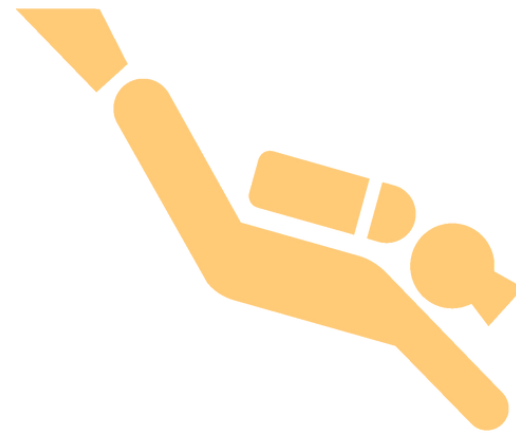


IT253 MINI PROJECT



DEEP DIVE A SYSTEM RESOURCE MONITOR

Nithin S, Ayush Kumar, Jay Chavan

A decorative pattern in the bottom-left corner consisting of several overlapping semi-circular segments in teal, red, blue, and yellow colors. A large, faint circular arc is visible in the bottom-right corner of the slide.

OVERVIEW



System Resource monitor tool made using
Python and PyQt

This utility monitors various metrics of the
computer system. It is built using technologies
such as Python, Psutil, PyCPUinfo, Distro and
Qt5.

REAL TIME

CPU & MEMORY USAGE

PACKET COUNT

OBJECTIVE

CPU

Overall Usage : Percentage and Clock Speeds
Per-Core/thread: Occupancy and duration,Active
Clock Speeds
Context Switches, system calls, Interrupts: Counts
for software and hardware

MEMORY

Utilization and swapping rate
Usage/Availability: Percentage and size in megabytes
Partition Information: Occupancy and size of
physical/logical partitions.



INTERNET

Global Network Statistics: Packet Count and size
rate

Upload/download: Packet Count and size
Per-NIC Activity: Transfer rate, Transmission,
Dropped transfers

PROCESSES

Dynamic Process Listing: PIDs, names, terminal ,
usernames, states, CPU/Memory Usage
Per-Process Details: CPU/Memory usage, context
switches, threads
Process Control: Kill, Resume, Terminate, Suspend
Options

