

# Live USB sticks using grub2

- A low level approach
- Paul Elliott
- [pelliott@blackpatchpanel.com](mailto:pelliott@blackpatchpanel.com)



# Usb disk to be used for rescue

- Must contain:
- Super Grub Disk for Grub1
- Super Grub Disk for Grub2
- System rescue CD
- Gparted Live CD
- A Ubuntu Live CD/Installer

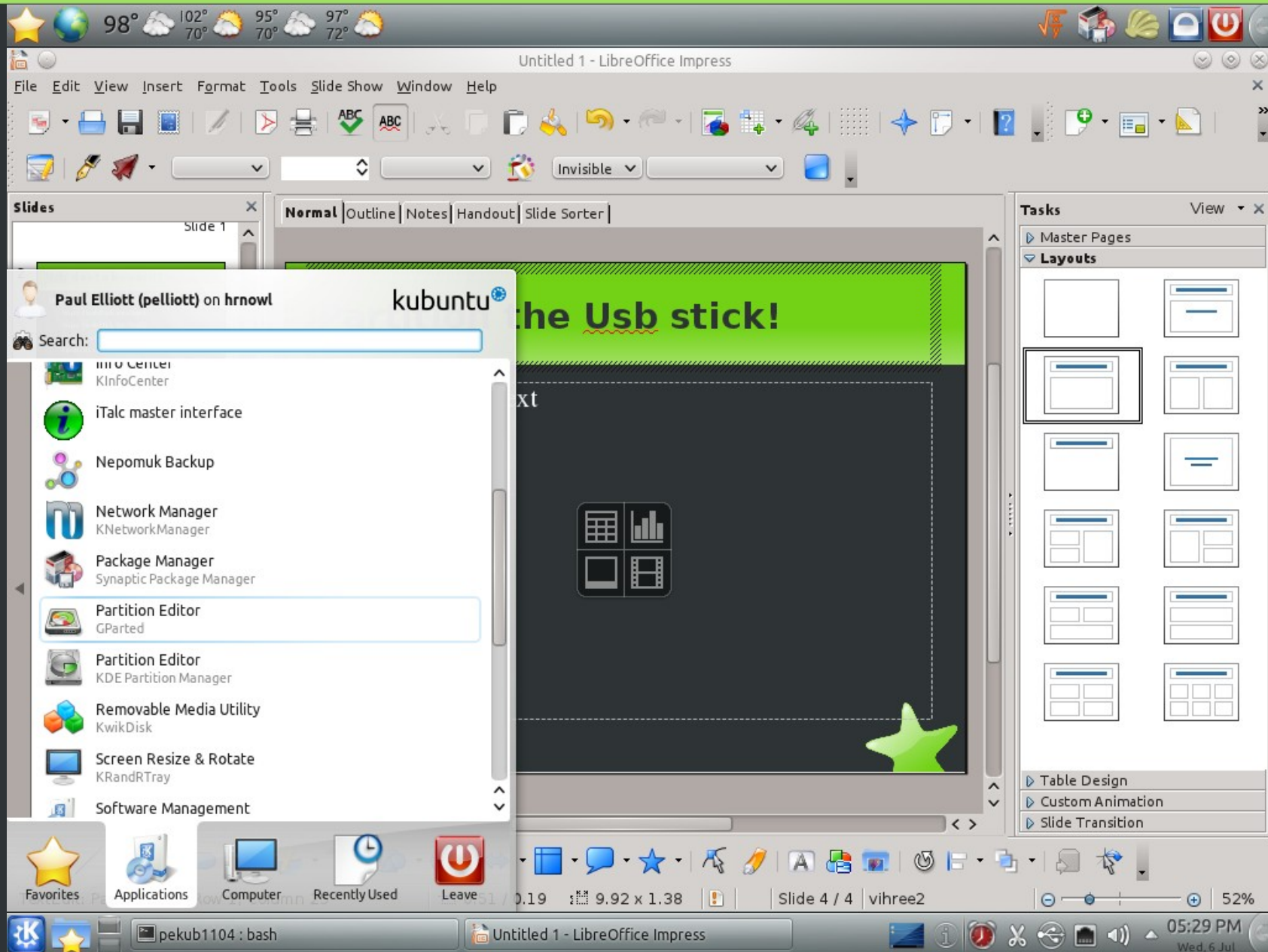


# Partitons needed

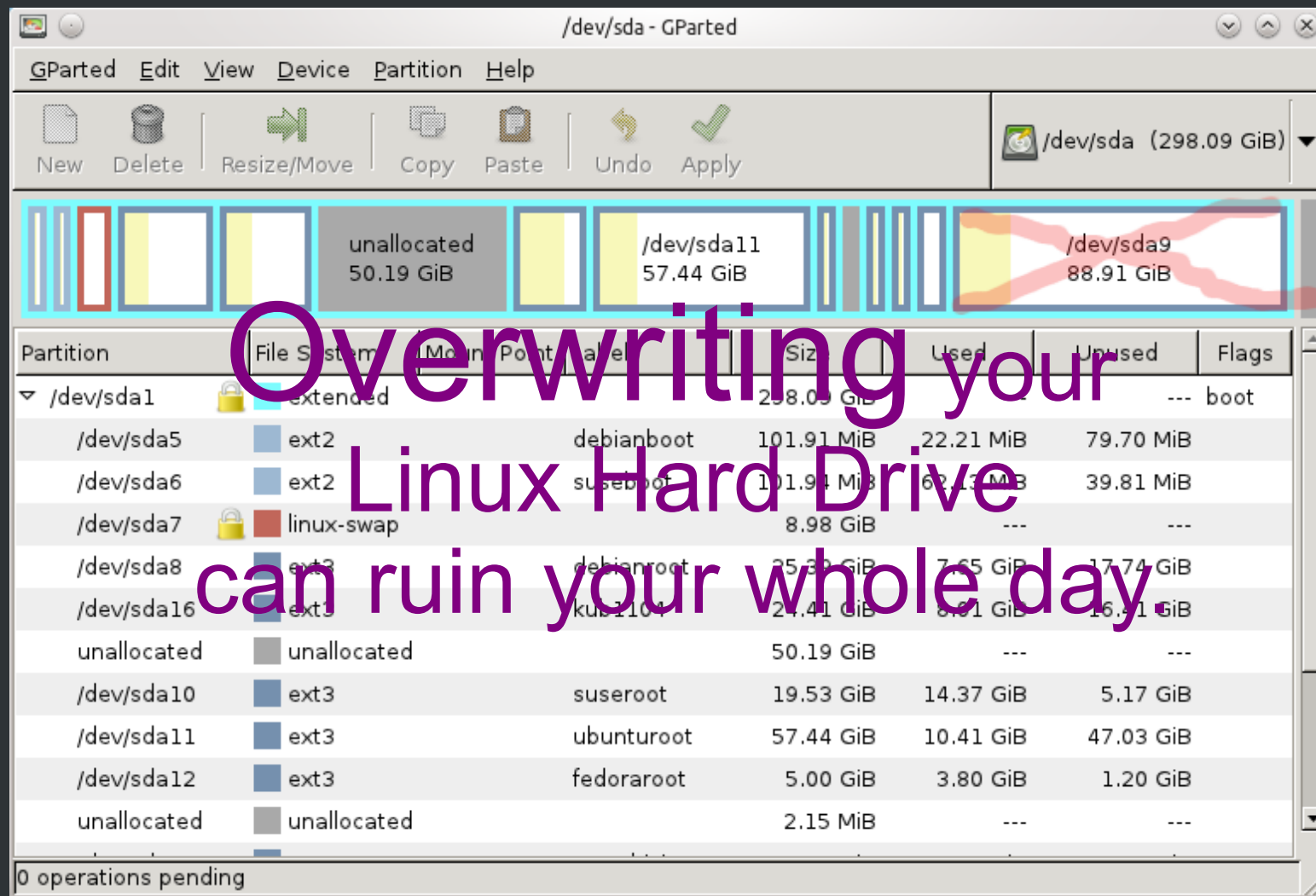
- Partition for super grub disk for grub1
- Partition for Grub2 to boot everything.
- Partition for loopback iso!



