

Hard Disk Retention Process Using Centos 7

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Step 1: Create RAID 0 on each Hard disk

>ctrl+R #Enter raid controller interface

```
LSI MegaRAID SAS PCI Express ROMB BIOS Configuration Utility 5.08-0006
UD Mgmt PD Mgmt Ctrl Mgmt Properties
Drive Management
PAGE-1
Enclosure Info
Vendor:
QUANTA
Enclosure ID:
8
Enclosure Location:
Internal
Enclosure Model:
D51PH-1ULH
Product Revision Level:
0400
Status:
Optimal
Number of Slots:
16
Number of PD's:
4

D51PH-1ULH QUANTA Port 0 - 3
Slot Type Capacity State DG Vendor
P0:01:09 SAS 0.00 KB Failed - SEAGATE
P0:01:11 SAS 1.81 TB UG - HGST
P0:01:12 SSD-SATA 223.06 GB Online 00 ATA
P0:01:10 SATA 1.81 TB Online 01 ATA

F1-Help F2-Operations F5-Refresh Ctrl-N-Next Page Ctrl-P-Prev Page F12-Ctrlr
```

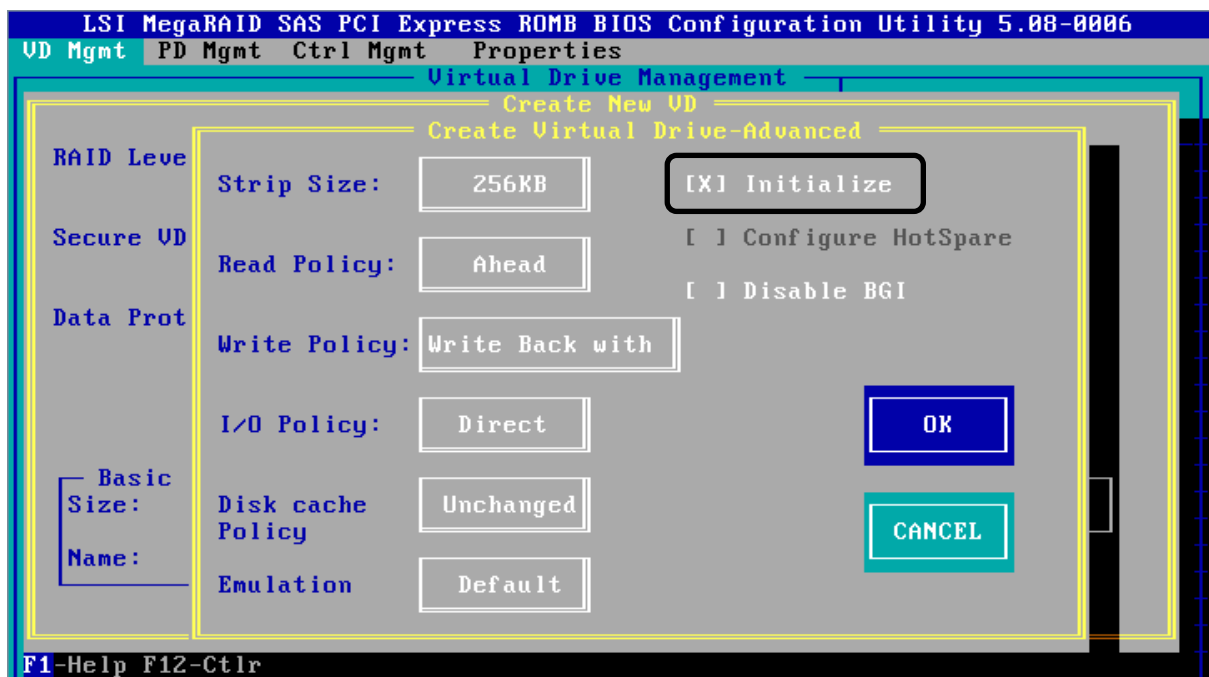
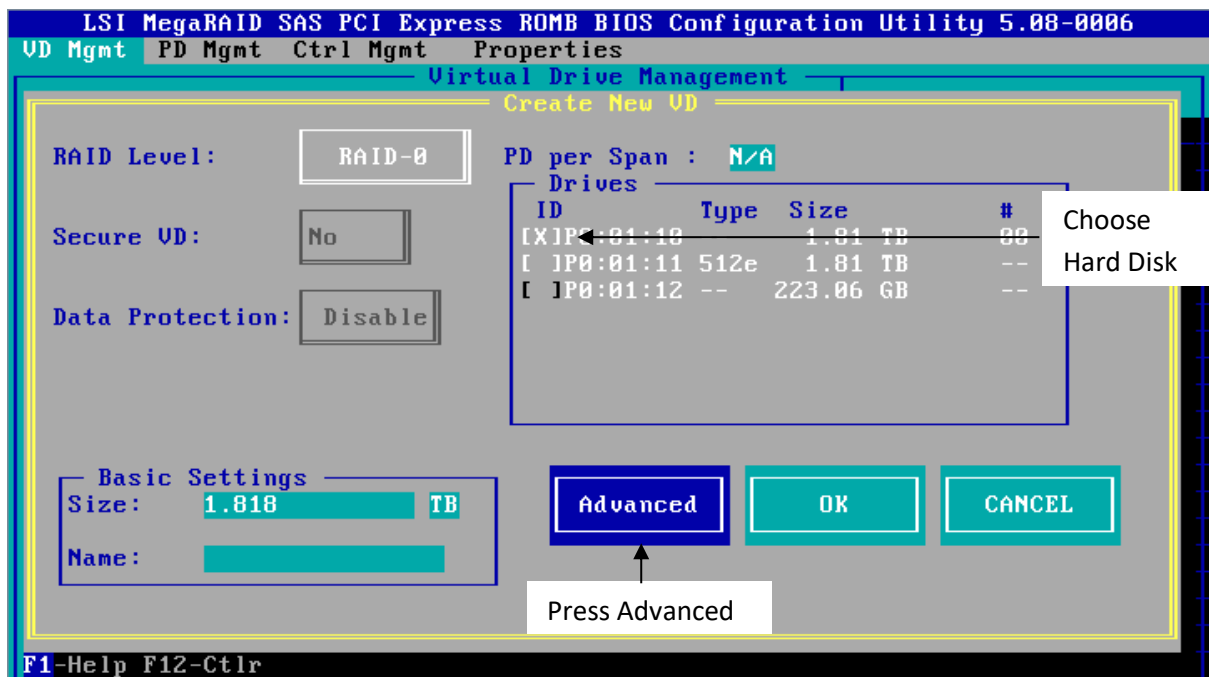
#If the hard disk state as FAILED, please END OF LIFE the hard disk directly.

