

# **Red Hat Enterprise Linux 6 Server Instruction Guide for Creating Volume in Free Disk Space**

**NEC Express Servers**  
**NEC Express5800/ft Series**

1st Edition  
03-2013

## Introduction

This document is intended as a guide to create an additional volume when Red Hat Enterprise Linux 6 Server and ft Server Control Software are installed on NEC Express5800/ft series and there is free disk space in the internal disk where the OS is installed.

This document applies to the following models:

- N8800-162/NEC Express5800/R320a-E4
- N8800-163/NEC Express5800/R320b-M4

### **IMPORTANT:**

- To perform the following operations, use a maintenance service provider with expertise.
- The following operations must be performed as the root user.

## 1. Preparing for the Creation

1. Check device names of internal disks where the OS is installed and names of RAID devices in use by running the `ftdiskadm` command.

The following example assumes that an internal disk where the OS is installed is inserted in slot 1 (slot 0 of CPU/IO module 0) and slot 9 (slot 0 of CPU/IO module 1).

You can see that the device names are `/dev/sda` and `/dev/sdi`, and that the RAID devices, `"md0"` through `"md3"`, have already been created.

Example:

```
# /opt/nec/ftras/sbin/ftdiskadm
```

Command action

- 1 List RAID Arrays
- 2 List Internal Disks
- 3 Make Mirroring Arrays (RAID1)
- 4 Repair Mirroring Arrays (RAID1)
- 5 Delete Mirroring Arrays (RAID1)
- 6 Remove Disk Partitions (RAID1)
- 7 Make Striping Array (RAID1+0)
- 8 Delete Striping Array (RAID1+0)
- c Configurations
- q Quit

Command: 1

[List RAID Arrays]

Name	Partition	(Label)	Status	Member
< Mirroring Array (RAID1) >				
md0	/boot	( - )	DUPLEX	(1) sda1 (9) sdi1
md1	/var/crash	( - )	DUPLEX	(1) sda2 (9) sdi2
md2	/	( - )	DUPLEX	(1) sda3 (9) sdi3
md3	swap	( - )	DUPLEX	(1) sda5 (9) sdi5

2. Check free disk space of the internal disks where the OS is installed by running the `fdisk` command or other method.
3. Based on results obtained in the earlier steps, decide the details of the volume you want to create.

The examples shown in the following chapter provide steps for creating a partition of 1024 MB in each of the internal disks (`"sda"` and `"sdi"`) and for creating the RAID1 device (`md4`).

## 2. Creating a Volume

1. Create an additional partition in free disk space of the disks in slot 1 (slot 0 of CPU/IO module 0) and slot 9 (slot 0 of CPU/IO module 1) by running the `fdisk` command.

The following example adds a partition of 1024 MB in free disk space of the disk in slot 1 (slot 0 of CPU/IO module 0).

Example:

```
<<< Run the fdisk command and type "p" to view partitions >>>
```

```
# 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
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x000279e0
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	1	33	262144	fd	Linux raid autodetect
Partition 1 does not end on cylinder boundary.						
/dev/sda2		33	3166	25165824	fd	Linux raid autodetect
/dev/sda3		3166	5255	16777216	fd	Linux raid autodetect
/dev/sda4		5255	8900	29278208	5	Extended
/dev/sda5		5255	5516	2097152	fd	Linux raid autodetect

```
<<< Run the "n" command to create the additional partition (/dev/sda6), and then run the "t" command to change the "Id" to "fd (Linux raid autodetect)" >>>
```

```
<<< To create multiple volumes, repeat this step >>>
```

```
Command (m for help): n
```

```
First cylinder (5516-8900, default 5516):
```

```
Using default value 5516
```

```
Last cylinder, +cylinders or +size{K,M,G} (5516-8900, default 8900): +1024M
```

```
Command (m for help): t
Partition number (1-6): 6 <<< Specify the created partition number >>>
Hex code (type L to list codes): fd <<< Be sure to specify "fd" >>>
Changed system type of partition 6 to fd (Linux raid autodetect)

Command (m for help): w <<< Save changes >>>
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 or after you run partprobe(8) or kpartx(8)
Syncing disks.
#

<<< Repeat this step for slot 9 (slot 0 of CPU/IO module 1) as well. Note that the additional partition
must be the same size >>>
```

2. Reboot the system because the added partition tables ("/dev/sda6" and "/dev/sdi6") are not loaded after saving partition settings in step 1.

Example:

```
<<< Reboot the system >>>

# /sbin/reboot
```

3. Specify the created partitions, and then create the new RAID1 device.  
This step specifies two partitions ("sda6" and "sdi6") to create the new RAID1 device (md4).

Example:

```
# /sbin/mdadm --create /dev/md4 --metadata=1.1 --bitmap=internal --level=1  
--raid-devices=2 /dev/sda6 /dev/sdi6
```

<<< If a message as shown below appears, type 'y' >>>

```
mdadm: /dev/sda6 appears to be part of a raid array:  
        level=raid1 devices=2 ctime=Thu Sup  6 16:47:38 2012  
mdadm: /dev/sdi6 appears to be part of a raid array:  
        level=raid1 devices=2 ctime=Thu Sup  6 16:47:38 2012  
Continue creating array? y  
mdadm: array /dev/md4 started.  
#
```

4. Create a filesystem in the new RAID device.

Example:

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

To create multiple volumes, repeat step 3 and 4.

5. Verify if the newly created RAID device is added.

Example:

```
# /opt/nec/ftras/sbin/ftdiskadm
```

Command action

- 1 List RAID Arrays
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- 4 Repair Mirroring Arrays (RAID1)
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- 7 Make Striping Array (RAID1+0)
- 8 Delete Striping Array (RAID1+0)
- c Configurations
- q Quit

Command: 1

[List RAID Arrays]

Name	Partition	(Label)	Status	Member
< Mirroring Array (RAID1) >				
md0	/boot	( - )	DUPLEX	(1) sda1 (9) sdi1
md1	/var/crash	( - )	DUPLEX	(1) sda2 (9) sdi2
md2	/	( - )	DUPLEX	(1) sda3 (9) sdi3
md3	swap	( - )	DUPLEX	(1) sda5 (9) sdi5
md4		( - )	DUPLEX	(1) sda6 (9) sdi6

You can verify that the new RAID device "md4" is comprised of the added partitions, "/dev/sda6" and "/dev/sdi6."

6. Update the "mdadm.conf" file under the "etc" directory.

Example:

```
<<< Create a backup file of the "mdadm.conf" file >>>

# /bin/cp -a /etc/mdadm.conf /etc/mdadm.bak

<<< Create the "mdadm.conf" file >>>

# /bin/echo 'DEVICE partitions' > /etc/mdadm.conf
# /sbin/mdadm --detail --scan -v | grep '^ARRAY' >> /etc/mdadm.conf
```

7. Update the boot image file.

Example:

```
<<< Create a backup file of the boot image file >>>

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

<<< Create the boot image file >>>

# /sbin/dracut /boot/initramfs-`uname -r`.img `uname -r`

<<< Check the result >>>

# echo status=$?
status=0 <<< If successful, "0" appears >>>
```

### IMPORTANT:

- If the "mdadm.conf" file and the boot image file are not created correctly in step 6 and 7, the system may not boot successfully. In the event that the system is unable to boot, you can boot the system by restoring the backup files created in the beginning of these steps; however, the newly created volume will be cleared. **Before using the newly created volume, we recommend that you reboot the system after step 7 and then verify if the files are created correctly. To verify, refer to "3. Verifying if the Volume is Created."**



### 3. Verifying if a Volume is Created

1. After creating a volume, reboot the system.

Example:

```
<<< Reboot the system >>>

# /sbin/reboot
```

2. After rebooting the system, verify if the newly created RAID device is added by running the `ftdiskadm` command.

Example:

```
# /opt/nec/ftras/sbin/ftdiskadm

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Command: 1

[List RAID Arrays]

Name Partition (Label) Status Member
=====
< Mirroring Array (RAID1) >

md0 /boot ( - ) DUPLEX (1) sda1 (9) sdi1
md1 /var/crash ( - ) DUPLEX (1) sda2 (9) sdi2
md2 / ( - ) DUPLEX (1) sda3 (9) sdi3
md3 swap ( - ) DUPLEX (1) sda5 (9) sdi5
md4 ( - ) DUPLEX (1) sda6 (9) sdi6
```

You can verify that the new RAID device "md4" is comprised of the added partitions, "/dev/sda6" and "/dev/sdi6."