RHSA1
Red Hat System Administration I
Day 1

Day 1 Contents

- Free/Open Source Software and Licenses.
- Linux History.
- Installation.
- Linux Components.
- Basic Commands.
- File and Directory Basics.
- Linux Documentation.

Red Hat

What is FOSS?

- Free/Open Source Software (FOSS) provides many freedoms, including the ability to:
  - View the source code used to compile programs.
  - Make modifications.
  - Distribute these modifications.
- Most FOSS is covered under a public license. The most common public license is the GNU General Public License (GPL).

FOSS Licenses

- An open-source license is a type of license for computer software and other products that allows the source code, blueprint or design to be used, modified and/or shared under defined terms and conditions.
- Examples:

  GPL, LGPL, Apache, Mozilla Public License and BSD.

Linux History

- Multics was developed in the 1963-1969 period through the collaboration of the Massachusetts Institute of Technology (MIT), General Electric,and Bell Labs.
- Unix first version created in Bell Labs in 1969.
- Unix flavors:
  - IBM->AIX
  - Hewlett-Packard->HP/UX
  - Sun-> Solaris
  - Silicon Graphics->IRIX
- Operate in a same manner.
- Offer the same standard utilities and commands.

Linux History

- In 1983, Richard Stallman started the GNU project with the goal of creating a free UNIX-like operating system.
  - GNU General Public License (GPL).
  - Free Software Foundation (FSF).
- In 1991, Linus Torvalds created Linux kernel.
- In 1992, Linux and GNU developers worked to integrate GNU components with Linux to make a fully functional and free operating system.

Linux distributions


ubuntu


fedora


Red Hat

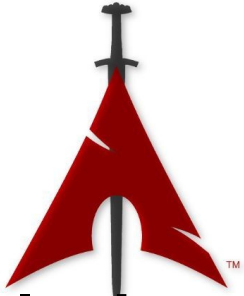

Solus

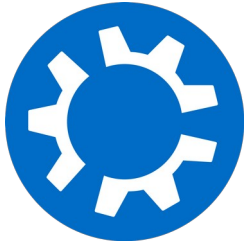

ZORIN


Linux Mint


debian

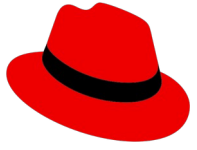

archlinux


BlackArch


Kubuntu


CentOS


Manjaro


Red Hat

Why Linux?

- Linux is open source.
- Linux is released under the GNU General Public License (GPL).
- Linux is secure and virus free.
- Linux is perfect for programmers.
- Linux has a better community support.

Why Linux?

- Linux is growing in the home users sector and the dominant of the professional and servers sector.
- Internet service providers (ISPs), e-commerce sites, and other commercial applications all use Linux today and continue to increase their commitment to Linux.

Red Hat

- Red Hat was founded on March 26, 1993.
- Red Hat Linux first appeared in 1994.

Red Hat Enterprise Linux

fedora

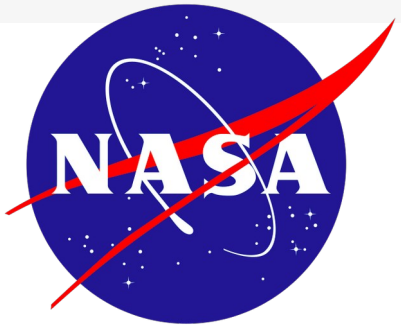
Red Hat

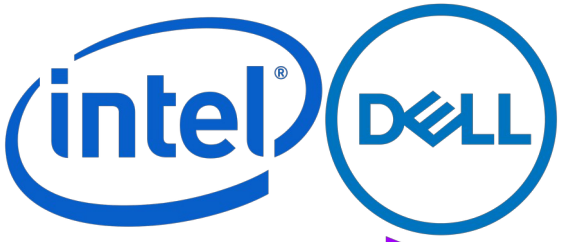
Red Hat

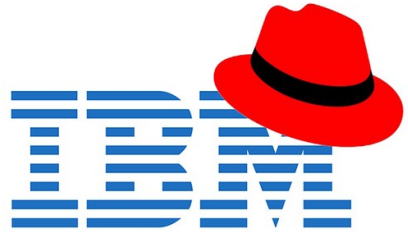
- More than 90% of Fortune Global 500 companies use Red Hat products and solutions*.
- The most demanding applications run better on Red Hat Enterprise Linux.
- RHEL scales well, and is more reliable.
- RHEL is secure.
- Red Hat partnership with hardware vendors.
- Red Hat training and support.