>Create RAID 0

```
LSI MegaRAID SAS PCI Express ROMB BIOS Configuration Utility 5.08-0006
UD Mgmt PD Mgmt Ctrl Mgmt Properties
Virtual Drive Management
[-] LSI MegaRAID SAS PCI Expre(Bus 0x05, Dev 0x00) ← Press Enter
  [-] No Configuration Present !
  [-] Unconfigured Drives
    P0:01:10: Ready: 1.81 TB
    P0:01:11: Ready: 1.81 TB
    P0:01:12: Ready: 223.06 GB

Drive Groups: 0
Virtual Drives: 0
Drives: 4

F1-Help F2-Operations F5-Refresh Ctrl-N-Next Page Ctrl-P-Prev Page F12-Ctrlr
```



```

LSI MegaRAID SAS PCI Express ROMB BIOS Configuration Utility 5.08-0006
VD Mgmt PD Mgmt Ctrl Mgmt Properties
Virtual Drive Management
[-] LSI MegaRAID SAS PCI Expre(Bus 0x05, Dev 0x00)
  [-] Drive Group: 0, RAID 0
    [-] Virtual Drives
      ID: 0, 1.81 TB
    [-] Drives
    [+ Available size: 0.00 KB
    Hot spare drives
  [-] Unconfigured Drives
    P0:01:11: Ready: 1.81 TB
    P0:01:12: Ready: 223.06 GB
  Virtual Drive 0:
  State: Optimal
  RAID Level: 0
  Operation: Init.
  Progress: / 49%
  Drive Group 0:
  Virtual Drives: 1
  Drives: 1
  Free Cap.: 0.00 KB
  Free Areas: 0
F1-Help F2-Operations F5-Refresh Ctrl-N-Next Page Ctrl-P-Prev Page F12-Ctrlr

