

# Maintaining a File System

## ■ File System Integrity

### ■ utility: `fsck -p [fileSystem]`

**fsck** (file system check) scans the specified file systems and checks them for consistency. The kind of consistency errors that can exist include:

- A block is marked as free in the bitmap but is also referenced from an inode.
- A block is marked as used in the bitmap but is never referenced from an inode.
- More than one inode refers to the same block.
- An invalid block number.
- An inode's link count is incorrect.
- A used inode is not referenced from any directory.

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# file system integrity

## ■ `fsck -p [fileSystem]`

- If the `-p` option is used, `fsck` automatically corrects any errors that it finds. Without the `-p` option, it prompts the user for confirmation of any corrections that it suggests.
- If `fsck` finds a block that is used but is not associated with a named file, it connects it to a file whose name is equal to the block's inode number in the `"/lost+found"` directory.
- If no file systems are specified, `fsck` checks the standard file systems listed in `"/etc/fstab."`
- Linux has specialized `fsck` programs for different types of file systems. For example, when checking an `ext2` or `ext3` file system, `fsck` act as a front-end to `e2fsck`, which is the program that actually checks the file system.

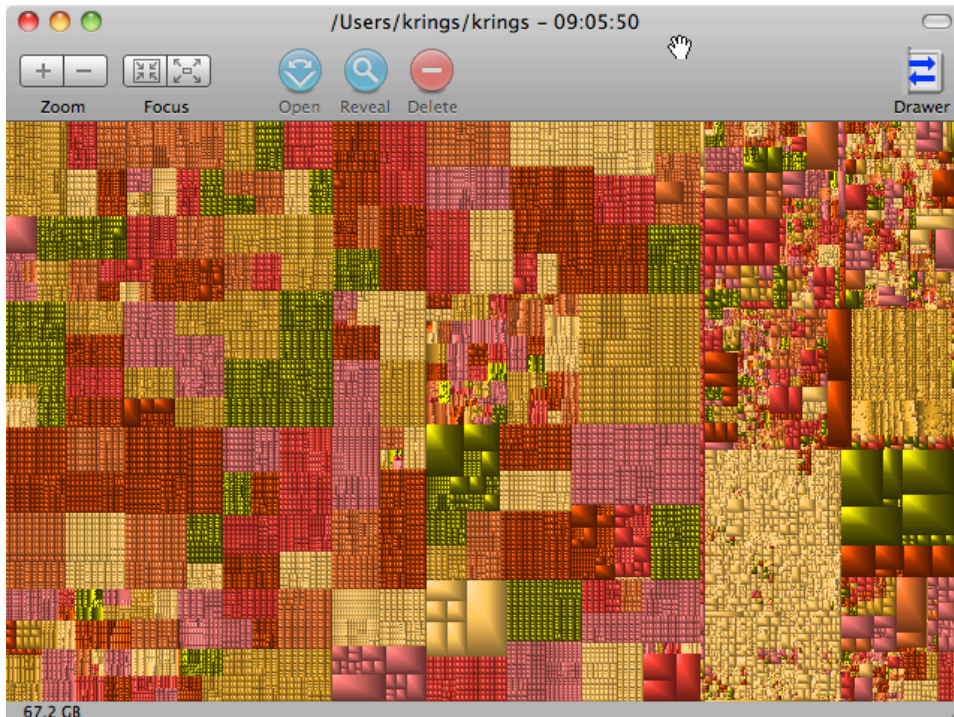
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# Display disk statistics

- My disk is full, my files are not saved, why?!@#
  - *du* -- display disk usage
    - displays the number of kB that are allocated to each of the specified filenames.
    - If a filename refers to a directory, its files are recursively described
    - -h option displays more human-readable values (i.e., 63844 blocks is displayed as 63M)
    - -s option displays only the grand total (summary) for each file or directory
  - *df* -- display free disk space

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# GrandPerspective under OS X



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# Display disk statistics

## ■ Quotas

- assigns limits of disk space for users
- *quota* -- display disk usage and limits
- *csquota* -- print out all disk quotas for the user

# Creating New File System

- What needs to be done before you can add a new disk to your system
  - partition and format the drive (if necessary)
  - create file system on the medium
  - mount disk

# Creating New File System

- Utility: `mkfs -t type specialFile [ sectorCount ]`
  - `mkfs` creates a new file system on the specified special file.
    - A new file system consists of a superblock, an inode list, a root directory, and a "lost+found" directory.
    - The file system is built to be `sectorCount` sectors in size.
    - Only a super-user can use this command.
  - `mkfs` is actually a front-end to a specific file system creator for each specific file system supported (e.g., `mke2fs`), determined by the file system type specified by `type`.

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# Backing up File System

- The most important task!
  - `dump & restore`
- Backup Utilities

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# Backing up File System

- Case study: OS X 10.6 Time Machine
  - how does it work
  - how does one control it
  - what does it store
  - how do I see what has been backed up