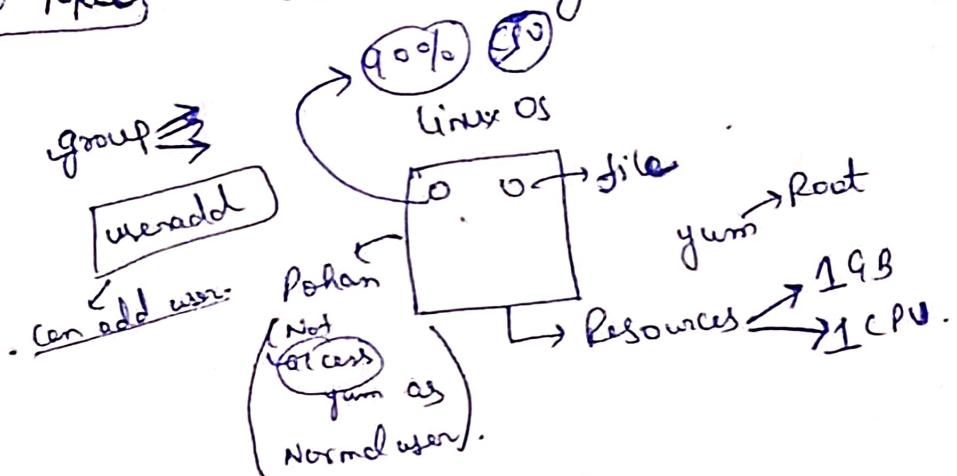


New Topic

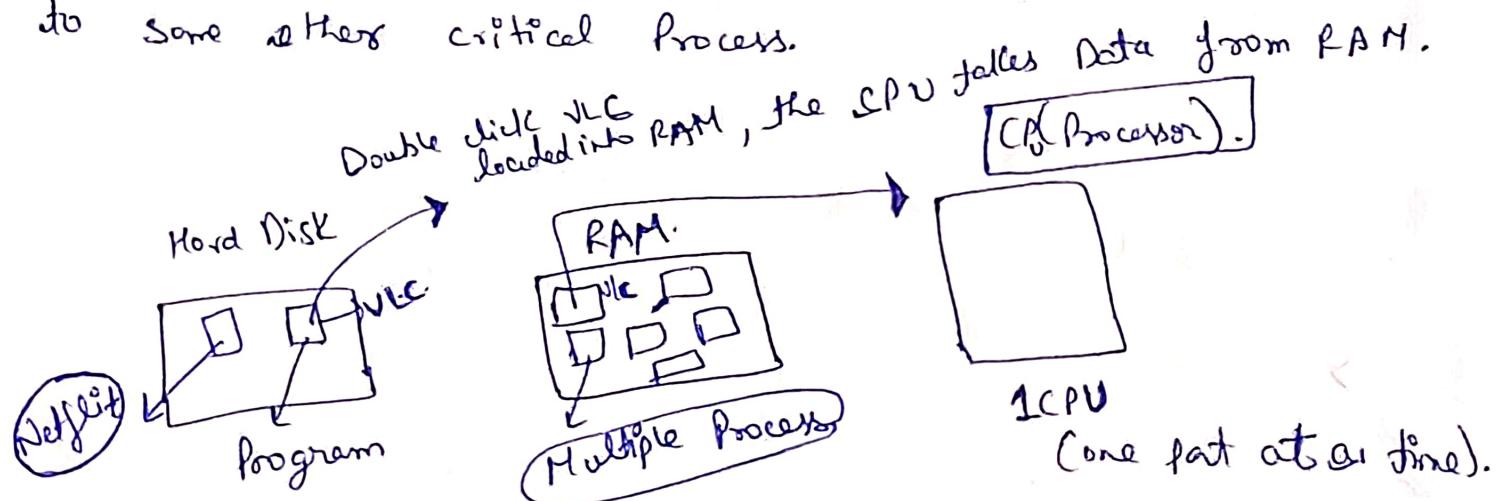
Linux Operating System.

Day 4



How to Manage Resources in OS (CPU Scheduling | Journal)

→ Adding ~~user~~ such that say Process (P_i) will access only 20% of this total resource and can align more resource to some other critical process.



→ CPU can execute only 1 instruction at a time.

Practical Implementation.