# Partition the Usb stick!



# Don't fuck with the wrong Drive!



The screenshot shows the GParted application window titled "/dev/sda - GParted". The menu bar includes GParted, Edit, View, Device, Partition, and Help. The toolbar contains icons for New, Delete, Resize/Move, Copy, Paste, Undo, and Apply. A dropdown menu shows "/dev/sda (298.09 GiB)". The main display area shows a disk layout with several partitions. A red box highlights a section of the disk, and a red arrow points to a partition labeled "/dev/sda9 88.91 GiB". A large purple text overlay reads "Overwriting your Linux Hard Drive can ruin your whole day." Below the main display area is a table with the following columns: Partition, File System, Mount Point, Label, Size, Used, Unused, and Flags.

Partition	File System	Mount Point	Label	Size	Used	Unused	Flags
▼ /dev/sda1	ext4			298.09 GiB			boot
/dev/sda5	ext2		debianboot	101.91 MiB	22.21 MiB	79.70 MiB	
/dev/sda6	ext2		suseboot	101.94 MiB	62.13 MiB	39.81 MiB	
/dev/sda7	linux-swap			8.98 GiB	---	---	
/dev/sda8	ext3		debianroot	25.32 GiB	7.65 GiB	17.74 GiB	
/dev/sda16	ext3		kub1104	24.41 GiB	8.81 GiB	16.41 GiB	
unallocated	unallocated			50.19 GiB	---	---	
/dev/sda10	ext3		suseroot	19.53 GiB	14.37 GiB	5.17 GiB	
/dev/sda11	ext3		ubunturoot	57.44 GiB	10.41 GiB	47.03 GiB	
/dev/sda12	ext3		fedoraroot	5.00 GiB	3.80 GiB	1.20 GiB	
unallocated	unallocated			2.15 MiB	---	---	

0 operations pending

# Choose the device that is the USB stick.

**GParted** Edit View Device Partition Help

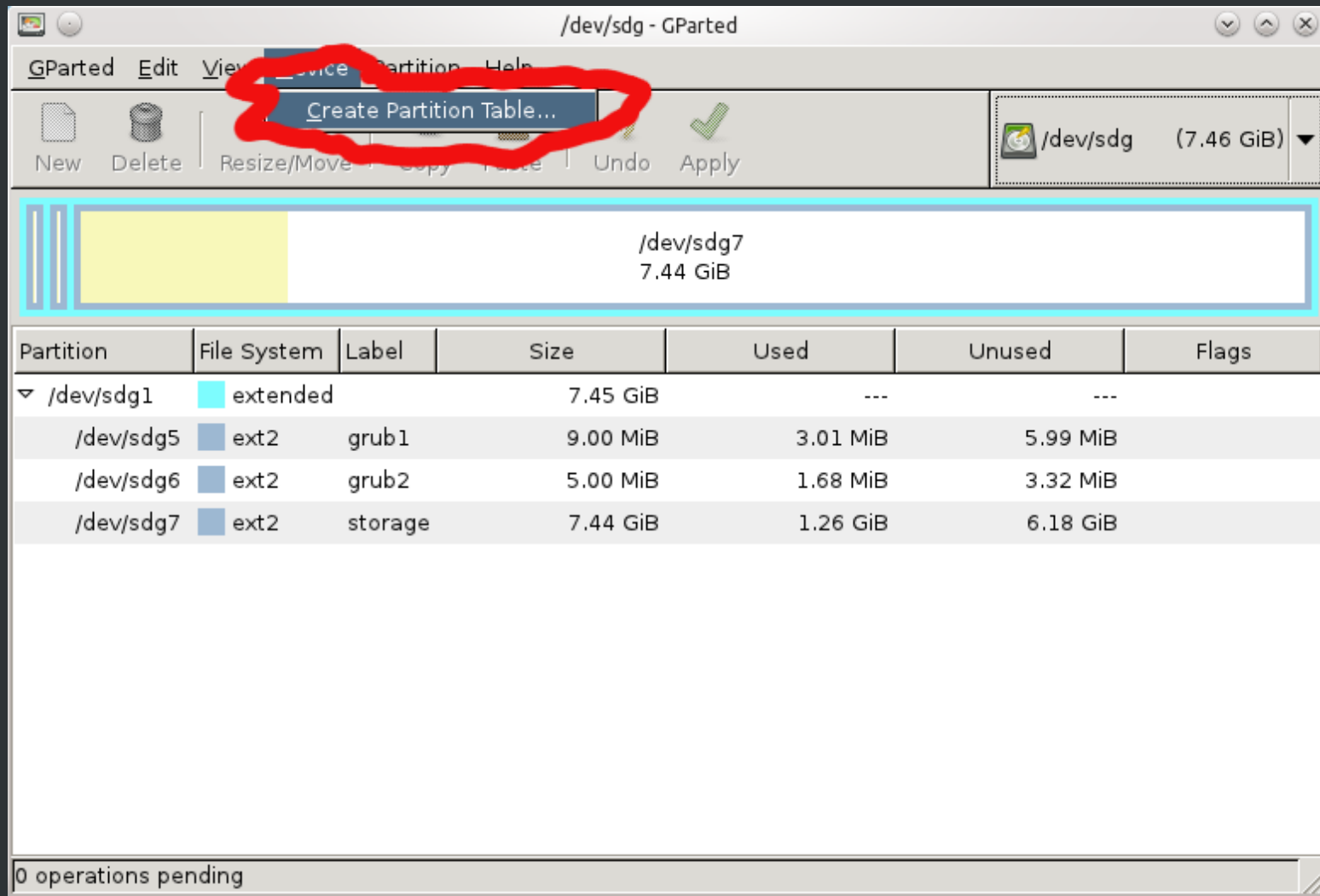
New Delete Resize/Move Copy Paste Undo Apply

unallocated 50.19 GiB /dev/sda11 57.44 GiB /dev/sda 298.09 GiB /dev/sdg (7.46 GiB) /dev/sda1 88.91 GiB