```

#Repeat the step until all hard disk become Raid 0

```

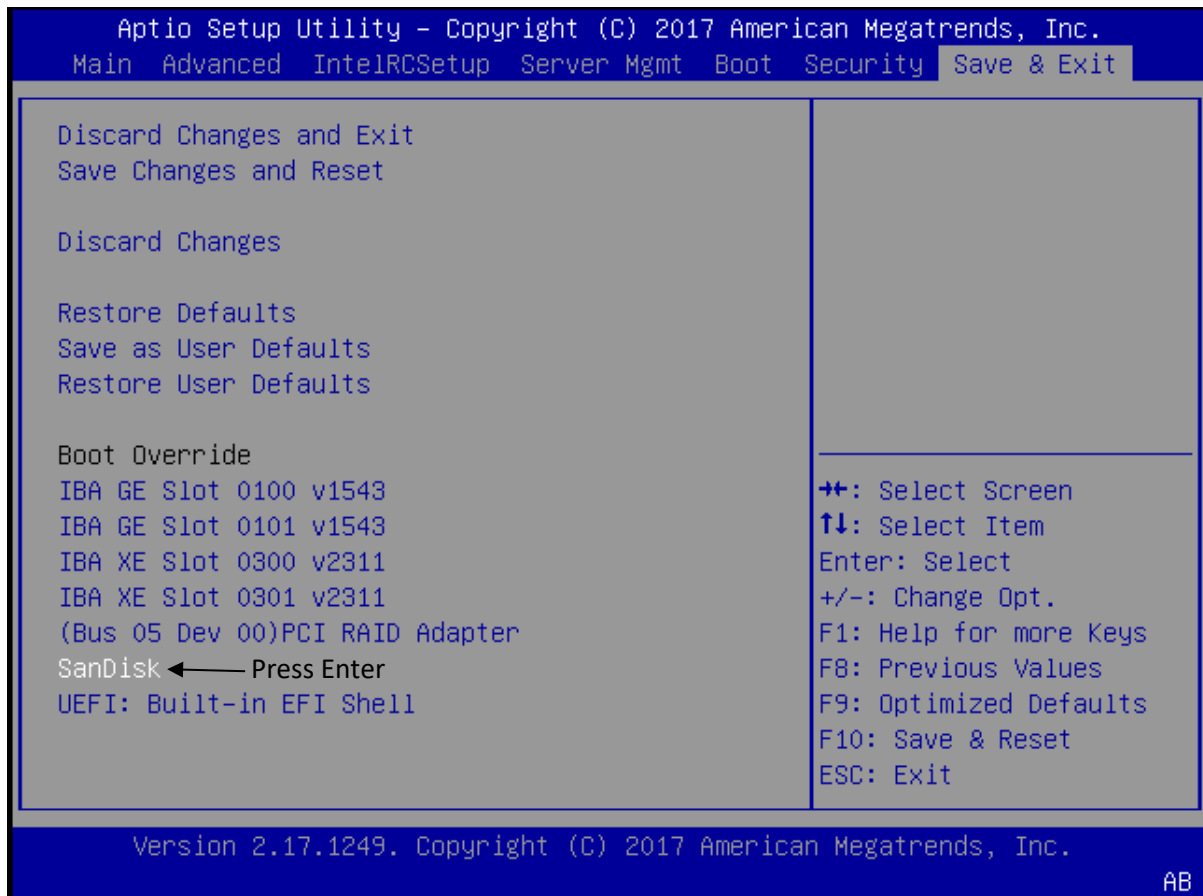
LSI MegaRAID SAS PCI Express ROMB BIOS Configuration Utility 5.08-0006
VD Mgmt PD Mgmt Ctrl Mgmt Properties
Virtual Drive Management
[-] LSI MegaRAID SAS PCI Expre(Bus 0x05, Dev 0x00)
  [-] Drive Group: 0, RAID 0
    [-] Virtual Drives
      ID: 0, 1.81 TB
    [-] Drives
    [+ Available size: 0.00 KB
    Hot spare drives
  [-] Drive Group: 1, RAID 0
    [-] Virtual Drives
      ID: 1, 1.81 TB
    [-] Drives
    [+ Available size: 0.00 KB
    Hot spare drives
  [-] Drive Group: 2, RAID 0
    [-] Virtual Drives
      ID: 2, 223.06 GB
    [-] Drives
    [+ Available size: 0.00 KB
    Hot spare drives
  Virtual Drive 0:
  State: Optimal
  RAID Level: 0
  Drive Group 0:
  Virtual Drives: 1
  Drives: 1
  Free Cap.: 0.00 KB
  Free Areas: 0
F1-Help F2-Operations F5-Refresh Ctrl-N-Next Page Ctrl-P-Prev Page F12-Ctrlr

