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## Installation of OpenFiler 2.3 and accessing the storage from RAC Nodes

Download openfiler from the below site

<http://sourceforge.net/projects/openfiler/files/openfiler-distribution-iso-x86/2.3%20Respin%20%2821-01-09%29/openfiler-2.3-x86-disc1.iso/download>

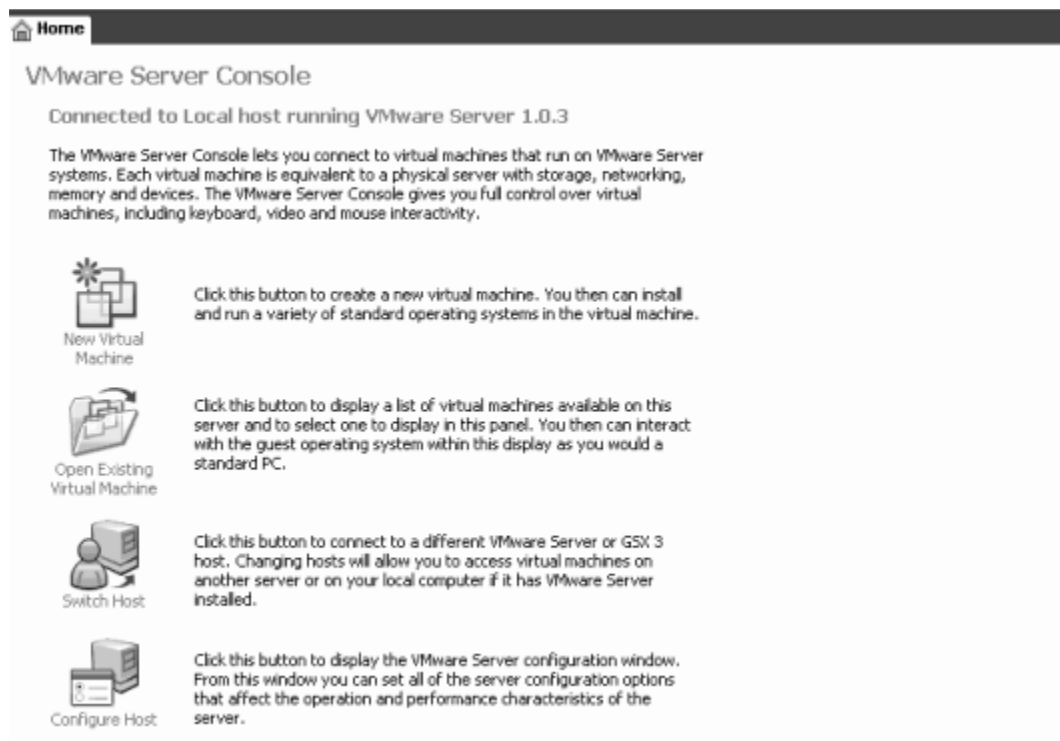


It is a iso image, we can directly use it in VMWARE

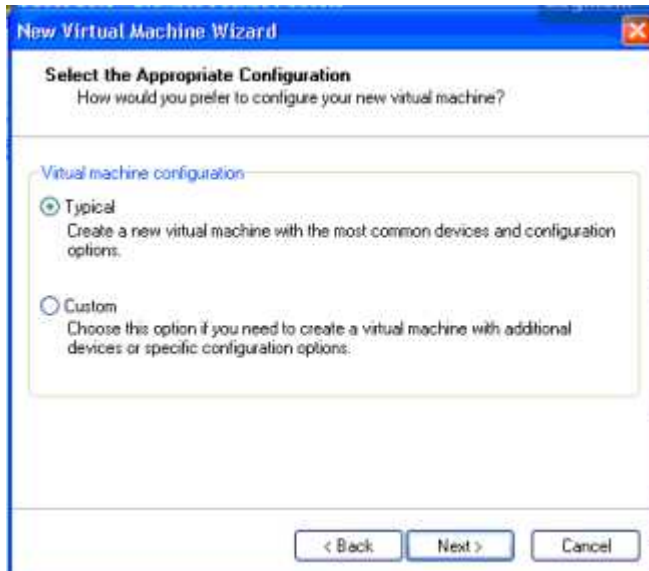
Install VMWARE by following the below steps

[http://www.appsdba.info/docs/RAC/install/1\\_Install\\_VMWARE.pdf](http://www.appsdba.info/docs/RAC/install/1_Install_VMWARE.pdf)

-- Start VMWARE



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**New Virtual Machine Wizard**

**Select a Guest Operating System**  
Which operating system will be installed on this virtual machine?

Guest operating system:

- Microsoft Windows
- Linux
- Novell NetWare
- Sun Solaris
- Other

Version:

Red Hat Enterprise Linux 4

< Back   Next >   Cancel

**New Virtual Machine Wizard**

**Name the Virtual Machine**  
What name would you like to use for this virtual machine?

Virtual machine name:

openfiler

Location:

F:\openfiler   Browse...

< Back   Next >   Cancel

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**New Virtual Machine Wizard**

**Network Type**  
What type of network do you want to add?

**Network connection**

- Use bridged networking  
Give the guest operating system direct access to an external Ethernet network. The guest must have its own IP address on the external network.
- Use network address translation (NAT)  
Give the guest operating system access to the host computer's dial-up or external Ethernet network connection using the host's IP address.
- Use host-only networking  
Connect the guest operating system to a private virtual network on the host computer.
- Do not use a network connection