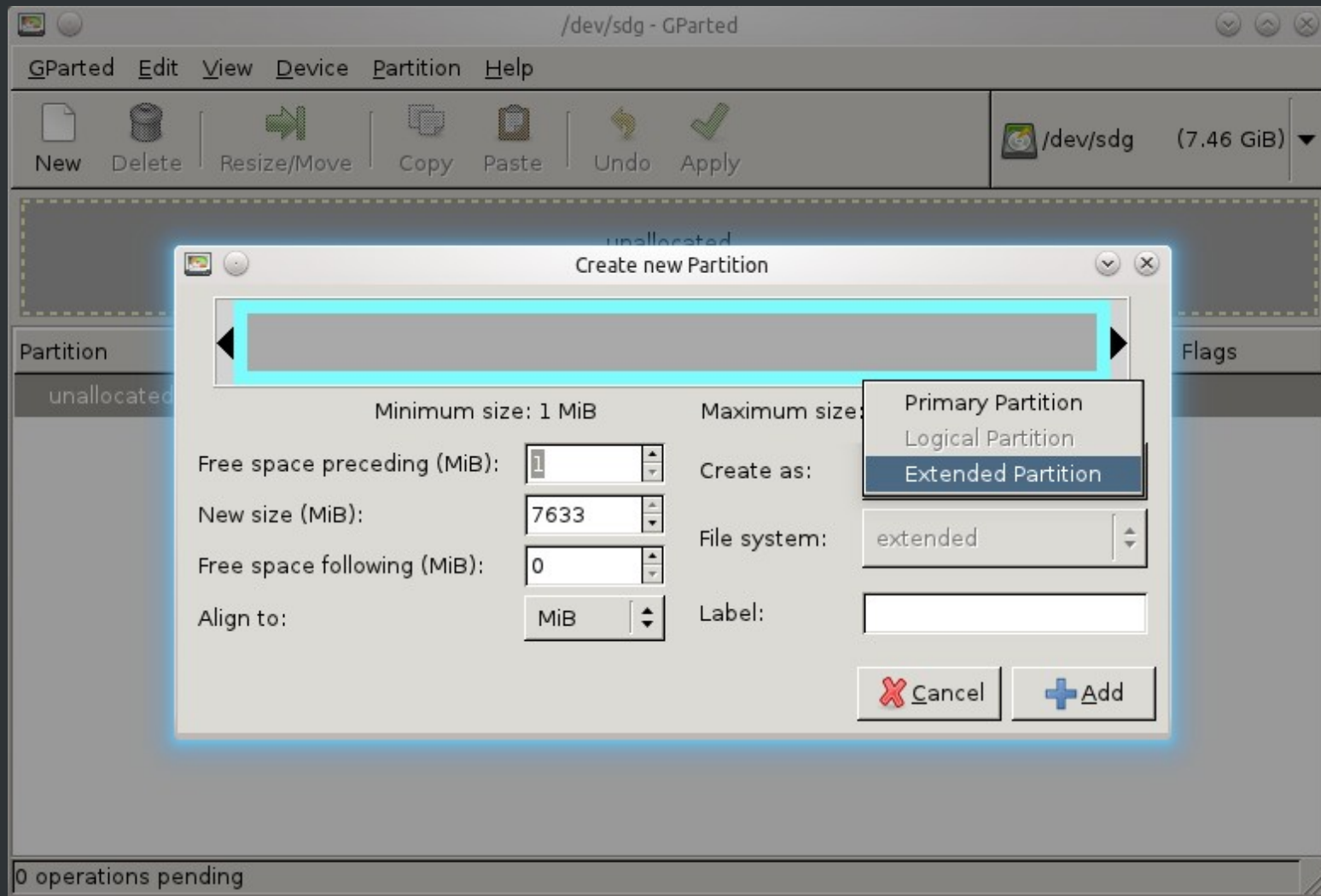
Partition	File System	Mount Point	Label	Size	Used	Unused	Flags
▼ /dev/sda1	extended			298.09 GiB	---	---	boot
/dev/sda5	ext2		debianboot	101.91 MiB	22.21 MiB	79.70 MiB	
/dev/sda6	ext2		suseboot	101.94 MiB	62.13 MiB	39.81 MiB	
/dev/sda7	linux-swap			8.98 GiB	---	---	
/dev/sda8	ext3		debianroot	25.39 GiB	7.65 GiB	17.74 GiB	
/dev/sda16	ext3		kub1104	24.41 GiB	8.01 GiB	16.41 GiB	
unallocated	unallocated			50.19 GiB	---	---	
/dev/sda10	ext3		suseroot	19.53 GiB	14.37 GiB	5.17 GiB	
/dev/sda11	ext3		ubunturoot	57.44 GiB	10.41 GiB	47.03 GiB	
/dev/sda12	ext3		fedoraroot	5.00 GiB	3.80 GiB	1.20 GiB	
unallocated	unallocated			2.15 MiB	---	---	

