpm
- gdb-6.3.0.0-1.143.el4.x86_64.rpm
- grub-0.95-3.8.x86_64.rpm
- httpd-2.0.52-32.ent.x86_64.rpm
- httpd-suexec-2.0.52-32.ent.x86_64.rpm
- kernel-smp-2.6.9-55.EL.x86_64.rpm
- kernel-smp-devel-2.6.9-55.EL.x86_64.rpm
- krb5-libs-1.3.4-47.i386.rpm
- krb5-libs-1.3.4-47.x86_64.rpm
- libgcj-3.4.6-8.x86_64.rpm
- libidn-0.5.6-1.i386.rpm
- libidn-0.5.6-1.x86_64.rpm
- libidn-devel-0.5.6-1.x86_64.rpm
- lm_sensors-2.8.7-2.40.3.x86_64.rpm
- mdadm-1.12.0-2.x86_64.rpm
- mod_perl-1.99_16-4.x86_64.rpm
- net-snmp-5.1.2-11.EL4.10.x86_64.rpm
- net-snmp-libs-5.1.2-11.EL4.10.x86_64.rpm
- net-snmp-perl-5.1.2-11.EL4.10.x86_64.rpm
- net-snmp-utils-5.1.2-11.EL4.10.x86_64.rpm
- OpenIPMI-tools-1.4.14-1.4E.17.x86_64.rpm
- openssl-0.9.7a-43.16.i686.rpm
- openssl-0.9.7a-43.16.x86_64.rpm
- openssl-devel-0.9.7a-43.16.x86_64.rpm
- perl-XML-Parser-2.34-5.x86_64.rpm
- perl-libwww-perl-5.79-5.noarch.rpm
- perl-libxml-perl-0.07-30.noarch.rpm
- pkgconfig-0.15.0-3.x86_64.rpm
- sysfsutils-1.2.0-1.x86_64.rpm
- w3c-libwww-5.4.0-10.1.RHEL4.2.x86_64.rpm

- xorg-x11-libs-6.8.2-1.EL.18.i386.rpm
- xorg-x11-libs-6.8.2-1.EL.18.x86_64.rpm

IMPORTANT:

- If any required package is not installed, the installation described in "Step 5: Install Software the Fault Tolerant Server Series offers" will fail. Make sure you install the required packages.

5. Restart.

6. On the GRUB window, point to the OS to be started and then press <E>.

- Red Hat Enterprise Linux AS(2.6.9-55.ELsmp)
  On the GRUB configuration window, point to the line of kernel and press <e>.
- kernel/vmlinuz-2.6.9-55 ro root=/dev/md2 rhgb quiet
  On the edit window, configure as described below.
- kernel /vmlinuz-2.6.9-55 ro root=/dev/md2 nmi_watchdog=0 reboot=warm i8042.noaux quiet
  After editing, press ENTER and then press <b> to boot.

IMPORTANT:

- It is required to edit kernel parameter for the OS boot until ft Server Control Software is installed. Once ft Server Control Software is installed, it is not required.
- As for kernel, use kernel-smp. The operation of the ft function using other kernel is not guaranteed.

Step 5: Install Software the Fault Tolerant Server Series offers

Install the software provided by the Fault Tolerant Server series by the following procedures.

ft Server Control Software

IMPORTANT:

The installation of ft Server Control Software must be executed by root user.

1. Set the EXPRESSBUILDER CD-ROM at DVD-ROM drive of the device.

2. Enter the command described below and mount the CD-ROM.

   A mount point is described as /media/cdrom1 here.

   # mount /media/cdrom1

3. Install ft Server Control Software.

   (a) Install the package.

   # /media/cdrom1/FTSys/install.sh

   (b) After the installation, press **Enter** for the massage shown below.

   "After pressing ENTER, the system will be rebooted."

4. Reboot the OS.

NEC ESMPRO Agent

IMPORTANT:

The installation of NEC ESMPRO Agent must be executed by root user.

1. Set the EXPRESSBUILDER CD-ROM at DVD-ROM drive of the device.
2. Enter the command described below and mount the CD-ROM.

   A mount point is described as /madia/cdrom1 here.

   # mount/media/cdrom1.

3. Install NEC ESMPRO Agent

   (a) Move to the directory where the package of the NEC ESMPRO Agent is stored.

   # cd /mnt/cdrom/ESMLINUX/esmpro_sa/esmpro/

   (b) Run the following command to install the package:

   # rpm -ivh libnec*.rpm
   # rpm -ivh Esmpro-*.rpm

4. Reboot the OS.

Step 6: Set Dual LAN Configuration

The Fault Tolerant Server series uses Bonding for duplex of 1000 BASE LAN cards controlled by the e1000 driver and builds them as bond*(*=0,1,2…) device.

Overview

For duplicating a LAN, active backup for bonding is used. Active backup is a coupled-interface using multiple LAN controllers. When only active LAN controller fails, this function allows for continued operation by immediately switching to a backup controller.

Network Configuration

For the Fault Tolerant Server series, network interface names are based on the naming convention as described in the table below. Network duplication is achieved by pairing network interfaces of PCI slots in CPU/IO module 0 and network interfaces in the same PCI slots in CPU/IO module 1.