- Launch on instance (Main Server, will Deploy to Main Application).
- Connect to that instance.
- Sudo su root (Switch to root user).
- **lshw**, what kind of HW we are using / present in the OS.

(lshw)

(Install this,

a.s. **Yum** what provides **lshw**

will do a search Amazon repos and other info.

b) yum install lshw

(Amazon Xen)

c) lshw (Virtual Machine).

Xen Hypervisor used by AWS for Virtualization.

→ Slot: CPU 1 (1 core CPU).

→ Memory CS:20 where memory is stored

→ Adapters, Net Card, Power Button, etc.
(Physical Details).

→ Convert into HTML format (Starting O/P in a file command).

• lshw -html (Standard O/P).

Used for redirection.

• lshw -html > os.html

(Redirect O/P to a file os.html).

→ **vi os.html** (Open the file).

- cp os.html /var/www/html.
 ↳ copy file. destination.
- Before this install Apache.
- Start the Apache server. (Security Group Inbound Anywhere).
- IP/os.html (Browser)
- Public
- $2.30 \text{ GHz} \rightarrow 2.3 \text{ billion cycle / seconds.}$
 Instructions.
- ↓ Speed of CPU. {Clock Speed
2.3 GHz}
- Parallel Processing in CPU due to Context Switching
- Context switching is the process of saving the state of one task and loading the state of another.
- {Switch from one process to another
Give equal priority to all the processes running}
- CPU Time
- Multi-core CPU (Multithreading).
- Video editing (CPU intensive Job).
- Web server
- 4 threads of some program.
(Threads are running in parallel).
- Parallel Running

→ Add user

useradd dev1

To list all users

cat -d: -f1 /etc/passwd

SSH

password ⇒ password dev1

Perm file

→ id dev1

Short command
Compgen -u

SSH -L = command

→ Want to create their own session.

↳ dev1

Means one session create
from Browser like EC2

ls -l-a

from CMD need to connect

Select the instance, connect

Putty

chmod 777
library

and another can be done from cmd

Multiple options. (connect from terminal)

SSH Command

(Remot System via SSH Protocol as
EC2 user).

SSH -i "keyfile" copy.

Perm one.

↳ To prove the identity.

chmod u-r (files)

→ cd Downloads where file is present.

lost the key

To remove permission
of owner.

. Want to Connect with password.

↓
ssh dev1@ipAddress (not asking for password as well).
Public IP Address

. Disable the password base login from terminal.

↓
. update the ssh config file.

⇒ vi /etc/ssh/sshd-config

↓

Password Authentication (no)
yes

On Mac
Perm file
permissions was not
working

so do chmod
400 file
then run the command

→ Restart the server.

Now will ask for password.

→ from terminal

whoami ⇒ dev1. ⇒ ls | pwd.

Python 3 (write code).

$x=5$
print(x).

* system handles the entire boot process by initializing services and mounting filesystems.

* starts services in parallel speeding up the boot time.

* uses unit files to define and manage services, sockets, devices etc

→ PS - aux. (all processes which are currently running).

↳ List.

→ Systemd ⇒ Special Program in Linux used to manage system.

Boot Start to initialize (Linux) system.
Test of the process required for the OS system to run.

Organise all the processes using C group slices.

→ Kill / terminate Kill - l. (Supports what features)
Signal it supports

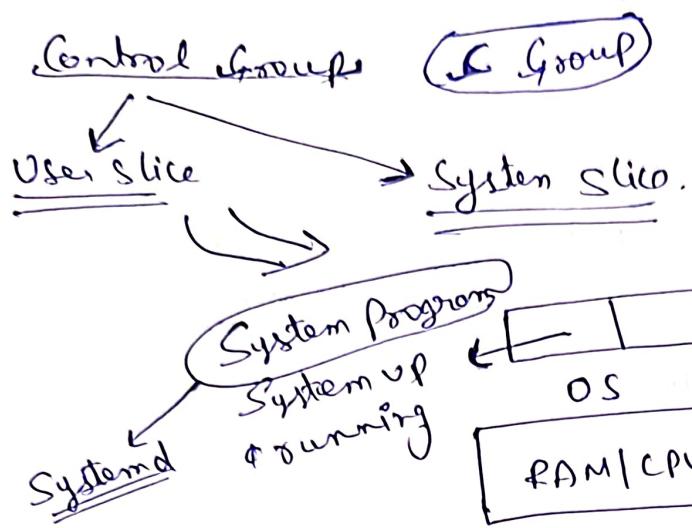
Kill -15 27785
↓ pid (Process id). (Root user).

