OS Project
Real-Time resource monitor for Linux

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Introduction

The fundamental to resolving any computer problem, including those with or pertaining to Linux and the hardware on which it executes, is information. Linux server performance monitoring is vital to identify performance issues that can interrupt the continued functioning of business services. Our goal is to develop a real-time monitoring system for Linux that can track the system's performance, including the number of processes running, CPU and memory utilization, and the duration of time each process is active.

Objectives to be covered:

- Real-Time Visibility On Performance
- Data transfer latency
- Alert Users On Time
- Real-Time Feedback

Problem Statement:

In real-time situations, timing constraints can still be violated for a variety of reasons despite the development of static timing analysis methodologies for attaining a correct-by-construction design for systems respecting their timing constraints. One significant method to gather critical information on the precise timing of Run-time monitoring is the process of seeing how a system behaves in the real world. However, Despite advancements in the creation of run-time monitors, a sizable Work needs to be done to improve these methods with reference to the primary concerns. use these monitors. These problems include the monitor's added latency, system, precision, hardware restrictions, etc. Linux operating system has proven to benefit from significant

features that make it adaptable to many frameworks. Nonetheless, like any other general-purpose operating system, it is highly vulnerable to timing constraint violations in real-time environments. The objective of this system is to design and implementation of a timing behavior run-time monitor for the Linux operating system with an emphasis on reducing the latency imposed by the monitor while providing a comprehensible monitoring facility.

Requirements:

- A single Linux computer may now support a variety of apps and virtual machines thanks to hardware and cloud technology developments. We must thus control system resources like CPU use.
- The resource monitoring tool will help you identify any service failures or errors that might occur.
- It provides fundamental activity monitoring data, such as which activities are presently being executed and which activities are consuming the most resources.

CPU and Memory Utilization:

- CPU Utilization is defined as the **amount of work a CPU does in order to perform the tasks which are assigned to it.**
- Memory utilization is **the average utilization derived from the percent of available memory in use at a given moment**.
- When a device isn't operating to its full capacity, one of the most frequent mistakes we do is to add additional RAM. If your device is not optimised, adding additional RAM won't help; instead, the performance will continue to decline.
- We've all heard the adage that your computer's performance will increase if you add more RAM. While this is generally accurate and true, there are several situations in which it will not be.
- The memory use of the devices and routers present in the network has to be monitored in terms of maintaining optimum network performance and minimise the amount of issues that may develop in a network.

TechStacks:

- CPP
- N-curses
- Makefile
- Linux
- Python

Results
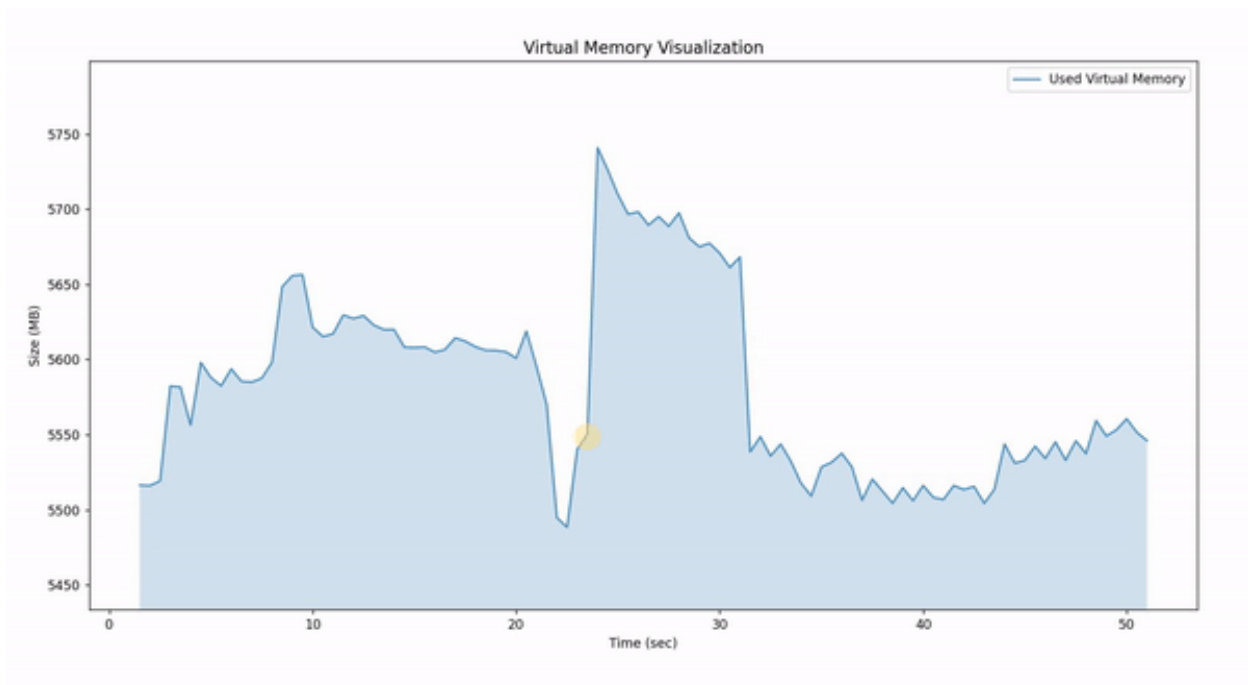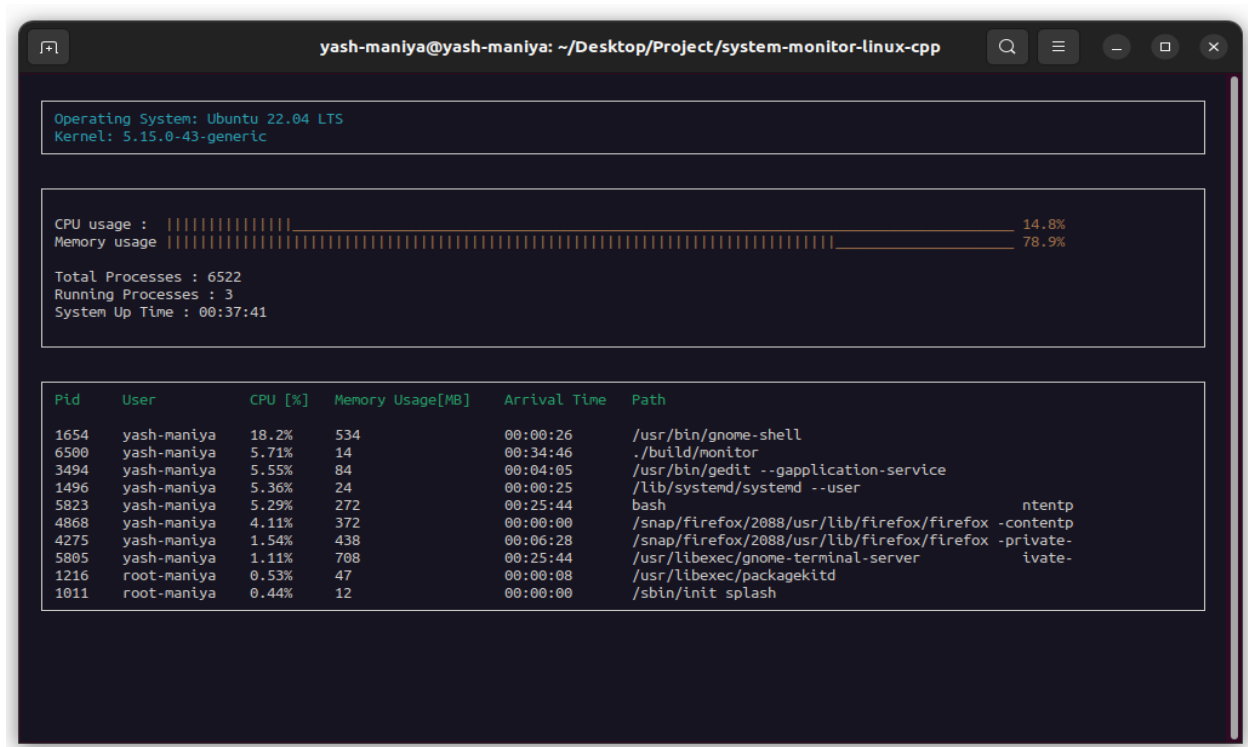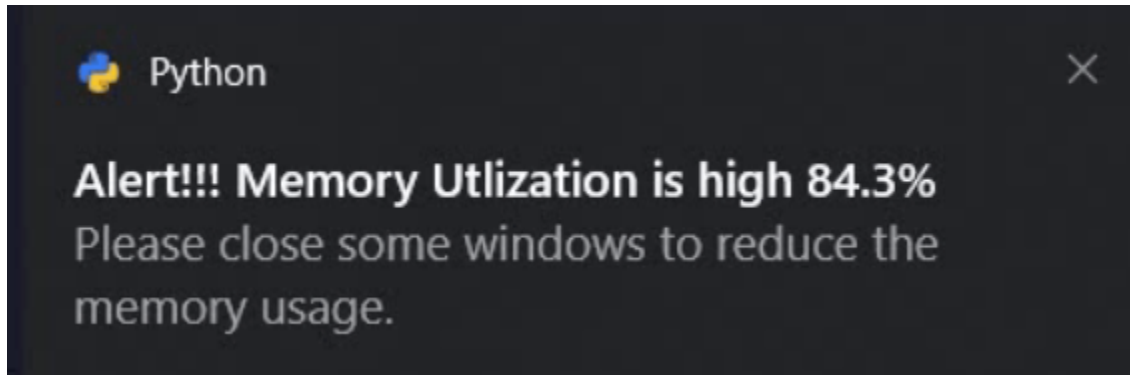
Conclusion

In the end, we can arrive at the conclusion that a real-time resource monitor is a great tool to examine our system's proper functioning. It enables you to keep track of what is happening in our system's background so that we can stop the activity that might cause problems. With little outside installation, these resource monitors maintain our system's cleanliness. Additionally, maintaining track of our system's performance and processor consumption will be beneficial for a longer period of time and will extend its lifespan.