

IBM OpenPower Linux

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?? RedHat Linux for Power

???IBM Power System S822LC (8001-22C) for big data
?????RedHat 7.3 for POWER8 Little Endian (NOTE: ?????? Little Endian
?????????????????????:Quick Start Guide for installing Linux on IBM Power System
LCservers)

?????

1. ???? Linux ??
2. ??????????????????????
NOTE: ???? storcli ?????????????????? Linux ??????????
3. ?????? Megaraid ?????????????????? Raid?
NOTE: ?? storcli ???? raid ???????? Resource already in use

?? RedHat Linux

“ NOTE: ???????? RedHat 7.2????????????????????????????????????

??????????

?????? USB ???????? RedHat ?????

??????? > Petitboot

??????????????? RedHat ????????

** Install Red Hat Enterprise Linux 7.3 (64-bit kernel)*

??????????????? Enter ??????????

“ TIP: ??????????????: Quick Start Guide for installing Linux on IBM Power
System LCservers

?? Raid ??

????????? Raid Adapter????? RedHat ? Software Raid????????????? x86
????????????????????????????

- RedHat for Power ??????????: BIOS > sda1: PPC PReP Boot > sda2: /boot (GRUB2) > sda3: /
- PPC PReP Boot ?????????? Software Raid (?: ??????????????????????????????: ??????????????)
- /boot ? / ???? Software Raid
- ??????: ?? 5 ??? sda, sdb, sdc, sdd, sde
 1. sda1 = PPC PReP Boot (Power ??)
 2. sda2 = raid1 /boot (GRUB2 ??)
 3. sda3 = raid6 /
 4. sdb1 = PPC PReP Boot (Power ??)
 5. sdb2 = raid1 /boot (GRUB2 ??)
 6. sdb3 = raid6 /
 7. sdc1 = raid6 /
 8. sdd1 = raid6 /
 9. sde1 = raid6 /?????????????
- raid6 ? / ?? LVM ?????? VG ??? rhel?LV ??? rhel-<????>??? rhel-swap
- ?? raid level 6 ??size policy ???? As large as possible?

“ TIP:

size policy:

?? Automatic - ? raid ? size ?????????????????????? raid

?? PV ? VG

???????????? 0 - 1 %?

As large as possible - ? raid ? size

?? raid

???????????????????? Raid Rebuild ???????????

???????

??? - ?????????????????? prepboot(sda), prepboot(sdb), /boot, SWAP, /?

??? - ?????????????? PPC PReP Boot

????????????????(Anaconda)??

fdisk ??????????????????

??? - ???????? prepboot ???

Summary of Changes?

??? - ??????: boot loader stage2 device boot is on a multi-disk array but

boot loader stage1 sevice sda1 is not????????????? Done ???????????

???????????????????? ?????????????? ????

????????

?? SELinux

```
sed -i 's/SELINUX=.*$/SELINUX=disabled/' /etc/selinux/config  
setenforce 0
```

?????

```
systemctl stop firewalld.service  
systemctl disable firewalld.service
```

??????

?? IPMI (BMC) ??

??????????? IPMI Network Port
?????? > Petitboot > Exit to Shell

```
ipmitool lan print 1  
ipmitool lan set 1 ipsrc static  
ipmitool lan set 1 ipaddr <ipmi-ip-address>  
ipmitool lan set 1 netmask <ipmi-ip-netmask>  
ipmitool lan set 1 defgw ipaddr <ipmi-ip-gateway>  
ipmitool lan print 1
```

BMC ?????

“ http://ipmi-ip-address/ , ???? : ADMIN / ADMIN
NOTE: ??????????????????

Java ??? 1.6.0.45 32-bit, Windows 7 64-bit?????? Java ???

IPMITools ????? ipmitool ? Desktop PC

Ubuntu

```
sudo apt-get update  
sudo apt-get install ipmitool
```

? source ?????

```
wget https://sourceforge.net/projects/ipmitool/files/latest/download
bzip2 -d ipmitool-1.8.15.tar.bz2
tar xvf ipmitool-1.8.15.tar
cd ipmitool-1.8.15
./configure
```

????

```
##### FRU []
ipmitool -I lanplus -H ipmi-ip-address -U ADMIN -P ADMIN fru
```

????????????

sdb	EMPTY	NVMe	EMPTY
sde	sdc	EMPTY	EMPTY
sda	sdd	EMPTY	NVMe

??????????

(

https://www.ibm.com/support/knowledgecenter/en/SST55W_4.3.0/liaca/liaca_config_os_yum_repos.html)

???? FTP/NFS/WWW ???

```
mount -o loop rhel-server-7.3-ppc64le-dvd.iso /mnt/DVD
cp -r /mnt/DVD/* /mnt/tpeitpfs02_nas/redhat_7.3_ppc64_le/
```

????????????????