PCI slot and network interface name

PCI slot	Port	CPU/IO module 0	CPU/IO module 1
On Board	#1	eth100200 (1)	eth110200 (1)
	#2	eth100201 (2)	eth110201 (2)
PCI-X slot 1	#1	eth100600 (3)	eth110600 (3)
	(#2)	eth100601 (4)	eth110601 (4)
PCI-X slot 2	#1	eth100808 (7)	eth110808 (7)
	(#2)	eth100809 (8)	eth110809 (8)
PCI-X slot 3	#1	eth100700 (5)	eth110700 (5)
	(#2)	eth100701 (6)	eth110701 (6)

* Port enclosed with brackets can be used when NIC is mounted on two ports.
* The number enclosed with brackets in the CPU/IO module column is slot numbers allocated by vndctl described later. The numbers from 1 to 8 are allocated to the interface names in alphabetical order.

Dual Configuration Setup

The following describes the procedure to set dual LAN configuration. The following example is used.

Since built-in network interfaces are combined and dual network is achieved with eth100200 and eth 110200 combined as bond0, and eth100201 and eth110201 as bond1 at this point, perform only network configuration (step 2 and after).

<configuration detail>
Slot number : 3
SLAVE0 interface name : eth100600
SLAVE1 interface name : eth110600
IPaddress : 192.168.0.1
Subnet mask : 255.255.255.0
Default gateway : 192.168.0.1

IMPORTANT:

You must perform the following operation as root user.

1. Execute the command below to construct the network interfaces (eth100600 and eth110600) corresponding to slot 3 as a combined interface.

```
# vndctl add 3
```

2. Execute the command below to check the status of the combined interface that has been constructed. When you enter default gateway, you can omit the process by pressing ENTER without specifying anything.

```
# vndctl config 3
*Boot Protocol? [none/dhcp/bootp] none
*IP address? 192.168.0.1
*Netmask? 255.255.255.0
*Default gateway (IP)? 192.168.0.1

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

DEVICE=bond2
ONBOOT=yes
BOOTPROTO=none
IPADDR=192.168.0.1
NETMASK=255.255.255.0
GATEWAY=192.168.0.1
```

3. Execute the command below to activate the combined interface that has been constructed.

```
# vndctl up 3
```

4. Execute the command below to check the status of the combined interface that has been constructed.

```
# vndctl status

--Virtual Network Status--
BondingDevice Slot Status  InetAddress  RXErrors TXErrors Collisions
bond0         1    ONLINE  -             0        0         0
bond1         2    ONLINE  -             0        0         0
bond2         3    ONLINE  192.168.0.1   0        0         0
bond3              OFFLINE -             0        0         0
bond4              OFFLINE -             0        0         0

Slot      RealDevice   Status   Interface LinkState LinkSpeed
1  top    eth100200     DUPLEX  UP         LINK      1000Mb/s-FD
   bottom eth110200    DUPLEX  UP         LINK      1000Mb/s-FD
2    top    eth100201    DUPLEX  UP         LINK      1000Mb/s-FD
   bottom eth110201    DUPLEX  UP        LINK      1000Mb/s-FD
3    top    eth100600    DUPLEX  UP        LINK      1000Mb/s-FD
   bottom eth110600    DUPLEX  UP         LINK      1000Mb/s-FD
4    top    -
    bottom -
5    top    -
    bottom -
6    top    -
    bottom -
7    top    -
    bottom -
8    top    -
    bottom -
```

When bond2 (bond 0 and bond 1 are configured by default.) is configured for the slot 3 and as shown above, and the status of each SLAVE interface (eth100600,eth110600) is DUPLEX, duplication is successfully completed.

Note
Follow the steps below to delete the dual LAN configuration.

1. Execute the command below to stop the combined interfaces corresponding to the slot number <slot>.

```
# vndctl down <slot>
```

2. Execute the command below to delete the combined interfaces corresponding to the slot number <slot>.

```
# vndctl del <slot>
```

Step 7: Set Dual Disk Configuration

The Fault Tolerant Server series secures data integrity by setting dual disk configuration using "Software-RAID." The section describes procedures to configure disks.

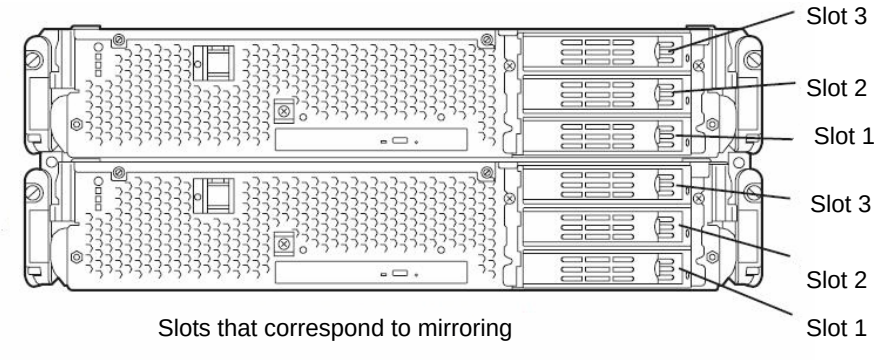
IMPORTANT:

- At this point, CPU/IO module 1 - Slot 1 and CPU/IO module 0 – Slot 1 have been duplex. Except when a disk has been added or RAID has been reconfigured, check if the duplication has succeeded and perform "Step 8: Connect and Configure Options".

