

joe@node1: ~

```
Selecting previously unselected package parted.  
Preparing to unpack .../parted_3.2-15_amd64.deb ...  
Unpacking parted (3.2-15) ...  
Processing triggers for libc-bin (2.23-0ubuntu3) ...  
Setting up libparted2:amd64 (3.2-15) ...  
Setting up parted (3.2-15) ...  
Processing triggers for libc-bin (2.23-0ubuntu3) ...
```

```
joe@node1:~$ sudo parted /dev/sda
```

```
GNU Parted 3.2
```

```
Using /dev/sda
```

```
Welcome to GNU Parted! Type 'help' to view a list of commands.
```

```
(parted) p
```

```
Model: ATA WDC WD1002FBYS-0 (scsi)
```

```
Disk /dev/sda: 1000GB
```

```
Sector size (logical/physical): 512B/512B
```

```
Partition Table: gpt
```

```
Disk Flags:
```

| Number | Start | End | Size | File system | Name | Flags |
|--------|--------|--------|-------|-------------|------|-----------|
| 1 | 1049kB | 538MB | 537MB | fat32 | | boot, esp |
| 2 | 538MB | 1050MB | 512MB | ext2 | | |
| 3 | 1050MB | 1000GB | 999GB | | | lvm |

```
(parted) █
```

joe@node1: ~

```
joe@node1:~$ echo "With uefi, we can see and manipulate the boot order with the following command"
```

With uefi, we can see and manipulate the boot order with the following command

```
joe@node1:~$ efibootmgr -v
```

```
BootCurrent: 0000
```

```
Timeout: 65535 seconds
```

```
BootOrder: 0000,0001,0003,0004
```

```
Boot0000* ubuntu          HD(1,GPT,00d028ec-4669-4448-ac3d-e089314488ad,0x800,0x100000)/File(\EFI\ubuntu\shimx64.efi)
```

```
Boot0001  Hard Drive      BBS(HD,,0x0)
```

```
Boot0003  Network Card    BBS(Network,,0x0)
```

```
Boot0004  Built-in EFI Shell  VenMedia(5023b95c-db26-429b-a648-bd47664c8012)/File(c57ad6b7-0515-40a8-9d21-551652854e37)
```

```
joe@node1:~$ echo "ubuntu will be booted"
```

ubuntu will be booted

```
joe@node1:~$ █
```

joe@node1: ~

```
joe@node1:~$ echo "gdisk is kinda like fdisk, but can see gpt partitions better"  
gdisk is kinda like fdisk, but can see gpt partitions better
```

```
joe@node1:~$
```

joe@node1: ~

```
joe@node1:~$ sudo gdisk -l /dev/sda  
GPT fdisk (gdisk) version 1.0.1
```

Partition table scan:

MBR: protective
BSD: not present
APM: not present
GPT: present

Found valid GPT with protective MBR; using GPT.

Disk /dev/sda: 1953525168 sectors, 931.5 GiB

Logical sector size: 512 bytes

Disk identifier (GUID): F48FDD67-518D-47A3-BD63-D759EC4EBEA0

Partition table holds up to 128 entries

First usable sector is 34, last usable sector is 1953525134

Partitions will be aligned on 2048-sector boundaries

Total free space is 3437 sectors (1.7 MiB)

| Number | Start (sector) | End (sector) | Size | Code | Name |
|--------|----------------|--------------|-----------|------|------|
| 1 | 2048 | 1050623 | 512.0 MiB | EF00 | |
| 2 | 1050624 | 2050047 | 488.0 MiB | 8300 | |
| 3 | 2050048 | 1953523711 | 930.5 GiB | 8E00 | |

```
joe@node1:~$
```

The MBR partitioning system uses a combination of cylinder/head/sector (CHS) addressing and logical block addressing (LBA). The former is klunky and limiting. GPT drops CHS addressing and uses 64-bit LBA mode exclusively. Thus, GPT data structures, and therefore **gdisk**, do not need to deal with CHS geometries and all the problems they create. Users of **fdisk** will note that **gdisk** lacks the options and limitations associated with CHS geometries.

For best results, you should use an OS-specific partition table program whenever possible. For example, you should make Mac OS X partitions with the Mac OS X Disk Utility program and Linux partitions with the Linux **gdisk** or GNU Parted program.

