آریا تدبیر

طراحان شبکه

دپارتمان آموزش

آموزش لینوکس

GNU/Linux Filesystem

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What We Will Learn

- Introduction
- Filesystem Hierarchy Standard
- Directory layout of Linux FS
- Help
- Mounting

Introduction

- Filesystem
  - How are data stored in storage?
  - How do users access the data?
    - Data organization, files and directories
- Filesystem types
  - Disk FS: ext2, ext3, FAT, FAT32 & NTFS
  - Network FS: Samba & NFS
  - Flash FS: JFFS2
  - Special FS: proc FS

Introduction (cont'd)

- You should understand Linux FS
  - Why?
- Everything in Linux is file, if it is NOT process
  - Easy to use
    - Open file, read/write and close the file
- Unlike Windows, Linux FS is standard FS
  - Everyone should learn standards

Filesystem Hierarchy Standard

- Started by Dennis Ritchie, 1993
- Defines the main directories and their contents in most Linux-based systems
- Current Version: 2.3.

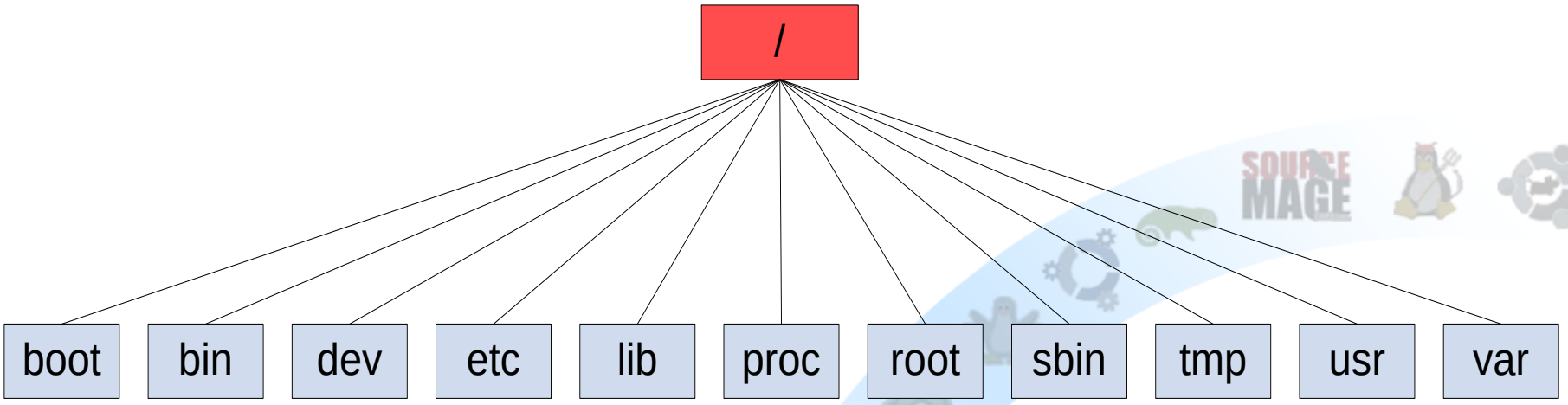
FHS

- There is not any drive C:, D:, …
- All directories are under “/”
  - “/” is the root directory
- It is possible
  - to have multiple partitions
  - to multiple filesystems

The “/”

- The primary hierarchy in FSH
  - The root of tree of filesystem
- All paths start form here
- There is only one “/” in filesystem

The “/”



boot

- Linux kernel
- Boot loader configuration
- If you lost **`boot`**
  - You cannot boot your OS