PS - aux (Python 3 raned).

Now dev1 started a particular program. that is taking too much CPU percentage.

Monitor How Processes / processes are working.

→ `Systemctl-cgtop` (CPU usage).



`Systemd-cgtop`
(Real Time CPU usage, memory etc.)

User Session
User programs.
(date, cal etc)..

C Group is one of the capabilities of Linux system to put some restriction on the resources -

→ Better info without Space.

`Systemctl-cgls`. entire hierarchy of processes.

→ **In cmd terminal**

Python 3. → EC2 instance run again `cyclic` command

Spacebar key press in EC2

`exit() in CMD`

Systemctl Cmd tool used to connect to System
(Internally)

under `System Slice`

- ⇒ Systemd is a system and service manager for Linux operating systems.
- ⇒ It is the first process that starts when the System reboots.
- ⇒ It initializes the system and manages system services, processes and dependencies.

⇒ in CMD tool

CPU stress program (Testing Purpose)

→ dd if=/dev/zero of=/dev/null.

Special files
in Linux.

(Going to infinite

Screens of null Byte).

Special file in Unix.

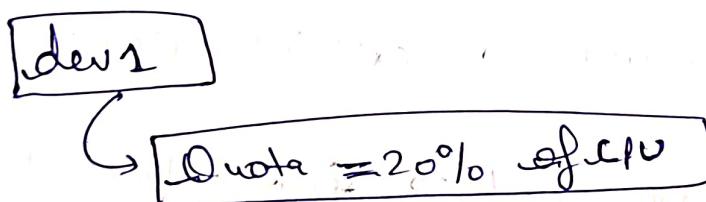
⇒ Data stored in file will
be Discarded.

. (100%) usage No CPU time,

How to restrict such this issue.

a) We can use C Group
Kernel to put some constraint on the process
User can add limit as well.

→ Create a rule and set quota



→ Systemctl -t slice
list of slices.

cd /etc/systemd/system

most of the time
the creation C group rules.

most of the time
the creation C group rules.

→ folder name start with user

user-1001.slice

→ mkdir user-1001.slice.d \downarrow file

→ rm user-1001.slice/* (All the content removed)

→ rm -r

→ mkdir user-1001.slice.d.

\downarrow

ls

\downarrow

file creation.

~~laptop.vip~~ cpu.conf

\downarrow

File ⇒

[slice]

CPUQuota = 20% (Save & quit).

\downarrow

Systemd-cgtop

⇒ Still occupying space.

Reload the configuration.

\downarrow

Systemd daemon reload. \downarrow program users entire System.

→ Can add quota per process as well

ps -aux | grep http.

which http (which location it is stored).

Unit file

program

Manual
user slice

Systemd

systemd

System slice

Search Cgroup Linux

(Advanced Topics).

docsredhat.com

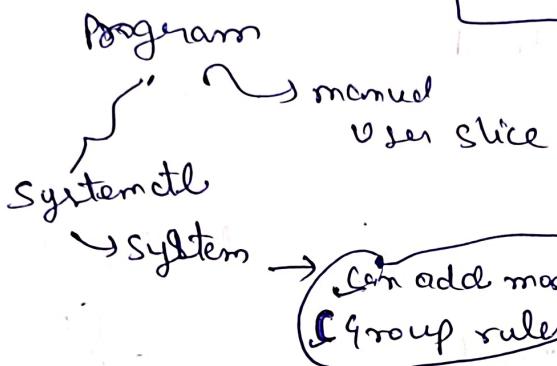
⇒ How to check under which slice what part is running.

[`systemctl -c top`]

* To add C group Rules always create a Service file and run via [System Slice.]

⇒ [`systemctl status httpd`]

[Point]



(File location) /usr/lib/systemd/

↓
Not recommended to make changes here

Directory

↓
Create a file in below location

cd .. ⇒ /etc/systemd/system

/usr/lib/systemd/system
http.service

cd httpd.service.d/

Location of the file
Main file given by Apache Programs

In this file
we can even add
CPU Quota
Memory max
etc

↓
ls
↓ ls
↓ in this file add custom
configurations.