SYSTEM/HARDWARE

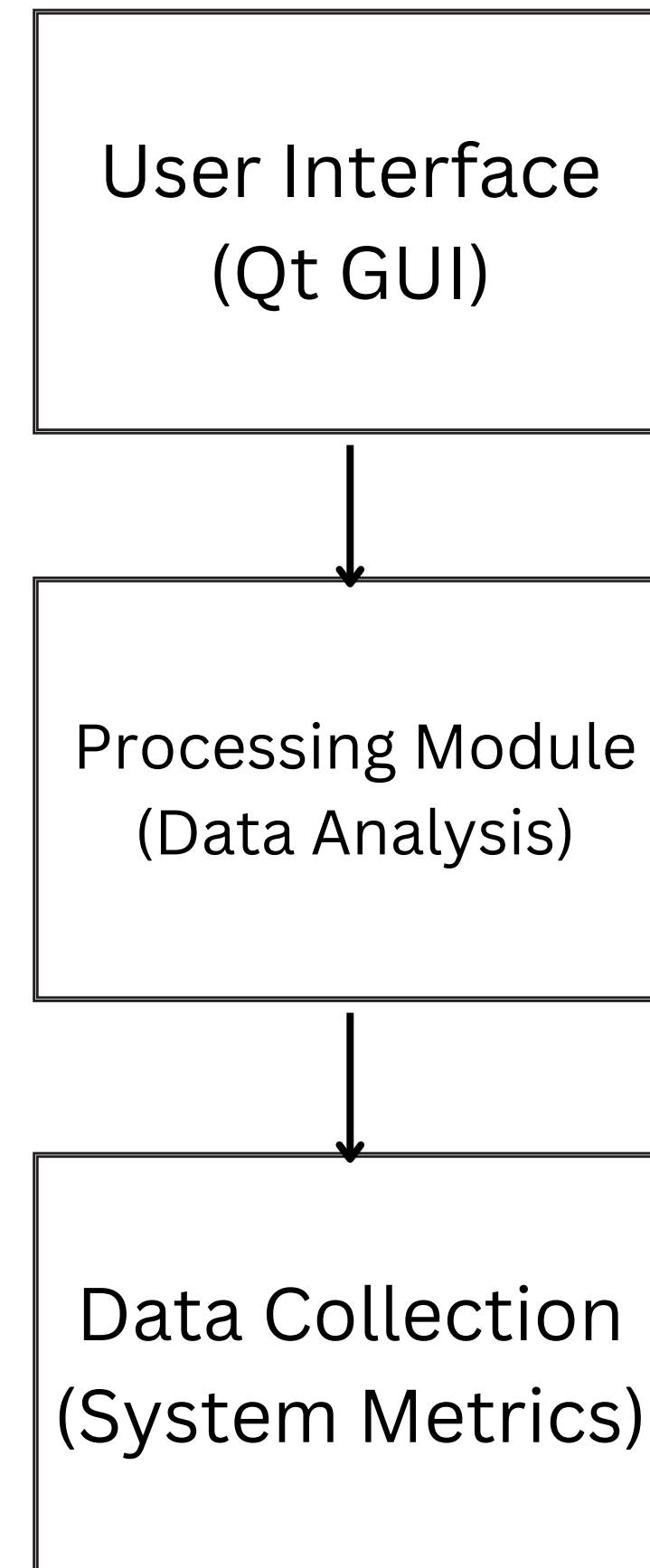
Software: OS, Kernel Names and Versions

Hardware: CPU Name, Vendor, Frequency,
Features

**VISUALLY REPRESENT REAL-TIME DATA CHANGES
FOR CLEAR UNDERSTANDING.**

SYSTEM DESIGN

User Interface designed using QT Designer
Collection & Processing of Data done by
Python Libraries



METHODOLOGY

BACKEND

```
while ( application running in an interval of 0.25sec )
{
    Distro.name()
    psutil.boot_time()
    diskioqt.read_count
    get_cpu_info().get("brand_raw")
    get_cpu_info().get("count")
    proc.info["pid"]
    proc.info["name"]
    psutil.cpu_percent()
    time.time()
    .....many more shown in the report
}
```

FRONTEND

Activities Designer Mon Mar 25 14:18 Qt Designer

File Edit Form View Settings Window Help

Widget Box

- Layouts
 - Vertical Layout
 - Horizontal Layout
 - Grid Layout
 - Form Layout
- Spacers
 - Horizontal Spacer
 - Vertical Spacer
- Buttons
 - Push Button
 - Tool Button
 - Radio Button
 - Check Box
 - Command Link Button
 - Dialog Button Box
- Item Views (Model-Based)
 - List View
 - Tree View
 - Table View
 - Column View
 - Undo View
- Item Widgets (Item-Based)
 - List Widget
 - Tree Widget
 - Table Widget
- Containers
 - Group Box
 - Scroll Area
 - Tool Box
 - Tab Widget
 - Stacked Widget
 - Frame
 - Widget
 - MDI Area
 - Dock Widget
- Input Widgets
 - Combo Box
 - Font Combo Box

Form - phptwdgt.ui

DEVICE

MOUNTPOINT (FILESYSTEM)

FREE	USED	TOTAL
000.00XB	000.00XB	000.00XB

Resources Activities Performance Connection

CPU

Memory

Swap

Context switches: 0

Interrupts since boot: 0

Software interrupts: 0

Active: 000.00B

Buffers: 000.00B

Shared: 000.00B

Used: 0%

Cached: 0%

Free: 0%

Swapped in: 000.00B

Swapped out: 000.00B

Form - perfwdgt.ui

000 000 000.00XHz

#CPU: 000 MIN: 000.00XHz, MAX: 000.00XHz

Time spent in

- Executing normal processes in user mode: TTTTts (XXX%)
- Executing prioritized processes in user mode: TTTTts (XXX%)
- Executing processes in kernel mode: TTTTts (XXX%)
- Doing absolutely nothing: TTTTts (XXX%)
- Waiting for I/O operations to complete: TTTTts (XXX%)
- Servicing hardware interrupts: TTTTts (XXX%)
- Servicing software interrupts: TTTTts (XXX%)
- Running other OSes in a virtualized environment: TTTTts
- Running a normal virtual CPU for guest OS on Linux kernel
- Running a prioritized virtual CPU for guest OS on Linux

