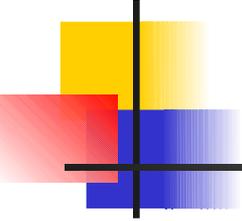


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Linux File Systems  
Partitioning  
Mounting File Systems

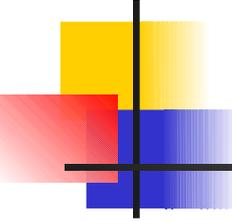


# Lab 4 - Part 1

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## Topics

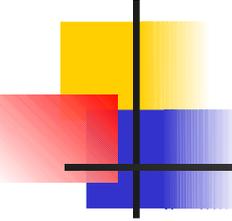
- Linux File Systems (ext2 / ext3 / ext4)
- Linux Partitioning / Formatting
- Mounting Linux File Systems



# Linux File Systems

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- A **file system** is necessary part of an operating system since it is a structure that is used to store data.
- When the operating system is installed, one of the first operations is to create a partition and then format the storage device to create the file system.
- There are many types of file system architectures for the Unix and Linux operating systems that have evolved over the years (for example: **ext2**, **ext3**, Reiser, **ext4**) . Each of them have their own characteristics and advantages...

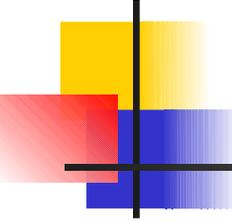


# Linux File Systems

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- **Which Linux File System Type to Use?**

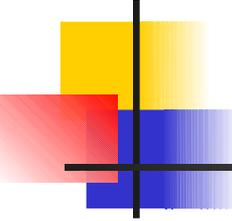
- Second Extended file system (**ext2**) is older, but is good for supporting large database storage (more efficient write and access)
- Third Extended file system (**ext3**) allows for **journalling**. Journalling tracks changes in the file-system, which helps to prevent data corruption in case of system crashes.
- Fourth Extended file system (**ext4**) newer that allows support for extremely large files. Features include journalling, and easy migration from ext3 to ext4. Normally when partition is formatted, can specify the number of boot prior to file-system checks.



# Linux Partitioning / Formatting

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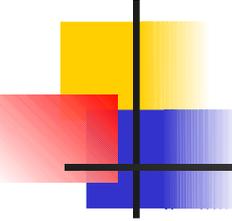
- Device names for storage are located in the `/dev` directory and have different names based on the number of hard disks, and type of disk. For example: **`/dev/sda`** (for sata drives), **`/dev/hdb`** (for IDE drives), etc.
- Storage devices can be subdivided into smaller containers called **partitions** (which are numbered). For example: **`/dev/sda5`**, **`/dev/sda6`**, **`/dev/sdb1`**, **`/dev/sdb2`**.
- There are graphical tools to create hard disk partitions (eg. **`gparted`**), as well as command line utilities (eg. **`fdisk`**).
- Graphical tools (such as **`gparted`**) can also format the partitions, but you can also use command-line utilities (such as **`mkfs.ext2`**, **`mkfs.ext3`**, **`mkfs.ext4`**)



# Mounting File Systems

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- **Mounting** a partition allows the computer to “connect” to a storage device for writing and access. **Un-mounting** simply disconnects the storage device from the computer system.
- Users have become accustomed to computers automatically mounting devices (**plug and play**). On the other hand, it is beneficial for system administrators to learn how to perform mounting and un-mounting storage devices manually.
- An example of the usefulness of manually mounting a storage device can be when the **system fails to boot-up into graphical mode**. The system administrator, may be able to switch to a text-based console (**single user mode, CTRL-ALT-F#**), or **boot from a live CD, and mount to existing file system** on hard-disk...



# Mounting File Systems

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- The manual mount command for newer Linux file systems is:

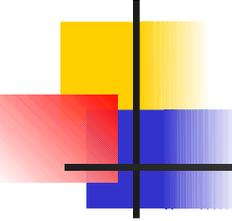
**mount [device-name] [mount-point-directoryname]**

(For example: **mount /dev/sda5 rescue-dir**)

- Note: the system administrator may need to **create a directory prior to use the mount command** to connect the storage area to the **directory** or “**mount-point**”.
- To disconnect the storage area from the computer, the system administrator can issue the Linux command:

**umount [mount-point-directoryname]**

(Note: the command is *umount*, not *unmount*!)



# Mounting File Systems

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- It would get annoying if the system administrator had to manually mount partitions upon boot-up. Fortunately, the system has a file that will automatically mount partitions upon bootup called **fstab** (short for File System Table).
- **fstab** is located in the **/etc** directory. The system administrator can edit the **fstab** file by issuing the command: **vi /etc/fstab**. This file contains fields for mounting. Issue the command **man fstab** for more details.

**NOTE: Take great care** when editing the **fstab** file. Incorrect entries may not allow the partition to be properly connected to the system which can cause problems when booting-up system!