```

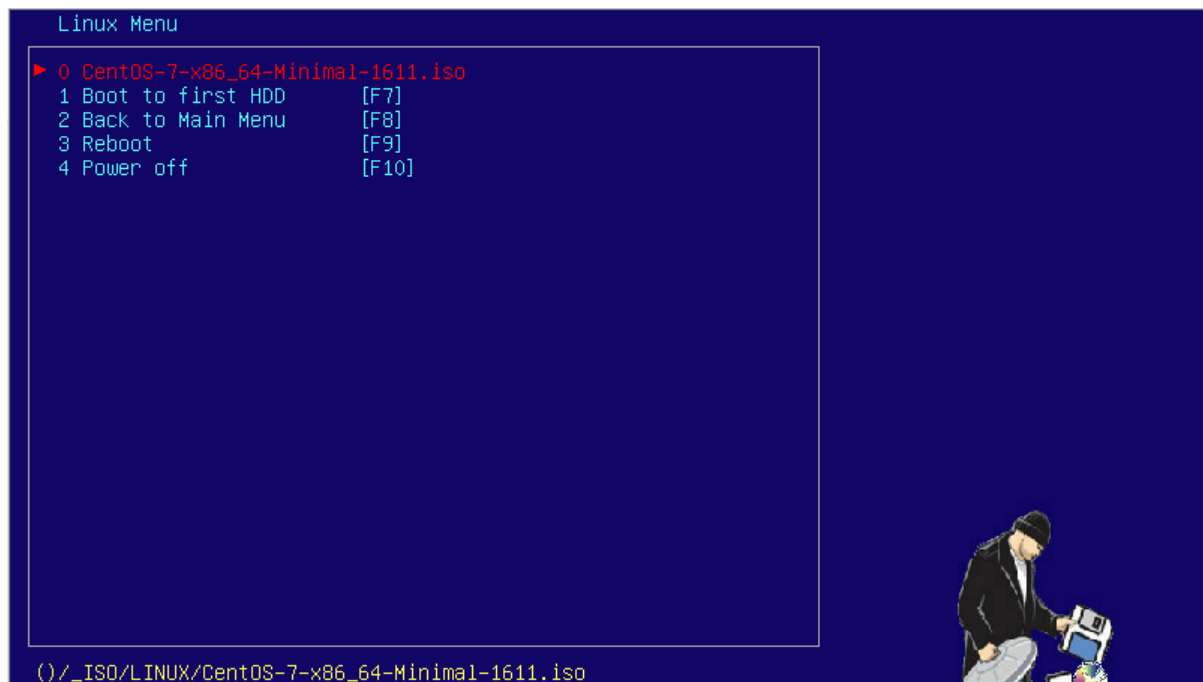
>Exit and reboot server

Step 2: Centos 7 Installation (Using e2b pendrive)