Red Hat

Red Hat

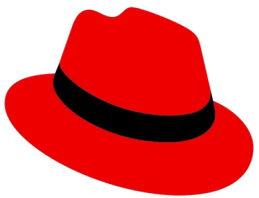






Red Hat

Red Hat



Red Hat Enterprise Linux

Red Hat

Types of installation

- Automated installation.
- Graphical installation.
- Remote installation.

Linux Components

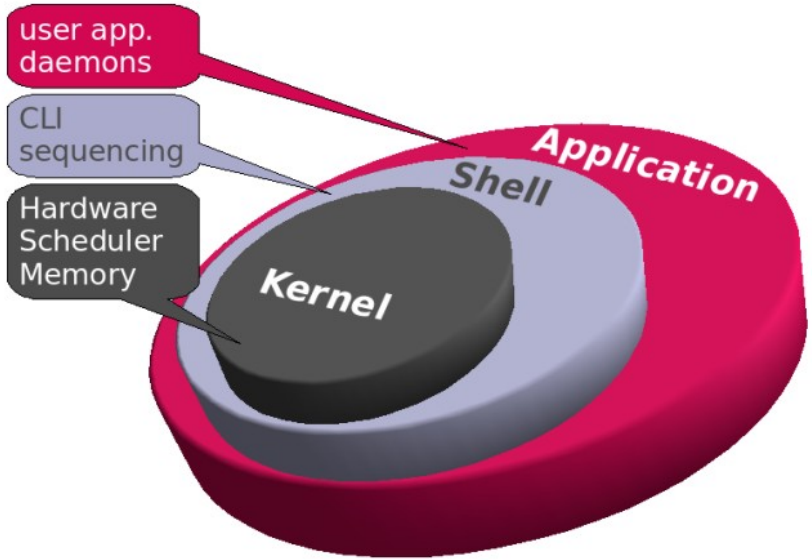
- **Kernel**
  - Is the core of the operating system.
  - Contains components like device drivers.
  - It loads into RAM when the machine boots and stays resident in RAM until the machine powers off.

Linux Components

- **Shell**
  - Provides an interface by which the user can communicate with the kernel.
  - “bash” is the most commonly used shell on Linux.
  - The shell parses commands entered by the user and translates them into logical segments to be executed by the kernel or other utilities.

Linux Components

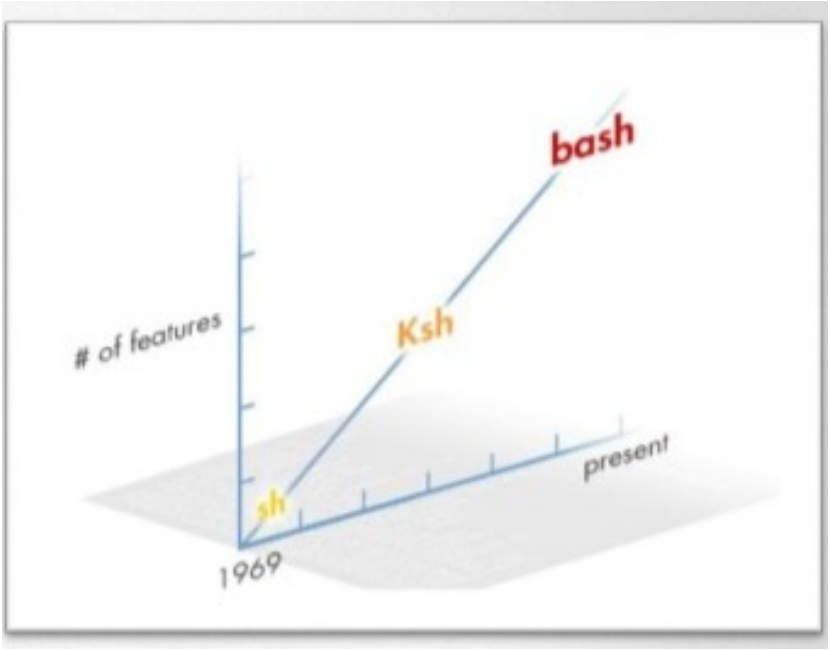
- **Terminal**
  - **Gives the shell a place to accept typed commands and to display their results.**



Red Hat

Command-Line Shells

- There are lot of shells as :
  - Bourn Shell (sh),
  - Korn Shell (ksh),
  - C Shell (csh) and
  - Bourn Again Shell (bash).



- They have different features that will be discussed later.

Red Hat

Running Commands

- Commands have the following syntax:

  command [options] [arguments]

- Each item is separated by a space.
- Options modify the command's behavior.
- Arguments are files name or other information needed by the command.
- Separate commands with semicolon (;).

