A Short History of Directories

Approach 1 : Single directory for entire system

- Put directory at known location on disk
- Directory contains `hname`, `inumberi` pairs
- If one user uses a name, no one else can
- Many ancient personal computers work this way

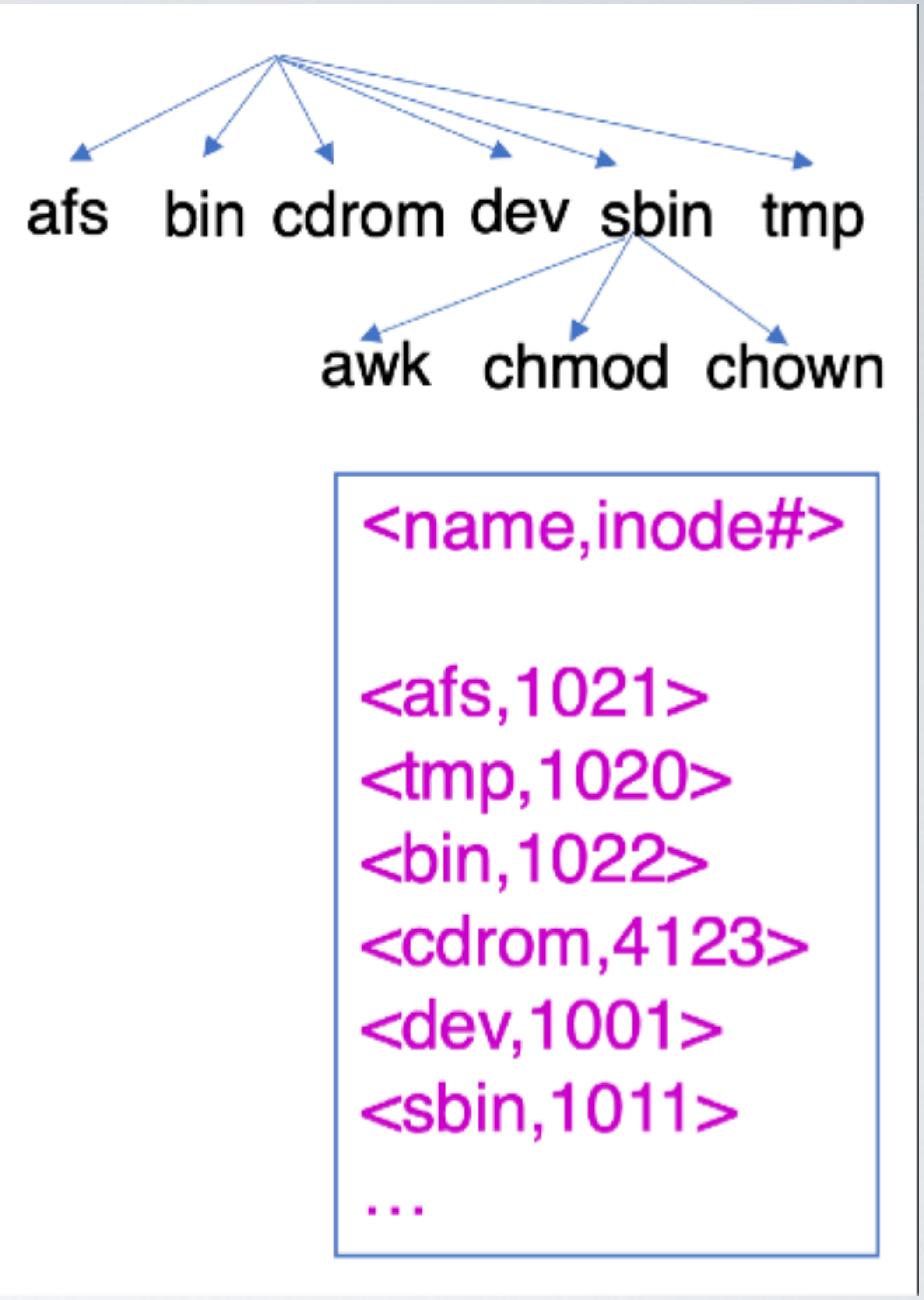
Approach 2 : Single directory for each user

- Still clumsy, and `ls` on 10,000 files is a real pain

Approach 3 : Hierarchical name spaces

- Allow directory to map names to files or other directories
- File system forms a tree (or graph, if links allowed)
- Large name spaces tend to be hierarchical
  (ip addresses, domain names, scoping in programming languages, etc.)

Hierarchical Directory



<name,inode#>

<afs,1021>
<tmp,1020>
<bin,1022>
<cdrom,4123>
<dev,1001>
<sbin,1011>
…

➡ Used since CTSS (1960s)
Unix picked up and used really nicely

Directories stored on disk just like regular files

- Special inode type byte set to directory
- User's can read just like any other file
- Only special syscalls can write
- Inodes at fixed disk location
- File pointed to by the index may be another directory
- Makes FS into hierarchical tree

✓ Simple, plus speeding up file ops speeds up dir ops!