Disk Configuration

RAID must be configured for all the internal disks in the Fault Tolerant Server series. For the Fault Tolerant Server series, RAID 1 is configured by software.

RAID is configured by hard disk drives pairing the slot 1 of CPU/IO module 0 and the slot 1 of CPU/IO module 1, the slot 2 of CPU/IO module 0 and the slot 2 of CPU/IO module 1, and the slot 3 of CPU/IO module 0 and the slot 3 of CPU/IO module 1.



Corresponding slot
PCI module 0 Slot 1 ⇔ PCI module 1 Slot 1
PCI module 0 Slot 2 ⇔ PCI module 1 Slot 2
PCI module 0 Slot 3 ⇔ PCI module 1 Slot 3

* In the table above, PCI module names correspond as follows:
PCI module (for CPU/IO module 0) - PCI module 0
PCI module (for CPU/IO module 1) - PCI module 1

IMPORTANT:

- When a disk is added or RAID is reconfigured, the status of each disk becomes **RESYNC** or **RECOVERY**. When a disk is in this status, do not insert or remove the disk, power off, or restart the system until the status is switched from RESYNC or RECOVERY. Check to see the status of RAID using the `ftdiskadm` command, which is described later in this document. See "Verifying duplication" on page "4-21".
- The two hard disk drives that configure RAID1 must have the same size of disk space and the same logical configuration.

The actual operation (e.g. mounting a disk) for a built-in disk is performed for the device (md) for RAID by software.

In ftdiskadm described later, slot numbers of the built-in disks are allocated as shown below to use.

Disk slot number for H/W	Disk slot number for ftdiskadm
PCI module 0 Slot 1	Slot 1
PCI module 0 Slot 2	Slot 2
PCI module 0 Slot 3	Slot 3
PCI module 1 Slot 1	Slot 4
PCI module 1 Slot 2	Slot 5
PCI module 1 Slot 3	Slot 6

Use ftdiskadm for checking the disk information.
The following is a display sample when you execute ftdiskadm, enter 2 for [RAID] and then 2 for [Status(System Disks)] (for displaying information on built-in disk).

```
#ftdiskadm
Command action
  1 => SCSI
  2 => RAID
  3 Environment
  9 QUIT

Command:2

Command action
  1 Status(Raid1)
  2 Status(System Disks)
  3 Repair Disk
  4 Auto Repair Disks
  5 New Disks
  6 Remove Half Disk
  7 Remove Full Disks
  9 <= RETURN

Command:2

[Scsi Disk Status(System Disks)]

Slot  Name [use]    Information (Vendor/Model/Serial)      path
=================================================================
1     sda(sdg) [3]  AAA/BBB/#CCC                           h5c0t128l0
2     -
3     -
4     sdd(sdj) [3]  AAA/BBB/#DDD                           h6c0t128l0
5     -
6     -
```

<Explanation of items>

Slot	slot number of built-in disk
Name	device name (kernel device name) "-" is displayed for built-in disk that is not recognized by kernel.
use	current mount count
Information	vendor name/model/serial number
path	SCSI path (described as h<HOST number>c<CHANNEL number>t<TARGET number>l<LUN>)

Disk settings (RAID construction)

Use ftdiskadm to construct RAID. Configure disks as follows:

IMPORTANT:

You must execute the following operations as root user.

1. By selecting [RAID] and [New Disks] of ftdiskadm, partitions are created for a disk specified by the slot number and its corresponding disk for a pair, and then RAID construction is performed for the created partitions.

The following is an example of configuration of disks set in slot 2 and 5 through RAID construction.

```
#ftdiskadm
Command action
  1 => SCSI
  2 => RAID
  3 Environment
  9 QUIT

Command:2

Command action
  1 Status(Raid1)
  2 Status(System Disks)
  3 Repair Disk
  4 Auto Repair Disks
  5 New Disks
  6 Remove Half Disk
  7 Remove Full Disks
  9 <= RETURN

Command:5

[New Disks]
* Which scsi SLOT? [1-6] 2
Making the disk partiton table: SLOT=2 SIZE=17343(MB)
     Reserved for the last partition: SIZE=1024(MB)
  * How many partitions? [1-14] 3        <<< *1 >>>
    * Input the SIZE of partition 1 [1- 17343(MB)] 1024
    * Input the SIZE of partition 2 [1- 17343(MB)] 2024
                    partition 3              14271
  * Input the LABEL [1-12 character(s)]   <<< *2 >>>
* Are you sure to create it? [y/n] y
```

*1 Enter the number of partitions to be created. Then enter the size for each partition by MB. The remainder is automatically allocated to the partition with the last number. As for partition number, after 3 comes 5, followed in ascending order. Since a certain amount of volume of disk is reserved for the last partition, the range of values that can be entered is smaller than that of the actual disk space. The value of actual partition volume varies slightly depending on the disk configuration.