boot

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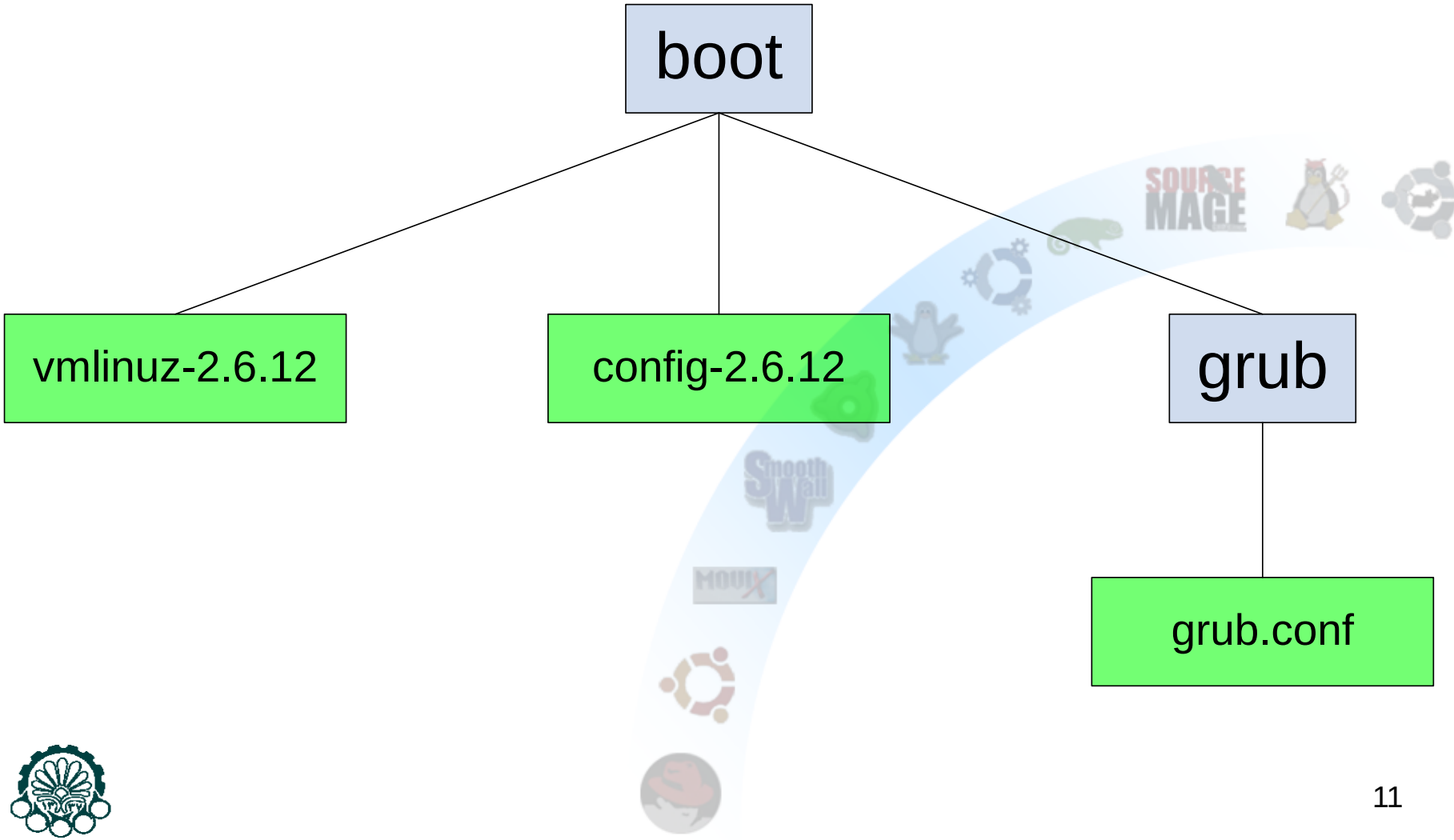