< Back   Next >   Cancel

**New Virtual Machine Wizard**

**Specify Disk Capacity**  
How large do you want this disk to be?

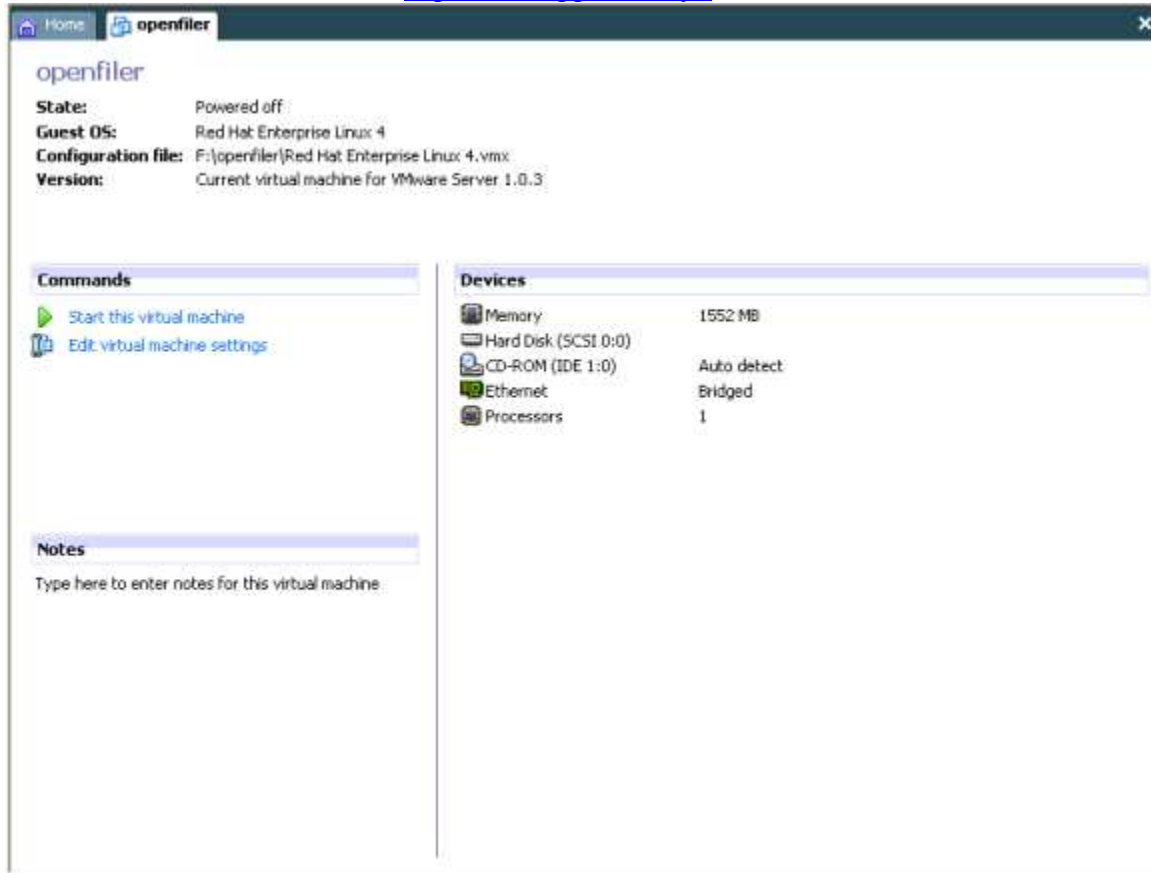
**Disk capacity**  
This virtual disk can never be larger than the maximum capacity that you set here.

Disk size (GB):

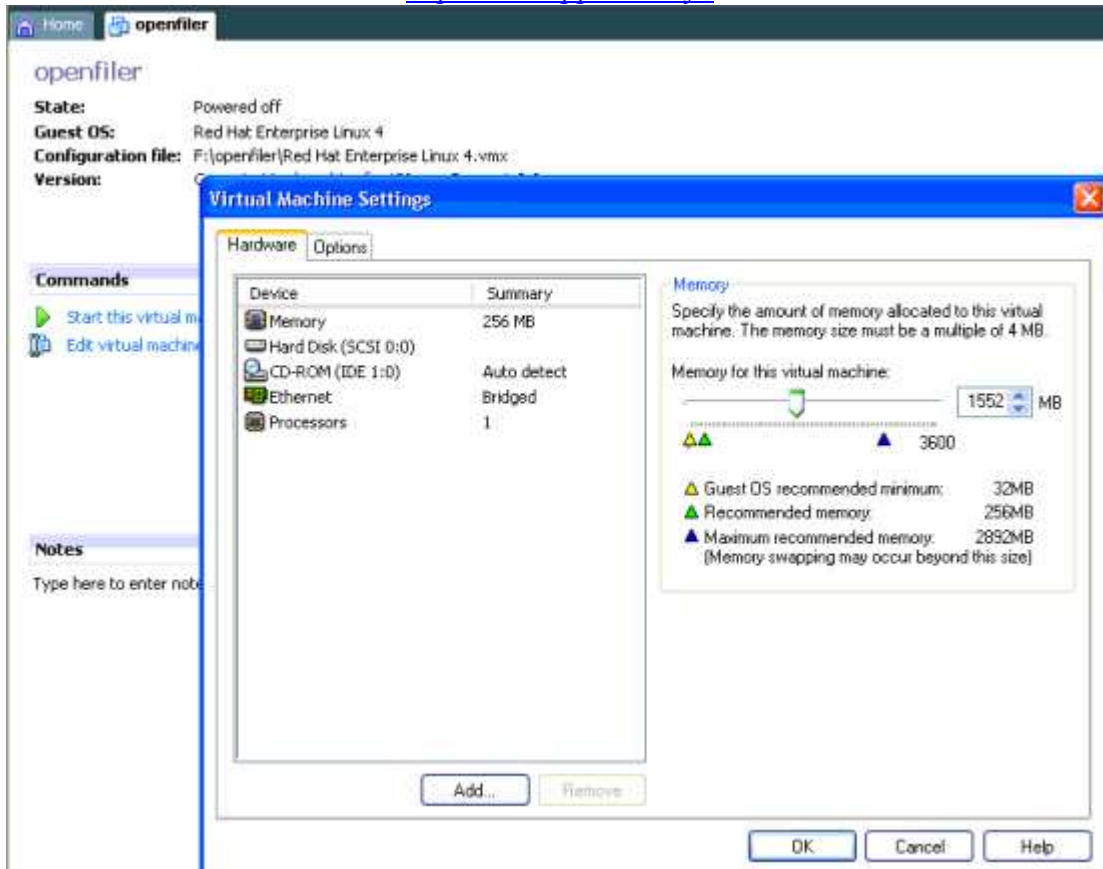
- Allocate all disk space now.  
By allocating the full capacity of the virtual disk, you enhance performance of your virtual machine. However, the disk will take longer to create and there must be enough space on the host's physical disk.  
If you do not allocate disk space now, your virtual disk files will start small, then become larger as you add applications, files, and data to your virtual machine.
- Split disk into 2 GB files