0 operations pending

# Completely modify the USB stick by creating new partition Table

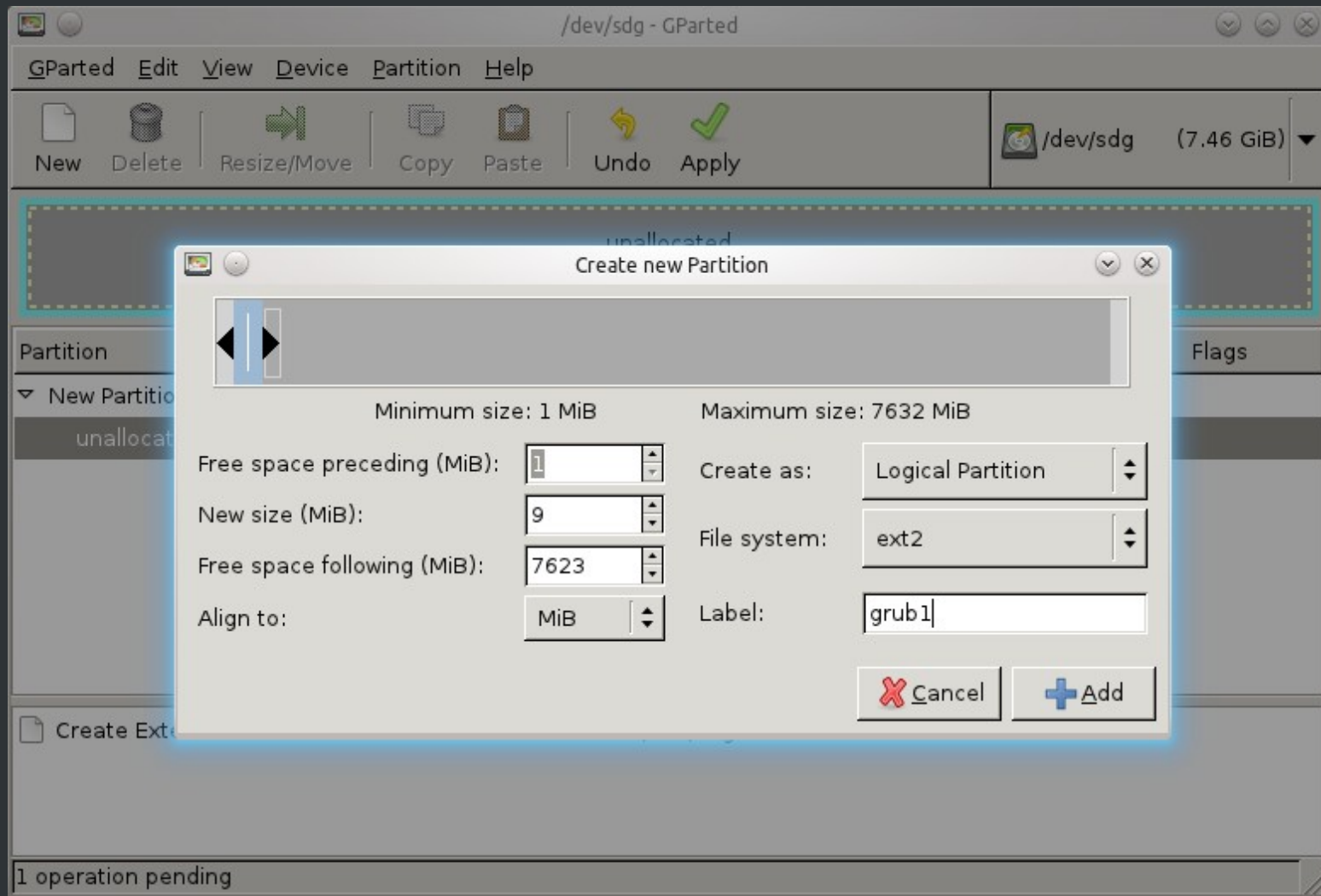


# Use an extended partitions Otherwise you are limited=4

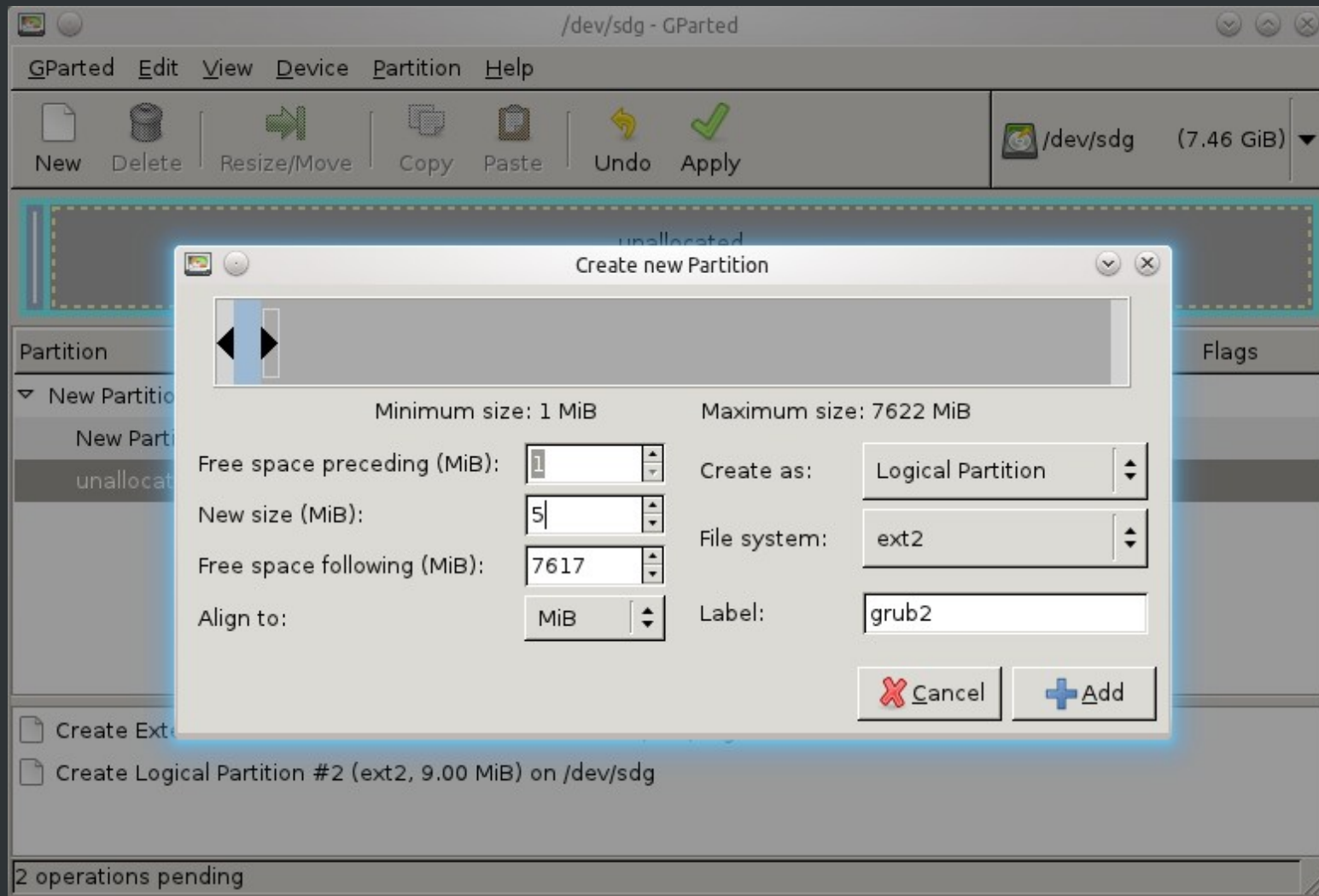




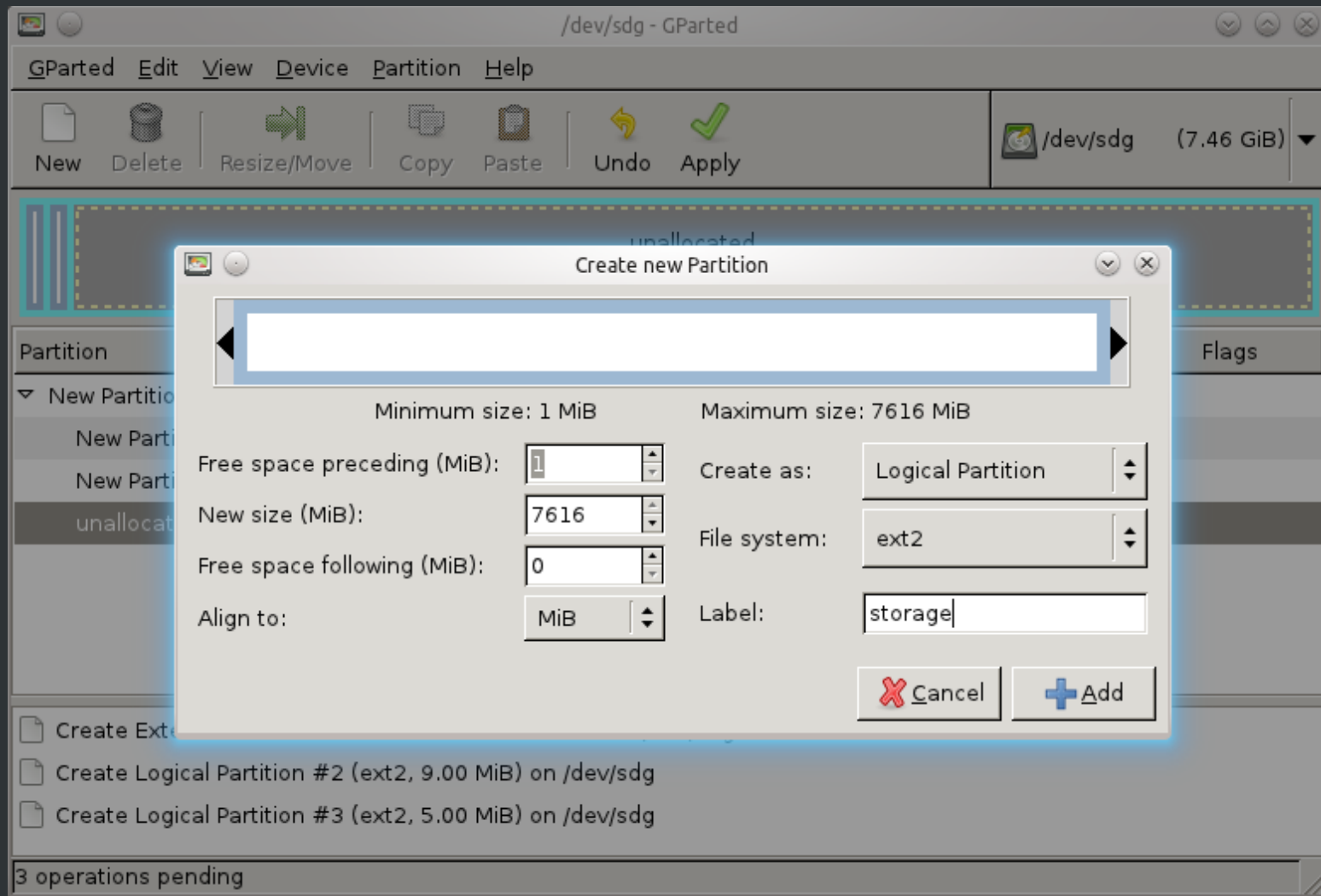
# 9 meg for Super Grub disk (1)