bin

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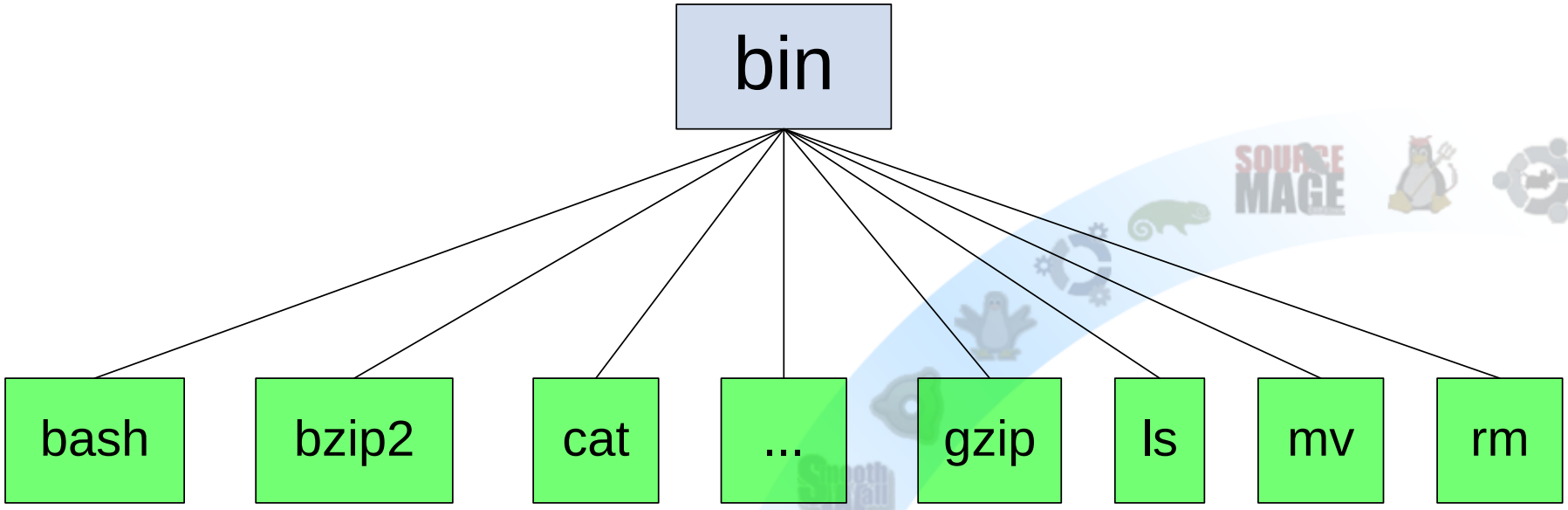
- Essential programs
- Need for system startup
- Basic commands for
  - Navigating in filesystem
  - File management