< Back   Finish   Cancel

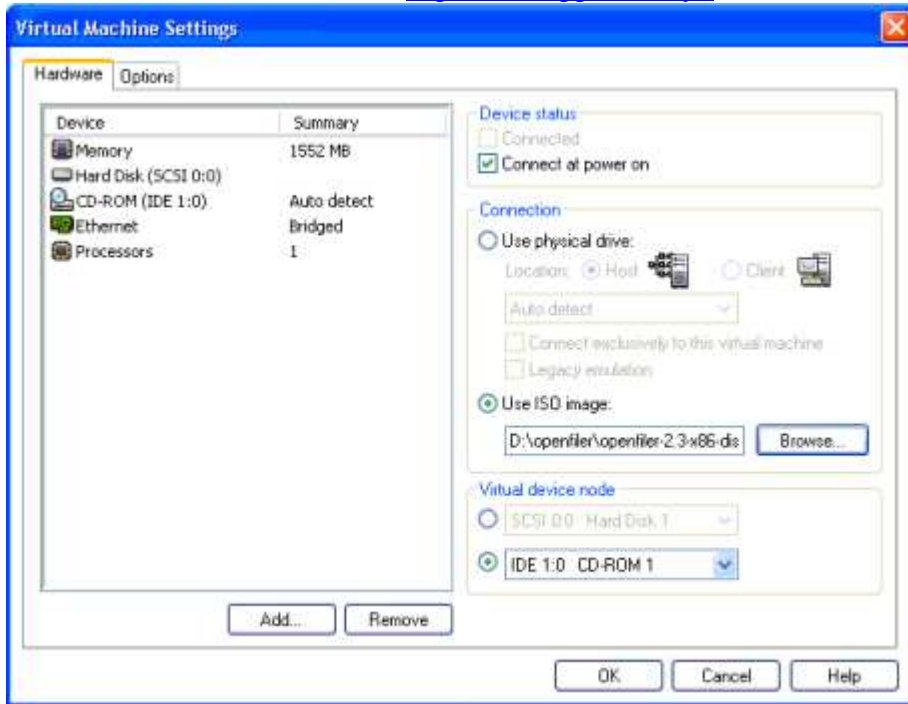
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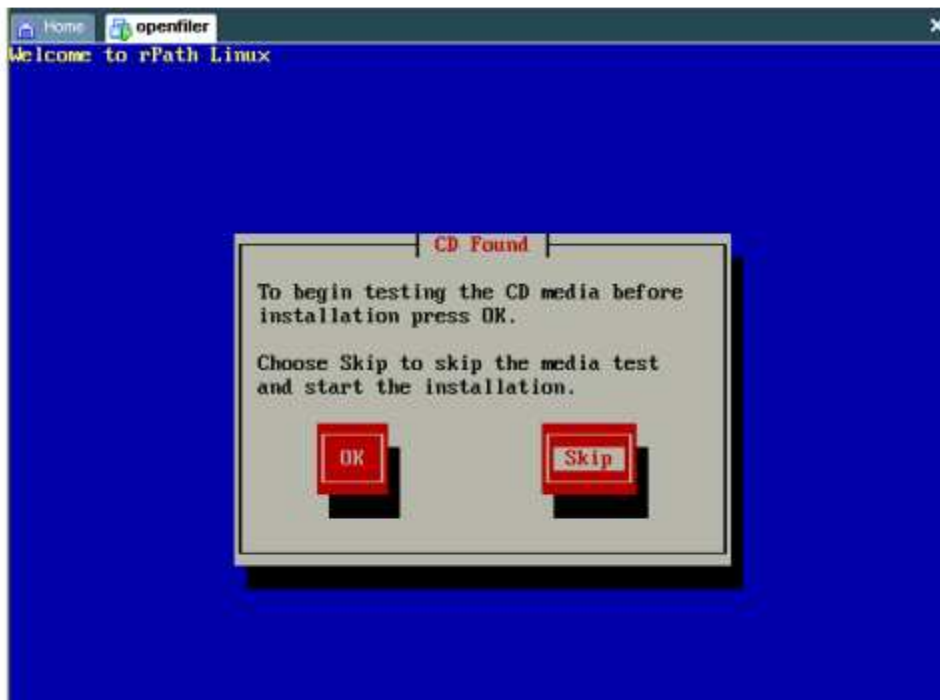
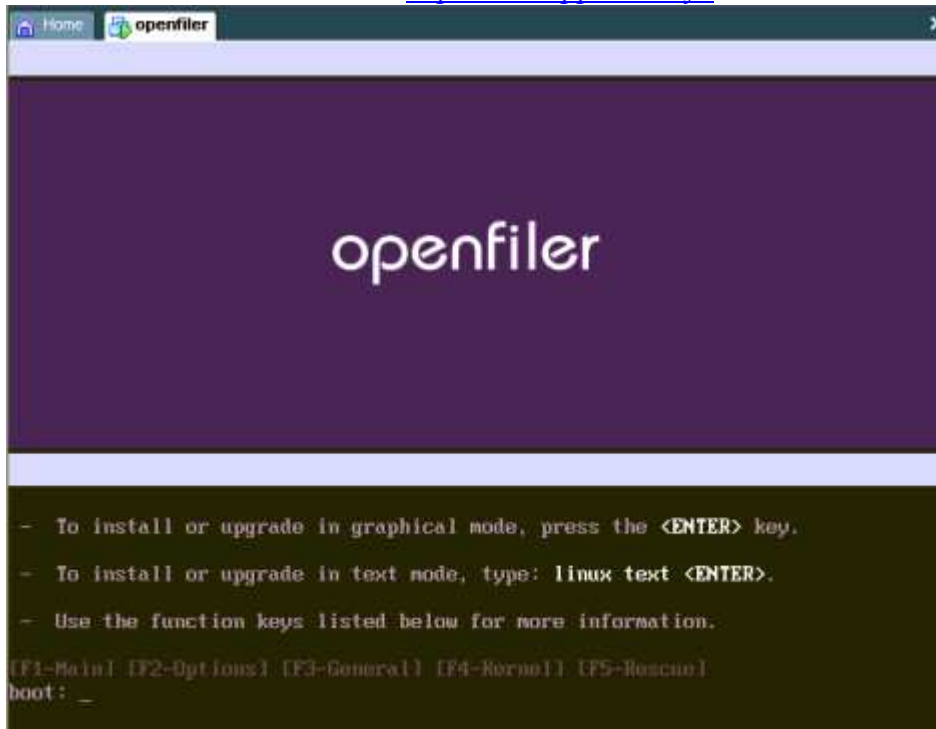
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**openfiler**