>Enter Setup/Bios

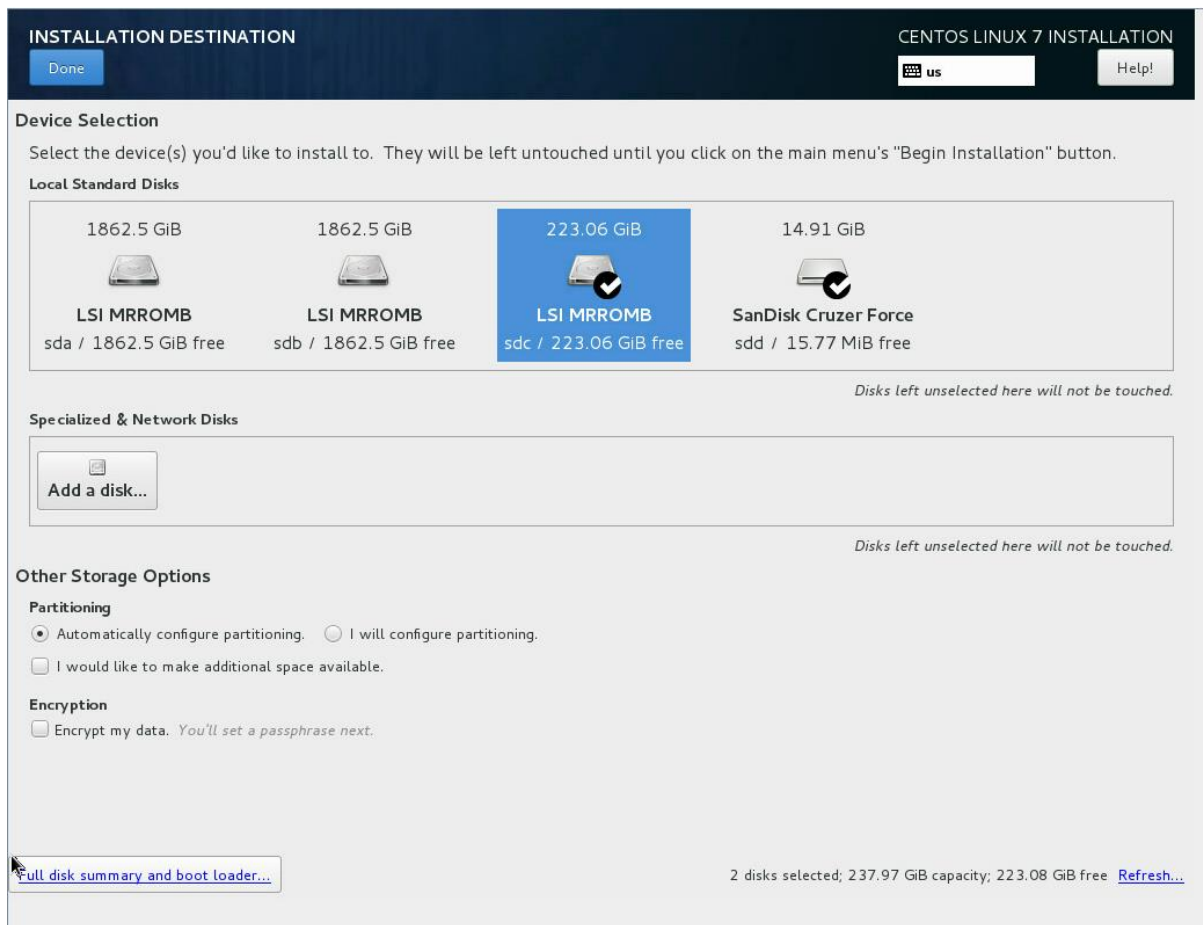


>Choose LINUX Menu > CentOS-7



>Install Centos 7

>Choose one of the hard disk as Installation Destination



The screenshot shows the 'INSTALLATION DESTINATION' window for CentOS Linux 7. The title bar says 'CENTOS LINUX 7 INSTALLATION'. There are 'Done' and 'Help!' buttons. The main section is 'Device Selection' with a sub-header 'Local Standard Disks'. It lists four disks: two 1862.5 GiB LSI MRROMB disks (sda and sdb) and two smaller disks (sdc and sdd). The sdc disk is selected with a checkmark. Below this is a section for 'Specialized & Network Disks' with an 'Add a disk...' button. At the bottom, there are 'Other Storage Options' for partitioning and encryption. A status bar at the bottom indicates '2 disks selected; 237.97 GiB capacity; 223.08 GiB free' and has a 'Refresh...' link.

