Linux : Get your feet wet

Bridge Course '19

EE Dept IITB

24 July 2019

Outline

Linux is a family of open source Unix-like operating systems based on the Linux kernel, Typically packaged in a Linux distribution

Why Linux

Why Linux

1. Access to hardware - almost no restrictions

Why Linux

1. Access to hardware - almost no restrictions
2. Opensource - view code , modify , learn create

Why Linux

1. Access to hardware - almost no restrictions
2. Opensource - view code , modify , learn create
3. Tailor Made - servers , fedora scientific

Why Linux

1. Access to hardware - almost no restrictions
2. Opensource - view code , modify , learn create
3. Tailor Made - servers , fedora scientific
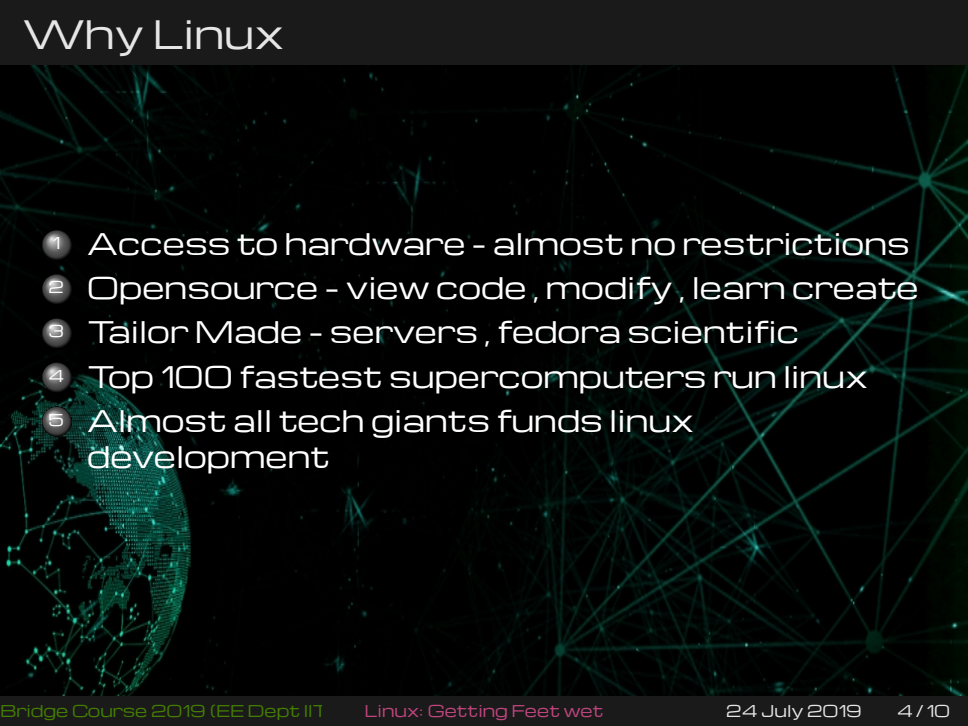4. Top 100 fastest supercomputers run linux

Why Linux

1. Access to hardware - almost no restrictions
2. Opensource - view code , modify , learn create
3. Tailor Made - servers , fedora scientific
4. Top 100 fastest supercomputers run linux
5. Almost all tech giants funds linux development

Why Linux ctd..

Why Linux ctd..

1. Free

Why Linux ctd..
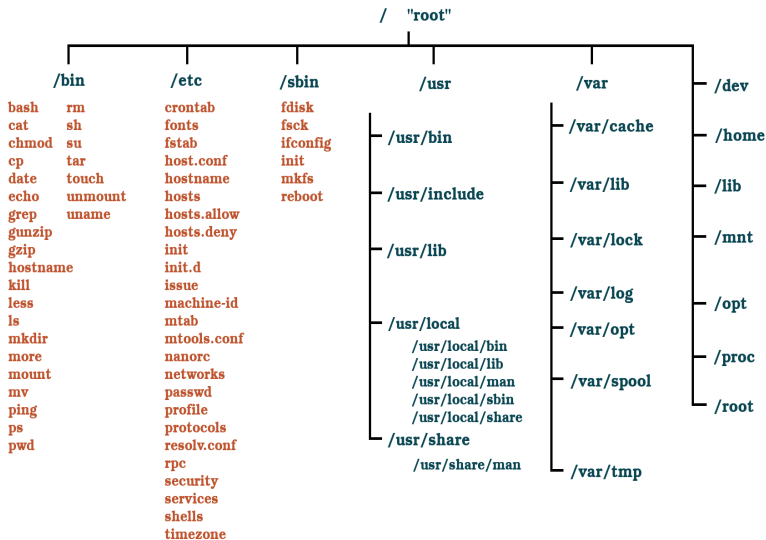
1. Free
2. Sabko Cadence chalana he

Why Linux ctd..