## Disk Partitioning Setup

One of the largest obstacles for a new user during a Linux installation is partitioning. This process is made easier by providing automatic partitioning.

By selecting automatic partitioning, you do not have to use partitioning tools to assign mount points, create partitions, or allocate space for your installation.

To partition manually, choose the **Disk Druid** partitioning tool.

Use the **Back** button to choose

Automatic Partitioning sets partitions based on the selected installation type. You also can customize the partitions once they have been created.

The manual disk partitioning tool, Disk Druid, allows you to create partitions in an interactive environment. You can set the file system types, mount points, partition sizes, and more.

Automatically partition

Manually partition with **Disk Druid**

Hide Help    Release Notes

Back    Next

**Warning**

The partition table on device sda was unreadable. To create new partitions it must be initialized, causing the loss of **ALL DATA** on this drive.

This operation will override any previous installation choices about which drives to ignore.

Would you like to initialize this drive, erasing **ALL DATA**?

No    Yes

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**Add Partition**

Mount Point: /

File System Type: ext3

Allowable Drives:  
 sda 20473 MB VMware, VMware Virtual S

Size (MB): 10000

Additional Size Options  
 Fixed size  
 Fill all space up to (MB): 1  
 Fill to maximum allowable size

Force to be a primary partition

**Add Partition**

Mount Point: <Not Applicable>

File System Type: swap

Allowable Drives:  
 sda 20473 MB VMware, VMware Virtual S

Size (MB): 4000

Additional Size Options  
 Fixed size  
 Fill all space up to (MB): 1  
 Fill to maximum allowable size

Force to be a primary partition

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Drive /dev/sda (281592 MB) (Model: VMware, VMware Virtual S)

sda1	Free
1004	267590 MB

\*\*\*\*\*

New Edit Delete Reset RAID LVM

Device	Mount Point/ RAID/Volume	Type	Format	Size (MB)	Start	End
▼ Hard Drives						
▼ /dev/sda						
/dev/sda1	/	ext3	✓	10001	1	1275
/dev/sda2		swap	✓	4001	1276	1785
Free		Free space		267591	1786	35898

Hide RAID device/LVM Volume Group members

tes

Back Next

Select DHCP for the network configuration

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**Network Devices**

Active on Boot	Device	IP/Netmask
<input checked="" type="checkbox"/>	eth0	DHCP

**Hostname**

Set the hostname:

automatically via DHCP

manually  (ex. "host.domain.com")

**Miscellaneous Settings**

Gateway:

Primary DNS:

Secondary DNS:

Tertiary DNS:


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# openfiler

## About to Install

**Caution:** Once you click **Next**, the installation program begins writing the operating system to the hard drive(s). This process cannot be undone. If you have decided not to continue with this installation, this is the last point at which you can safely abort the installation process.

To abort this installation, press your computer's **Reset** button or reset using **Control-Alt-Delete**, and then remove the installation media between the unmounting and reboot screen messages.