Upon start, **gdisk** attempts to identify the partition type in use on the disk. If it finds valid GPT data, **gdisk** will use it. If **gdisk** finds a valid MBR or BSD disklabel but no GPT data, it will attempt to convert the MBR or disklabel into GPT form. (BSD disklabels are likely to have unusable first and/or final partitions because they overlap with the GPT data structures, though.) GPT **fdisk** can identify, but not use data in, Apple Partition Map (APM) disks, which are used on 680x0- and PowerPC-based Macintoshes. Upon exiting with the 'w' option, **gdisk** replaces the MBR or disklabel with a GPT. This action is potentially

joe@node1: ~

```
joe@node1:~$ echo "Create gpt partition table on device"
```

```
Create gpt partition table on device
```

```
joe@node1:~$ sudo parted /dev/sdc mklabel gpt
```

```
Warning: The existing disk label on /dev/sdc will be destroyed and all data on  
this disk will be lost. Do you want to continue?
```

```
Yes/No? Yes
```

```
Information: You may need to update /etc/fstab.
```

```
joe@node1:~$ █
```

joe@node1: ~

```
joe@node1:~$ sudo parted /dev/sdc p
```

```
Model: ATA ST2000NM0011 (scsi)
```

```
Disk /dev/sdc: 2000GB
```

```
Sector size (logical/physical): 512B/512B
```

```
Partition Table: gpt
```

```
Disk Flags:
```

| Number | Start | End | Size | File system | Name | Flags |
|--------|-------|-----|------|-------------|------|-------|
|--------|-------|-----|------|-------------|------|-------|

```
joe@node1:~$ █
```

joe@node1: ~

```
joe@node1:~$ echo "Make partition"
```

```
Make partition
```

```
joe@node1:~$ sudo parted /dev/sdc mkpart
```

```
Partition name? []? firstp
```

```
File system type? [ext2]? ext4
```

```
Start? 1MiB
```

```
End? 20MiB
```

```
Information: You may need to update /etc/fstab.
```

```
joe@node1:~$ sudo parted /dev/sdc p
```

```
Model: ATA ST2000NM0011 (scsi)
```

```
Disk /dev/sdc: 2000GB
```

```
Sector size (logical/physical): 512B/512B
```

```
Partition Table: gpt
```

```
Disk Flags:
```

| Number | Start | End | Size | File system | Name | Flags |
|--------|--------|--------|--------|-------------|--------|-------|
| 1 | 1049kB | 21.0MB | 19.9MB | | firstp | |

```
joe@node1:~$ █
```


joe@node1: ~

```
joe@node1:~$ echo "Or another way"
```

Or another way

```
joe@node1:~$ sudo parted /dev/sdc mkpart secondp 20MiB 1GiB
```

Information: You may need to update /etc/fstab.

```
joe@node1:~$ sudo parted /dev/sdc p
```

Model: ATA ST2000NM0011 (scsi)

Disk /dev/sdc: 2000GB

Sector size (logical/physical): 512B/512B

Partition Table: gpt

Disk Flags:

| Number | Start | End | Size | File system | Name | Flags |
|--------|--------|--------|--------|-------------|---------|-------|
| 1 | 1049kB | 21.0MB | 19.9MB | | firstp | |
| 2 | 21.0MB | 1074MB | 1053MB | | secondp | |

```
joe@node1:~$ █
```

joe@node1: ~

```
joe@node1:~$ echo "Whoops, those are too small"
```

```
Whoops, those are too small
```

```
joe@node1:~$ sudo parted /dev/sdc rm 1
```

```
Information: You may need to update /etc/fstab.
```

```
joe@node1:~$ sudo parted /dev/sdc rm 2
```

```
Information: You may need to update /etc/fstab.
```

```
joe@node1:~$ sudo parted /dev/sdc p
```

```
Model: ATA ST2000NM0011 (scsi)
```

```
Disk /dev/sdc: 2000GB
```

```
Sector size (logical/physical): 512B/512B
```

```
Partition Table: gpt
```

```
Disk Flags:
```

```
Number  Start  End  Size  File system  Name  Flags
```

```
joe@node1:~$ █
```