*2 If necessary, configure the disk volume label. As a label, the entered value is used as it is when the disk is used in a single partition, and "<entered value>_s<partition number>" is used when the disk is divided into multiple partitions. Disk labels can be modified later by commands such as e2label.

2. When configuring the partitions of the disk (slot 2) is completed, the configuration is automatically copied to the paired disk (slot 5). RAID is configured with each partition as RAID device (md).

Verifying duplication

ftdiskadm is used to check if disks are duplicated.
The following shows an example when you execute ftdiskadm, enter 2 for [RAID] and then 1 for [Status (RAID1)](the current RAID status of the disk).

```
#ftdiskadm
Command action
  1 => SCSI
  2 => RAID
  3 Environment
  9 QUIT
```

```
Command:2

Command action
  1 Status(Raid1)
  2 Status(System Disks)
  3 Repair Disk
  4 Auto Repair Disks
  5 New Disks
  6 Remove Half Disk
  7 Remove Full Disks
  9 <= RETURN

Command:1

[Status(Raid1)]

Name  Partition      (Label)        Status         Member
=================================================================
md0   swap           ( - )          DUPLEX         (1)sda2    (4)sdd2
md1   /boot          ( - )          DUPLEX         (1)sda1    (4)sdd1
md2   /              ( - )          DUPLEX         (1)sda3    (4)sdd3
md3                  ( - )          DUPLEX         (2)sdb1    (5)sde1
md4                  ( - )          DUPLEX         (2)sdb2    (5)sde2
md5                  ( - )          DUPLEX         (2)sdb3    (5)sde3
```

<Explanation of items>

Name — Name of the software RAID device

Partition — Mount point
When this is blank, it means RAID is configured but is not mounted as a file system.

Label — Volume label of the disk
"-" is displayed when there is no label.

Member — The information on members that constitute RAID is displayed with the format as described below. The information in the following format is displayed for all the members. If there is an error, "F" is displayed on the left. In this case, it is required to repair RAID.
(Slot Number)Name

Status — Shows the disk status See the following for indications:

Status	Meaning
DUPLEX	It is duplicated successfully.
SIMPLEX	Only one RAID is incorporated. A member that is not incorporated is not displayed. Repairing is needed.
RECOVERY(XX.X%)	It is in the process of recovery. When it is done, "DUPLEX" is displayed.
RESYNC(XX.X%)	It is in the process of synchronization. When it is done, "DUPLEX" is displayed.
RESYNC	It is on standby for recovery or synchronization. When "R" is added to Member column, the member is on standby for recovery.

Repairing disk automatically

ftdiskadm has a function to monitor partitions of disks configured by RAID 1 at specified intervals (Cf. Note) and to attempt auto restoration for, if any, partitions that were removed from RAID1 configuration due to a failure. You can set on/off this function by specifying at [Auto Repair Disks] on [RAID] in ftdiskadm.

Note:
The interval is set to 10 minutes by default. You can change this by changing the value of AUTO_REPAIR_INTERVAL on [Environment] in ftdiskadm when the function is off, and then setting the function on again. You can specify a value from 1 through 60.

Step 8: Connect and Configure Options

If there is any optional PCI board or peripheral equipment to connect to the Fault Tolerant Server series, Turn off the power to the Fault Tolerant Server series, and connect it according to the "PCI board" in *User's Guide* and the device's instruction.

IMPORTANT:

If there is any option PCI board or peripheral equipment that has been purchased other than by "build to order", connect it.

When a LAN card or disk is added, dual configuration is required. For details of the procedures, see "Step 6: Set Dual LAN Configuration" (P.4-16) and the following "Step 9: Create Volume" (P.4-24).

Step 9: Create Volume

If there is free disk space in the internal disk with the OS, you can create a volume. To create a volume in the free disk space and construct RAID partition,, follow the steps below.

IMPORTANT:

- Ask maintenance service provider having expertise to perform the following operation.
- The following operation must be performed by root user.

1. Check the device name of the internal disk with OS by selecting [RAID] and [Status (RAID1)] in ftdiskadm (See page 4-26).

The following example shows that the internal disks with OS are set in slots 1 (slot 1 of CPU/IO module 0) and 4 (slot 1 of CPU/IO module 1), whose device names are /dev/sda and /dev/sdd, respectively.

Example)

```
[Status(Raid1)]

Name  Partition      (Label)       Status         Member
================================================================
md0   /boot          ( - )         DUPLEX          (1)sda1    (4)sdd1
md1   swap           ( - )         DUPLEX          (1)sda2    (4)sdd2
md2   /              ( - )         DUPLEX          (1)sda3    (4)sdd3
md3   /var/crash     ( - )         DUPLEX          (1)sda5    (4)sdd5
```

2. Create additional partition in the free disk space in slots 1 (slot 1 of CPU/IO module 0) and 4 (slot 1 of CPU/IO module 1) with the fdisk command.