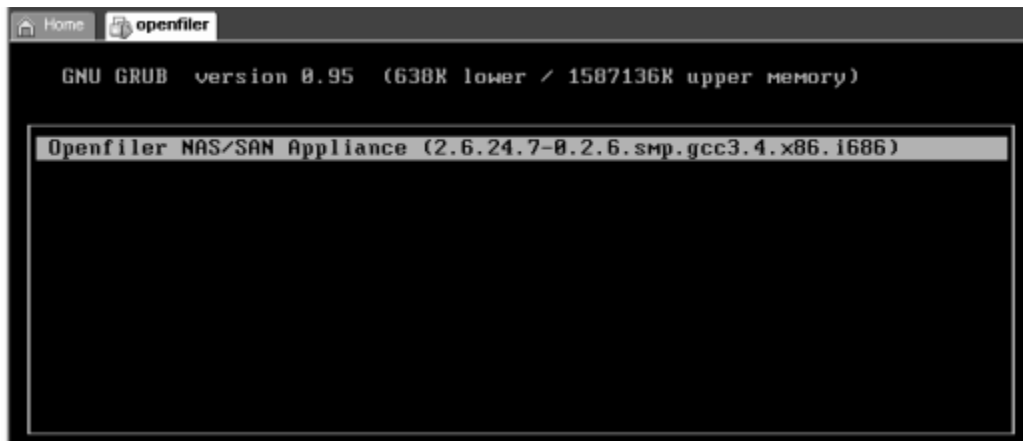
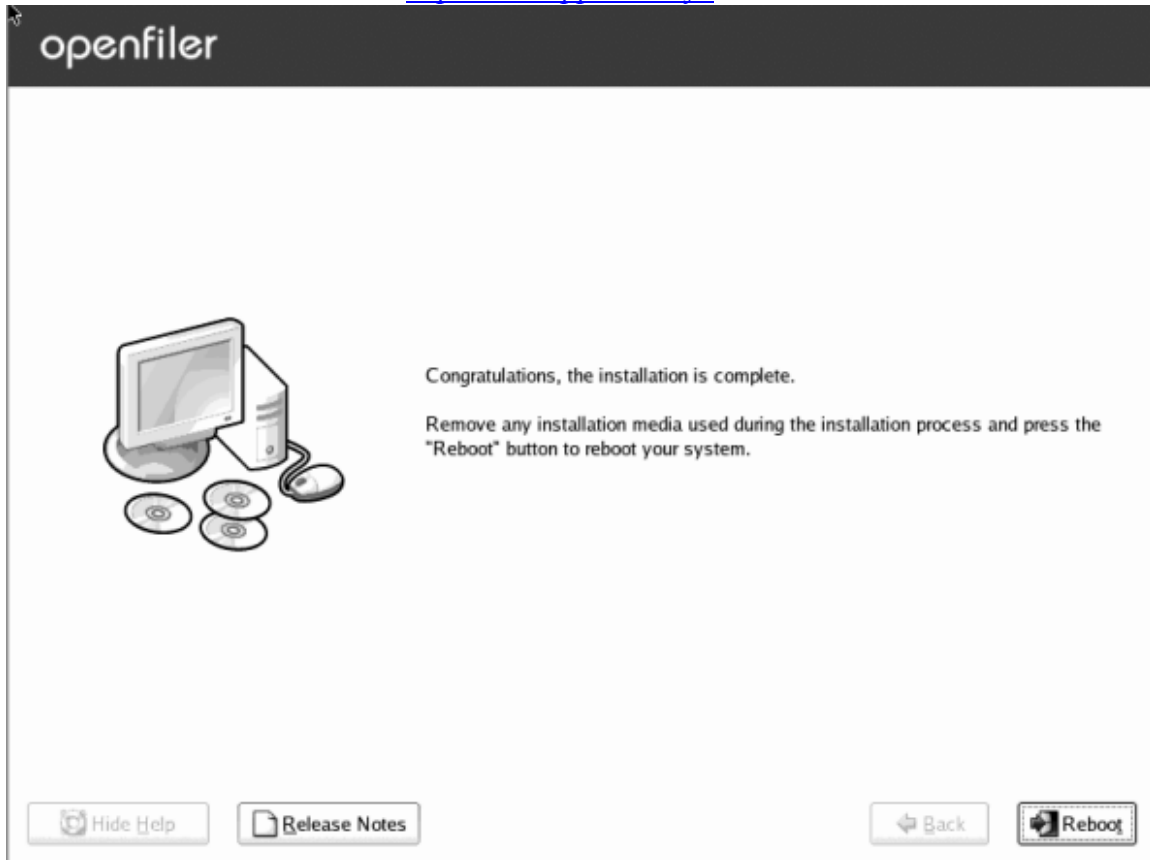


Click next to begin installation of Openfiler NAS/SAN Appliance.

A complete log of the installation can be found in the file `'/root/install.log'` after rebooting your system.

A kickstart file containing the installation options selected can be found in the file `'/root/anaconda-ks.cfg'` after rebooting the system.