Form - lgptwdgt.ui

DEVICE

MOUNTPOINT (FILESYSTEM)

FREE	USED	TOTAL
000.00XB	000.00XB	000.00XB

Form - ntwwdgt.ui

DEVICE

v-c Receiving rate: 000.00B/s (0Pk/s)

ow Transmitting rate: 000.00B/s (0 Pk/s)

ml: 000.00B received (in 0 packets)

ir: 0 errors faced (0 packets dropped)

ilo: 000.00B transmitted (in 0 packets)

ic: 0 errors faced (0 packets dropped)

toggle-on

MainWindow - procwind.ui

PROCESS_NAME

nb	roc	0%	mc	0%

CPU count: 0

Created by: 0

Execution priority: 0

Voluntary CTXSWs: 0

Parent PID: 0

Thread count: 0

Terminal: 0

IO priority: 0

Involuntary CTXSWs: 0

State: 0

Kill

Resume

Terminate

Suspend

Object Inspector

Filter

Object	Class
lgptfrlb	QLabel
lgptfrtx	QLabel
lgptfsys	QLabel
lgptpgbr	QProgressBar
lgptsmbl	QLabel
lgptsmtx	QLabel
lgptuslb	QLabel
lgptustx	QLabel
unitfrm	QFrame

Property Editor

Filter

unitfrm : QFrame

Property	Value
QObject	
objectName	unitfrm
QWidget	
enabled	<input checked="" type="checkbox"/>
geometry	[(0, 0), 340 x 30]
sizePolicy	[Fixed, Fixed, 0, 0]
minimumSize	340 x 30
maximumSize	340 x 30
sizeIncrement	0 x 0
baseSize	0 x 0
palette	Customized (3 roles)
font	A [Ubuntu, 11]
cursor	Arrow
mouseTracking	<input type="checkbox"/>
tabletTracking	<input type="checkbox"/>
focusPolicy	NoFocus