⇒ Now add Group rule

vi gfg.conf

{ } ↓

[Service]

Memory Max = 201 MB

↓
systemctl daemon-reload

↓
Systemctl edit httpd.

↓ How file looks like

will be loaded in this file

↓ if system restart/Boot Manually Start
Systemctl enable httpd at Boot time Automatically restart.
System behind the scenes

→ Same file can also run from systemctl as well under System slice.

→ service file ⇒ vi s1.service

Unit
location
need to check

[Unit]

Description = CPU stress command.

[Service]

ExecStart = dd if=/dev/zero of=/dev/null

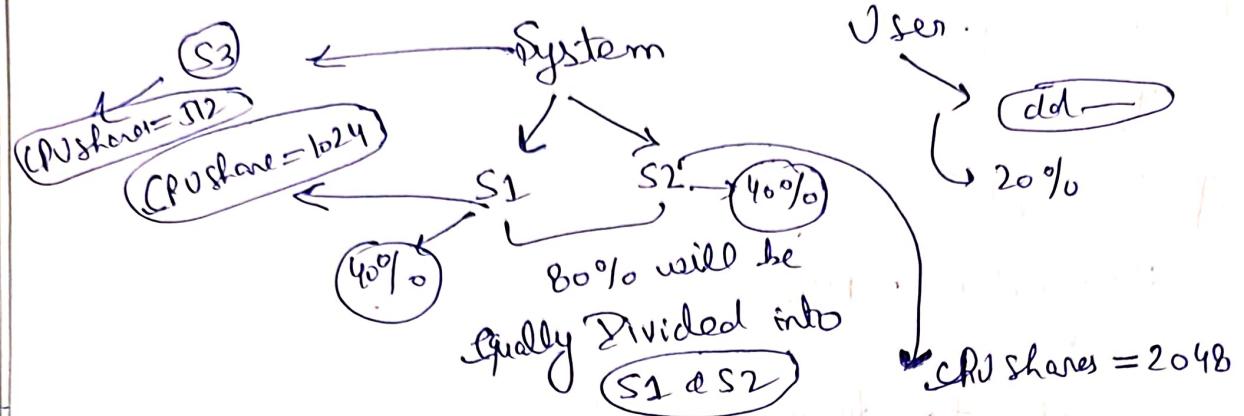
Memory Max = 200 MB

Note

for Apache, Nginx

SSL Not creating unit file because we start & stop with file wide

Flow & Priority



CPU CFS algo
Web search

CFS Algo
Completely fair scheduler

⇒ How to change the Priority
Using CGroup

S1-Service \Rightarrow CPUShares = 1024 (By default value).

II
S2-Service \Rightarrow CPUshares = 2048

Systemctl daemon-reload

cd /etc/systemd/system

Main location for System Slice

File creation inside this will be overridden by system slice.

Individual Service files creation in.

Main Service file

/usr/lib/systemd/system/ftpd.service

Not recommended to make changes here.

httpd.service → Prop in depo to make / override the changes

⇒ Logs (Running so many things in the system).

→ Can identify all detailed logs.

journalctl

↓
filter the logs

⇒ journalctl -u glibapp. | journalctl -u httpd.

⇒ See the logs in reverse order.

→ journalctl -r

⇒ User specific logs

↓
journalctl -u UID=1003

⇒ ps - aux | grep httpd.

Logs for specific process ID

↓
journalctl -P ID=33303

⇒ Logs into JSON format to share

→ journalctl -o json
journalctl -o json

⇒ man journalctl (entire manual for journalctl)
access Systemctl

⇒ Manual
man useradd Imp for study.

⇒ All the Different warnings that you have Identified.
→ journalctl -p warning.

→ live logs
journalctl -f.

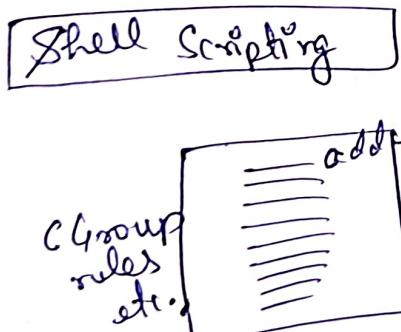
(2) go to cmd
↓
log in to dev1 user.