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```
-----  
Commercial Support: http://www.openfiler.com/support/ |  
Administrator Guide: http://www.openfiler.com/buy/administrator-guide |  
Community Support: http://www.openfiler.com/community/forums/ |  
Internet Relay Chat: server: irc.freenode.net channel: #openfiler |  
-----  
(C) 2001-2008 Openfiler. All Rights Reserved. |  
Openfiler is licensed under the terms of the GNU GPL, version 2 |  
http://www.gnu.org/licenses/gpl-2.0.html |  
-----  
Welcome to Openfiler NAS/SAN Appliance, version 2.3  
Web administration GUI: https://192.168.1.6:446/
```

Open <https://192.168.1.6:446>

Username – openfiler  
Password – password

The screenshot displays the Openfiler web administration interface. At the top, there is a navigation bar with tabs for Status, System, Volumes, Quota, Shares, Services, and Accounts. The main content area is titled "System Information: openfiler1.com (192.168.1.12)". It is divided into three sections: System Vital, Hardware Information, and Network Usage. On the right side, there are three sidebar panels: "Status section" with links for System Overview and iSCSI Targets; "Support resources" with links for Report bug, Get support, Forums, and Admin Guide.

System Vital			
Canonical Hostname	openfiler1.com		
Listening IP	192.168.1.12		
Kernel Version	2.6.24.7-0.2.6.smp.gcc3.4.x86_i686 (SMP)		
Distro Name	Openfiler NAS/SAN		
Uptime	5 minutes		
Current Users	1		
Load Averages	0.10 0.46 0.27		

Network Usage			
Device	Received	Sent	Err/Drop
lo	282.08 KB	282.08 KB	0/0
eth0	35.60 KB	134.51 KB	0/0

Hardware Information	
Processors	1
Model	AMD Athlon(tm) Dual Core Processor 4850e
CPU Speed	2.51 GHz
Cache Size	512.00 KB
System Bogomips	5076.83
PCI Devices	- Bridge: Intel Corporation 82371AB/EB/MB PIIX4 ACPI - Ethernet controller: Advanced Micro Devices [AMD] 79c970 [PCnet32 LANCE] - Host bridge: Intel Corporation 440BX/ZX/DX - 82443BX/ZX/DX Host bridge - IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE - ISA bridge: Intel Corporation 82371AB/EB/MB PIIX4 ISA - PCI bridge: Intel Corporation 440BX/ZX/DX - 82443BX/ZX/DX AGP bridge

Click Services

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## Manage Services

Service Name	Status	Modification
SMB / CIFS server	Disabled	<a href="#">Enable</a>
NFSv3 server	Disabled	<a href="#">Enable</a>
HTTP / WebDAV server	Disabled	<a href="#">Enable</a>
FTP server	Disabled	<a href="#">Enable</a>
iSCSI target server	Disabled	<a href="#">Enable</a>
Rsync server	Disabled	<a href="#">Enable</a>
UPS server	Disabled	<a href="#">Enable</a>
LDAP server	Disabled	<a href="#">Enable</a>
ACPI daemon	Enabled	<a href="#">Disable</a>
iSCSI initiator	Enabled	<a href="#">Disable</a>

Select Enable iSCSI target server



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### Manage Services

Service Name	Status	Modification
SMB / CIFS server	Disabled	<a href="#">Enable</a>
NFSv3 server	Disabled	<a href="#">Enable</a>
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FTP server	Disabled	<a href="#">Enable</a>
iSCSI target server	Enabled	<a href="#">Disable</a>
Rsync server	Disabled	<a href="#">Enable</a>
UPS server	Disabled	<a href="#">Enable</a>
LDAP server	Disabled	<a href="#">Enable</a>
ACPI daemon	Enabled	<a href="#">Disable</a>
iSCSI initiator	Enabled	<a href="#">Disable</a>

Click System and add the 2 private IP address

### Network Access Configuration

Delete	Name	Network/Host	Netmask	Type
<input type="checkbox"/>	linux1-priv	192.168.0.101	255.255.255.0	Share
New	<input type="text" value="linux2-priv"/>	<input type="text" value="192.168.0.102"/>	<input type="text" value="255.255.255.0"/> ▼	<input type="text" value="Share"/> ▼

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Click Volumes


Navigation: Status System **Volumes** Quota Shares Services Accounts

### Volume Group Management

Volume Group Name	Size	Allocated	Free	Members	Add physical storage	Delete VG
-------------------	------	-----------	------	---------	----------------------	-----------

---

### Create a new volume group

 *No existing physical volumes were found, or all existing physical volumes are used. You can [create new physical volumes](#).*

Create new physical volumes

### Block Device Management

Edit Disk	Type	Description	Size	Label type	Partitions
<a href="#">/dev/sda</a>	SCSI	VMware, VMware Virtual S	274.99 GB	msdos	2 ( <a href="#">view</a> )

Click /dev/sda

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Edit partitions in /dev/sda (35898 cylinders with "msdos" label)

Device	Type	Number	Start cyl	End cyl	Blocks	Size	Type	Delete
/dev/sda1	Unknown Partition Type (0x0)	1	1	1275	10241406	9.77 GB	Primary	-
/dev/sda2	Linux Swap (0x82)	2	1276	1785	4096575	3.91 GB	Primary	-

*sdgda2  
(49986)*

Select Partition Type as Physical Volume

Create a partition in /dev/sda



You can use ranges within the following extents:

Mode	Starting cylinder	Ending cylinder	Space
Primary	1786	35898	261.32 GB

Mode	Partition Type	Starting cylinder	Ending cylinder	Size	Create	Reset
Primary	Physical volume	1786	35898	261.32 GB	Create	In Use

Edit partitions in /dev/sda (35898 cylinders with "msdos" label)

Device	Type	Number	Start cyl	End cyl	Blocks	Size	Type	Delete
/dev/sda1	Unknown Partition Type (0x0)	1	1	1275	10241406	9.77 GB	Primary	-
/dev/sda2	Linux Swap (0x82)	2	1276	1785	4096575	3.91 GB	Primary	-
/dev/sda3	Linux Physical Volume (0x8e)	3	1786	35898	274012672	261.32 GB	Primary	Delete

*sdgda2  
(49986)*

**Volume Group Management**

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The next step is to create a *Volume Group*. We will be creating a single volume group named `rac1` that contains the newly created primary partition.

From the Openfiler Storage Control Center, navigate to [Volumes] / [Volume Groups]. There we would see any existing volume groups, or none as in our case. Using the Volume Group Management screen, enter the name of the new volume group (`rac1`), click on the checkbox in front of `/dev/sdb1` to select that partition, and finally click on the 'Add volume group' button. After that we are presented with the list that now shows our newly created volume group named "rac1":

**Create a new volume group**

Valid characters for volume group name: **A-Z a-z 0-9**  
\_ + -

**Volume group name (no spaces)**

rac1

**Select physical volumes to add**

<input checked="" type="checkbox"/>	/dev/sda3	261.32 GB
-------------------------------------	-----------	-----------

Add volume group

## Logical Volumes

We can now create the five logical volumes in the newly created volume group (`rac1`).

From the Openfiler Storage Control Center, navigate to [Volumes] / [Add Volume]. There we will see the newly created volume group (`rac1`) along with its block storage statistics. Also available at the bottom of this screen is the option to create a new volume in the selected volume group - (*Create a volume in "rac1"*). Use this screen to create the following five logical (iSCSI) volumes. After creating each logical volume, the application will point you to the "Manage Volumes" screen. You will then need to click back to the "Add Volume" tab to create the next logical volume until all five iSCSI volumes are created:

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Free  
(100%)

### Create a volume in "rac1"

<b>Volume Name (*no spaces*. Valid characters [a-z,A-Z,0-9]):</b>	<input type="text" value="racdb-crs"/>
<b>Volume Description:</b>	<input type="text" value="b - Oracle Clusterware"/>