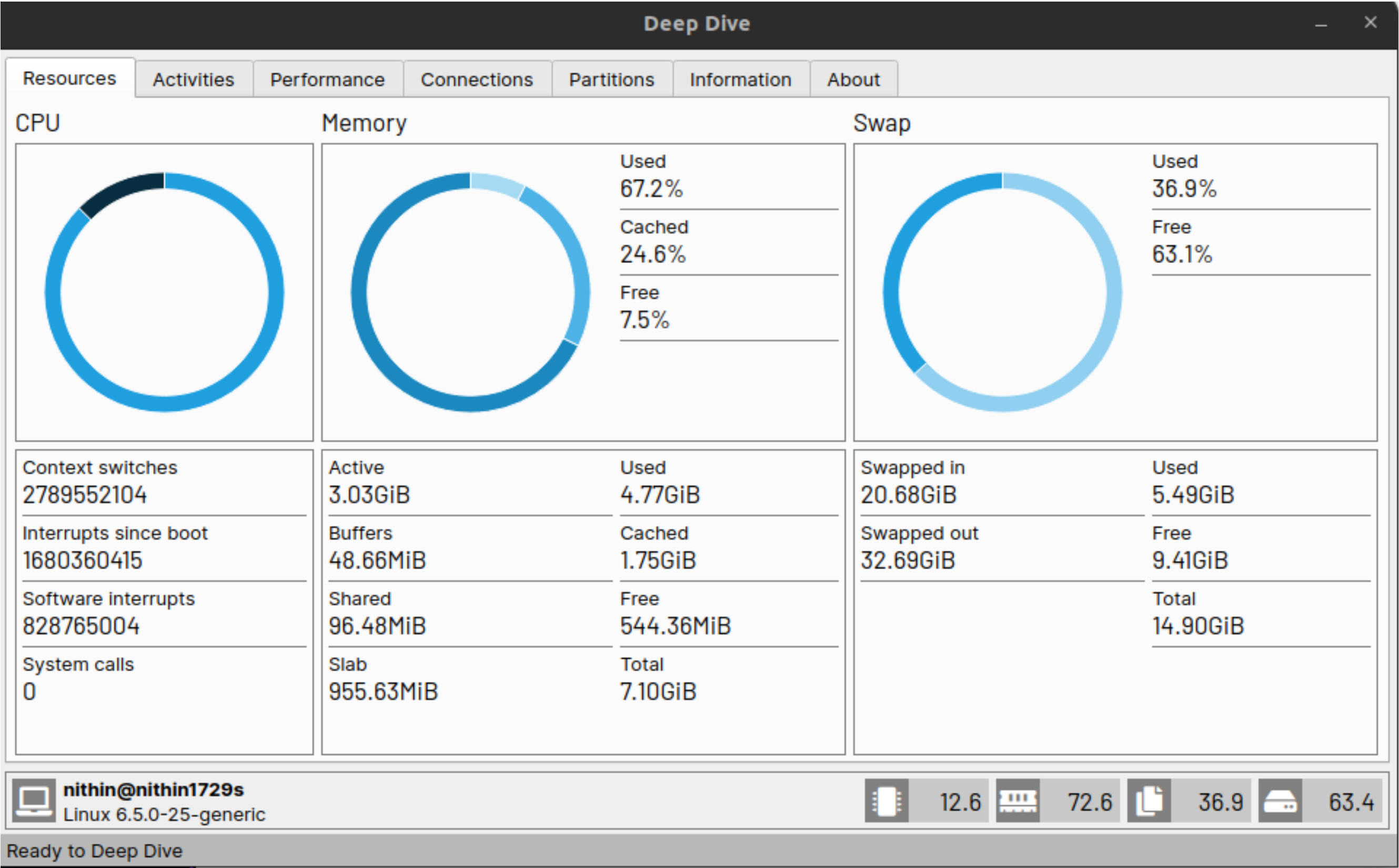
Resource Browser

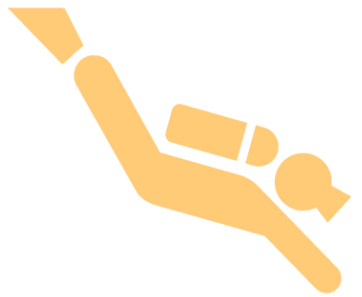
Filter

<resource root>

Signal/Slot Editor Action Editor Resource Browser

RESULTS





Deep Dive

Resources

Activities

Performance

Connections

Partitions

Information

About

Activities

475 processes

ID	Name	Terminal	Username	State	CPU %	Memory %	Thread #
1	systemd	None	root	sleeping	0.0	0.1	1
2	kthreadd	None	root	sleeping	0.0	0.0	1
3	rcu_gp	None	root	idle	0.0	0.0	1
4	rcu_par_gp	None	root	idle	0.0	0.0	1
5	slub_flushwq	None	root	idle	0.0	0.0	1
6	netns	None	root	idle	0.0	0.0	1
11	mm_percpu_wq	None	root	idle	0.0	0.0	1
12	rcu_tasks_kthread	None	root	idle	0.0	0.0	1
13	rcu_tasks_rude_kthread	None	root	idle	0.0	0.0	1
14	rcu_tasks_trace_kthread	None	root	idle	0.0	0.0	1
15	ksoftirqd/0	None	root	sleeping	0.0	0.0	1
16	rcu_preempt	None	root	idle	0.0	0.0	1
17	migration/0	None	root	sleeping	0.0	0.0	1
18	idle_inject/0	None	root	sleeping	0.0	0.0	1
19	cpuhp/0	None	root	sleeping	0.0	0.0	1
20	cpuhp/2	None	root	sleeping	0.0	0.0	1
21	idle_inject/2	None	root	sleeping	0.0	0.0	1
22	migration/2	None	root	sleeping	0.0	0.0	1
23	ksoftirqd/2	None	root	sleeping	0.0	0.0	1

nithin@nithin1729s

Linux 6.5.0-25-generic

6.6

74.3

36.8

63.4

Ready to Deep Dive



Deep Dive

Resources

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About

Performance

12 CPU(s)

Statistics

1

6

3.13GHz

#CPU MIN: 400.00MHz, MAX: 4.28GHz

Time spent in

Executing normal processes in user mode: 2.16 hours (2%)

Executing prioritized processes in user mode: 5.17 secs (0%)

Executing processes in kernel mode: 42.40 mins (3%)

Doing absolutely nothing: 2.47 days (93%)

Waiting for I/O operations to complete: 4.13 mins (0%)

Servicing hardware interrupts: 0.00 secs (0%)

Servicing software interrupts: 1.67 hours (0%)