In the procedures below, a partition with 1024MB is added in the free disk space in slot 1 (slot 1 of CPU/IO module 0).

Example)

```
<<< Start fdisk and enter command "p" to check the partition status.>>>
# fdisk /dev/sda
Command (m for help): p

Disk /dev/sda: 73.2 GB, 73200476160 bytes
255 heads, 63 sectors/track, 8899 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

Device Boot   Start  End   Blocks    Id  System
/dev/sda1   * 1       33    265041   fd  Linux raid autodetect
/dev/sda2     34     549   4144770   fd  Linux raid autodetect
/dev/sda3    550    4726  33551752+  fd  Linux raid autodetect
/dev/sda4    4727   8899  33519622+   5  Extended
/dev/sda5    4727   8381  29358756   fd  Linux raid autodetect

    <<< Create additional partition (/dev/sda4) by the command "n", and change ld to
    fd (Linux raid automatic detection) by the command "t".>>>

Command (m for help): n
First cylinder (8382-8899, default 8382):
Using default value 8382
Last cylinder or +size or +sizeM or +sizeK (8382-8899, default 8899): +1024M

Command (m for help): t
Partition number (1-6): 6
Hex code (type L to list codes): fd
Changed system type of partition 6 to fd (Linux raid autodetect)

Command (m for help): w    <<< the modification is saved. >>>>
The partition table has been altered!
```

```
Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with error 16: Device or resource busy.
The kernel still uses the old table.
The new table will be used at the next reboot.
Syncing disks.
```

The procedures above should be similarly performed for slot 4 (slot 1 of CPU/IO module 1). Note that the size of the partition to be added must be the same.

3. In step 2, the partition table added (/dev/sda6,/dev/sdd6) is not read after saving the partition configuration. Reboot the system.

4. Add the created partition to the new RAID device (/dev/md4 that was not used in step 1).

Example)

```
#/sbin/mdadm --create /dev/md4 --level=1 --raid-devices=2 /dev/sda6
/dev/sdd6
mdadm: array /dev/md4 started.
```

5. Create a file system in the new RAID device.

Example)

```
#/sbin/mkfs -t ext3 /dev/md4
```

6. Execute ftdiskadm, enter 2 for [RAID] and then 1 for [Status (RAID1)] to check if the new RAID device (/dev/md4) is added.

Example)

```
[Status(Raid1)]

Name  Partition      (Label)      Status       Member
=================================================================
md0   /boot          ( - )        DUPLEX       (1)sda1    (4)sdd1
md1   swap           ( - )        DUPLEX       (1)sda2    (4)sdd2
md2   /              ( - )        DUPLEX       (1)sda3    (4)sdd3
md3   /var/crash     ( - )        DUPLEX       (1)sda5    (4)sdd5
md4                  ( - )        DUPLEX       (1)sda6    (4)sdd6
```

It shows that the new RAID device md4 successfully constitutes the added partitions /dev/sda6 and /dev/sdd6. To create more, repeat the same procedures.

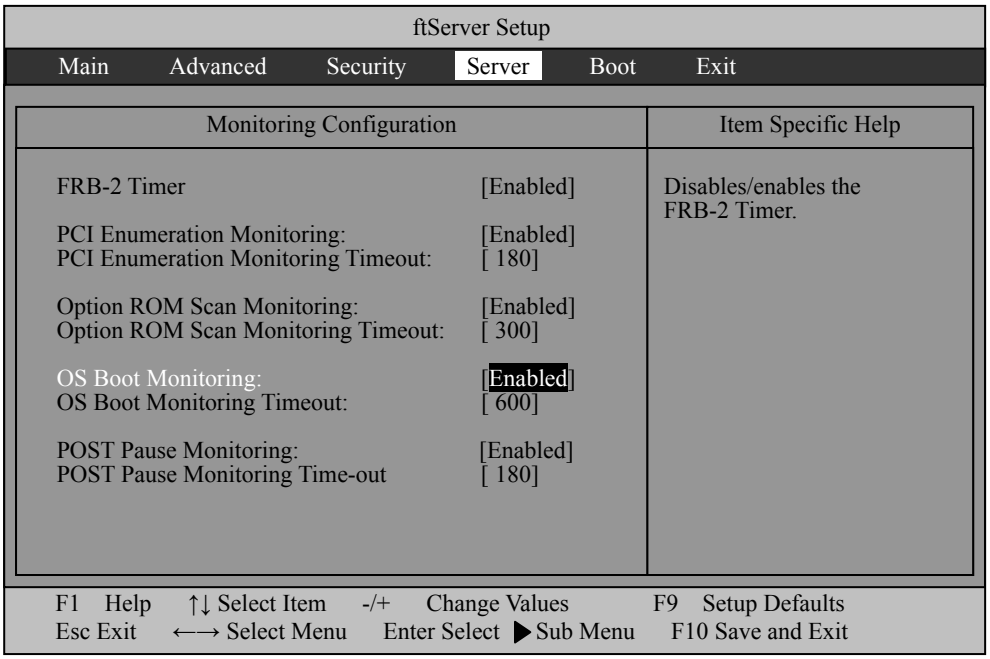
Step 10: Set Network for NEC ESMPRO Agent

NEC ESMPRO Agent is required for continuous operation of the Fault Tolerant Server series. It will be installed automatically when reinstalling the OS by using Linux for the Fault Tolerant Server series Back UP CD-ROM.