?? Linux ?????????????? /etc/yum.repos.d/rhel-media.repo

```
[rhel-media]
name=name=Red Hat Enterprise Linux $releasever - Media
baseurl=ftp://10.10.1.115/LINUX_REPO/redhat_7.3_ppc64_le/
gpgcheck=1
enabled=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-beta,file:///etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release
```

????

```
yum repolist
```

?: ???????????

????????????????

```
mkdir /mnt/tpeitpfs02_nas/redhat_7.3_ppc64_le/optional/Packages
cp your-packages.rpm /mnt/tpeitpfs02_nas/redhat_7.3_ppc64_le/optional/Packages
createrepo /mnt/tpeitpfs02_nas/redhat_7.3_ppc64_le/optional
```

??????????

???OpenPOWER Linux ???????????? PPC PReP Boot ????? Software Raid
??
????????????????????????????????????

????????????????????????????

“ TIP: PPC PReP Boot ??? IBM Power ???????????? x86 ??? MBR?

???????https://access.redhat.com/discussions/2158911

?????

????????????????????????

```
# fdisk -l /dev/sda
```

Disk /dev/sda: 960.2 GB, 960197124096 bytes, 1875385008 sectors

Units = sectors of 1 * 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 4096 bytes

I/O size (minimum/optimal): 4096 bytes / 4096 bytes

Disk label type: dos

Disk identifier: 0x000e7231

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	2048	22527	10240	41	PPC PReP Boot
/dev/sda2		22528	2121727	1049600	fd	Linux raid autodetect
/dev/sda3		2121728	1875384319	936631296	fd	Linux raid autodetect

“ sda1 Power ??? (????????????)

sda2 Linux ??? /boot (?? Raid 1)

sda3 LVM ?? (?? Raid6)

?? Power ?????????? /sdb1

```
dd if=/dev/sda1 of=/dev/sdb1 bs=512 conv=noerror,sync
```

```
/dev/sdb ????
```

```
# fdisk -l /dev/sdb

Disk /dev/sdb: 960.2 GB, 960197124096 bytes, 1875385008 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes
Disk label type: dos
Disk identifier: 0x0003819f


   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1          2048        22527        10240    41  PPC PReP Boot
/dev/sdb2          22528       2121727       1049600    fd  Linux raid autodetect
/dev/sdb3          2121728     1875384319     936631296    fd  Linux raid autodetect
```

Disk identifier: 0x0003819f

Device	Boot	Start	End	Blocks	Id	System
/dev/sdb1		2048	22527	10240	41	PPC PreP Boot
/dev/sdb2		22528	2121727	1049600	fd	Linux raid autodetect
/dev/sdb3		2121728	1875384319	936631296	fd	Linux raid autodetect


“ sdb ? sda ?????????????????????????????????

????????

```
????? sda ? sdb ?????????????????????? raid ???
```

? /dev/sda ??

```
fdisk /dev/sda
```



```
n > p > 1(default) > 2048(default) > 22527
n > p > 2 (default) > 22528 (default) > 2121727
n > p > 3 (default) > 2121728 (default) > 1875385007 (default)
```

$n > p > 3$ (default) > 2121728 (default) > 1875385007 (default)

|||||

t > 1 > 41 PPC PReP Boot

t > 2 > fd Linux raid

t > 3 > fd Linux raid

|||||#1 |||||

a > 1

|||||

p

|||||

w

??????? sdb ? sda

```
dd if=/dev/sdb1 of=/dev/sda1 bs=512 conv=noerror,sync
```

?? Raid

```
# cat /proc/mdstat
```

```
Personalities : [raid1] [raid6] [raid5] [raid4]
```

```
md126 : active raid1 sdb2[1]
```

```
1049536 blocks super 1.0 [2/1] [_U]
```

```
bitmap: 1/1 pages [64KB], 65536KB chunk
```

```
md127 : active raid6 sdb3[1] sdd1[3] sde1[4] sdc[5]
```

```
2809500672 blocks super 1.2 level 6, 512k chunk, algorithm 2 [5/4] [_UUUU]
```

```
bitmap: 1/1 pages [64KB], 65536KB chunk
```

```
unused devices: <none>
```

```
# mdadm --detail /dev/md126
```

```
/dev/md126:
```

```
Version : 1.0
```

```
Creation Time : Mon Feb 20 23:30:01 2017
```

```
Raid Level : raid1
```

```
Array Size : 1049536 (1024.94 MiB 1074.72 MB)
```

```
Used Dev Size : 1049536 (1024.94 MiB 1074.72 MB)
```

```
Raid Devices : 2
```

Total Devices : 1
Persistence : Superblock is persistent

Intent Bitmap : Internal

Update Time : Fri Feb 24 19:55:16 2017
State : clean, degraded

Active Devices : 1
Working Devices : 1
Failed Devices : 0
Spare Devices : 0

Name : localhost.localdomain:boot
UUID : 1b78d1ea:f5380532:4fe25553:20ef8396
Events : 44

Number	Major	Minor	RaidDevice	State
-	0	0	0	removed
1	8	18	1	active sync /dev/sdb2

mdadm --detail /dev/md127

/dev/md127:

Version : 1.2
Creation Time : Mon Feb 20 23:30:10 2017
Raid Level : raid6
Array Size : 2809500672 (2679.35 GiB 2876.93 GB)
Used Dev Size : 936500224 (893.12 GiB 958.98 GB)
Raid Devices : 5
Total Devices : 4
Persistence : Superblock is persistent

Intent Bitmap : Internal

Update Time : Fri Feb 24 14:42:10 2017
State : clean, degraded

Active Devices : 4
Working Devices : 4
Failed Devices : 0
Spare Devices : 0

Layout : left-symmetric

Chunk Size : 512K

Name : localhost.localdomain:pv00

UUID : f7a62cb2:b269daa9:29f8025f:6fcef40f

Events : 4769

Number	Major	Minor	RaidDevice	State
-	0	0	0	removed
1	8	19	1	active sync /dev/sdb3
5	8	32	2	active sync /dev/sdc
3	8	49	3	active sync /dev/sdd1
4	8	65	4	active sync /dev/sde1

?? Raid

```
# fdisk -l /dev/sda
```

Disk /dev/sda: 960.2 GB, 960197124096 bytes, 1875385008 sectors

Units = sectors of 1 * 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 4096 bytes

I/O size (minimum/optimal): 4096 bytes / 4096 bytes

Disk label type: dos

Disk identifier: 0x000e7231

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	2048	22527	10240	41	PPC PReP Boot
/dev/sda2		22528	2121727	1049600	fd	Linux raid autodetect
/dev/sda3		2121728	1875385007	936631640	fd	Linux raid autodetect

```
# mdadm /dev/md126 --add /dev/sda2
```

```
# mdadm /dev/md127 --add /dev/sda3
```

????-StorCLI

????? Local Disks ???????? MegaRAID (MegaRAID SAS-3 3108) ??????????????
Linux????????? lshw ???????????

“ ??? Raid ???????? Raid?? Petitboot ?????????? storcli ????? Raid ???
?????: Resources already in use

???? StorCLI

????? <https://www.broadcom.com/support/download-search/?pg=&pf=&pn=&po=&pa=&dk=storcli>

StorCLI for Linux ?????????????? storcli (storcli64 for 64-bit) ?????????????? RPM ? DEB
??? PPC64LE for RedHat????? PPC64LE for
Ubuntu (*.deb) ?????????? Windows ? Linux ??? *.deb ???????????? `storcli64` ?

??????????????????? RedHat Linux ??????

“ storcli64 ????? Petitboot????? scp ? wget ??????????

? Linux ??? MegaRAID ??

```
# lshw

...

*-raid
  description: RAID bus controller
  product: MegaRAID SAS-3 3108 [Invader]
  vendor: LSI Logic / Symbios Logic
  physical id: 0
  bus info: pci@0001:03:00.0
  logical name: scsi0
  version: 02
  width: 64 bits
```

clock: 33MHz

capabilities: raid pm pciexpress vpd msi msix bus_master cap_list rom

configuration: driver=megaraid_sas latency=0

resources: irq:507 memory:3fe080200000-3fe08020ffff memory:3fe080000000-3fe0800fffff

memory:3fe080100000-3fe0801fffff

*-enclosure UNCLAIMED

description: SCSI Enclosure

product: SAS3x28

vendor: LSI

physical id: 0.8.0

bus info: scsi@0:0.8.0

version: 0601

configuration: ansiversion=5

*-disk:0

description: ATA Disk

product: SDLF1DAR-960G-1H

physical id: 0.9.0

bus info: scsi@0:0.9.0

logical name: /dev/sda

version: ZH06

serial: A008676A

size: 894GiB (960GB)

capacity: 894GiB (960GB)

capabilities: 15000rpm partitioned partitioned:dos

configuration: ansiversion=6 logicalsectorsize=512 sectorsize=4096 signature=000e7231

*-volume:0

description: PPC PReP Boot partition

physical id: 1

bus info: scsi@0:0.9.0,1

logical name: /dev/sda1

capacity: 10MiB

capabilities: primary bootable boot

*-volume:1

description: Linux raid autodetect partition

physical id: 2

bus info: scsi@0:0.9.0,2

logical name: /dev/sda2

capacity: 1025MiB

capabilities: primary multi

*-volume:2

description: Linux raid autodetect partition

physical id: 3

bus info: scsi@0:0.9.0,3

logical name: /dev/sda3

capacity: 893GiB

capabilities: primary multi

*-disk:1

description: ATA Disk

product: SDLF1DAR-960G-1H

physical id: 0.a.0

bus info: scsi@0:0.10.0

logical name: /dev/sdb

version: ZH06

serial: A0086638

size: 894GiB (960GB)

capacity: 894GiB (960GB)

capabilities: 15000rpm partitioned partitioned:dos

configuration: ansiversion=6 logicalsectorsize=512 sectorsize=4096 signature=0003819f

*-volume:0

description: PPC PReP Boot partition

physical id: 1

bus info: scsi@0:0.10.0,1

logical name: /dev/sdb1

...