root@node1: ~

```
root@node1:~# echo "Recreating partitions again"
```

```
Recreating partitions again
```

```
root@node1:~# parted /dev/sdc
```

```
GNU Parted 3.2
```

```
Using /dev/sdc
```

```
Welcome to GNU Parted! Type 'help' to view a list of commands.
```

```
(parted) mkpart
```

```
Partition name? []? partone
```

```
File system type? [ext2]? ext4
```

```
Start? 1MiB
```

```
End? 20GiB
```

```
(parted) p
```

```
Model: ATA ST2000NM0011 (scsi)
```

```
Disk /dev/sdc: 2000GB
```

```
Sector size (logical/physical): 512B/512B
```

```
Partition Table: gpt
```

```
Disk Flags:
```

| Number | Start | End | Size | File system | Name | Flags |
|--------|--------|--------|--------|-------------|---------|-------|
| 1 | 1049kB | 21.5GB | 21.5GB | ext4 | partone | |

```
(parted) █
```

```
(parted) mkpart
Partition name? []? parttwo
File system type? [ext2]? ext4
Start? 20GiB
End? 40GiB
```

```
(parted) p
Model: ATA ST2000NM0011 (scsi)
Disk /dev/sdc: 2000GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:
```

| Number | Start | End | Size | File system | Name | Flags |
|--------|--------|--------|--------|-------------|---------|-------|
| 1 | 1049kB | 21.5GB | 21.5GB | ext4 | partone | |
| 2 | 21.5GB | 42.9GB | 21.5GB | ext4 | parttwo | |

```
(parted) █
```

```
(parted) mkpart  
Partition name? []? part3  
File system type? [ext2]? ext4  
Start? 40GiB  
End? 20%
```

```
(parted) p  
Model: ATA ST2000NM0011 (scsi)  
Disk /dev/sdc: 2000GB  
Sector size (logical/physical): 512B/512B  
Partition Table: gpt  
Disk Flags:
```

| Number | Start | End | Size | File system | Name | Flags |
|--------|--------|--------|--------|-------------|---------|-------|
| 1 | 1049kB | 21.5GB | 21.5GB | ext4 | partone | |
| 2 | 21.5GB | 42.9GB | 21.5GB | ext4 | parttwo | |
| 3 | 42.9GB | 400GB | 357GB | ext4 | part3 | |

```
(parted) █
```

```
(parted) resizepart 3 60GiB  
Warning: Shrinking a partition can cause data loss, are you sure you want to  
continue?  
Yes/No? Yes
```

```
(parted) p  
Model: ATA ST2000NM0011 (scsi)  
Disk /dev/sdc: 2000GB  
Sector size (logical/physical): 512B/512B  
Partition Table: gpt  
Disk Flags:
```

| Number | Start | End | Size | File system | Name | Flags |
|--------|--------|--------|--------|-------------|---------|-------|
| 1 | 1049kB | 21.5GB | 21.5GB | ext4 | partone | |
| 2 | 21.5GB | 42.9GB | 21.5GB | ext4 | parttwo | |
| 3 | 42.9GB | 64.4GB | 21.5GB | ext4 | part3 | |

```
(parted) █
```

root@node1: ~

```
(parted) resizepart 1 30GiB
```

```
Error: Can't have overlapping partitions.
```

```
(parted) █
```

(parted) p

Model: ATA ST2000NM0011 (scsi)

Disk /dev/sdc: 2000GB

Sector size (logical/physical): 512B/512B

Partition Table: gpt

Disk Flags:

| Number | Start | End | Size | File system | Name | Flags |
|--------|--------|--------|--------|-------------|---------|-------|
| 1 | 1049kB | 21.5GB | 21.5GB | ext4 | partone | |
| 2 | 21.5GB | 42.9GB | 21.5GB | ext4 | parttwo | |
| 3 | 42.9GB | 64.4GB | 21.5GB | ext4 | part3 | |

(parted) q


```
root@node1:~# partprobe
root@node1:~# gdisk -l /dev/sdc
GPT fdisk (gdisk) version 1.0.1
```

Partition table scan:

- MBR: protective
- BSD: not present
- APM: not present
- GPT: present

Found valid GPT with protective MBR; using GPT.
Disk /dev/sdc: 3907029168 sectors, 1.8 TiB
Logical sector size: 512 bytes
Disk identifier (GUID): 9850BC40-C708-4C52-B314-28CAAED50EAF
Partition table holds up to 128 entries
First usable sector is 34, last usable sector is 3907029134
Partitions will be aligned on 2048-sector boundaries
Total free space is 3781202028 sectors (1.8 TiB)

| Number | Start (sector) | End (sector) | Size | Code | Name |
|--------|----------------|--------------|----------|------|---------|
| 1 | 2048 | 41943039 | 20.0 GiB | 8300 | partone |
| 2 | 41943040 | 83886079 | 20.0 GiB | 8300 | parttwo |
| 3 | 83886080 | 125829120 | 20.0 GiB | 8300 | part3 |

root@node1: ~

root@node1:~# ls

root@node1:~# mkdir testmount

root@node1:~# mount /dev/sdc1 testmount/

mount: /dev/sdc1 is write-protected, mounting read-only
mount: wrong fs type, bad option, bad superblock on /dev/sdc1,
missing codepage or helper program, or other error

In some cases useful info is found in syslog - try
dmesg | tail or so.

root@node1:~# mkfs.ext4 /dev/sdc1

mke2fs 1.42.13 (17-May-2015)

Creating filesystem with 5242624 4k blocks and 1310720 inodes

Filesystem UUID: 336fd84e-5457-4d76-89b5-e8652609371f

Superblock backups stored on blocks:

32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
4096000

Allocating group tables: done

Writing inode tables: done

Creating journal (32768 blocks): done

Writing superblocks and filesystem accounting information: done

root@node1:~# mount /dev/sdc1 testmount/

root@node1:~#

root@node1: ~/testmount

root@node1:~# cd testmount/

root@node1:~/testmount# ls

lost+found

root@node1:~/testmount# df -h

| Filesystem | Size | Used | Avail | Use% | Mounted on |
|----------------------------|------|------|-------|------|------------------------|
| udev | 7.9G | 0 | 7.9G | 0% | /dev |
| tmpfs | 1.6G | 8.8M | 1.6G | 1% | /run |
| /dev/mapper/node1--vg-root | 901G | 1.7G | 853G | 1% | / |
| tmpfs | 7.9G | 0 | 7.9G | 0% | /dev/shm |
| tmpfs | 5.0M | 0 | 5.0M | 0% | /run/lock |
| tmpfs | 7.9G | 0 | 7.9G | 0% | /sys/fs/cgroup |
| /dev/sda2 | 473M | 116M | 333M | 26% | /boot |
| /dev/sda1 | 511M | 3.6M | 508M | 1% | /boot/efi |
| tmpfs | 100K | 0 | 100K | 0% | /run/lxcfs/controllers |
| tmpfs | 1.6G | 0 | 1.6G | 0% | /run/user/1000 |
| /dev/sdc1 | 20G | 44M | 19G | 1% | /home/joe/testmount |

root@node1:~/testmount#

root@node1: ~/testmount

root@node1:~/testmount# parted /dev/sdb mklabel gpt

Warning: The existing disk label on /dev/sdb will be destroyed and all data on this disk will be lost. Do you want to continue?

Yes/No? Yes

Information: You may need to update /etc/fstab.

root@node1:~/testmount# parted /dev/sdb mkpart p1 1024MiB 10%

Information: You may need to update /etc/fstab.

root@node1:~/testmount# parted /dev/sdb p

Model: ATA WDC WD7501AALS-0 (scsi)

Disk /dev/sdb: 750GB

Sector size (logical/physical): 512B/512B

Partition Table: gpt

Disk Flags:

| Number | Start | End | Size | File system | Name | Flags |
|--------|--------|--------|--------|-------------|------|-------|
| 1 | 1074MB | 75.0GB | 73.9GB | | p1 | |

root@node1:~/testmount#

root@node1: ~/testmount

```
root@node1:~/testmount# pvcreate /dev/sdb1 /dev/sdc2
Physical volume "/dev/sdb1" successfully created
Physical volume "/dev/sdc2" successfully created
root@node1:~/testmount#
```

```
root@node1:~/testmount# vgcreate
```

