Mounting File Systems in Unix

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What is Mounting?

Mount system call connects the file system in a specified section of a disk to the existing file system hierarchy.

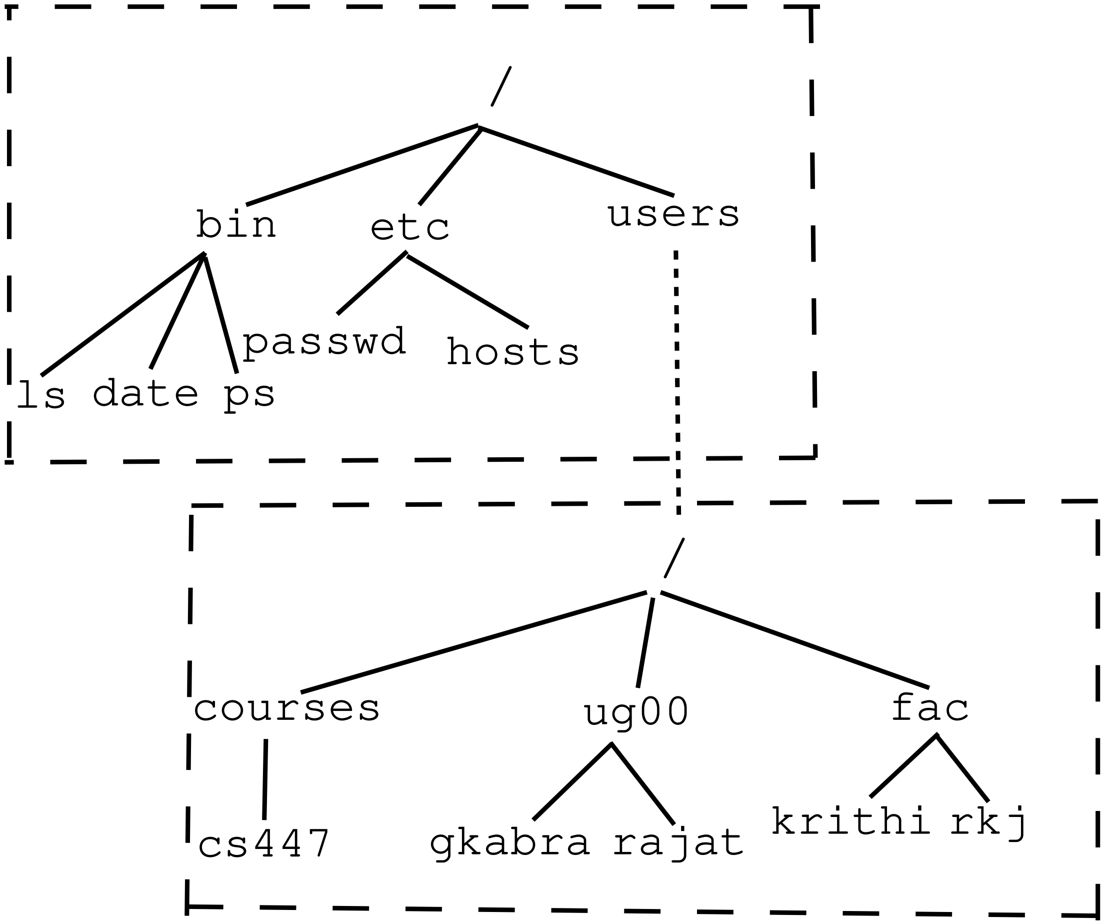
Thus it allows users to access data in a disk section as a file system instead of a sequence of disk blocks.

mount(special-pathname, directory-pathname, options)

special-pathname: special file of the disk section to be mounted
directory-pathname: a directory in the existing hierarchy (called mount point)
options: read-only...