Examples

- uname

  Linux
- uname -n

  host1
- uname -a

  Linux host1 .....

print system information

Red Hat

Examples

- **cal**

```
   September 2020
Su Mo Tu We Th Fr Sa
                1  2  3  4  5
 6  7  8  9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30
```

Red Hat

Examples

- **cal 9 2020**

September 2020

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

cal [month] [year]

Red Hat

Examples

- **date**

  Tue Sep 1 19:26:42 EET 2020

print or set the system date and time

- **whoami**

  root

print effective userid

Directories

- Think of
  - File system as a building
  - Directory is a room
  - File is a desk
- The current working directory is the room you are.
- To find out where you are at any time.

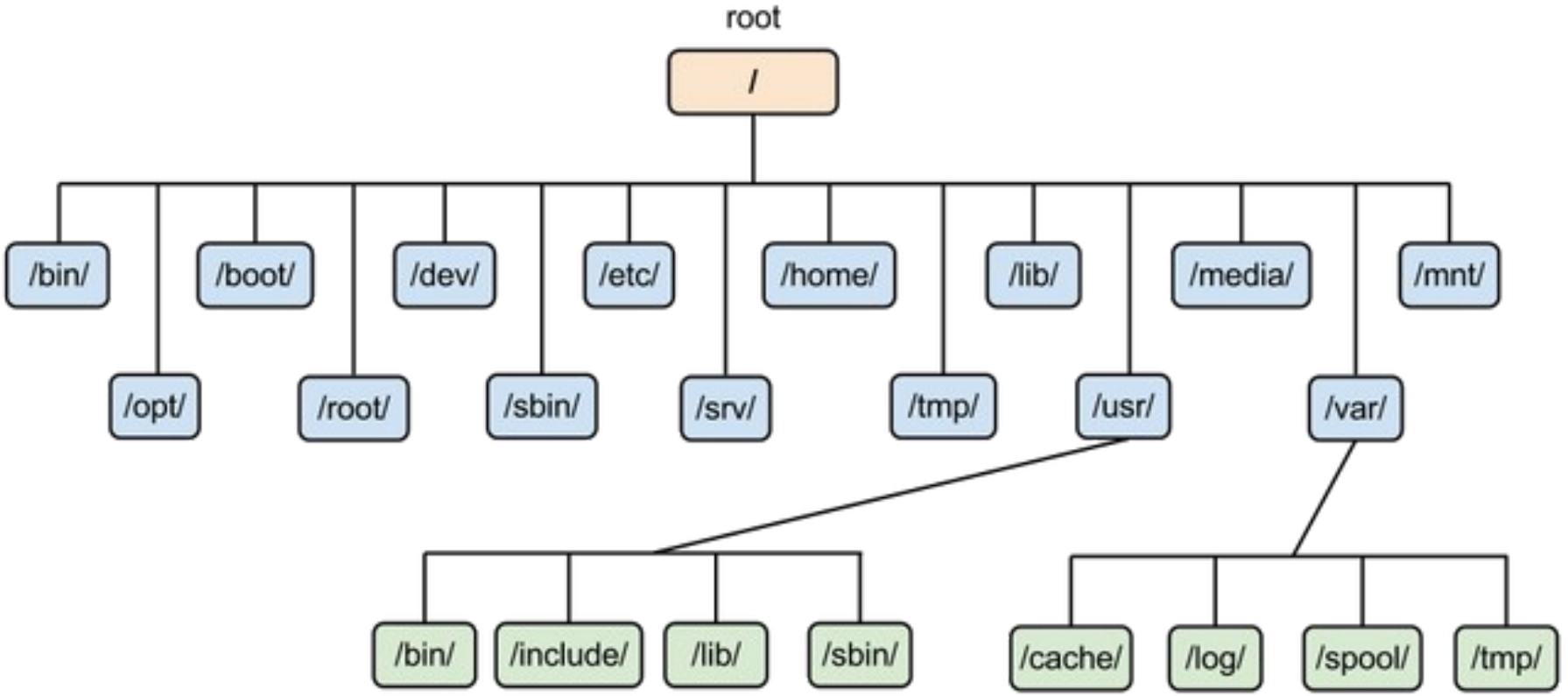
pwd

/home/guest

print name of current/working directory

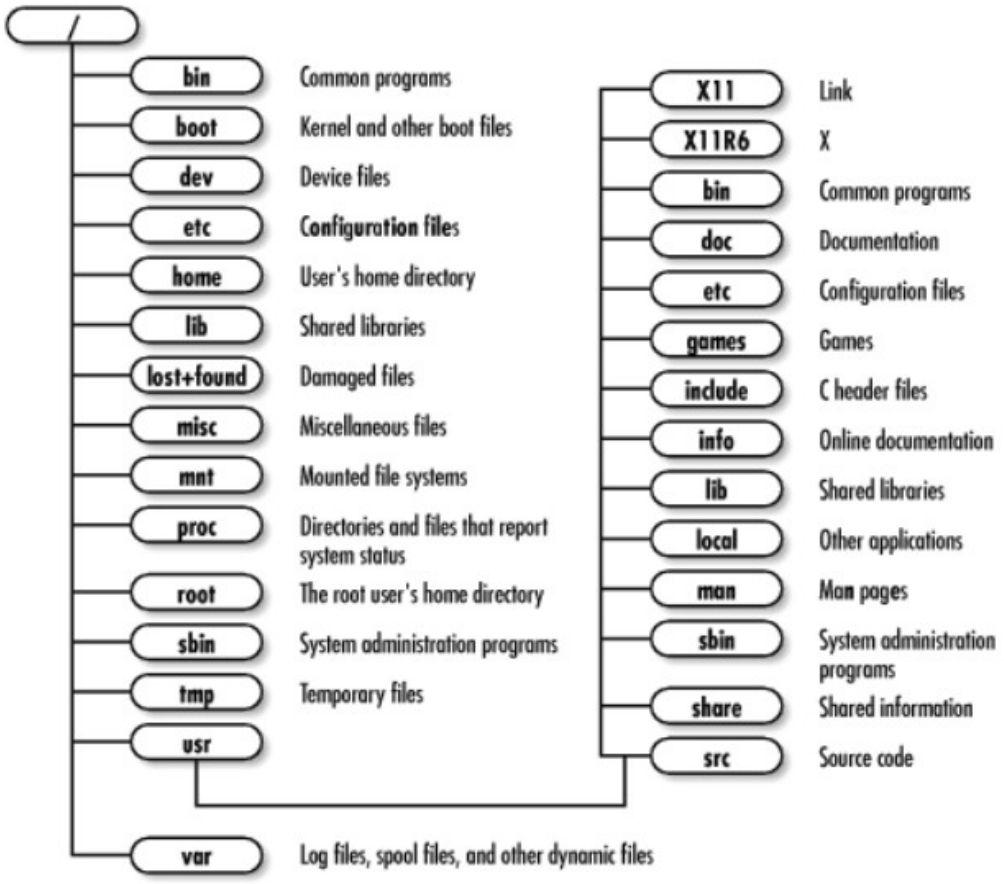
Red Hat

File System



Red Hat

Directories



- **Pathnames**
  - **Absolute pathname**
  - **Relative pathname**

Red Hat

Changing Directories

- To move from directory to directory on the system.

  cd */home*/user1/work

  cd ..

  cd ~

  cd -

Red Hat

Listing Directory Contents

- ls

  dir1 dir2 file1

  dir3 file2 file3

- ls /home/user1/dir1

  f1 f2

- Pwd

  /home/user1

- ls dir1

  f1 f2