Shell Scripting.

→ OS [Operating System] → for 10⁸ Manually process is Good

OS [Operating System] → [Administration Activities].

- directories
- add users.
- add group rules.



entire script can be executed in the OS.

`cd /` → CC terminal.

Bash Program ps -aux | grep bash.

Any part/key we are Typing Bash program is running. series of commands

→ `vi basics.sh` file name.

$x=5$
echo x ⇒ $x=5$
echo \$ x .

Used to print

Run in bash terminal

`bash basics.sh`

$x=5$

echo \$ x .

$\$a$ → Means
any No of
Arguments

x as a string
 $x=5$
echo x

5 will be printed

echo \$ x → variable
with \$
Symbol.

$name=\$1$ →

First Argument

$name=\$2$.

$echo hi \$name$

Input
from user.

$echo hi \$name \$name$.

Working.

`bash basics.sh` abhishek

Input from the
user.

If not to do like this then

$\$@$ → Any No. of
Arguments.

$x=5$
echo \$ x .

$names=\$@$

$echo hi \$names$.

⇒ Bash (Bourne Again shell)
is a CLI and scripting
language for Linux/Unix
systems.

⇒ Bash location
/bin/bash-

⇒ Packages = \$@

yum install \$packages -y

mkdirc test
touch a.txt
ls
date
cal
useradd dev2.

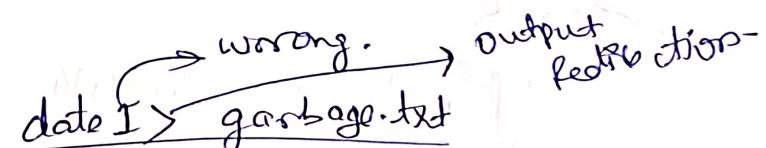
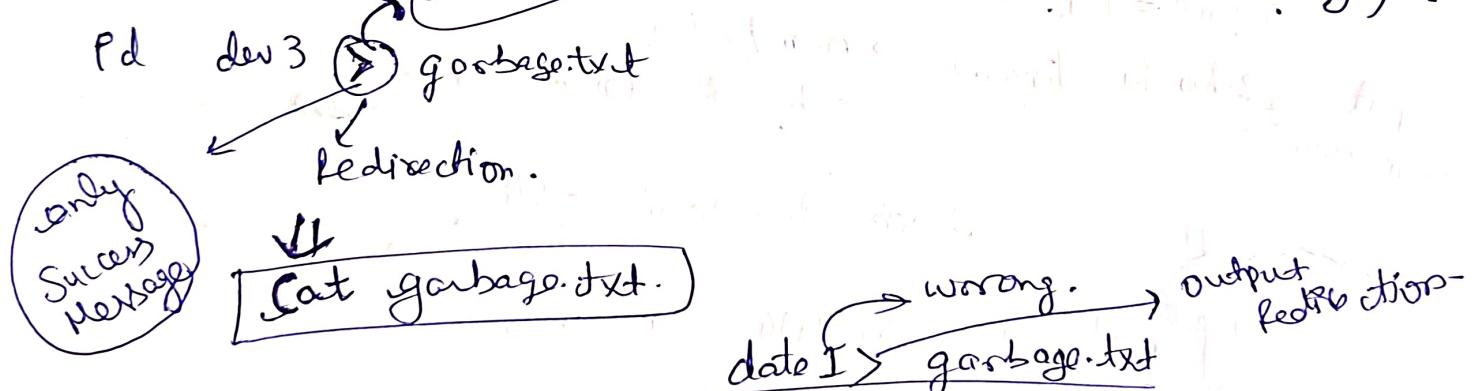
(Not will ask for yes)

loop to add users
(Homework)

Dedicated script for user account Automation creation.

Input / output redirection

Whenever we run any command. (O/P will come to terminal only).



In case of error, error will still be printed and not redirected.

Don't want to override

old file → garbage.txt] Successfull then work.



pwd 1111 1> garbage.txt

pwd 1111 2> garbage.txt

Failure Message

date 2 > garbage.txt

will only redirect failure messages.



date 23 24 &> garbage.txt

Whether error or success message

Redirect it.

override everything

(2) → now will append everything

col >> garbage.txt

col 1 >> g.txt

wrong command

(1) → only the success message.

(2) → error message