To run NEC ESMPRO Agent, you need to make settings of the SNMP. For details and methods of the settings, see from "2. Environment settings of snmpd" to "5. Setting SELinux" on "NEC ESMPRO Agent" of "Installing Management Utility."

Step 11: Enable OS Boot Monitoring Function

When necessary for system operation, enable the “OS Boot Monitoring” setting which has been disabled in “Step 3: Disable OS Boot Monitoring Function” (page 4-7) and set appropriate time (default is 10 min.).



Step 12: Back up System Information

After setting up the system, back up the system information using the Off-line Maintenance Utility.

Without backup for system information, the information and settings that are specific to your server cannot be restored after the server is repaired. Take the following steps to make a backup copy of the system information:

1. Prepare a 3.5-inch floppy disk.
2. Insert the "EXPRESSBUILDER" CD-ROM into the DVD-ROM drive of the server, and restart the system.

   EXPRESSBUILDER is activated and [EXPRESSBUILDER Top Menu] is displayed.
3. Select [Off-line Maintenance Utility] from [Tools].
4. Select [Save] from [System Information Management].

   Follow the instructions you see on the screen.

The setup is now completed.

Chapter 5

Procedures after Completion of Installation

This chapter describes how you install management utilities, how you back up system information, and setup of PCs on the network. You may need to confirm these procedures while the system is running.

INSTALLING MANAGEMENT UTILITIES

The provided "EXPRESSBUILDER" CD-ROM contains "NEC ESMPRO Agent" for monitoring the Fault Tolerant Server series and "NEC ESMPRO Manager" for managing the Fault Tolerant Server series. Install and setup these utilities in the Fault Tolerant Server series or the computer (management PC) that manages the Fault Tolerant Server series.

NEC ESMPRO Agent

NEC ESMPRO Agent is a utility to monitor the operating status, the configuration information, the failure occurrence status of hardware and software on the Fault Tolerant Server series. When it detects some problems, it sends messages to the computer in which the NEC ESMPRO Manager is installed.

NEC ESMPRO Agent is automatically installed by installing the software provided with the Fault Tolerant Server series. However, you still need to set up according to your environment for operating NEC ESMPRO Agent. See "Preparation before Setup" described later to set up.

IMPORTANT:

Make sure that NEC ESMPRO Agent is installed because it is indispensable for continuous operation of the Fault Tolerant Server series.

Operation Environment

NEC ESMPRO Agent can be operated in the hardware and software environments shown below.

□ Hardware

Installation system of the Fault Tolerant Server series

Software

The following packages are required.

If there are any packages which are not installed, please install it.

(Please install the package which the following package depends on entirely)

net-snmp

net-snmp-devel

net-snmp-utils

newt

newt-devel

portmap

slang

slang-devel

compat-libstdc++

Preparation before Setup

Be sure to read the following before system installation or setup.

To operate NEC ESMPRO Agent, each service must be installed appropriately and must be operating.

1. Check necessary packages

The following packages are needed to use NEC ESMPRO Agent.

If there are any packages which are not installed, please install it.

(Please install the package which the following package depends on entirely)

net-snmp

net-snmp-devel

net-snmp-utils

newt

newt-devel

portmap

slang

slang-devel

compat-libstdc++

2. Environment settings of snmpd

Modify the environment setting file of snmpd (/etc/opt/ft/snmp/snmpd.conf) to set a community right to more than "READ WRITE."

IMPORTANT:

The environment setting file for snmpd on the Fault Tolerant Server series is /etc/opt/ft/snmp/snmpd.com. When rebooting snmpd, the appropriate environment setting file may not be applied and NEC ESMPRO Agent cannot be operated properly. For the proper operation, ft-snmp needs to be rebooted.

service ft-snmpd restart

Correct the environment setting using the vi command, etc., referring to the following.

For details of the settings, refer to the online help of snmpd.

```
# # # #
# Third, create a view for us to let the group have rights to:
# name incl/excl subtree mask(optional)
view all included .1 80
# # # #
# Finally, great the group read-only access to the systemview view.
# group context sec.model sec.level prefix read write notif
access notConfigGroup “” any noauth exact all all none
```

3. Start setting of portmap

Set portmap to start automatically.

```
# /sbin/chkconfig --level 345 portmap on
```

4. Setting firewall

When monitoring from the NEC ESMPRO Manager, use the following port.

If you set the firewall on your environment, set the access permission to the following port.

```
snmp 161/udp
snmp-trap 162/udp
```

5. Setting SELinux

NEC ESM Agent uses snmpd.

When a SELinux function becomes effective, you carry out the following commands, and please remove a limit of snmpd.

```
# setsebool -P snmpd_disable_trans 1
# /etc/init.d/ft-snmpd restart
```

Please confirm the setting situation of the SELinux function by carrying out a sestatus command.