Running other OSe in a virtualized environment: 0.00 secs (0%)

Running a normal virtual CPU for guest OS on Linux kernel: 1.23 mins (0%)

Running a prioritized virtual CPU for guest OS on Linux kernel: 0.00 secs (0%)

2

4

2.31GHz

#CPU MIN: 400.00MHz, MAX: 4.28GHz

Time spent in

Executing normal processes in user mode: 2.19 hours (3%)

Executing prioritized processes in user mode: 7.42 secs (0%)

CPU information

Name

AMD Ryzen 5 5600H with Radeon Graphics

Vendor

AuthenticAMD

Frequency

4.0924 GHz

Count

12

Bits

64

Arch

X86_64

Stepping

None

Model

80

Family

25

Feature flags

3dnowprefetch

abm

adx

aes

aperfmpperf

apic

arat

avic

avx

avx2

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Linux 6.5.0-25-generic

8.4

74.7

36.7

63.4

Ready to Deep Dive



Deep Dive

Resources

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Connections

4 NIC(s)

In bytes

↓ Receiving rate

100.60KiB/s

⬇ Received

55.47GiB

↑ Transmitting rate

820.00B/s

⬆ Transmitted

27.83GiB

In packets

↓ Receiving rate

642Pk/s

⬇ Received

130335005Pk(s)

↑ Transmitting rate

6Pk/s

⬆ Transmitted

34239964Pk(s)

Statistics

Errors while receiving

0 error(s)

Errors while transmitting

0 error(s)

Packet drops in receiving

332313Pk(s)

Packet drops in transmitting

0Pk(s)

lo

↓ Receiving rate

0.00B/s (0Pk/s)

↑ Transmitting rate

0.00B/s (0Pk/s)

⬇ 27.10GiB received (in 28713394Pk(s))

⬆ 0 error(s) faced (0Pk(s) dropped)

⬆ 27.10GiB transmitted (in 28713394Pk(s))

⬆ 0 error(s) faced (0Pk(s) dropped)

eno1

↓ Receiving rate

24.29KiB/s (55Pk/s)

↑ Transmitting rate

26.82KiB/s (43Pk/s)

⬇ 10.64GiB received (in 9951485Pk(s))

⬆ 0 error(s) faced (0Pk(s) dropped)

⬆ 449.68MiB transmitted (in 4436441Pk(s))

⬆ 0 error(s) faced (0Pk(s) dropped)

wlo1

↓ Receiving rate

65.91KiB/s (563Pk/s)

↑ Transmitting rate

0.00B/s (0Pk/s)

⬇ 17.74GiB received (in 91670123Pk(s))

⬆ 297.15MiB transmitted (in 1090129Pk(s))