1. Free
2. Sabko Cadence chalana he
3. Friends urge friends to use linux

Why Linux ctd..

1. Free
2. Sabko Cadence chalana he
3. Friends urge friends to use linux
4. Microsoft gives you windows. Linux gives you whole house

File System Hierarchy


```
                                    /   "root"
        ┌───────────┬───────────┬──────────────┬──────────────┬──────────┐
     /bin        /etc        /sbin          /usr           /var        /dev

   bash   rm    crontab     fdisk                                      /home
   cat    sh    fonts       fsck        /usr/bin        /var/cache
   chmod  su    fstab       ifconfig                                   /lib
   cp     tar   host.conf   init        /usr/include    /var/lib
   date   touch hostname    mkfs                                       /mnt
   echo   unmount hosts     reboot      /usr/lib        /var/lock
   grep   uname hosts.allow                                           /opt
   gunzip       hosts.deny              /usr/include    /var/log
   gzip         init                                                  /proc
   hostname     init.d                  /usr/local      /var/opt
   kill         issue                     /usr/local/bin                /root
   less         machine-id                /usr/local/lib  /var/spool
   ls           mtab                      /usr/local/man
   mkdir        mtools.conf               /usr/local/sbin
   more         nanorc                    /usr/local/share
   mount        networks                /usr/share      /var/tmp
   mv           passwd                    /usr/share/man
   ping         profile
   ps           protocols
   pwd          resolv.conf
                rpc
                security
                services
                shells
                timezone
```

Linux File System: Basic commands

Note

use : man <command> - to get the full details regarding any command

Linux File System: Basic commands

1. ls - list the files the current directory

Note

use : man <command> - to get the full details regarding any command

Linux File System: Basic commands

1. ls - list the files the current directory
2. pwd - print the working directory

Note

use : man <command> - to get the full details regarding any command

Linux File System: Basic commands

1. ls - list the files the current directory
2. pwd - print the working directory
3. touch <file_name> - create an empty file

Note

use : man <command> - to get the full details regarding any command

Linux File System: Basic commands

1. ls - list the files the current directory
2. pwd - print the working directory
3. touch <file_name> - create an empty file
4. mkdir <dir_name> - create a directory

Note
use : man <command> - to get the full details regarding any command

Linux File System: Basic commands

1. ls - list the files the current directory
2. pwd - print the working directory
3. touch <file_name> - create an empty file
4. mkdir <dir_name> - create a directory
5. cd - change directory

Note

use : man <command> - to get the full details regarding any command

Users, Group and Permissions

As we saw, everything can be treated as a file in linux.

Users, Group and Permissions

As we saw, everything can be treated as a file in linux.
Who has permissions to edit these files???

Users, Group and Permissions

As we saw, everything can be treated as a file in linux.
Who has permissions to edit these files???
For each file, linux assigns a set of attributes , some of these decides
which users can Read , Write and (if possible)Execute the file. These
attributes are called the file permissions.

Users, Group and Permissions

As we saw, everything can be treated as a file in linux.

Who has permissions to edit these files???

For each file, linux assigns a set of attributes , some of these decides which users can Read , Write and (if possible)Execute the file. These attributes are called the file permissions.

For each file, permissions are given in three categories.

Users, Group and Permissions
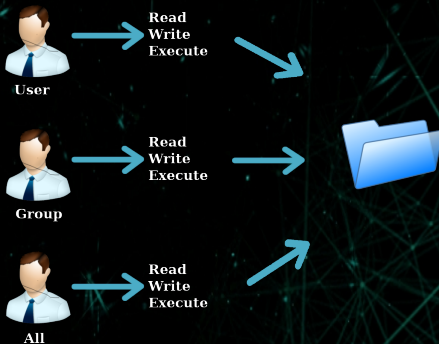
hint

USER|GROUP|ALL .
RWX-RWX-RWX

1. use ls -l command to find out permission of files given to you.

TODO

hint
USER|GROUP|ALL .
RWX-RWX-RWX

1. use ls -l command to find out permission of files given to you.
2. try executing
3. ./hello_perm.sh
4. what do you see

TODO

hint
USER|GROUP|ALL .
RWX-RWX-RWX

1. use ls -l command to find out permission of files given to you.
2. try executing
3. ./hello_perm.sh
4. what do you see
5. change permission the file using
6. chmod 111 hello_perm.sh
7. try executing now .