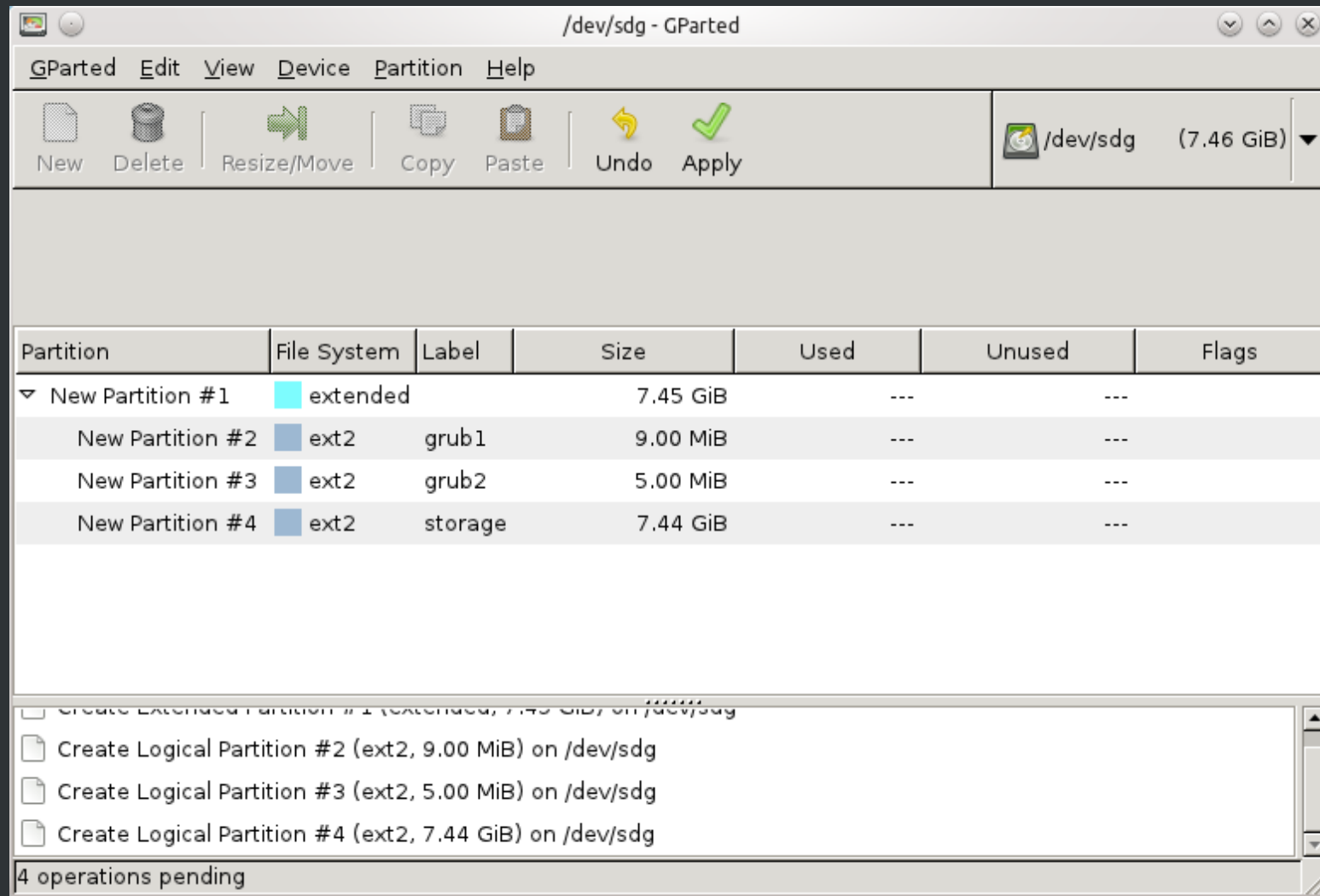
# 5 meg to install grub2.



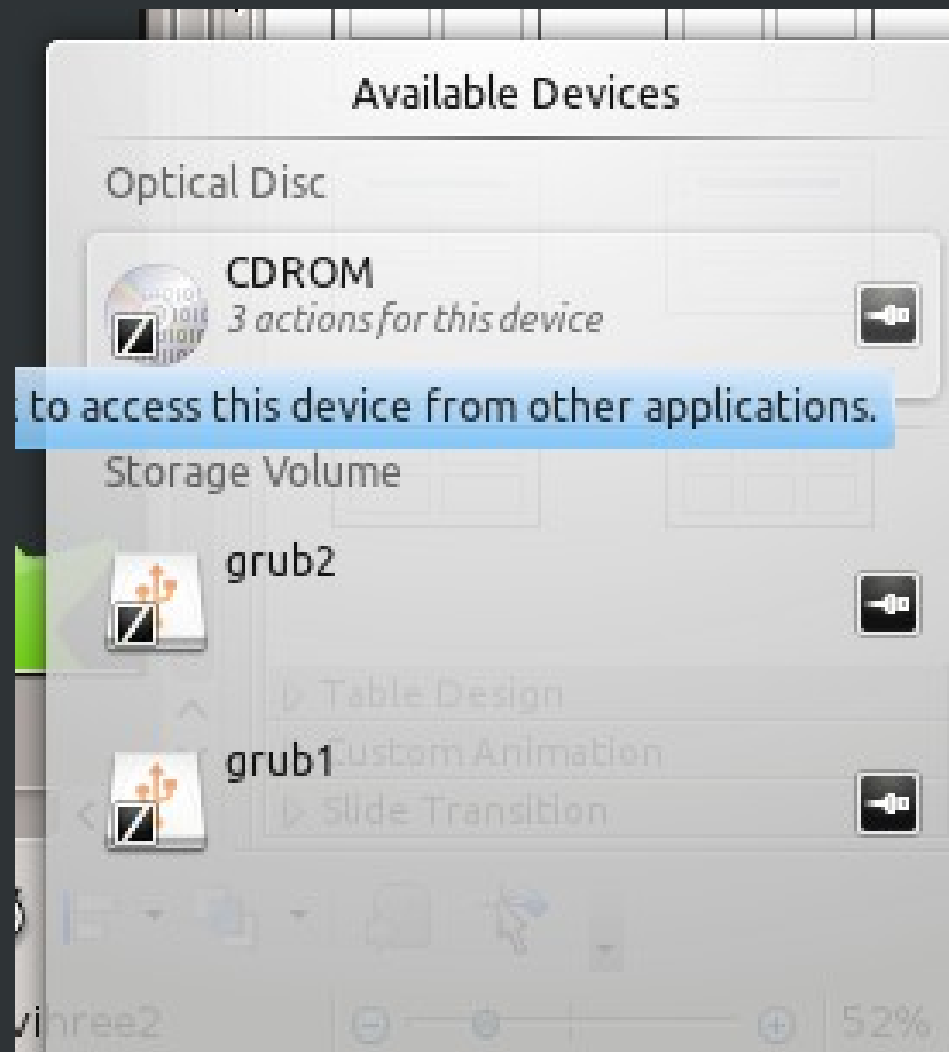
# Remainder to store ISO, other stuff.