ls [option] [argument]

Red Hat

Listing Directory Contents

- ls -a dir1

```
.    .f1  f1
..   .f2  f2
```

- ls -l dir1

```
total 2
-rw-r--r-- 1 fatma fatma 20 2 May 21 16:11 f1
-rw-r--r-- 1 fatma fatma 20 0 May 21 16:11 f2
```

- ls -F

```
dir1/  dir2/   file1
dir3/  file2*  file3@
```

Red Hat

Listing Directory Contents

- ls -ld dir1

```
drwxr-xr-x 2 fatma fatma 51237 May 29 16:06 dir1
```

File type

-:file
d:directory
c:?
b:?
S:?
P:?
l:?

Listing Directory Contents

- ls -R

```
. :
dir1  dir2  file1
dir3  file2  file3
./dir1:
f1  f2
./dir2:
./dir3:
```

Red Hat

File Naming

- File names may be up to 255 characters.
- There are no extensions in Linux.
- Avoid special characters as >< ? * # '.
- File names are case sensitive.

Viewing File Content

- cat fname
- more fname

  Scrolling keys for the more command

  Spacebar: moves forward on screen.

  Return: scroll one line at a time.

  b: move back one screen.

  /string: search forward for pattern.

  n: find the next occurrence.

  q: quit and return to the shell prompt.
- head -n fname
- tail -n fname

File Globing

- When typing commands, it is often necessary to issue the same command on more than one file at a time.
- The use of wildcards, or “metacharacters”, allows one pattern to expand to multiple filenames.