<b>Required Space (MB):</b>	<input type="text" value="2048"/> 
<b>Filesystem / Volume type:</b>	<input type="text" value="iSCSI"/>

Create

### Create a volume in "rac1"

<b>Volume Name (*no spaces*. Valid characters [a-z,A-Z,0-9]):</b>	<input type="text" value="racdb-asm1"/>
<b>Volume Description:</b>	<input type="text" value="racdb - ASM Volume 1"/>
<b>Required Space (MB):</b>	<input type="text" value="71680"/> 
<b>Filesystem / Volume type:</b>	<input type="text" value="iSCSI"/>

Create

Create racdb-asm2

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### Create a volume in "rac1"

<b>Volume Name (*no spaces*. Valid characters [a-z,A-Z,0-9]):</b>	<input type="text" value="racdb-asm3"/>
<b>Volume Description:</b>	<input type="text" value="racdb - ASM Volume 3"/>
<b>Required Space (MB):</b>	<input type="text" value="71680"/> 
<b>Filesystem / Volume type:</b>	<input type="text" value="iSCSI"/>

Create volumes as follows –

Volume name	Volume description	Volume size	File system type	File system size	FS used space	FS free space	Delete	Properties	Snapshots
racdb-crs	racdb - Oracle Clusterware	2048 MB	iSCSI	Not applicable	Not applicable	Not applicable	<a href="#">Delete</a>	<a href="#">Edit</a>	<a href="#">Create</a>
racdb-asm1	racdb - ASM Volume 1	71680 MB	iSCSI	Not applicable	Not applicable	Not applicable	<a href="#">Delete</a>	<a href="#">Edit</a>	<a href="#">Create</a>
racdb-asm2	racdb - ASM Volume 2	71680 MB	iSCSI	Not applicable	Not applicable	Not applicable	<a href="#">Delete</a>	<a href="#">Edit</a>	<a href="#">Create</a>
racdb-asm3	racdb - ASM Volume 3	71680 MB	iSCSI	Not applicable	Not applicable	Not applicable	<a href="#">Delete</a>	<a href="#">Edit</a>	<a href="#">Create</a>
<b>0 MB allocated to snapshots</b>									
<b>50496 MB of free space left</b>									

## Targets

At this point we have four iSCSI logical volumes. Before an iSCSI client can have access to them, however, an iSCSI target will need to be created for each of these five volumes. Each iSCSI logical volume will be *mapped* to a specific iSCSI target and the appropriate network access permissions to that target will be granted to both Oracle RAC nodes. For the purpose of this article, there will be a one-to-one mapping between an iSCSI logical volume and an iSCSI target.

There are three steps involved in creating and configuring an iSCSI target; create a unique Target IQN (basically, the universal name for the new iSCSI target), map one of the iSCSI logical volumes (created in the previous section) to the newly created iSCSI

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target, and finally, grant both of the Oracle RAC nodes access to the new iSCSI target. Please note that this process will need to be performed for each of the five iSCSI logical volumes created in the previous section.

For the purpose of this article, the following table lists the new iSCSI target names (the Target IQN) and which iSCSI logical volume it will be mapped to

We are now ready to create the four new iSCSI targets - one for each of the iSCSI logical volumes. The example below illustrates the three steps required to create a new iSCSI target by creating the Oracle Clusterware / racdb-crs target (iqn.2006-01.com.openfiler:racdb.crs). This three step process will need to be repeated for each of the five new iSCSI targets listed in the table above.

### Create New Target IQN

From the Openfiler Storage Control Center, navigate to [Volumes] / [iSCSI Targets]. Verify the grey sub-tab "Target Configuration" is selected. This page allows you to create a new iSCSI target. A default value is automatically generated for the name of the new iSCSI target (better known as the "Target IQN"). An example Target IQN is "iqn.2006-01.com.openfiler:tsn.ae4683b67fd3":

Target Configuration	LUN Mapping	Network ACL	CHAP Authentication
Add new iSCSI Target			
Target IQN		Add	
<input type="text" value="iqn.2006-01.com.openfiler:racdb.crs"/>		<input type="button" value="Add"/>	

Once you are satisfied with the new Target IQN, click the "Add" button. This will create a new iSCSI target and then bring up a page that allows you to modify a number of settings for the new iSCSI target. For the purpose of this article, none of settings for the new iSCSI target need to be changed.

### LUN Mapping

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After creating the new iSCSI target, the next step is to map the appropriate iSCSI logical volumes to it. Under the "Target Configuration" sub-tab, verify the correct iSCSI target is selected in the section "Select iSCSI Target". If not, use the pull-down menu to select the correct iSCSI target and hit the "Change" button.

Next, click on the grey sub-tab named "LUN Mapping" (next to "Target Configuration" sub-tab). Locate the appropriate iSCSI logical volume (`/dev/rac1/racdb-crs` in this case) and click the "Map" button. You do not need to change any settings on this page

Target Configuration | **LUN Mapping** | Network ACL | CHAP Authentication

---

LUNs mapped to target: iqn.2006-01.com.openfiler:racdb.crs

LUN Id.	LUN Path	R/W Mode	SCSI Serial No.	SCSI Id.	Transfer Mode	Unmap LUN
0	/dev/rac1/racdb-crs	write-thru	H6M22Y-y6BU-E0Io	H6M22Y-y6BU-E0Io	blockio	<input type="button" value="Unmap"/>

---

Map New LUN to Target: "iqn.2006-01.com.openfiler:racdb.crs"

Name	LUN Path	R/W Mode	SCSI Serial No.	SCSI Id.	Transfer Mode	Map LUN
racdb - ASM Volume 1	/dev/rac1/racdb-asm1	<input type="button" value="write-thru"/>	k1dPpO-8yNP-HfQA	k1dPpO-8yNP-HfQA	<input type="button" value="blockio"/>	<input type="button" value="Map"/>
racdb - ASM Volume 2	/dev/rac1/racdb-asm2	<input type="button" value="write-thru"/>	H1LxMS-V954-vuoC	H1LxMS-V954-vuoC	<input type="button" value="blockio"/>	<input type="button" value="Map"/>
racdb - ASM Volume 3	/dev/rac1/racdb-asm3	<input type="button" value="write-thru"/>	lcS22Y-owB7-HfYq	lcS22Y-owB7-HfYq	<input type="button" value="blockio"/>	<input type="button" value="Map"/>

## Network ACL

Before an iSCSI client can have access to the newly created iSCSI target, it needs to be granted the appropriate permissions. Awhile back, we [configured network access](#) in Openfiler for two hosts (the Oracle RAC nodes). These are the two nodes that will need to access the new iSCSI targets through the storage (private) network. We now need to grant both of the Oracle RAC nodes access to the new iSCSI target.

Click on the grey sub-tab named "Network ACL" (next to "LUN Mapping" sub-tab). For the current iSCSI target, change the "Access" for both hosts from 'Deny' to 'Allow' and click the 'Update' button:



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Target Configuration	LUN Mapping	Network ACL	CHAP Authentication
iSCSI host access configuration for target "iqn.2006-01.com.openfiler:racdb.crs"			
Name	Network/Host	Netmask	Access
linux1-priv	192.168.0.101	255.255.255.0	Allow <input type="button" value="v"/>
linux2-priv	192.168.0.102	255.255.255.0	Allow <input type="button" value="v"/>
<input type="button" value="Update"/>			

Go back to the [Create New Target IQN](#) section and perform these three tasks for the remaining four iSCSI logical volumes while substituting the values found in the "[iSCSI Target / Logical Volume Mappings](#)" table .

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I had issues accessing these drives in the RAC nodes, had to comment the entries in the file /etc/initiators.deny

Before:-

