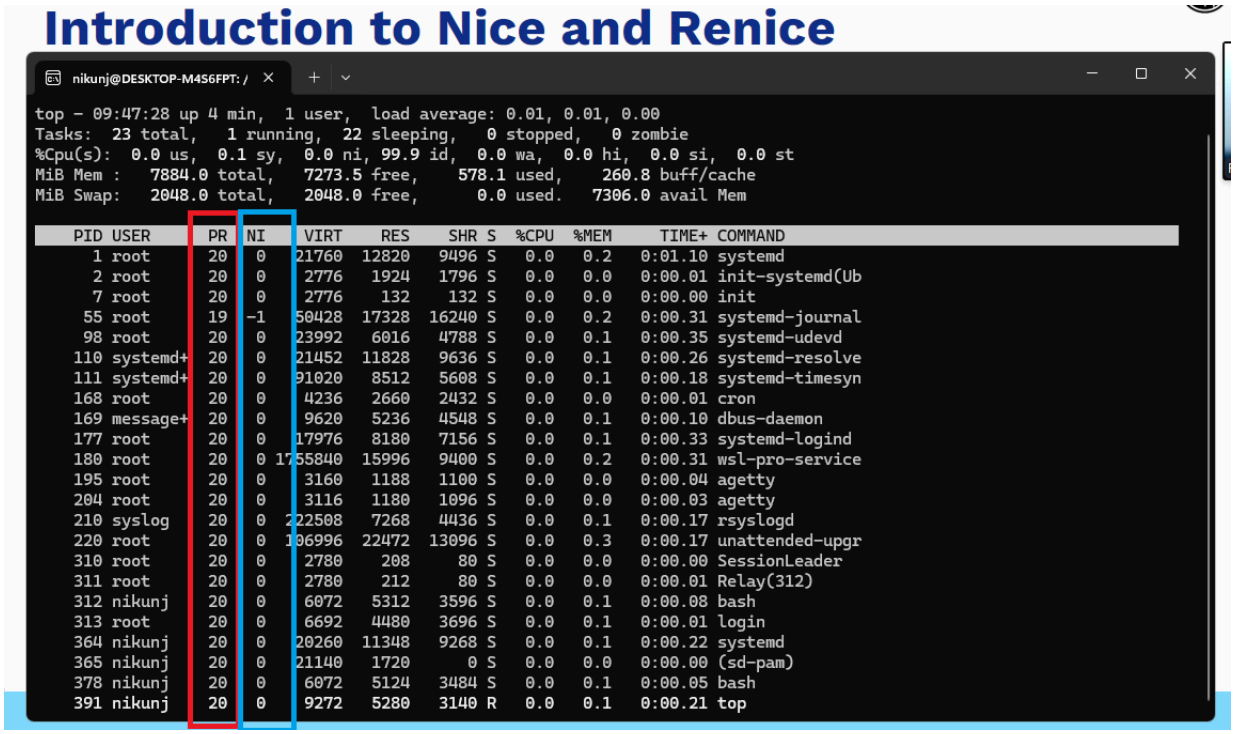
Session-2

Nice and Renice

nice is used to start process with specific priority
renice is used to change the priority of existing process

1. each process has a nice value ranging from -20(highest Priority) to 19 (lowest priority)
2. by default new process starts with a nice value of 0.



- higher the value means lower priority(the process is "nicer" to others)
- Lower nice value means Highers Priority (requires root access for negative values)
- you can start a particular process by using priority as

```
nice -n 10 myscript.sh
```

```
renice 10 -p <PID>
```

create script

```
#!/bin/bash
echo "Starting script with priority $(nice)"
```

```
sleep 100 # Simulate a process running
echo "Script completed."
```

start the script

```
bash script.sh
```

now open the wsl and run the above nice and renice commands and check the priority (PI) and nice (NI) using top command

CPU Bottlenecks

- High CPU Usage (nearly 100%)
- Slow Application response Time
- High Load Average(**uptime , top , htop** to monitor this)

How to Deal With IT?

Use ps to list the CPU Consuming processes

```
ps -eo pid,ppid,cmd,%mem,%cpu --sort=-%mem | head -10
```

also u can check using sysstat

```
sudo apt install mpstat # if its ask to install install using this command
mpstat -P ALL 1
```

Solution: Optimize the code, add caching, or Scale the servers HORIZINTALLY by adding More and More Servers

MEMORY BOTTLENECKS

- System slowdown Frequent Swapping
- High Ram usage (you can check this free -m or vmstat)
- Out of Memory (OOM error)

how to deal with it?

```
free -h # used to check free memory usage
```

```
ps -eo pid,ppid,cmd,%mem,%cpu --sort=-%mem | head -10 # find process consuming
the most of the memories
```

I/O Bottlenecks (Disk & Network)

- slow file read / write operation
- High Disk utilization
- High Network latency or dropped packets

How to Identify

```
# monitor disk I/O
iostat

iostat -dx

iostat -dx -1

#to find the input and output i/O comsuming process
sudo iotop
```

A database query performing full table scan instead of using indexes can cause excessive disk I/O.
Solution: Optimize the queries , add indexes or caching

Introduction to SAR

(System Activity Report)

- it is command line tool that collects, reports, and saves syatem performance data.
- it is part of sysstat package
- it provide insight of CPU Usage, Memory Utilization, Network Activity...