TODO

hint
USER|GROUP|ALL .
RWX-RWX-RWX

1. use ls -l command to find out permission of files given to you.
2. try executing
3. ./hello_perm.sh
4. what do you see
5. change permission the file using
6. chmod 111 hello_perm.sh
7. try executing now .
8. try to read file using
9. cat hello_perm.sh
10. chmod 755 hello_perm.sh
11. cat hello_perm.sh

Echo and output redirection

1. echo "test"

Echo and output redirection

1. echo "test"
2. output redirection (w+), echo "to file" > test-file

Echo and output redirection

1. echo "test"
2. output redirection (w+), echo "to file" > test-file
3. appeding (a+), echo "added new line " » test-file

Echo and output redirection

1. echo "test"
2. output redirection (w+), echo "to file" > test-file
3. appeding (a+), echo "added new line " » test-file
4. substitutions, echo `pwd`

Echo and output redirection

1. echo "test"
2. output redirection (w+), echo "to file" > test-file
3. appeding (a+), echo "added new line " » test-file
4. substitutions, echo `pwd`
5. substitutions , echo `cat test-file`
6. echo "current directory is `pwd`"

cut command

Cut command is used to extract one or more fields from a file with fields seperated by a delimiter
use cat to view the contents of examples/cut-input

cut command

Cut command is used to extract one or more fields from a file with fields seperated by a delimiter
use cat to view the contents of examples/cut-input
cut syntax - cut -d '<delimiter>' -f<number> <filename>
try printing out only the names

cut command

Cut command is used to extract one or more fields from a file with fields seperated by a delimiter

use cat to view the contents of examples/cut-input

cut syntax - cut -d '<delimiter>' -f<number> <filename>

try printing out only the names

ans : cut -d ',' -f1 cut-input

what is the command to get only specialisation ?

cut command

Cut command is used to extract one or more fields from a file with fields seperated by a delimiter

use cat to view the contents of examples/cut-input

cut syntax - cut -d '<delimiter>' -f<number> <filename>

try printing out only the names

ans : cut -d ',' -f1 cut-input

what is the command to get only specialisation ?

sort command

sort can be applied on any of the fields

sort command

sort can be applied on any of the fields

sort syntax - sort -t '<delimiter>' -k<number> <filename>

try sorting based the names

sort command

sort can be applied on any of the fields

sort syntax - sort -t '<delimiter>' -k<number> <filename>

try sorting based the names

ans : sort -t ',' -k1

what is the command to get only specialisation ?

sort command

sort can be applied on any of the fields

sort syntax - sort -t '<delimiter>' -k<number> <filename>

try sorting based the names

ans : sort -t ',' -k1

what is the command to get only specialisation ?

grep command

grep is used for finding occurences

grep command

grep is used for finding occurences

1. grep <find> <filename>
2. grep pclab cut-input1

grep command

grep is used for finding occurences

1. grep \<find\> \<filename\>
2. grep pclab cut-input1
3. grep -i variant

grep command

grep is used for finding occurences

1. grep \<find\> \<filename\>
2. grep pclab cut-input1
3. grep -i variant
4. grep -i ee5 cut-input2 -c

grep command

grep is used for finding occurences

1. grep \<find\> \<filename\>
2. grep pclab cut-input1
3. grep -i variant
4. grep -i ee5 cut-input2 -c

grep command

grep is used for finding occurences

1. grep <find> <filename>
2. grep pclab cut-input1
3. grep -i variant
4. grep -i ee5 cut-input2 -c
5. grep with regexes

pipes(|) and the Unix philosophy

Pipe allows us to redirect the output of one command as the input of another command

common syntax - command1 input-file | command2

eg: cat test-file | sort

Q: write the command to get only the sorted names from file cut-input2 use cat cut-input2 to inspect the file

pipes(|) and the Unix philosophy

Pipe allows us to redirect the output of one command as the input of another command

common syntax - command1 input-file | command2

eg: cat test-file | sort

Q: write the command to get only the sorted names from file cut-input2

use cat cut-input2 to inspect the file ans : cut -d ',' -f1 cut-input2 | sort

what is the command to sort all lines based on names for EE1?

pipes(|) and the Unix philosophy

Pipe allows us to redirect the output of one command as the input of another command

common syntax - command1 input-file | command2

eg: cat test-file | sort

Q: write the command to get only the sorted names from file cut-input2

use cat cut-input2 to inspect the file ans : cut -d ',' -f1 cut-input2 | sort

what is the command to sort all lines based on names for EE1? grep -i ee1 | sort -t ',' -k1

Tables and Figures

- Use `tabular` for basic tables – see Table 1, for example.
- You can upload a figure (JPEG, PNG or PDF) using the files menu.
- To include it in your document, use the `includegraphics` command (see the comment below in the source code).

Item	Quantity
Widgets	42
Gadgets	13

Table 1: An example table.

Readable Mathematics

Let $X_1, X_2, \ldots, X_n$ be a sequence of independent and identically distributed random variables with $E[X_i] = \mu$ and $\text{Var}[X_i] = \sigma^2 < \infty$, and let

$$S_n = \frac{X_1 + X_2 + \cdots + X_n}{n} = \frac{1}{n} \sum_{i}^{n} X_i$$

denote their mean. Then as n approaches infinity, the random variables $\sqrt{n}(S_n - \mu)$ converge in distribution to a normal $\mathcal{N}(0, \sigma^2)$.