Please provide volume group name and physical volumes

Run `vgcreate --help` for more information.

```
root@node1:~/testmount# vgcreate ^C
```

```
root@node1:~/testmount# pvs
```

| PV | VG | Fmt | Attr | PSize | PFree |
|-----------|----------|------|------|---------|--------|
| /dev/sda3 | node1-vg | lvm2 | a-- | 930.53g | 0 |
| /dev/sdb1 | | lvm2 | --- | 68.86g | 68.86g |
| /dev/sdc2 | | lvm2 | --- | 20.00g | 20.00g |

```
root@node1:~/testmount# vgcreate testvol /dev/sdb1 /dev/sdc2
```

Volume group "testvol" successfully created

```
root@node1:~/testmount# vgs
```

| VG | #PV | #LV | #SN | Attr | VSize | VFree |
|----------|-----|-----|-----|--------|---------|--------|
| node1-vg | 1 | 2 | 0 | wz--n- | 930.53g | 0 |
| testvol | 2 | 0 | 0 | wz--n- | 88.86g | 88.86g |

```
root@node1:~/testmount#
```

root@node1: ~/testmount

root@node1:~/testmount# vgs

| VG | #PV | #LV | #SN | Attr | VSize | VFree |
|----------|-----|-----|-----|--------|---------|--------|
| node1-vg | 1 | 2 | 0 | wz--n- | 930.53g | 0 |
| testvol | 2 | 0 | 0 | wz--n- | 88.86g | 88.86g |

root@node1:~/testmount# lvcreate -l 20%FREE -n lv-awesome testvol

Logical volume "lv-awesome" created.

root@node1:~/testmount# lvs

| LV | VG | Attr | LSize | Pool | Origin | Data% | Meta% | Move | Log | Cpy% |
|------------|----------|------------|---------|------|--------|-------|-------|------|-----|------|
| root | node1-vg | -wi-ao---- | 914.55g | | | | | | | |
| swap_1 | node1-vg | -wi-ao---- | 15.98g | | | | | | | |
| lv-awesome | testvol | -wi-a----- | 17.77g | | | | | | | |

root@node1:~/testmount# █

root@node1: ~/testmount

```
root@node1:~/testmount# lvcreate --type raid1 -m 1 -L 1G -n awesome-raid testvol  
Logical volume "awesome-raid" created.
```

```
root@node1:~/testmount#
```



```
root@node1:~# lvs
LV          VG          Attr          LSize   Pool Origin Data%  Meta%  Move Log Cp
y%Sync Convert
root        node1-vg    -wi-ao----   914.55g
swap_1      node1-vg    -wi-ao----   15.98g
awesome-raid testvol     rwi-a-r---    1.00g
lv-awesome  testvol     -wi-a-----  17.77g
```

```
root@node1:~# mkdir mount_for_lv-awesome
root@node1:~# mkdir mount_for_awesome-raid
root@node1:~#
```

root@node1: ~

Creating filesystem with 262144 4k blocks and 65536 inodes
Filesystem UUID: ea7efa4d-ddc8-4974-8a34-df5ae2705657
Superblock backups stored on blocks:
32768, 98304, 163840, 229376

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done

root@node1:~# mkfs.ext4 /dev/testvol/lv-awesome

mke2fs 1.42.13 (17-May-2015)
Creating filesystem with 4658176 4k blocks and 1164592 inodes
Filesystem UUID: 520b094b-ecda-43f6-a907-a3150bd33c1b
Superblock backups stored on blocks:
32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
4096000

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done

root@node1:~#

```
root@node1:~# mount /dev/testvol/awesome-raid mount_for_awesome-raid/
```

```
root@node1:~# mount /dev/testvol/  
awesome-raid lv-awesome
```

```
root@node1:~# mount /dev/testvol/lv-awesome mount_for_  
mount_for_awesome-raid/ mount_for_lv-awesome/
```

```
root@node1:~# mount /dev/testvol/lv-awesome mount_for_lv-awesome/
```

```
root@node1:~#
```

```
root@node1:~# mount | grep -E 'mapper|sdc'  
/dev/mapper/node1--vg-root on / type ext4 (rw,relatime,errors=remount-ro,data=ordered)  
/dev/sdc1 on /home/joe/testmount type ext4 (rw,relatime,data=ordered)  
/dev/mapper/testvol-awesome--raid on /home/joe/mount_for_awesome-raid type ext4  
(rw,relatime,data=ordered)  
/dev/mapper/testvol-lv--awesome on /home/joe/mount_for_lv-awesome type ext4 (rw,  
relatime,data=ordered)  
root@node1:~# █
```