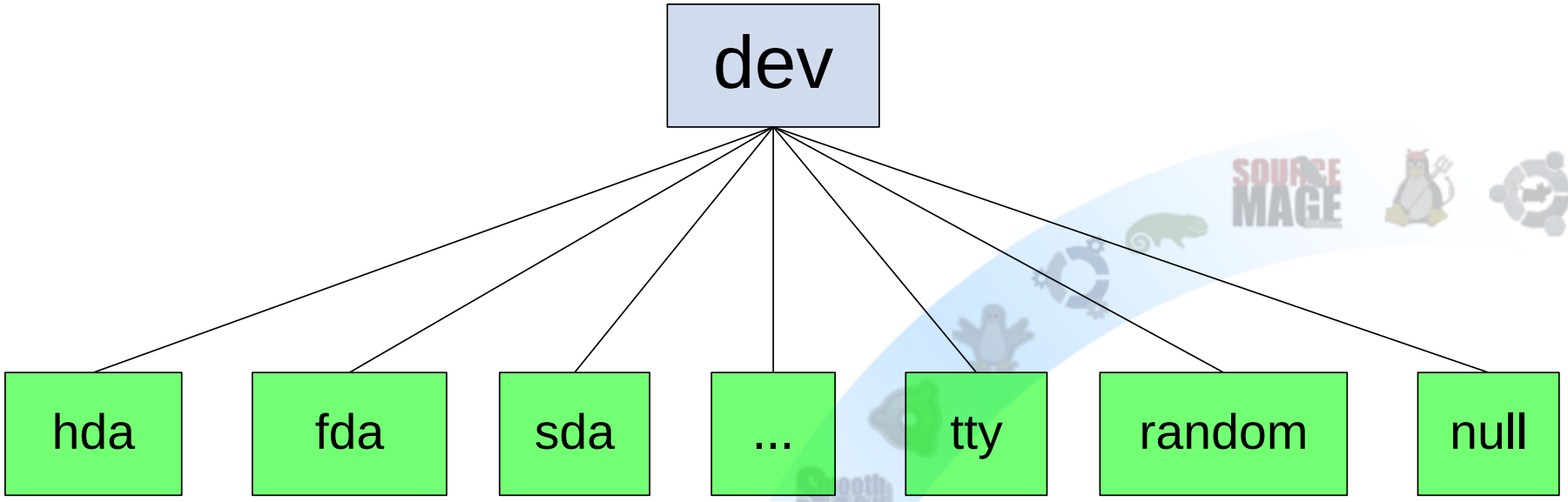
bin



dev

- Everything is file
  - Hardware components (devices) are file
    - Hard disk
    - Key board
- All device files are here
- Direct interaction with device driver
  - Open the device file
  - Read & Write

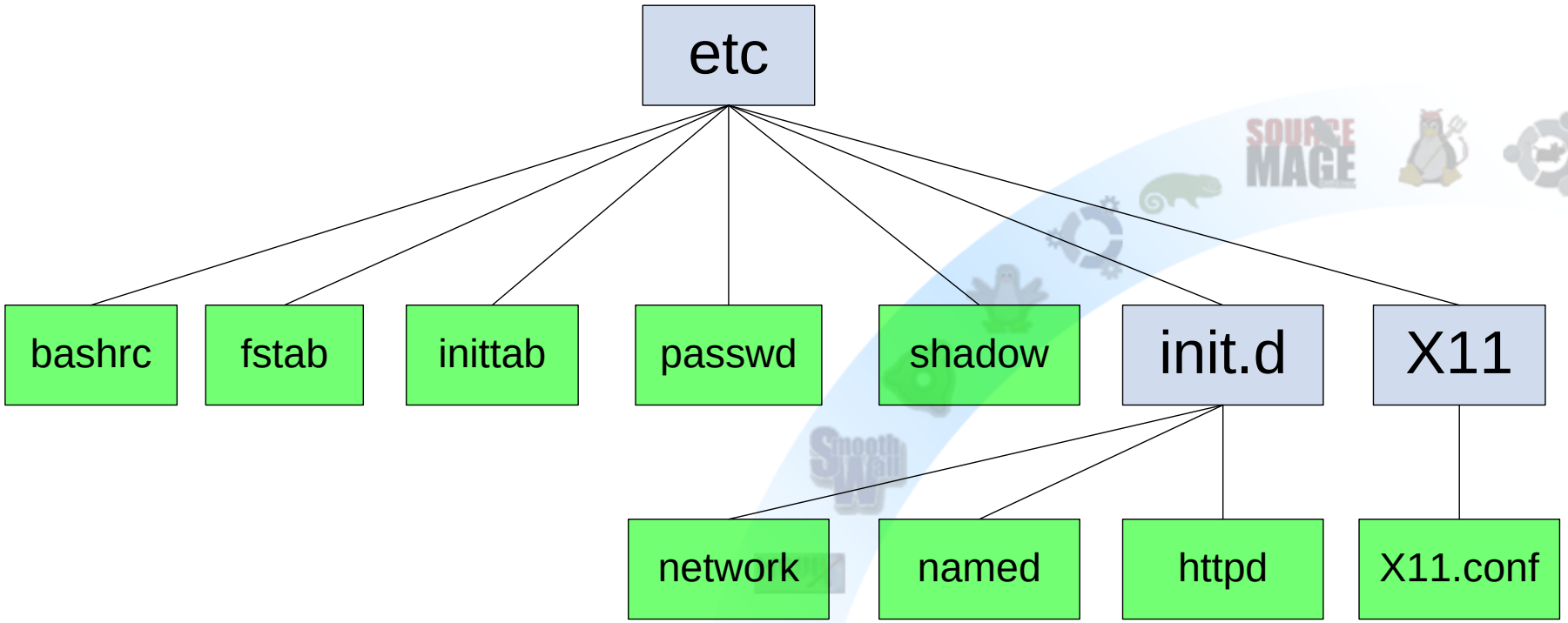
dev



etc

- System configuration directory
  - What is done by the registry in Windows
- All configuration file are text files
  - You can view and edit it manually