```
[root@openfiler1 ~]# cat /etc/initiators.deny
# PLEASE DO NOT MODIFY THIS CONFIGURATION FILE!
#   This configuration file was autogenerated
#   by Openfiler. Any manual changes will be overwritten
#   Generated at: Mon Jul 19 15:48:58 IST 2010

iqn.2006-01.com.openfiler:racdb.crs ALL
iqn.2006-01.com.openfiler:racdb.asm1 ALL
iqn.2006-01.com.openfiler:racdb.asm2 ALL
iqn.2006-01.com.openfiler:racdb.asm3 ALL

# End of Openfiler configuration
```

After :-

```
[root@openfiler1 ~]# cat /etc/initiators.deny
# PLEASE DO NOT MODIFY THIS CONFIGURATION FILE!
#   This configuration file was autogenerated
#   by Openfiler. Any manual changes will be overwritten
#   Generated at: Mon Jul 19 15:48:58 IST 2010

#iqn.2006-01.com.openfiler:racdb.crs ALL
#iqn.2006-01.com.openfiler:racdb.asm1 ALL
#iqn.2006-01.com.openfiler:racdb.asm2 ALL
#iqn.2006-01.com.openfiler:racdb.asm3 ALL

# End of Openfiler configuration
```

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## Configure iSCSI Volumes on Oracle RAC Nodes

On linux1

*Configure the iSCSI initiator on both Oracle RAC nodes in the cluster! Creating partitions, however, should only be executed on one of nodes in the RAC cluster*

Install the package - iscsi-initiator-utils-4.0.3.0-5.rpm which comes with Red Hat Linux 4 update 5 or download from net

```
rpm -Uvh iscsi-initiator-utils-4.0.3.0-5.rpm
```

### Modify DiscoveryAddress

```
vi /etc/iscsi.conf  
DiscoveryAddress=192.168.1.6
```

Monitor /var/log/messages

### **Configure the iSCSI (initiator) service**

After verifying that the `iscsi-initiator-utils` package is installed on both Oracle RAC nodes, start the `iscsid` service and enable it to automatically start when the system boots. We will also configure the `iscsi` service to automatically start which logs into iSCSI targets needed at system startup.

```
# service iscsi start  
Turning off network shutdown. Starting iSCSI daemon: [ OK ]  
[ OK ]  
  
# chkconfig iscsid on  
# chkconfig iscsi on
```

**Note - Perform the above on linux2 machine**

### **Create Partitions on iSCSI Volumes**

We now need to create a single primary partition on each of the iSCSI volumes that spans the entire size of the volume. As mentioned earlier in this article, I will be using Oracle's Cluster File System, Release 2 (OCFS2) to store the two files to be shared for Oracle's Clusterware software. We will then be using Automatic Storage Management (ASM) to create four ASM volumes; two for all physical database files (data/index files, online redo log files, and control files) and one for the *Flash Recovery Area* (RMAN backups and archived redo log files).

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fdisk -l

```
Disk /dev/sdb: 75.1 GB, 75161927680 bytes
255 heads, 63 sectors/track, 9137 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

Disk /dev/sdb doesn't contain a valid partition table

Disk /dev/sdc: 75.1 GB, 75161927680 bytes
255 heads, 63 sectors/track, 9137 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

Disk /dev/sdc doesn't contain a valid partition table

Disk /dev/sdd: 2147 MB, 2147483648 bytes
67 heads, 62 sectors/track, 1009 cylinders
Units = cylinders of 4154 * 512 = 2126848 bytes

Disk /dev/sdd doesn't contain a valid partition table

Disk /dev/sde: 75.1 GB, 75161927680 bytes
255 heads, 63 sectors/track, 9137 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

Disk /dev/sde doesn't contain a valid partition table
```

Author – *A.Kishore*<http://www.appsdba.info>

```
[root@linux1 oracle]# fdisk /dev/sdb
Device contains neither a valid DOS partition table, nor Sun, SGI or OSF disklabel
Building a new DOS disklabel. Changes will remain in memory only,
until you decide to write them. After that, of course, the previous
content won't be recoverable.

The number of cylinders for this disk is set to 9137.
There is nothing wrong with that, but this is larger than 1024,
and could in certain setups cause problems with:
 1) software that runs at boot time (e.g., old versions of LILO)
 2) booting and partitioning software from other OSs
   (e.g., DOS FDISK, OS/2 FDISK)
Warning: invalid flag 0x0000 of partition table 4 will be corrected by w(rite)

Command (m for help): n
Command action
  e   extended
  p   primary partition (1-4)
p
Partition number (1-4): 1
First cylinder (1-9137, default 1):
Using default value 1
Last cylinder or +size or +sizeM or +sizeK (1-9137, default 9137):
Using default value 9137

Command (m for help): w
```

Perform the same for the remaining partitions

Author – A.Kishore

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```
Disk /dev/sdb: 75.1 GB, 75161927680 bytes
255 heads, 63 sectors/track, 9137 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sdb1		1	9137	73392921	83	Linux

```
Disk /dev/sdc: 75.1 GB, 75161927680 bytes
255 heads, 63 sectors/track, 9137 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sdc1		1	9137	73392921	83	Linux

```
Disk /dev/sdd: 2147 MB, 2147483648 bytes
67 heads, 62 sectors/track, 1009 cylinders
Units = cylinders of 4154 * 512 = 2126848 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sdd1		1	1009	2095662	83	Linux

```
Disk /dev/sde: 75.1 GB, 75161927680 bytes
255 heads, 63 sectors/track, 9137 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sde1		1	9137	73392921	83	Linux

Reference: [http://www.oracle.com/technology/pub/articles/hunter\\_rac10gr2\\_iscsi\\_2.html](http://www.oracle.com/technology/pub/articles/hunter_rac10gr2_iscsi_2.html)