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Linux 6.5.0-25-generic

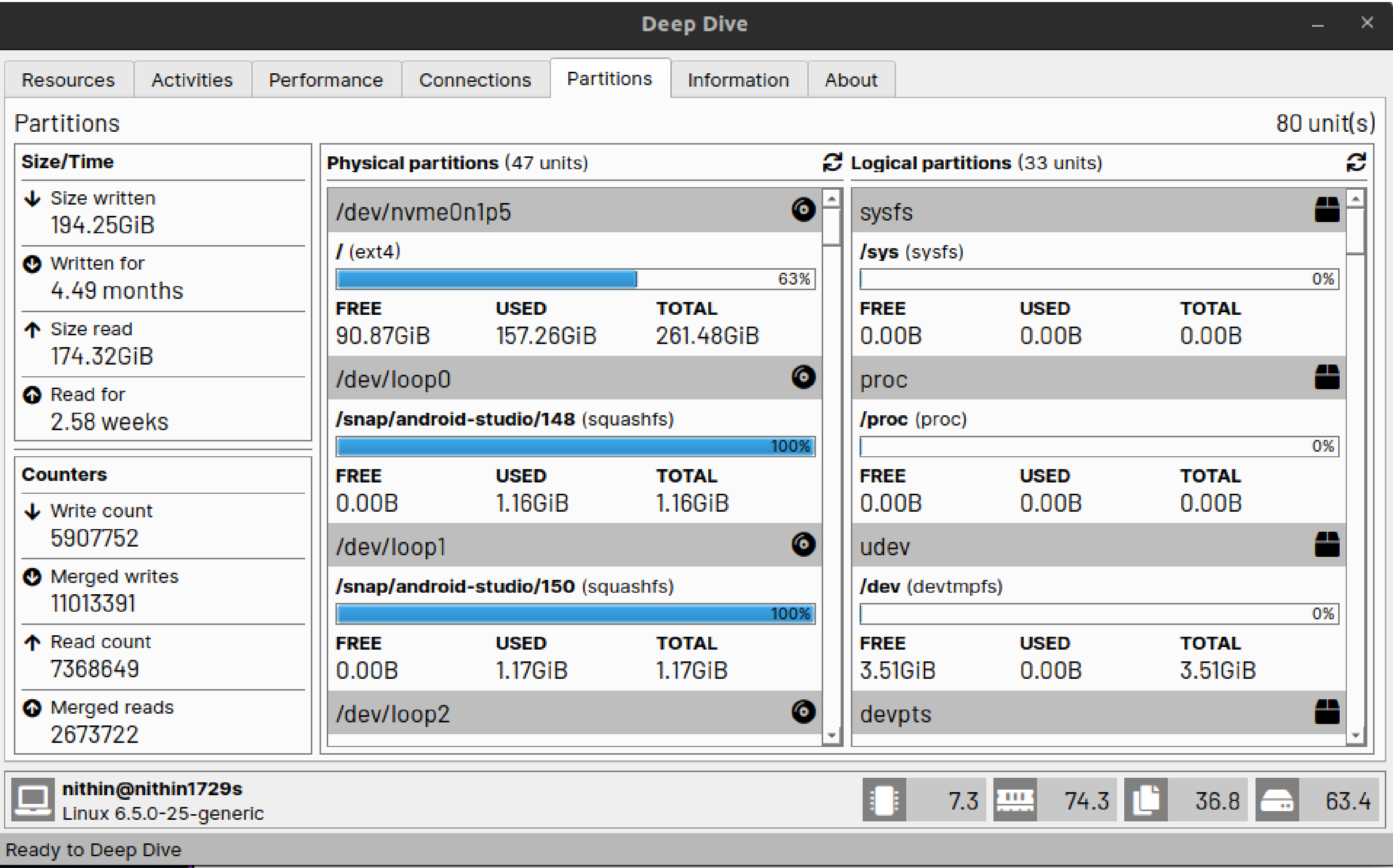
7.7

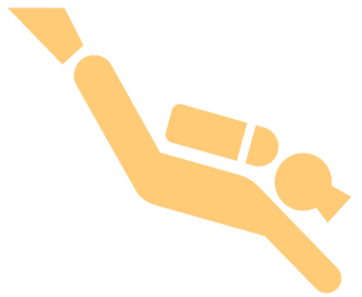
74.6

36.7

63.4

Ready to Deep Dive





Deep Dive

Resources

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Deep Dive

Your system runs on

Name	Version
Ubuntu	22.04
Hostname	Release
nithin1729s	6.5.0-25-generic
Rendition	
#25~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Tue Feb 20 16:09:15 UTC 2	
Booted on	
2024-03-11, 22:46:29	

Tech Stack

System Resource Monitor	
Deep Dive	
Python version	
3.10.12 (main, Nov 20 2023, 15:14:05)[GCC 11.4.0]	
PyQt version	Psutil version
5.15.2	5.9.3
Py-CPUinfo version	Distro version
8.0.0	1.7.0

nithin@nithin1729s

Linux 6.5.0-25-generic

9.2

74.3

36.8

63.4

Ready to Deep Dive

INDIVISUAL CONTRIBUTION

Backend Dev: Nithin S, Ayush Kumar

Frontend Dev: Jay Chavan, Nithin S

FUTURE WORK

Reducing Overhead
Better System Architecture
Integrating Alerts
Historical Data Analysis
Enable Customization
Multi Platform Support

The background features four decorative geometric patterns in the corners. The top-left corner has a series of parallel diagonal lines in a light blue-grey color. The top-right corner contains a cluster of overlapping semi-circles in yellow, red, teal, and dark blue. The bottom-left corner also features a cluster of overlapping semi-circles in red, teal, and dark blue. The bottom-right corner has a series of parallel diagonal lines in a light blue-grey color, mirroring the top-left pattern.

THANK YOU