Metacharacters

- **Asterisk(*): represents 0 or more character, except leading(.)**

  Example:

  ls f*

  file.1 file.2 file.3 file4

  file1 file2 file3 fruit

  ls *3

  file.3 file3

  dir3:

  Moon planets space sun

Metacharacters

- **Question mark(?) character represents any single character except the leading (.)**

  Example:

  ls file?

  file4 file1 file2

  ls z?

  Z?:No such file or directory

- **Square bracket([]): represent a range of characters for a single character position.**

  Example

  ls [a-f]*

  ls [pf]*

Metacharacters

```
ls -a
. .. .profile abm bam bat battle project
ls -l b*
-rw-r----- 1 sgs 16 Feb 12 11:04 bam
-rw-r----- 1 sgs 12 Feb 12 11:05 bat
-rw-r----- 1 sgs 19 Feb 12 11:06 battle
ls *
abm bam bat battle project
ls .*
. .. .profile
ls *m
abm bam
```

Metacharacters

```
ls ???
abm  bam  bat
ls ?a?
bam  bat
ls ?a*
bam  bat  battle
ls *a*
abm  bam  bat  battle
```

Metacharacters

ls [ab]*

abm bam bat battle

ls [ab]m

ls: "[ab]m: No such file or directory

ls [a-zA-Z]*

abm bam bat battle project

Red Hat

File & Dir. Manipulation

- **Coping Files and Directories**

  cp [options] source(s) target

Option	Description
-i	Prevents you from accidentally overwriting existing files or directories
-r	Copy a directory including the contents of all subdirectories

File & Dir. Manipulation

- **Coping Files and Directories**

  cp [options] sfile1 sfile2 sfile3 targetDest_directory

Option	Description
-i	Prevents you from accidentally overwriting existing files or directories
-r	Copy a directory including the contents of all subdirectories

File & Dir. Manipulation

- **Moving and Renaming Files and Directories**

  mv [options] source(s) target

Option	Description
-i	Prevents you from accidentally overwriting existing files or directories

File & Dir. Manipulation

- To create files

  touch file(s)_name

- To create directories

  mkdir [-p] dir(s)_name

File & Dir. Manipulation

- **To remove files**

  rm [-i] file(s)_name

- **To remove directories**

  rmdir dir(s)_name

  rm [-r] dir(s)_name

Linux Documentation

Manual page consists of:

- **Name**

  The name of the command and a one-line description.

- **Synopsis**

  The syntax of the command.

- **Description**

  Explanation how the command works and what it does.

- **Files**

  The file used by the command.

- **Bugs**

  Known bugs and errors.

- **See also**

  Other commands related to this one.

man man

Red Hat

Linux Documentation

- Shows the commands that have manual pages that contains any of the given keywords.

  man -k keyword

  man -s keyword

- Shows the commands one line description.

  whatis command

Red Hat

Linux Documentation

--help Option

- Another way to get help about a command.
- help is built in the command itself (if supported).

Interrupting Execution

- To interrupt a command that's taking too long to execute, use [Ctrl]-c.
- Occasionally, you might enter a command without an argument that expects input to come from the keyboard. In this case, use [Ctrl]-d to terminate the command.

NTFS

- sudo yum --enablerepo=extras install epel-release;
- sudo yum install ntfs-3g -y;

Grub

- Check that windows is detected. Run grub2-mkconfig but discard its output:
- sudo grub2-mkconfig > /dev/null

  Generating grub configuration file ...

  Found background image: /usr/share/images/desktop-base/desktop-grub.png

  Found linux image: /boot/vmlinuz-3.16.0-4-amd64

  Found initrd image: /boot/initrd.img-3.16.0-4-amd64

  Found memtest86+ image: /boot/memtest86+.bin

  Found memtest86+ multiboot image: /boot/memtest86+_multiboot.bin

  Found Windows 7 (loader) on /dev/sda2
- The output will look similar (but not identical) to what is shown above. Make sure that Windows is listed.

Grub

- If Windows was listed in the previous step, go ahead and save the new configuration file. Make a backup first, just in case.
- sudo cp /boot/grub2/grub.cfg /boot/grub2/grub.cfg.old
- sudo grub2-mkconfig -o /boot/grub2/grub.cfg

- If all went well, you should now be able to reboot into Windows.

Install Centos 8

- **https://www.linuxtechi.com/centos-8-installation-guide-screenshots/#:~:text=%2Fboot%20%E2%80%93%202%20GB%20**

Linux File Hierarchy Structure

- https://www.geeksforgeeks.org/linux-file-hierarchy-structure/

- https://www.howtogeek.com/117435/htg-explains-the-linux-directory-structure-explained/