"SELinux status:" When is displayed with "enabled", a SELinux function becomes effective.

```
# sestatus -v
SELinux status: enabled    <-Please check here.
:
:
```

Installation procedure

1. Log in to the system as a root user.

2. Set the EXPRESSBUILDER to the DVD-ROM drive.

3. Enter the following command to mount the CD-ROM.

In this example, the mount point is assumed to be “mnt/cdrom.”

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

4. Move to the directory where the package of the NEC ESMPRO Agent is stored.

```
# cd /mnt/cdrom/ESMLINUX/esmpro_sa/esmpro/
```

5. Run the following command to install the package:

```
# rpm -ivh libnec*.rpm
# rpm -ivh Esmpro-*.rpm
```

6. Restart the OS.

Uninstallation procedure

1. Log in to the system as a root user.

2. Run the following command to uninstall the package:

```
# rpm –e Esmpro-ft
# rpm –e Esmpro-type1
# rpm –e Esmpro-Express
# rpm –e Esmpro-common
# rpm –e libnechwid
# rpm –e libnecsmbios
```

3. Restart the OS**.**

Setup of NEC ESMPRO Agent

Follow the instructions below to setup the NEC ESMPRO Agent.

1. Log in the system as a root user.

2. Move to the directory where the NEC ESMPRO Agent is installed.

```
# cd /opt/nec/esmpro_sa
```

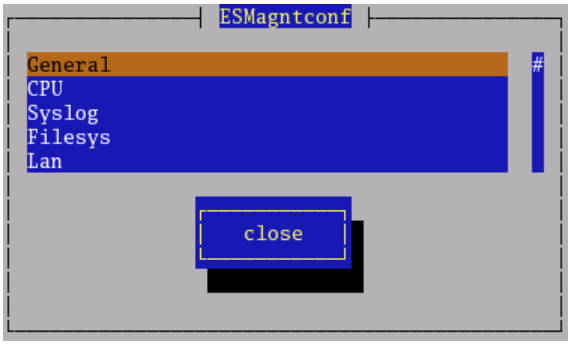
3. Move to the directory where the control panel is stored.

```
# cd bin
```

4. Start the control panel.

```
# ./ESMagntconf
```

The screen of the control panel will appear.



Report Setting

To report from the NEC ESMPRO Agent to the NEC ESMPRO Manager, you need to set the method of report.

Setting of Manager (SNMP)

1. Log in the system as a root user.

2. Move to the directory where the NEC ESMPRO Agent is installed.

```
# cd /opt/nec/esmpro_sa
```

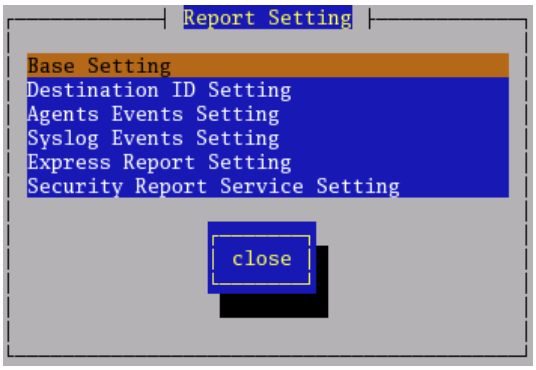
3. Move to the directory where the Report Setting tool is stored.

```
# cd bin
```

4. Start the Report Setting tool.

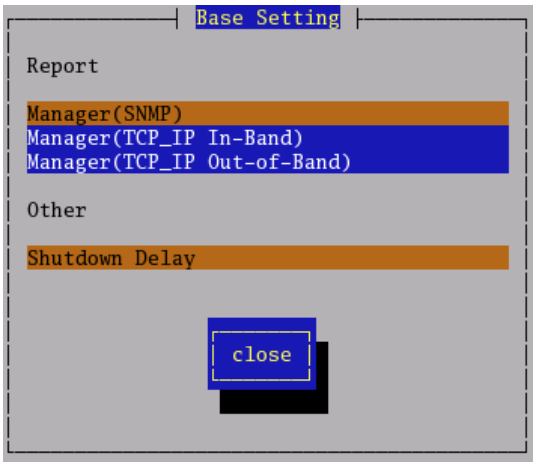
```
# ./ESMamsadm
```

The [Report Setting] screen will appear.



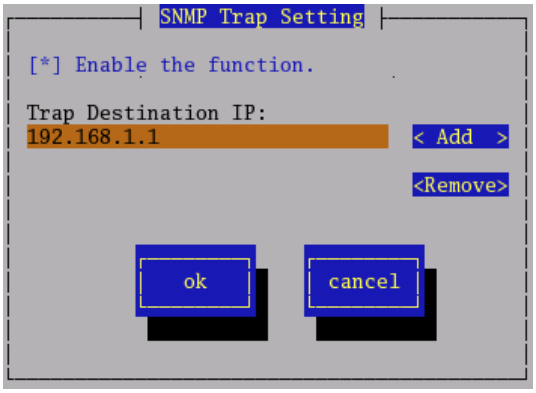
5. Select [Base Setting].

The [Base Setting] screen will appear.