etc


etc
bashrc
fstab
inittab
passwd
shadow
init.d
X11
network
named
httpd
X11.conf

home

- Home directory of user
- Each user has a directory
  - /home/bahador
  - /home/hamed
- All files of user are stored here

lib

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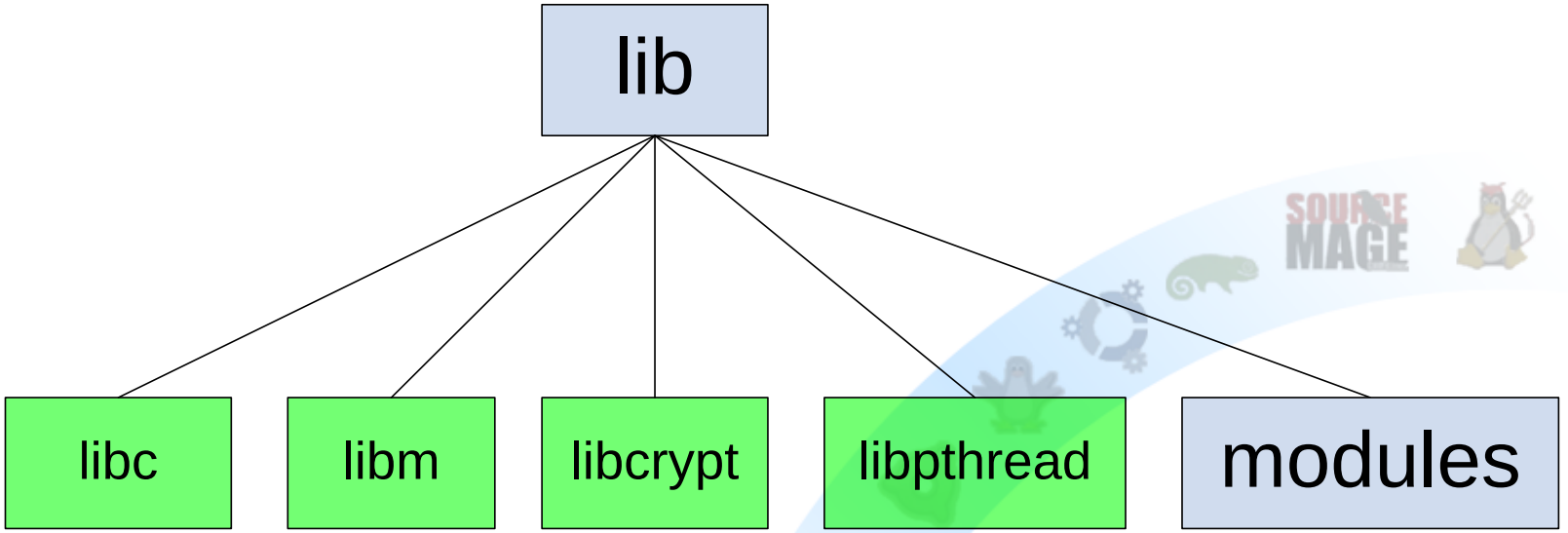
- Programs need libraries
  - Dynamically linked libraries
- Programmers need libraries
- All essential libraries are here
  - Needed for system startup