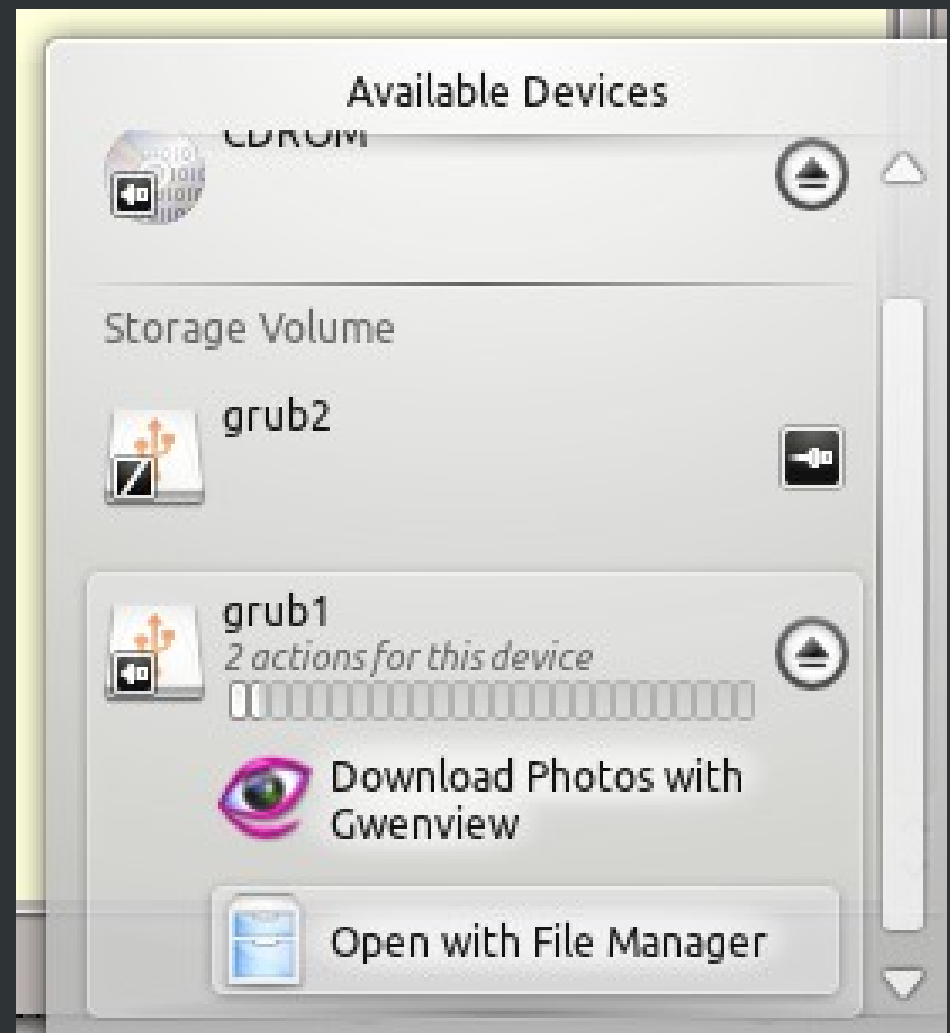
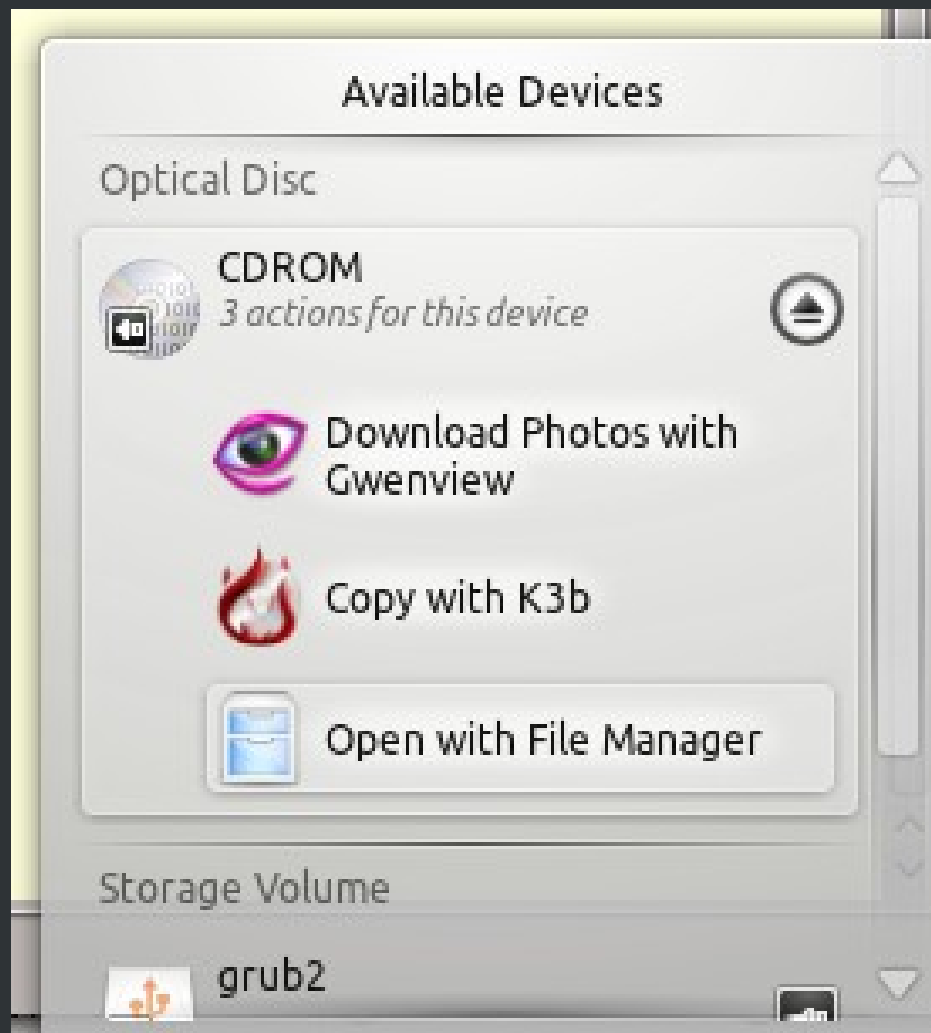
# Which gives this layout.