INSTALLATION DESTINATION





CENTOS LINUX 7 INSTALLATION

Done Help!

Device Selection

Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begin Installation" button.

Local Standard Disks

1862.5 GiB	1862.5 GiB	223.06 GiB	14.91 GiB
			
LSI MRROMB	LSI MRROMB	LSI MRROMB	SanDisk Cruzer Force
sda / 1862.5 GiB free	sdb / 1862.5 GiB free	sdc / 223.06 GiB free	sdd / 15.77 MiB free

Disks left unselected here will not be touched.

Specialized & Network Disks

Add a disk...

Disks left unselected here will not be touched.

Other Storage Options

Partitioning

☒ Automatically configure partitioning. ☐ I will configure partitioning.

☐ I would like to make additional space available.

Encryption

☐ Encrypt my data. You'll set a passphrase next.

[Full disk summary and boot loader...](#)

2 disks selected; 237.97 GiB capacity; 223.08 GiB free [Refresh...](#)

>set root password

>Reboot the server and unplug e2b pendrive after finish

Step 3: Login into Centos and enable SSH service in Centos

>ip addr #show interface name

```
[root@localhost ~]# ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eno1: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq state DOWN qlen 1000
    link/ether 2c:68:0c:d0:5b:fa brd ff:ff:ff:ff:ff:ff
3: eno2: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq state DOWN qlen 1000
    link/ether 2c:68:0c:d0:5b:fb brd ff:ff:ff:ff:ff:ff
4: ens255f0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq state DOWN qlen 1000
    link/ether 2c:68:0c:f1:f2:dd brd ff:ff:ff:ff:ff:ff
5: ens255f1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP qlen 1000
    link/ether 2c:68:0c:f1:f2:de brd ff:ff:ff:ff:ff:ff
```

>ifup <int> #received dhcp ip for particular interface

```
[root@localhost ~]# ifup ens255f1
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/0)
[root@localhost ~]# ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eno1: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq state DOWN qlen 1000
    link/ether 2c:60:0c:d0:5b:fa brd ff:ff:ff:ff:ff:ff
3: eno2: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq state DOWN qlen 1000
    link/ether 2c:60:0c:d0:5b:fb brd ff:ff:ff:ff:ff:ff
4: ens255f0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq state DOWN qlen 1000
    link/ether 2c:60:0c:f1:f2:dd brd ff:ff:ff:ff:ff:ff
5: ens255f1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP qlen 1000
    link/ether 2c:60:0c:f1:f2:de brd ff:ff:ff:ff:ff:ff
    inet 192.168.9.182/24 brd 192.168.9.255 scope global dynamic ens255f1
        valid_lft 86396sec preferred_lft 86396sec
    inet6 fe80::b16:da7:e155:623b/64 scope link
        valid_lft forever preferred_lft forever
```

#ip = 192.168.9.182

Step 2: SSH through Putty

Step 3: Check Disk available

>fdisk -l

Or >lsblk #Easy to view

```
[root@localhost ~]# lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda          8:0    0 223.1G  0 disk
├─sda1       8:1    0   500M  0 part /boot
├─sda2       8:2    0 222.6G  0 part
│   ├─centos-root 253:0    0    50G  0 lvm  /
│   ├─centos-swap 253:1    0   7.8G  0 lvm  [SWAP]
│   └─centos-home 253:2    0 164.7G  0 lvm  /home
sdb          8:16   0   1.8T  0 disk
```

First Disk with OS

→ Targeted Disk

Step 4: Format Disk from Beginning

>dd if=/dev/zero of=/dev/sdb bs=1M count=1000

```
[root@localhost ~]# dd if=/dev/zero of=/dev/sdb bs=1M count=1000
1000+0 records in
1000+0 records out
1048576000 bytes (1.0 GB) copied, 7.70589 s, 136 MB/s
```

Step 5: Format Disk from Ending

>fdisk -s /dev/sdb #Check for block size

```
[root@localhost ~]# fdisk -s /dev/sdb
1952972800
```