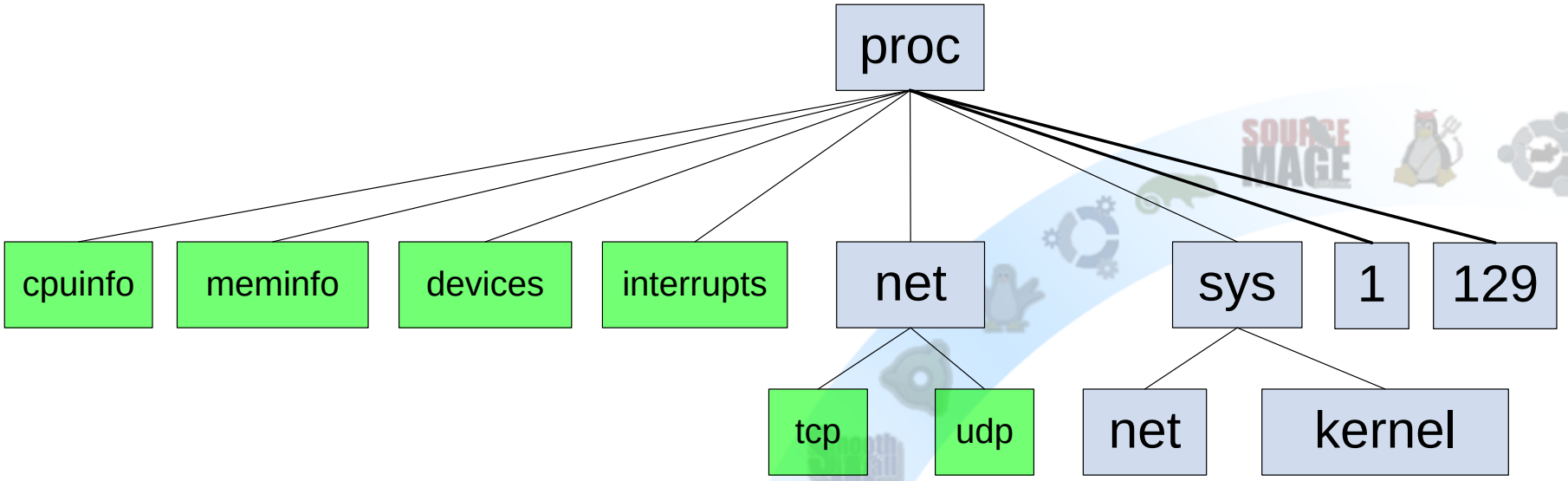
lib



proc

- Kernel's interface
  - Kernel pseudo-directory
- Special directory
  - It is NOT a directory on hard disk
- Kernel Configuration
- Kernel State monitoring

proc


proc
cpuinfo
meminfo
devices
interrupts
net
sys
1
129
tcp
udp
net
kernel

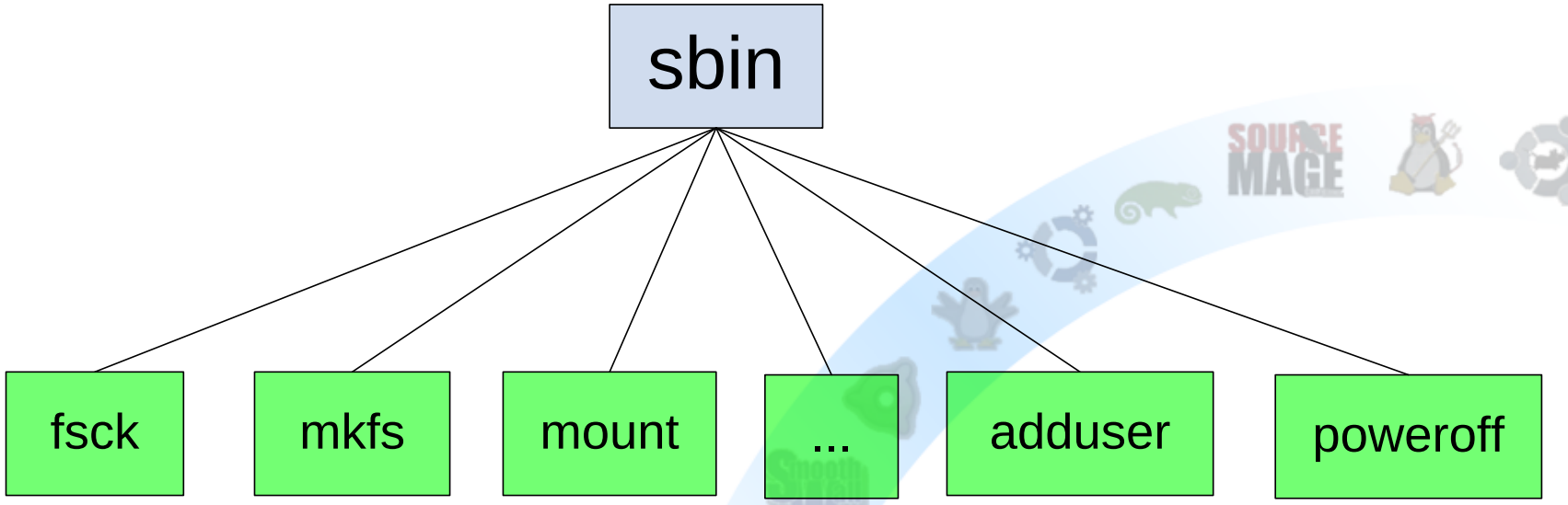
root

- Home directory of root
- Don’t confuse
  - / is the “root of Filesystem”
  - root is the name of system admin
  - /root is the admin