# Mount the SGD CD and grub1 partitions



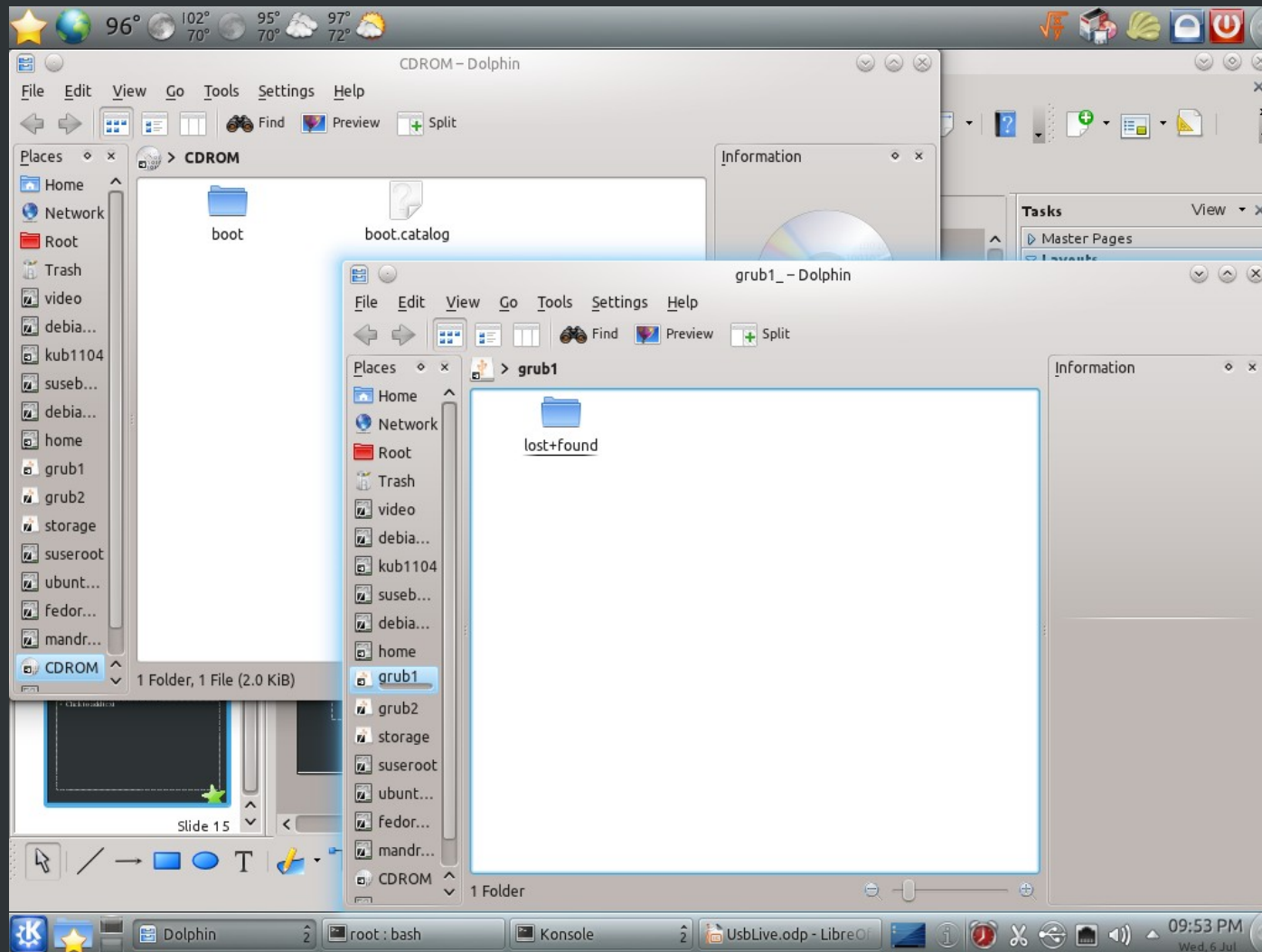
# Open SGD cdrom grub1 partitons.



# Run dolphin as root



# Open CD, grub1





# Reboot

- Boot super grub disk live CD. (version 1)
- Determine which is the partition with label=grub1
  - Boot & Tools
  - Show partitions
  - Device will be in form (hdX,Y)
    - X and Y will be numbers
- “c” to get to grub command line



# In Grub

root (hdx,y)

setup (hdx,y)

- After setup test with
- chainloader +1
- boot
- 
- Will boot super grub disk!



# Return to GNU/LINUX with grub version 2, like ubuntu

- Install grub2!
  - `cd /media`
  - `mkdir grub2`
  - `mount -L grub2 grub2`
  - `grub-install --root-directory=/media/grub2 /dev/sdX`
- What is X?
  - Same device as shown by
    - `ls -l /dev/disk/by-label/grub2`



# My version of grub.cfg

<http://www.free.blackpatchpanel.com/pme/linux/grub.cfg>



# Only remains to create boot/grub/grub.cfg

```
menuentry "Super Grub Disk" {
```

```
    insmod part_msdos
```

```
    insmod ext2
```

```
    insmod chain
```

```
    set root='(hd0,msdos11)'
```

Echo “wont work until uuid adjusted”

```
    search --no-floppy --fs-uuid --set=root 259d247c-  
3b98-4491-a985-dcf2dbc74ed5
```

```
    chainloader +1
```

```
}
```



# UUIC initial U stands for unique.

- UUIC is created when partition is made.
- Must determine UUIC for menu entry.