An Example

mount("10.105.1.3:/users", "/users",0)

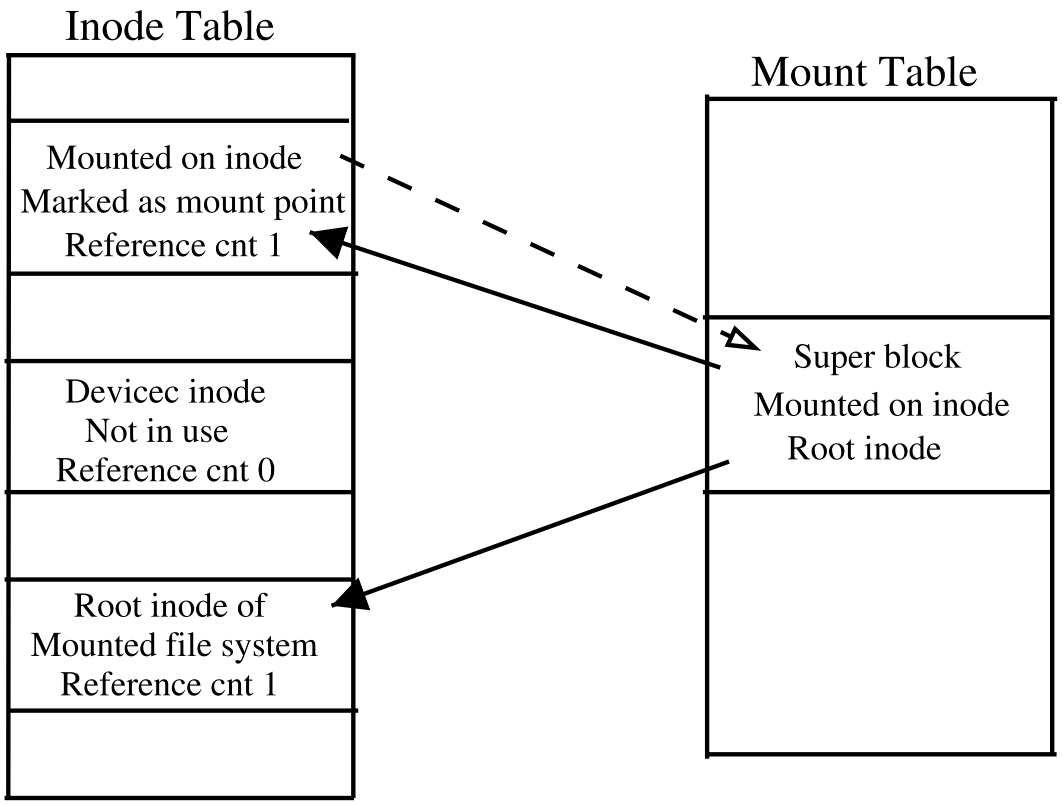


Mount Table

Each Mount Table Entry contains:

- a device number to identify the mounted file system
- a pointer to a buffer containing the file system super block
- a pointer to the root inode of mounted file system
- a pointer to the inode of directory that is the mount point

Data Structures after Mount



Crossing Mount Points in File Path Name

mount "10.105.1.3:/users" "/users"

cd /users/fac/rkj

cd ../../..

Mount command mounts the file system in the disk section identified by "10.105.1.3:/users" onto the dir "/users"

First cd command causes kernel to cross the mount point from the mounted-on file system to the mounted file system.

Second cd command causes kernel to cross the mount point from the the mounted file system to mounted-on file system.

Crossing from mounted-on to mounted file system

cd /users/fac/rkj

- first access the inode for "/users" in the mounted-on file system
- "/users" is marked as "mounted-on"
- Go to the Mount Table Entry for "/users"
- Find the inode of the mounted file system from this entry
- Access the root inode of the mounted file system

Crossing from mounted-on to mounted file system

cd /../../..

- Working inode becomes "/users/fac" after first ".."
- Working inode becomes "/users"(of 10.105.1.3) after second ".."
- At third "..":
  - working inode is root inode
  - inode number for ".." is also root inode
  - Conclude that the inode is a mount point
- Find the mount table entry for "/users" mount point
- Change working inode to "/users"(of mounted-on file system)
- Search for ".." in the mounted-on "/users"
- Return the root of file system "/"

References

- The Design of the UNIX Operating System by Maurice J. Bach
  Prentice Hall of India
- Operating System Concepts by Silberschatz and Galvin