sbin

- System configuration programs
  - Format hard disk
  - Manage hardware
- Only “root” can run the programs

sbin



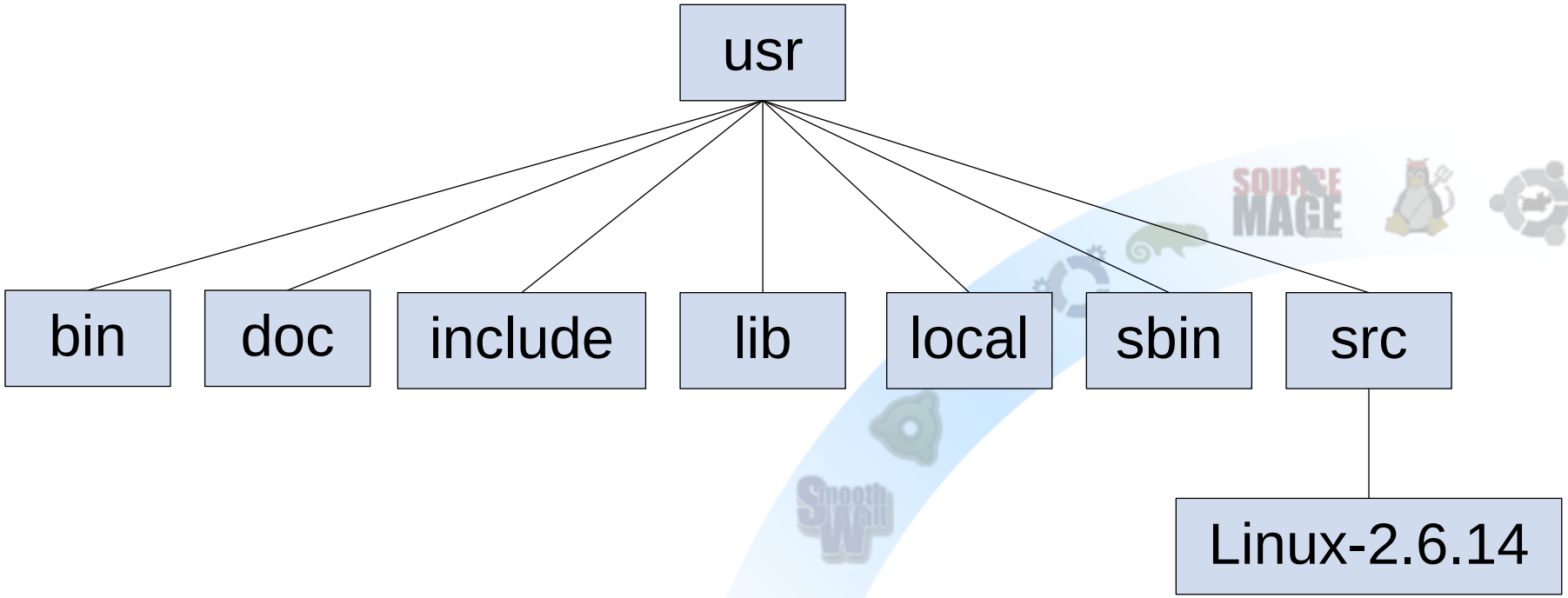
tmp

- Temporary directory
- All temp files are created by programs
- Your temp files
- It is emptied regularly

usr

- Secondary hierarchy
- Very useful programs
  - We usually use them
    - compiler, tools
- Are not essential for system startup

