

What Goes Where?

A short talk to introduce the
Filesystem Hierarchy Standard.

Filesystem Hierarchy Standard

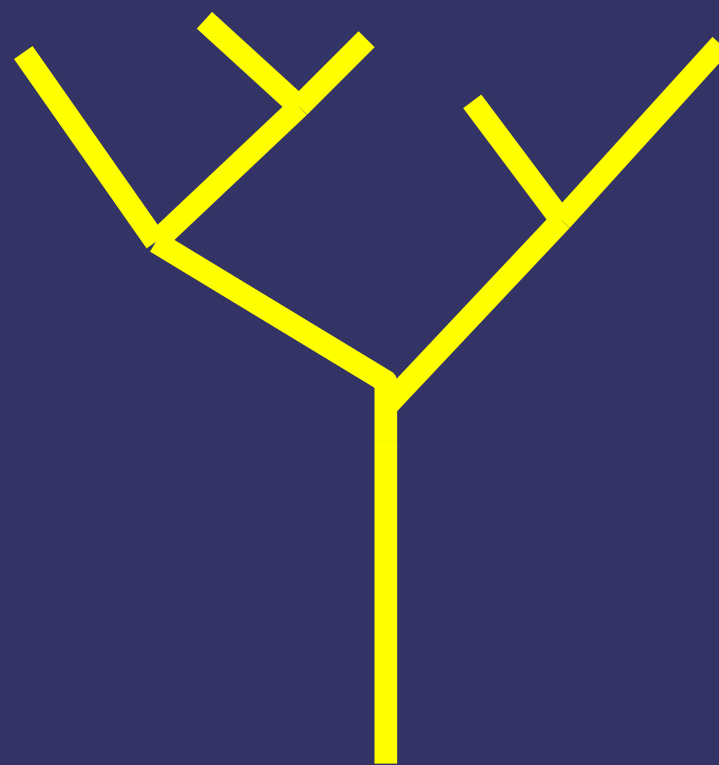
- The Filesystem Hierarchy Standard (FHS) was designed as a standard filesystem layout for any Unix, Linux or POSIX like operating system
- Current version 2.3, released January 2004
- <http://www.pathname.com/fhs/>
- Not every “distro” complies totally – there will be differences

Filesystem Types

- Shareability
 - Shareable: filesystem can be used on several different computers
 - Unshareable: filesystem needs to be specific to only one computer
- Variability
 - Static: filesystem does not change and may be mounted read-only
 - Variable: filesystem changes and must be mounted read-write

The Root Filesystem

- The base of the filesystem
- Everything hangs off the root
- May be tiny
- Shouldn't have anything in it other than the specified files in the FHS



/

- bin
- boot
- dev
- etc
- home
- lib
- libXXX
- media
- mnt
- opt
- root
- sbin
- srv
- tmp
- usr
- var

/bin and /sbin

- The basic binaries must be stored on the “root” filesystem
- Contains **only** the binaries to run the system in single user mode with no other filesystems mounted
- /bin contains binaries for users and the root user
- /sbin contains binaries intended for only root
- The FHS lists exactly which binaries **MUST** be present

/dev

- For special or “device” files
- Must contain a command called MAKEDEV
- Structure depends on device method
 - udev, devfs or manual
- SCSI, USB and SATA
 - sd<letter> + <number> e.g. /dev/sda1
- ATA
 - hd<letter> + <number> e.g. /dev/hda2
- BSDs and other Unix use different scheme

/etc

- Host-specific configuration files
- Most modern programs have a configuration file or directory in this tree:
 - foo => /etc/foo.conf
 - bar => /etc/bar/config
- `init.d` (not FHS)
 - Most Linux and BSDs keep their initiation scripts in `/etc/init.d` and have links to them in the runlevel `rcX.d` directories – distro specific

/boot

- Must be accessible by the boot loader
- Sometimes on it's own filesystem
 - Disk geometry restrictions
 - LVM or RAID reasons
 - Easy configuration for multi-boot
- Normally contains your boot system images:
/boot/vmlinuz-foo
- GRUB is installed here /boot/grub/

/mnt and /media

- These are mount points for other filesystems
- Removable media should be mounted in `media`
 - `/media/floppy` `/media/zip` `/media/cdrom`
- Temporary other filesystems go in `/mnt`
 - `/mnt/tmp-iso` `/mnt/lappy`
- Links in `/` to `/mnt` and `/media` permitted but discouraged

/opt and /var/opt

- For “Add-on Application Packages”
- Self contained hierarchies
- Common in Unix less common in Linux, except for large commercial packages
- Static applications:
 - /opt/<package>/bin or /opt/<provider>
- Dynamic applications:
 - /var/opt

/usr

- Shareable and read-only, may be mounted from a remote system
- bin
- include
- lib
- local
- sbin
- share
- X11R6
- games
- libXXX
- src
- spool > /var/spool
- spool/locks > /var/spool/locks
- tmp > /var/tmp

/home and /root

- Optional but common
- /home/userXXX
 - Home directory hierarchy for users
 - Often on own filesystem or remotely mounted
- /root
 - Home directory hierarchy for “root” user
- User specific configuration data usually stored in “dot” files in the users home directory: .bashrc and .kde/

/var

- Variable content
 - Not found on older Unix and Linux distros
- cache
- lib
- local
- log
- opt
- run
- spool
- tmp
- account
- crash
- games
- mail
- yp

/usr/local and /var/local

- System Local applications and data – should be safe from distro automated tools
- bin
- etc
- games
- include
- lib
- man
- sbin
- share
- src

/tmp and /var/tmp

- Temporary data, usually world write and readable
- Volatile – assume will be purged automatically
 - /tmp
- Involatile – will not be automatically purged
 - /var/tmp

`/lib`, `/libXXX`, `/usr/lib`, `/usr/libXXX` `/usr/local/lib` and `/usr/local/libXXX`

- Shared libraries
 - `/lib` for binaries in `/bin` and `/sbin` only
 - `/usr/lib` for binaries in `/usr/bin` and `/usr/sbin`
 - `/usr/local/lib` for binaries in `/usr/local/bin`
- If dual architecture, then `lib<arch>` must exist in each version