# Where did the UUIC come from?

grub1

```
root@hrnowl:/media# ls /dev/disk/by-label/ -l
total 0
lrwxrwxrwx 1 root root 9 2011-07-07 09:54 Bluebirds -> ../../sr0
lrwxrwxrwx 1 root root 10 2011-07-07 09:54 debianboot -> ../../sda5
lrwxrwxrwx 1 root root 10 2011-07-07 09:54 debianroot -> ../../sda8
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 fedoraroot -> ../../sda12
lrwxrwxrwx 1 root root 10 2011-07-07 13:49 grub1 -> ../../sdg5
lrwxrwxrwx 1 root root 10 2011-07-07 13:49 grub2 -> ../../sdg6
lrwxrwxrwx 1 root root 10 2011-07-07 09:54 home -> ../../sda9
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 kub1104 -> ../../sda16
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 mandriviareoot -> ../../sda13
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 opensusel1.3 -> ../../sda14
lrwxrwxrwx 1 root root 10 2011-07-07 13:49 storage -> ../../sdg7
lrwxrwxrwx 1 root root 10 2011-07-07 09:54 suseboot -> ../../sda6
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 suseroot -> ../../sda10
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 ubuntuoot -> ../../sda11
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 video -> ../../sda15
```

```
root@hrnowl:/media# ls /dev/disk/by-uuid/ -l
total 0
lrwxrwxrwx 1 root root 10 2011-07-07 09:54 10b2be02-ad19-4cd7-8bc3-03e13146e554 -> ../../sda6
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 2219b872-f075-4c61-be30-9b544eaa6560 -> ../../sda10
lrwxrwxrwx 1 root root 10 2011-07-07 13:49 259d247c-3b98-4491-a985-dcf2dbc74ed5 -> ../../sdg5
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 3cab804-c8c7-435d-bfa0-874b9b0b0684 -> ../../sda13
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 680d2262-38e5-457b-b17e-0f38b048000d -> ../../sda14
lrwxrwxrwx 1 root root 10 2011-07-07 09:54 7816d5b0-8b5d-48d5-9753-2b38e7e0259 -> ../../sda5
lrwxrwxrwx 1 root root 10 2011-07-07 13:49 7f75e4b5-2b4f-450e-bf07-97a88f6e4beb -> ../../sdg7
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 8194ce4e-340c-4336-8882-086353a40167 -> ../../sda15
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 856d704c-b041-4203-bfd6-95ff6988b01e -> ../../sda16
lrwxrwxrwx 1 root root 10 2011-07-07 09:54 8c0cf975-dc1c-46e3-b3f5-202f36a43d93 -> ../../sda9
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 b2a77d13-1085-4b40-a726-711912b0b6fb -> ../../sda11
lrwxrwxrwx 1 root root 10 2011-07-07 09:54 bdd20a04-564f-4d93-ba68-f2d030dedbf6 -> ../../sda8
lrwxrwxrwx 1 root root 10 2011-07-07 13:49 d1266df2-cab0-4a66-8862-87010fb0b248 -> ../../sdg6
lrwxrwxrwx 1 root root 11 2011-07-07 09:54 e97b4bb4-f253-427c-a3ab-1840c5448b05 -> ../../sda12
lrwxrwxrwx 1 root root 10 2011-07-07 09:54 f800131f-ab78-443f-a911-a5d438901a83 -> ../../sda7
root@hrnowl:/media#
```

```
menuentry "Super Grub Disk" {
    insmod part_msdos
    insmod ext2
    insmod chain
    set root='(hd0,msdos11)'
    search --no-floppy --fs-uuid --set=root 259d247c-3b98-4491-a985-dcf2dbc74ed5
    chainloader +1
}
```



# But this may be too complicated. So boot by label

```
menuentry "Super Grub Disk by label" {  
    insmod part_msdos  
    insmod ext2  
    insmod chain  
    set root='(hd0,msdos11)'  
    echo "super grub disk partition must be labeled grub1"  
    search --no-floppy --label --set=root grub1  
    chainloader +1  
}
```





# How to convert menu entries!

```
menuentry "SystemRescueCd std-32bit" {  
    insmod part_msdos  
    insmod ext2  
    set root='(hd0,msdos11)'  
    search --no-floppy --file --set=root $sysresisofile  
    loopback loop $sysresisofile  
    set root={loop}  
    linux /isolinux/rescuecd isoloop=$sysresisofile  
    initrd /isolinux/initram.igz  
}
```



# Isolinux subdirectory \*.cfg

- Isolinux subdirectory contains .cfg files with menu items.

```
root@hrnowl:/media/cdrom/isolinux# ls *.cfg  
isolinux.cfg  
root@hrnowl:/media/cdrom/isolinux#
```



# Fields of isolinux file and corresponding in grub.cfg

```
label live
  menu label ^Start Kubuntu
  kernel /casper/vmlinuz
  append file=/cdrom/preseed/kubuntu.seed \
  boot=casper maybe-ubiquity initrd=/casper/initrd.lz quiet splash --
```

```
menuentry "Kubuntu Live" {
  insmod part_msdos
  insmod ext2
  set root='(hd0,msdos11)'
  search --no-floppy --file --set=root /kubuntu-11.04-desktop-i386.iso
  loopback loop /kubuntu-11.04-desktop-i386.iso
  linux (loop)/casper/vmlinuz file=/cdrom/preseed/ubuntu.seed boot=casper \
  iso-scan/filename=/kubuntu-11.04-desktop-i386.iso splash quiet --
  initrd (loop)/casper/initrd.lz
}
```

Filename

Distro dependant



# Menu.cfg

```
menuentry "Kubuntu Live" {  
    insmod part_msdos  
    insmod ext2  
    set root='(hd0,msdos11)'  
    search --no-floppy --file --set=root /kubuntu-11.04-desktop-i386.iso  
loopback loop /kubuntu-11.04-desktop-i386.iso  
    linux (loop)/casper/vmlinuz file=/cdrom/preseed/ubuntu.seed boot=casper \  
        iso-scan/filename=/kubuntu-11.04-desktop-i386.iso splash quiet --  
    initrd (loop)/casper/initrd.lz
```

```
}
```



# Exceptions

- Sometimes “linux” is “linux16”
- Sometimes “initrd” is “initrd16”



# Kernal loopback paramter

- Different Live CDs use different kernal parameter to indicate file which holds the “CDROM” device.
- Isolloop= System Rescue CD
- Findiso= Gparted Live CD
- iso-scan/filename= Ubuntu Live CDs!
- Linux Standard Base should recommend a standard name!



# Put the ISOs in big storage partition

```
root@hrnowl:/media/isoStorage# ls -l
gparted-live-0.8.1-3.iso
kubuntu-11.04-desktop-i386.iso
lost+found
super_grub_disk_0.9799.iso
super_grub_disk_english_usb_0.9799.tar.gz
systemrescuecd-x86-2.2.0.iso
```



# We can now refer to these ISOs via loopback.

```
menuentry "SystemRescueCd std-32bit" {  
    insmod part_msdos  
    insmod ext2  
    set root='(hd0,msdos1 1)'  
    search --no-floppy --file --set=root $sysresisofile  
    loopback loop $sysresisofile  
    set root=(loop)  
  
    linux /isolinux/rescuecd isoloop=$sysresisofile  
    initrd /isolinux/initram.igz  
}
```





# So our USB stick can do the following

- Boot/restore grub1 and windows partitions with super grub disk
  - Boot older grub distros like fedora that use grub1
  - Boot Windows
  - Restore master boot record
- System Rescue CD
- Gparted Live CD
- Ubuntu Live CD



# So our USB stick can do the following

- Boot/restore grub1 and windows partitions with super grub disk
- System Rescue CD
  - 32 64 bit versions
  - MemTest+
  - NT Password Editor
  - GAG
- Gparted Live CD
- Ubuntu Live CD



# So our USB stick can do the following

- Boot/restore grub1 and windows partitions with super grub disk
- System Rescue CD
  - MHDD
  - Hardware Detection Tool
  - Aida
  - Ranish Partition Manager
- Gparted Live CD
- Ubuntu Live CD



# So our USB stick can do the following

- Boot/restore grub1 and windows partitions with super grub disk
- System Rescue CD
  - FreeDOS
  - Super Grub Disk 2 to boot ubuntu!
- Gparted Live CD
- Ubuntu Live CD



# So our USB stick can do the following

- Boot/restore grub1 and windows partitions with super grub disk
- System Rescue CD
- Gparted Live CD
- Ubuntu Live CD
  - Try out ubuntu
  - Install ubuntu



# So our USB stick can do the following

- Boot/restore grub1 and windows partitions with super grub disk
- System Rescue CD
- Gparted Live CD
  - Repartition Whole drives, move resize partitions.
- Ubuntu Live CD