6. Select [Manager (SNMP)].

The [SNMP Trap Setting] screen will appear.



7. Enable [Enable the function].

Set enable/disable using space key. When checked, it is enabled.

When not checked, it is disabled.

8. Select [Add] to set [Trap Destination IP].

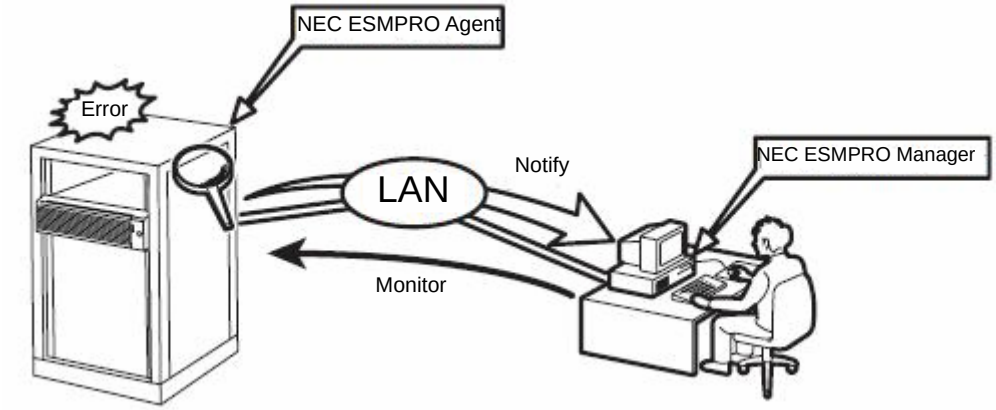
Set the IP address of the device where the NEC ESMPRO Manager is installed.

9. Finish the tool.

The report will be performed to the NEC ESMPRO Manager.

NEC ESMPRO Manager

Linked with NEC ESMPRO Agent installed in the server, NEC ESMPRO Manager monitors the server status and receives alerts from the server.



When a failing module in the server is to be replaced, NEC ESMPRO Manager enables logical module disconnection from the server and logical installation after module replacement.

For the installation of NEC ESMPRO Manager and notes on the operation, see the separate volume of the User's Guide.

CONFIRMATION OF THE KERNEL VERSION

The following describes how to check the version of the kernel, which is the core of the software achieving fault tolerance.
This process is performed when the version of the kernel in operation needs to be checked, such as when a device is added to the Fault Tolerant Server series.

Confirm the version following the steps below.

1. Execute the command below.

```
# uname -a
```

The version of the kernel in operation is displayed.

This completes version confirmation.

CONFIRMATION OF THE FT SERVER CONTROL SOFTWARE VERSION

The following describes how to check the version of ft Server Control Software, which consists of various types of software for fault tolerance. Perform the procedure when you need to check the ft Server Control Software version of the current system before adding units or attachment to the Fault Tolerant Server series.

Confirm the version following the steps below:

1. Execute the command below.

```
# rpm -q lsb-ft-eula_display
```

The version of the ft Server Control Software in operation is displayed.

This completes the version confirmation.

Chapter 6

SYSTEM REPAIR

For RAID repair procedures upon disk failure, see “Chapter 4 : Linux Setup” (P.4-1).

IMPORTANT:

- If the hard disk drive cannot be recognized, the system cannot be repaired.
- To execute this configuration, login as a user with root privilege.

If fsck stops in the middle of startup at the time of boot, try fsck to each md device.

```
# fsck –y /dev/md*
*:md number
```

TROUBLESHOOTING

This section describes what you should do when a trouble occurs in the product.

Problems with EXPRESSBUILDER

When the Fault Tolerant Server series is not booted from the EXPRESSBUILDER CD-ROM, check the following:

- ☐ Did you set the EXPRESSBUILDER CD-ROM during POST and restart the server?

  → If you do not set the EXPRESSBUILDER CD-ROM during POST and restart the server, an error message will appear or the OS will boot.

- ☐ Is BIOS configuration correct?

  → The boot device order may be specified with the BIOS setup utility of the server. Use the BIOS setup utility to change the boot device order to boot the system from the DVD-ROM drive first.

  <Menu to check: [Boot]>

When an error occurs while EXPRESSBUILDER is in progress, the following message appears. After this message appears, check the error and take the appropriate corrective action according to the error codes listed in the table below.

Message	Cause and Remedy
This machine is not supported.	This EXPRESSBUILDER version is not designed for this server. Execute the EXPRESSBUILDER on the compliant server.
NvRAM access error	An access to the nonvolatile memory (NvRAM) is not acceptable.
Hard disk access error	The hard disk is not connected or it is failed. Check whether the hard disk is correctly connected.
The system-specific information does not exist on the baseboard. Please restore the backup data or write the data by using [System Information Management] of the Off-line Maintenance Utility. Only the authorized personnel are allowed to do this operation.	This message is displayed when EXPRESSBUILDER cannot find device specific information due to the replacement of a motherboard, etc. Contact your maintenance service company.

An error message will also be displayed when an error was detected during system diagnosis. Take a note or print the error message displayed, and contact your sales agent.