How to Install?

```
sudo apt update sudo apt install sysstat -y
```

Enable and Start Data Collection

```
sudo systemctl enable sysstat
```

```
sudo systemctl start sysstat
```

lets start collecting data

```
sar -u 5 5
```

here -u : CPU usage Report
5 5   : Collects data every 5 seconds for 5 iteration

%user   : CPU time Spent on user process
%system   : CPU time Spent on Syatem / Kernel
%IOwait   : Time Waiting for I/O operations
%idle   : Available CPU time.

lets start collecting data

```
sar -S 5 5
```

here -S : Swap Usage STATISTICS
5 5   : Collects data every 5 seconds for 5 iteration

```
sar -d 5 5
```

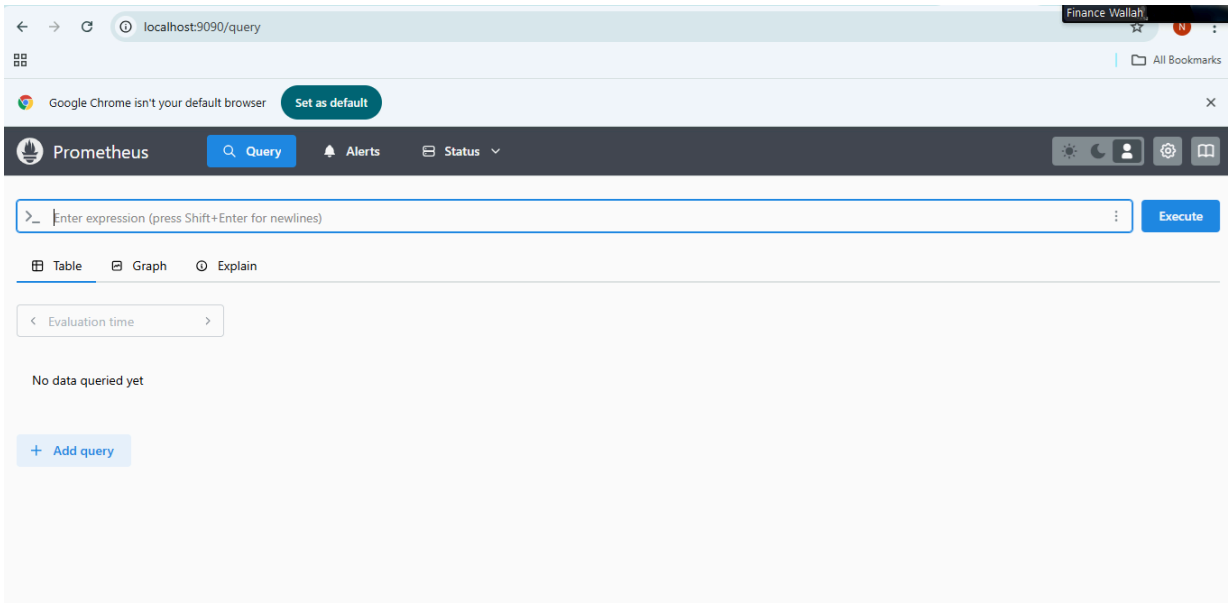
here -d : disk Memory
5 5   : Collects data every 5 seconds for 5 iteration

PROMETHEUS
it is open source monitoring system
pull based model to collect system metrics from systems

How to Install ?
download from : https://prometheus.io/download/
Extract it to the folder
Start the Prometheus

```
./prometheus --config.file=prometheus.yml
```

goto the browser and open: localhost:9090



GRAFANA

- it is an interactive tool for Data Visualization

Link: https://grafana.com/grafana/download

```
sudo apt-get install -y adduser libfontconfig1 musl
wget https://dl.grafana.com/enterprise/release/grafana-enterprise_11.5.2_amd64.deb
sudo dpkg -i grafana-enterprise_11.5.2_amd64.deb
```

once it is installed

```
sudo systemctl daemon-reload
sudo systemctl start grafana-server
sudo systemctl status grafana-server
sudo systemctl enable grafana-server.service
```

- open the Grafna UI-> http:localhost:3000
- LOGIN: admin /admin
- Configure DataSource: Configuration-> DataSource
- Select: Prometheous and enter the URL: http://localhost:9090
- Save and TEST