Attaching External disks to LINUX

Attaching FireWire (ieee1394a) or USB2 external drives to LINUX systems at SBC is a reasonably straight forward process since the upgrade to RedHat WS4; but, there are no guarantees. It is best to **become familiar with using your disks on linux at your home institute** before you use them at SBC.

WARNING: Linux-formatted disks ("ext3" format) enforce file ownerships and permissions! ***Before you arrive at SBC please be sure that the top-level permissions on your linux-formatted disks have open WRITE permission for EVERYONE*** ("other") so that your SBC linux user account will be able to write to your disk. FAT32-formatted disks do not implement these types of access controls.

Even if your drives work on other linux systems, there are no guarantees that your disks will work on the SBC linux systems so **please test your drives on SBC computers as soon after you arrive as possible**. ***In most cases you simply attach the drive and power it up! Remember to test to confirm that you can write files to your disks from your SBC computer account.***

NORMALLY

After a short wait, usually less than a minute, the system should:

1. recognize the drive and create a mountpoint for the drive in the /media directory
2. mount the drive on the new mountpoint
3. create a new desktop icon for the disk drive.

Provided that all of the above complete successfully **you may treat the drive as a *locally attached disk* using standard LINUX commands such as cp or rsync ON THE LOCAL LINUX SYSTEM to perform your data backup.** You might consider "*rsync –rlt - -progress FROMDIR TODIR*" or "*cp –r FROMDIR TODIR*". I have created an alias at SBC called "***rsyncsbc***" which is equivalent to "rsync –rlt - -progress". Note: the "progress" option is preceded by two dashes with no space in between; but, Microsoft Word does not illustrate this easily.

Caution 1: while your "home" directory is shared by all of our linux systems, your Firewire or USB disk is a "local" filesystem available only on the system to which you attatched the disk. You must perform your backups on that particular linux system.

WHAT CAN GO WRONG?

If no icon appears on the desktop, you may want to try again. I suggest that you power off the drive, and list the contents of "/media" with the drive turned OFF (type *ls –axl /media*). Power the drive ON and look for a new entry in "/media" after giving the system time to recognize the new disk (say 30 seconds or so). If you see a new mountpoint in /media , look for a new filesystem for that device with the "*df*" command. If the filesystem is there, you can live without the desktop icon. If there is no new filesystem; but, there is a new mountpoint in /media (eg. /media/MyVolumeLabel) try typing the command:

mount /media/MyVolumeLabel

The "*df –h*" command should list the new filesystem. If this does not work and your drive supports both ieee1394a and USB2, then you may have better luck with the other interface. The procedure is the same as described above. If the drive does not work with either interface you might try a different SBC Linux system; otherwise, you must use a PC or laptop for your backups.

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Caution 2: Linux will not recognize *every* disk format. The "ext3", "fat32" and "hfs+" formats have been used successfully at SBC; but, "fat32" (fat32 is "vfat" on linux systems) and "hfs" (no "+") both have exhibited some limitations and strange behavior. I have noticed that UPPER CASE is sometimes converted to lower case when files are copied to vfat disks. I recommend using all lower case when you collect and process your data if you intend to copy it to fat32 using linux. Users have reported while using fat32 disks that rsync sometimes re-copies files that have not been changed (similar to "cp –r"); but, the copy process has been fast and is not a problem if you provide time for it to complete. The "hfs" format, older version of the Mac filesystem, also exhibits strange permission and file modification dates generated by linux copies and "hfs" seems to hide deleted files somewhere that Linux and Windows cannot find them. Mac users should consider using either "hfs+" or "ufs".

Caution 3: The "ext3" format is a fully linux compatable format and therefore does support file ownership and access rights as does the "hfs+" Mac format. **You may need "root" privileges (at home) to change ownership or privileges so that you can write to the disk with an SBC login and again (at home) to open privileges when you attach the disk to a system at your home institute. Please speak to your systems administrator and do this BEFORE you come to SBC.**

SOME USEFUL LINUX COMMANDS
(examples use "$" as the command prompt)

Long listing of the /media directory
$ ls –axl /media

List of mounted filesystems including file system "type"
$ df –hT

The cp command syntax is "cp –r FROM TO"
Copy recursively directory crystal1 to directory /media/usbdisk/backup
$ cp –r crystal1 /media/usbdisk/backup

The rsync command syntax is "rsync –rlt - - progress FROM TO"
Copy recursively directory crystal2 to directory /media/usbdisk/backup
$ rsync –rlt - - progress crystal2 /media/usbdisk/backup
Same as
$ rsyncsbc crystal2 /media/usbdisk/backup

To unmount a drive which has been mounted at "/media/MyVolumeLabel"
Right-click the desktop icon and Left-click on the "unmount" tab at the bottom of the resulting menu choices
Or use the LINUX command (notice only one "n" in the command "umount"):
$ umount /media/MyVolumeLabel