Operating Systems
COMS W4118
Lecture 22

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1 Berkeley Fast File System (FFS) Layout

- Partition means you have a physical drive and you separate each section of the drive into a filesystem.
- Partitions are also known as *Volumes*
- iNode is a single block per file; each file has an inode. INode keeps track of the location of data within the file as well as the metadata for the file.
- i-node is a fixed array of numbers. Each file is uniquely identified by the i-node number in the file system.
- Block bitmap is used to find out which block of memory is not in use.
- A cylinder is the same track on a disk. A cylinder group is a larger number of tracks linked together.
- The basic structure is a list of i-nodes that point to data blocks.
- You can have multiple filenames pointing to the same file in the UNIX system.

2 Hard Links Versus Symlinks

- Every hard link is equal. It is a link that refers to some i-node number.
- You can get stuck in a cycle if two hardlinks are connected to each other.
- You cannot make a hard link to a directory in the unix system.
- Symbolic link is a file itself.
- A hard link is an actual entry in the directory, a symbolic link is just a shortcut.

- Symbolic links are just names that point to any file.
- Hardlinks must point to an i-node in the file system.
- You cannot have two hardlinks from different file systems because that uses two separate i-node directories.

3 Schematic View of Virtual File System

- Regular hard disks can be mounted and unmounted just like mobile drives.
- The operating system must be able to mount and unmount any file system.
- VFS was created because the operating system simply writes code using the interface defined by the VFS. Different types of file systems will implement the VFS interface.

4 LFS Idea

- Let's just treat the file system as a large tape.
- Everything is sequential, there is no random access.
- Log structured file system.
- Since we are doing a lot more reading than writing to a file system, we should store all files being read sequentially.