>dd if=/dev/zero of=/dev/sdb bs=1k seek=1952900000 #last 5 digits become zero

```
[root@localhost ~]# dd if=/dev/zero of=/dev/sdb bs=1k seek=1952900000
dd: error writing '/dev/sdb': No space left on device
72801+0 records in
72800+0 records out
74547200 bytes (75 MB) copied, 2.40883 s, 30.9 MB/s
```

Step 6: Check disk using Megacli

>yum install http://dl.marmotte.net/rpms/redhat/el6/x86_64/megacli-8.00.46-2/megacli-8.00.46-2.x86_64.rpm #Install only once

>MegaCli -PDList -aALL

```
Enclosure Device ID: 8
Slot Number: 9
Enclosure position: 0
Device Id: 106
Sequence Number: 2
Media Error Count: 0
Other Error Count: 2
Predictive Failure Count: 0
Last Predictive Failure Event Seq Number: 0
PD Type: SAS
Raw Size: 0 KB [0x0 Sectors]
Non Coerced Size: 0 KB [0x0 Sectors]
Coerced Size: 0 KB [0x0 Sectors]
Firmware state: Unconfigured(bad)
SAS Address(0): 0x5000c500835e70f1
SAS Address(1): 0x0
Connected Port Number: 0(path0)
Inquiry Data: SEAGATE ST1000NM0023      0004Z1W3WHY8
FDE Capable: Not Capable
FDE Enable: Disable
Secured: Unsecured
Locked: Unlocked
Needs EKM Attention: No
Foreign State: None
Device Speed: Unknown
Link Speed: Unknown
Media Type: Hard Disk Device
Drive: Not Supported
Drive Temperature :0C (32.00 F)
```

} Check for these four sections. If result not equal to zero, proceed for Step 7

Example of result for good condition hard disk

```
Media Error Count: 0
Other Error Count: 0
Predictive Failure Count: 0
Last Predictive Failure Event Seq Number: 0
```

Step 7: Bad Condition Hard Disk Check

>yum install smartmontools #Install only once

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

Total download size: 666 k
Installed size: 2.0 M
Is this ok [y/d/N]: y

Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Importing GPG key 0xF4A80EB5:
  Userid      : "CentOS-7 Key (CentOS 7 Official Signing Key) <security@centos.org>"
  Fingerprint: 6341 ab27 53d7 8a78 a7c2 7bb1 24c6 a8a7 f4a8 0eb5
  Package     : centos-release-7-2.1511.el7.centos.2.10.x86_64 (@anaconda)
  From        : /etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Is this ok [y/N]: y

Installed:
  smartmontools.x86_64 1:6.2-8.el7

Dependency Installed:
  mailx.x86_64 0:12.5-16.el7

Complete!
```

>service smartd start

>chkconfig smartd on

>MegaCli -PDList -aALL #Look for targeted hard disk

```
Enclosure Device ID: 8
Slot Number: 10
Enclosure position: 0
Device Id: 23
Sequence Number: 2
Media Error Count: 0
Other Error Count: 0
Predictive Failure Count: 0
Last Predictive Failure Event Seq Number: 0
PD Type: SATA
Raw Size: 1.819 TB [0xe8e088b0 Sectors]
Non Coerced Size: 1.818 TB [0xe8d088b0 Sectors]
Coerced Size: 1.818 TB [0xe8d00000 Sectors]
Firmware state: Online, Spun Up
SAS Address(0): 0x5001636001a0dbca
Connected Port Number: 0(path0)
Inquiry Data:      WD-WMAY00446759WDC WD2001FASS-00W2B0      05.01D05
FDE Capable: Not Capable
FDE Enable: Disable
Secured: Unsecured
Locked: Unlocked
Needs EKM Attention: No
Foreign State: None
Device Speed: 3.0Gb/s
Link Speed: 3.0Gb/s
Media Type: Hard Disk Device
Drive: Not Certified
Drive Temperature :34C (93.20 F)
```

Or >/opt/MegaRAID/MegaCli/MegaCli64 -PdList -aALL | grep "Device Id"

Example of BAD condition Hard disk