usr



var

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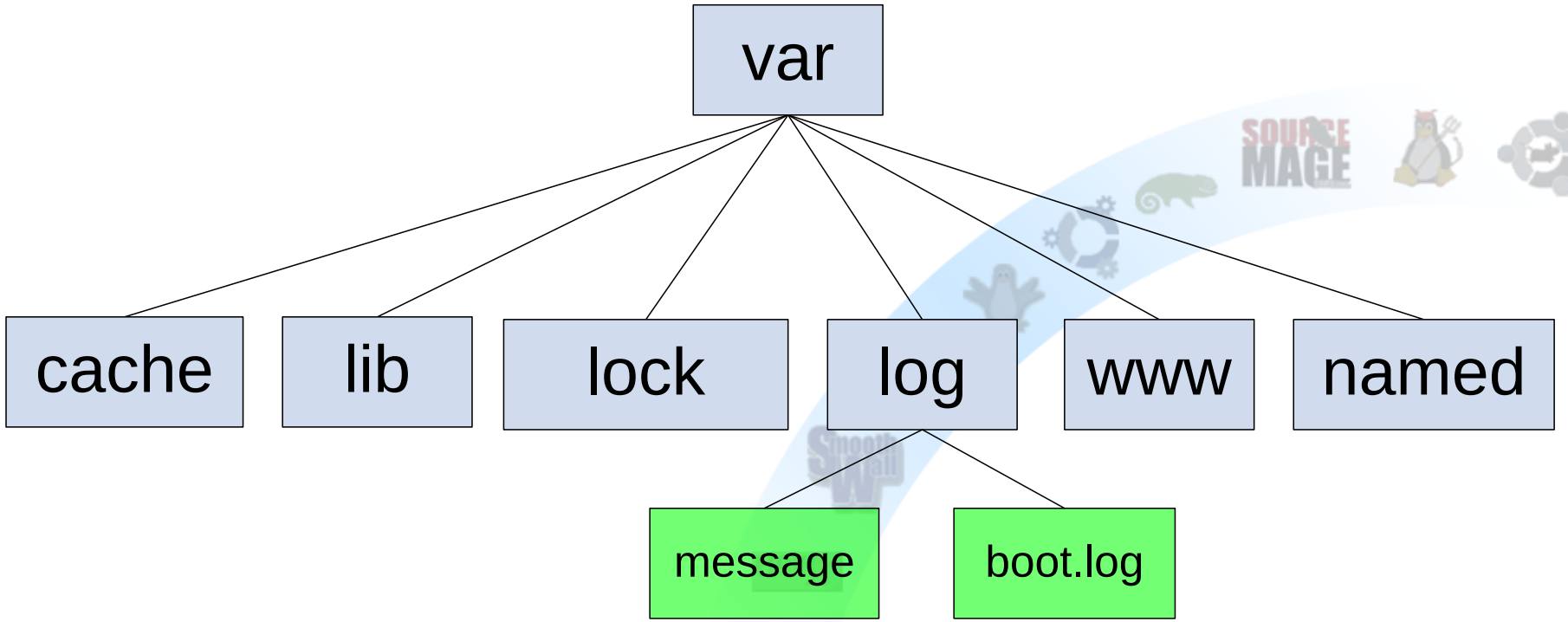
- The variable directory
- All dynamic files
- User cannot change the files

var



Helps

- Some documents are in /usr/share/doc
- Info pages are not complete help
  - **`info`** <command name>
- Man pages
  - /usr/share/man
  - man1: user commands, man8: System administration
  - **`man`** <command name>

Permissions

- There are 3 basic permissions
  - Read (r)
  - Write (w)
  - Execute (x)
- How to find them
  - `ls -l`
- How to change them
  - `chmod +/- r/w/x <filename>`

Mounting

- Mount
  - To add a filesystem to other filesystem
    - Add you cool-disk FS to you laptop FS
- How?
  - **`mount <options> <device> <mount point>`**
  - **`mount -t vfat /dev/sdb1 /mnt/flash`**
- Don't forget the umount
  - **`umount <mount point>`**
  - **`umount /mnt/flash`**

Linux FS vs. Windows FS

- There is not drive C:, D:
- Top hierarchy is /
- Path separator is / not \
- File extensions have NOT any meaning
- There is not hidden attribute, hidden files are started by .

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