

CS 447/647

Where to Start

Most popular general-purpose Linux distributions

Distribution	Web site	Comments
Arch	archlinux.org	For those who fear not the command line
CentOS	centos.org	Free analog of Red Hat Enterprise
CoreOS	coreos.com	Containers, containers everywhere
Debian	debian.org	Free as in freedom, most GNUish distro
Fedora	fedoraproject.org	Test bed for Red Hat Linux
Kali	kali.org	For penetration testers
Linux Mint	linuxmint.com	Ubuntu-based, desktop-friendly
openSUSE	opensuse.org	Free analog of SUSE Linux Enterprise
openWRT	openwrt.org	Linux for routers and embedded devices
Oracle Linux	oracle.com	Oracle-supported version of RHEL
RancherOS	rancher.com	20MiB, everything in containers
Red Hat Enterprise	redhat.com	Reliable, slow-changing, commercial
Slackware	slackware.com	Grizzled, long-surviving distro
SUSE Linux Enterprise	suse.com	Strong in Europe, multilingual
Ubuntu	ubuntu.com	Cleaned-up version of Debian

BSD

- Unix-like
- Berkeley Software Distribution
- FreeBSD - 1993
 - Most commonly used BSD OS today
 - TrueNAS, OPNsense, pfSense
- NetBSD - 1993
 - Focus on portability/compatibility
 - Use is largely restricted to embedded systems and retrocomputing
- OpenBSD
 - Focus on security
 - Origin of OpenSSH (OpenBSD Secure Shell)
- macOS

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RICHTER ^{REST} x 00



Dracula

What is a manpage?

A miserable little
pile of secrets.



bash

- Keep scripts small
- Automate as much as possible
- Learning a few tools well
 - `vi`
 - `vim/nano`
 - `emacs`
 - `awk`
 - `csvtool`
 - `tmux` - terminal multiplexer
- Don't optimize prematurely
- Exit codes - `$?`
 - 0 - Everything went fine
 - non-zero - Something broke

bash configuration and dotfiles

- `/etc/bash.bashrc` - System-wide `.bashrc` file for interactive `bash(1)` shells.
- `/etc/profile` - Profile file for `sh(1)` and `bash(1)`
- `/etc/profile.d` - Collections of profile scripts.
 - Often used for `$PATH` modifications
 - modules!
- `~/.bashrc` - Interactive shell configuration file
- `~/.bash_profile` - Executed for login shells

“Classic Unix documentation is written to be **telegraphic** but complete... The style assumes an active reader, one who is **able to deduce obvious unsaid consequences** of what is said, and who has the self-confidence to trust those deductions. **Read every word carefully**, because you will seldom be told anything twice.”

Eric Raymond

Pathname	Contents
/bin	Core operating system commands
/boot	Boot loader, kernel, and files needed by the kernel
/compat	On FreeBSD, files and libraries for Linux binary compatibility
/dev	Device entries for disks, printers, pseudo-terminals, etc.
/etc	Critical startup and configuration files
/home	Default home directories for users
/lib	Libraries, shared libraries, and commands used by /bin and /sbin
/media	Mount points for filesystems on removable media
/mnt	Temporary mount points, mounts for removable media
/opt	Optional software packages (rarely used, for compatibility)
/proc	Information about all running processes
/root	Home directory of the superuser (sometimes just /)
/run	Rendezvous points for running programs (PIDs, sockets, etc.)
/sbin	Core operating system commands ^a
/srv	Files held for distribution through web or other servers
/sys	A plethora of different kernel interfaces (Linux)
/tmp	Temporary files that may disappear between reboots
/usr	Hierarchy of secondary files and commands
/usr/bin	Most commands and executable files
/usr/include	Header files for compiling C programs
/usr/lib	Libraries; also, support files for standard programs
/usr/local	Local software or configuration data; mirrors /usr
/usr/sbin	Less essential commands for administration and repair
/usr/share	Items that might be common to multiple systems
→ /usr/share/man	On-line manual pages
/usr/src	Source code for nonlocal software (not widely used)
/usr/tmp	More temporary space (preserved between reboots)
/var	System-specific data and a few configuration files
/var/adm	Varies: logs, setup records, strange administrative bits
/var/log	System log files
/var/run	Same function as /run ; now often a symlink
/var/spool	Spooling (that is, storage) directories for printers, mail, etc.
/var/tmp	More temporary space (preserved between reboots)

a. The distinguishing characteristic of **/sbin** was originally that its contents were statically linked and so had fewer dependencies on other parts of the system. These days, all binaries are dynamically linked and there is no real difference between **/bin** and **/sbin**.

Back to man

Section	Contents
1	User-level commands and applications
2	System calls and kernel error codes
3	Library calls
4	Device drivers and network protocols
5	Standard file formats
6	Games and demonstrations
7	Miscellaneous files and documents
8	System administration commands
9	Obscure kernel specs and interfaces

man

```
STAT(1)                                User Commands                                STAT(1)

NAME
    stat - display file or file system status

SYNOPSIS
    stat [OPTION]... FILE...

DESCRIPTION
    Display file or file system status.

    Mandatory arguments to long options are mandatory for short options
    too.

    -L, --dereference
        follow links

    -f, --file-system
        display file system status instead of file status

    -c --format=FORMAT
        use the specified FORMAT instead of the default; output a new-
        line after each use of FORMAT

    --printf=FORMAT
        like --format, but interpret backslash escapes, and do not out-
        put a mandatory trailing newline; if you want a newline, include
        \n in FORMAT

    -t, --terse
        print the information in terse form

    --append-exe
        append .exe if cygwin magic was needed

    --help display this help and exit

    --version
        output version information and exit

    The valid format sequences for files (without --file-system):

    %a    access rights in octal (note '#' and '0' printf flags)

    %A    access rights in human readable form

    %b    number of blocks allocated (see %B)

    %B    the size in bytes of each block reported by %b

    %C    SELinux security context string

    %d    device number in decimal

    %D    device number in hex

    %f    raw mode in hex
```

How are man pages rendered?

groff

- System for typesetting documents
 - Similar to TeX..
 - troff in 1971.
 - groff in 1990
- More like a compiler
- Text input files with embedded formatting

man 7 groff_man

man

```
apt install -y man manpages manpages-dev info groff
```

```
mandb #Regenerate manpages from roff source.
```

```
    #Config in /etc/manpath.config
```

```
man -k ext4    # Keyword search for string “ext4”
```

```
man -K ext4    # Page through manpages that contain ext4
```

```
man -a intro   # Page through the intro manual
```

```
man ls         # manpage for ls
```

```
# Why do we need any of this when Google exists?
```

Tmux demo