```
>smartctl -a -d megaraid,23 /dev/sdb
```

```
=== START OF READ SMART DATA SECTION ===
SMART overall-health self-assessment test result: PASSED
Warning: This result is based on an Attribute check.
```

```
SMART Attributes Data Structure revision number: 16
Vendor Specific SMART Attributes with Thresholds:
ID# ATTRIBUTE_NAME          FLAG     VALUE WORST THRESH TYPE      UPDATED  WHEN_FAILED RAW_VALUE
 1 Raw_Read_Error_Rate     0x002f   199    199   051  Pre-fail Always    -         3993
 3 Spin_Up_Time            0x0027   169    169   021  Pre-fail Always    -        13533
 4 Start_Stop_Count        0x0032   100    100   000    Old_age Always    -          11
 5 Reallocated_Sector_Ct   0x0033   200    200   140  Pre-fail Always    -          0
 7 Seek_Error_Rate         0x002e   200    200   000    Old_age Always    -          0
 9 Power_On_Hours          0x0032   040    039   000    Old_age Always    -       44374
10 Spin_Retry_Count        0x0032   100    253   000    Old_age Always    -          0
11 Calibration_Retry_Count 0x0032   100    253   000    Old_age Always    -          0
12 Power_Cycle_Count       0x0032   100    100   000    Old_age Always    -         10
192 Power-Off_Retract_Count 0x0032   200    200   000    Old_age Always    -         10
193 Load_Cycle_Count       0x0032   026    026   000    Old_age Always    -     524994
194 Temperature_Celsius    0x0022   118    112   000    Old_age Always    -          34
196 Reallocated_Event_Count 0x0032   200    200   000    Old_age Always    -          0
197 Current_Pending_Sector  0x0032   200    199   000    Old_age Always    -          5
198 Offline_Uncorrectable   0x0030   199    199   000    Old_age Offline    -         386
199 UDMA_CRC_Error_Count    0x0032   200    200   000    Old_age Always    -          0
200 Multi_Zone_Error_Rate   0x0008   198    198   000    Old_age Offline    -         483

SMART Error Log Version: 1
No Errors Logged
```

#If the above highlighted attribute mentioned as Pre-fail and Old_age and there are OFFLINE on UPDATED section, it means the hard disk is not in very good condition.

```
>smartctl -t short -d megaraid,23 /dev/sdb
```

#take a short test for hard disk

```
>smartctl -l selftest -d megaraid,23 /dev/sdb
```

#retrieve the result of short test

```
[root@localhost ~]# smartctl -l selftest -d megaraid,23 /dev/sdb
smartctl 6.2 2017-02-27 r4394 [x86_64-linux-3.10.0-327.el7.x86_64] (local build)
Copyright (C) 2002-13, Bruce Allen, Christian Franke, www.smartmontools.org

/dev/sdb [megaraid_disk_23] [SAT]: Device open changed type from 'megaraid,23' to 'sat+megaraid,23'
=== START OF READ SMART DATA SECTION ===
SMART Self-test log structure revision number 1
Num Test_Description      Status              Remaining  LifeTime(hours)  LBA_of_first_error
# 1 Short offline          Completed: read failure     90%        44374            617547912
# 2 Short offline          Completed: read failure     90%        44374            617547912
```

#If there are any failure, please **end of life** the hard disk

Example of Good Condition Hard Disk

```
=== START OF READ SMART DATA SECTION ===
SMART Health Status: OK
```

```
[root@localhost ~]# smartctl -l selftest -d megaraid,108 /dev/sda
smartctl 6.2 2017-02-27 r4394 [x86_64-linux-3.10.0-514.el7.x86_64] (local build)
Copyright (C) 2002-13, Bruce Allen, Christian Franke, www.smartmontools.org

=== START OF READ SMART DATA SECTION ===
SMART Self-test log
Num Test              Status              segment  LifeTime  LBA_first_err [SK ASC ASQ]
   1 Description
# 1 Background short  Completed              -          1            - [- - -]
Long (extended) Self Test duration: 17274 seconds [287.9 minutes]
```

#Please mark as **AP** is the hard disk condition is good.