Network Security Lab

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Lab-01:

Task-02 (Virtualization)

### 1) Creating two Virtual machines with same OS but different resource allocations

VM 1: with minimal CPU and Memory resources

The cpu and memory resources given to the virtual machine are as follows:

Device	Summary
Memory	1 GB
Processors	1
Hard Disk (SCSI)	10 GB
CD/DVD (SATA)	Using file C:\Users\riazr\Docum...
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

VM 2: with High CPU and Memory resources

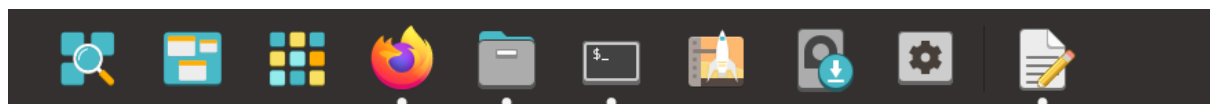The cpu and memory resources given to the virtual machine are as follows:
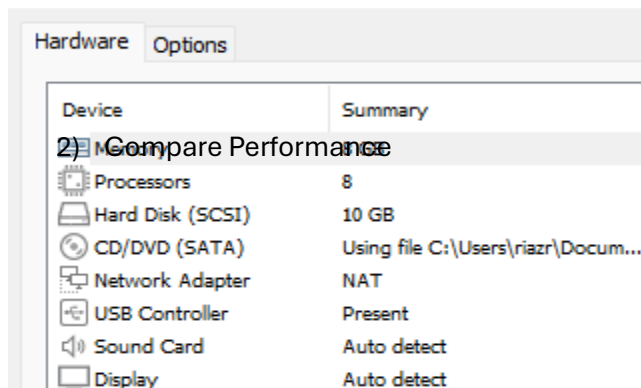
2) Compare Performance

Virtual Machine with Low Resources

Running a file search

```
root@pop-os:/home/pop-os# find / -name 'giki'
find: '/run/user/999/gvfs': Permission denied
find: '/run/user/999/doc': Permission denied
root@pop-os:/home/pop-os#
```

Running multiple programs at once


```
root@pop-os: /home/pop-os

top - 17:46:27 up 28 min,  2 users,  load average: 0.65, 0.43, 0.43
Tasks: 318 total,   1 running, 317 sleeping,   0 stopped,   0 zombie
%Cpu(s):  2.3 us,  1.8 sy,  0.3 ni, 95.3 id,  0.0 wa,  0.0 hi,  0.2 si,  0.0 st
MiB Mem :   1919.8 total,    199.0 free,   1369.3 used,    351.5 buff/cache
MiB Swap:   1920.0 total,    797.5 free,   1122.5 used.    338.4 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
 1542 pop-os    20   0  393164  44808  19424 S   3.0   2.3   1:03.05 Xorg
 1984 pop-os    20   0 3646728 161276  55168 S   2.6   8.2   0:49.49 gnome-shell
 2930 pop-os    20   0  560904  29964  22764 S   1.7   1.5   0:01.70 gnome-terminal-
 3272 pop-os    20   0 2742960 187532  57828 S   1.7   9.5   0:18.09 Isolated Web Co
 2987 pop-os    26   6 1117448  30172  20884 S   0.7   1.5   0:03.68 nautilus
 4125 root      26   6   23612   4096   3200 R   0.7   0.2   0:00.40 top
 3383 pop-os    20   0 2411564  33540  28544 S   0.3   1.7   0:00.25 Web Content
 3943 root      20   0       0      0      0 I   0.3   0.0   0:00.64 kworker/1:1-events
    1 root      20   0  166276   6788   4960 S   0.0   0.3   0:04.16 systemd
    2 root      20   0       0      0      0 S   0.0   0.0   0:00.00 kthreadd
    3 root      20   0       0      0      0 S   0.0   0.0   0:00.00 pool_workqueue_release
    4 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/R-rcu_g
    5 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/R-slub_
    6 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/R-netns
    9 root       0 -20       0      0      0 I   0.0   0.0   0:00.95 kworker/0:0H-kblockd
   10 root      20   0       0      0      0 I   0.0   0.0   0:00.00 kworker/u512:0-ipv6_addrconf
   11 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/R-mm_pe
   12 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tasks_kthread
   13 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tasks_rude_kthread
   14 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tasks_trace_kthread
   15 root      20   0       0      0      0 S   0.0   0.0   0:00.35 ksoftirqd/0
   16 root      20   0       0      0      0 I   0.0   0.0   0:00.61 rcu_preempt
   17 root      20   0       0      0      0 S   0.0   0.0   0:00.00 rcu_exp_par_gp_kthread_worker/1
   18 root      20   0       0      0      0 S   0.0   0.0   0:00.00 rcu_exp_gp_kthread_worker
   19 root      rt   0       0      0      0 S   0.0   0.0   0:00.04 migration/0
   20 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/0
   21 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/0
   22 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/1
   23 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/1
   24 root      rt   0       0      0      0 S   0.0   0.0   0:00.43 migration/1
   25 root      20   0       0      0      0 S   0.0   0.0   0:00.39 ksoftirqd/1
```

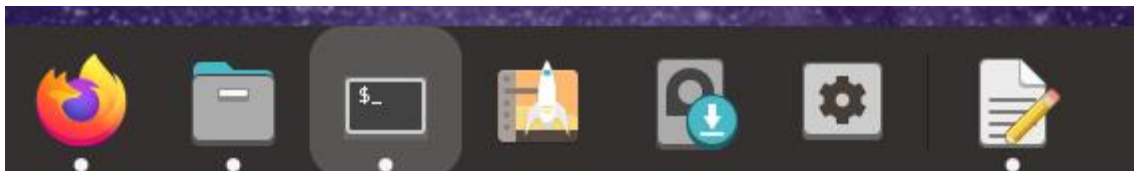This image shows the top command output from a Linux system.

- The system has been running for 28 minutes, with a load average of 0.65, 0.43, and 0.43.

- There are 318 total tasks, with 1 running and 317 sleeping.

- CPU usage is at 2.3%, with 95.3% idle, while memory usage shows 1919.8 MiB total, with 199.0 MiB free.

- The process "Xorg" is using the most CPU at 3%, and "gnome-shell" is using 2.6% CPU and 8.2% memory.

- The top command run by user "root" is consuming 0.2% CPU and 0.2% memory

Virtual Machine with High Resources

Running a file search

Running multiple programs at the same time

Result of top command

This image shows the output of the top command in a Linux terminal.

- The CPU usage is minimal, with around 1.6% in use and 0% waiting or idle.

- The system has a total of 7894 MiB of memory, with 828.4 MiB used and 4994.7 MiB in cache.

- The highest CPU-consuming process is "Isolated Web Co" using 8.6% of the CPU and 3.9% of memory.

- The user "root" is running the top process, which is consuming 0.3% CPU and 0.1% memory.

Summary

The low-resource VM showed higher CPU and memory usage with slower performance while performing basic tasks like opening applications and searching for files. Applications took longer to open, and system responsiveness was reduced.

In contrast, the high-resource VM handled tasks more efficiently, with lower CPU and memory utilization, faster task completion, and smoother responsiveness. Overall, the high-resource VM provided a better user experience under similar workloads.

The top output reflects that the high-resource VM had more available memory and lower CPU strain, improving overall performance.