Module 2: Critical Thinking

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CSC507-2: Foundations of Operating Systems

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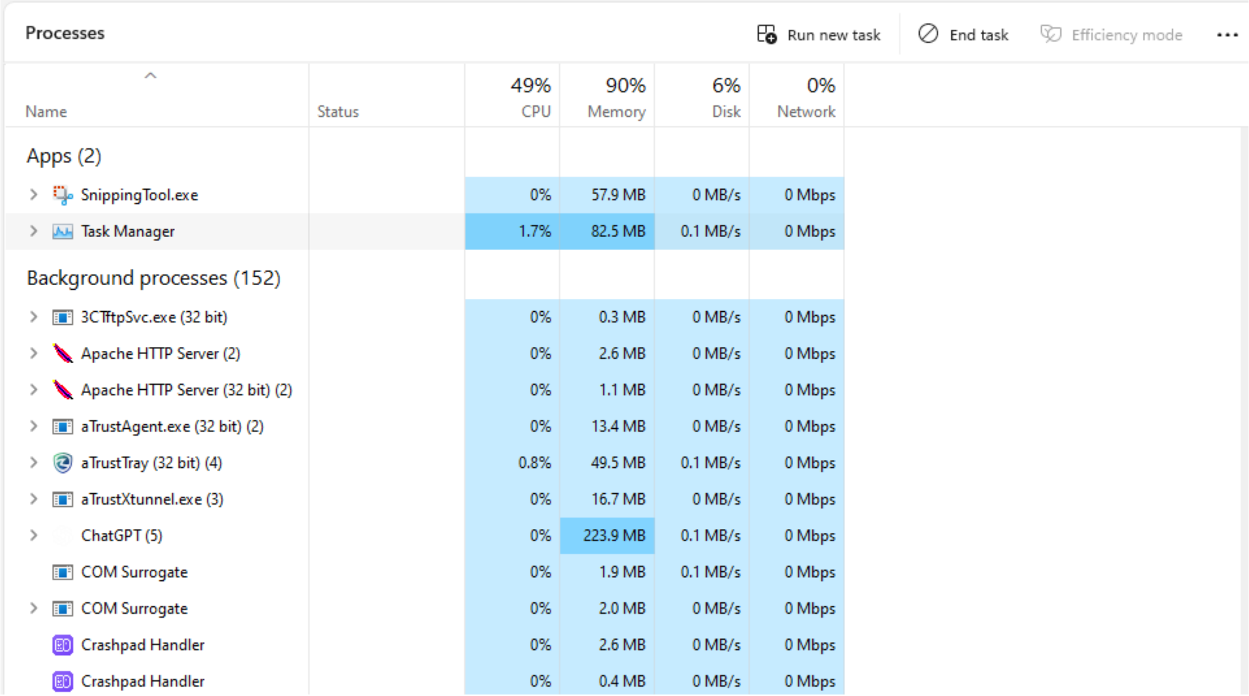
Critical Thinking 1

Windows and Linux are two operating systems that handle process management differently. Windows uses a graphical tool called Task Manager while Linux uses shell commands to perform various tasks.

Windows

Figure 1 shows the first page you see when opening task manager. On this page you can monitor both running and background processes. From this page, you can select a task and end it or you can start a new task. You also see the percentage that is being used up by that process with respect to the CPU, memory, disk and network.

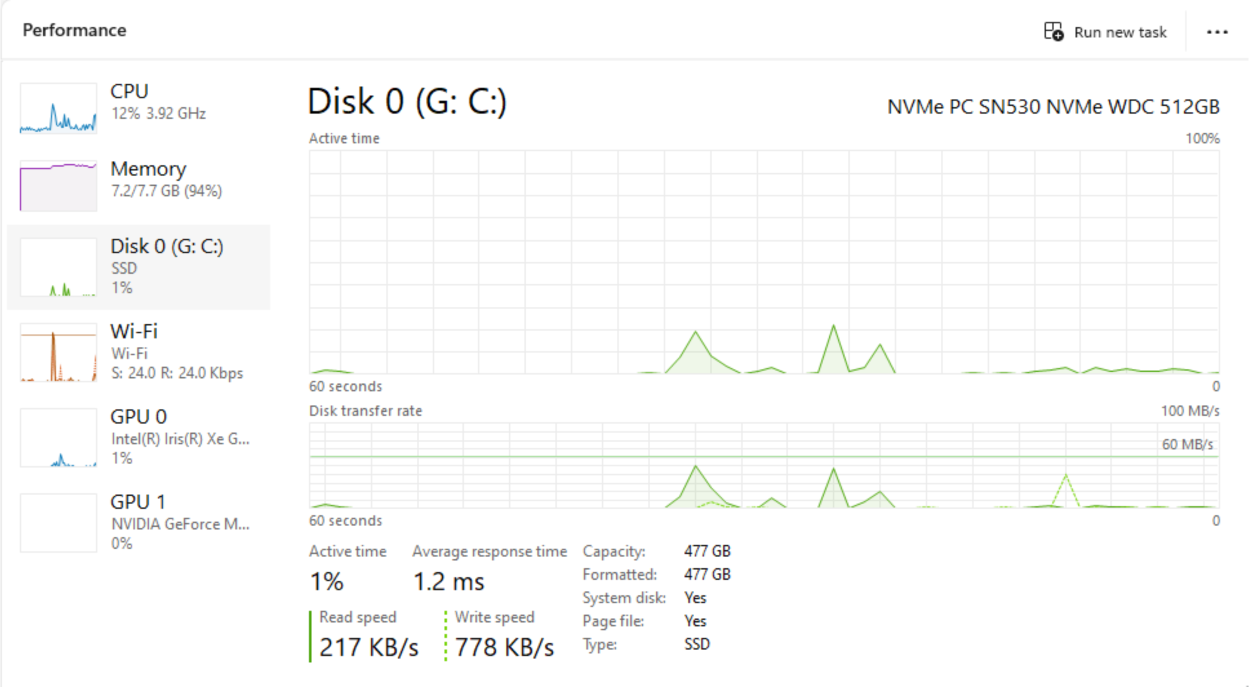
Figure 1: *Windows Task Manager Processes*



Name	Status	49% CPU	90% Memory	6% Disk	0% Network
Apps (2)					
SnippingTool.exe		0%	57.9 MB	0 MB/s	0 Mbps
Task Manager		1.7%	82.5 MB	0.1 MB/s	0 Mbps
Background processes (152)					
3CTftpSvc.exe (32 bit)		0%	0.3 MB	0 MB/s	0 Mbps
Apache HTTP Server (2)		0%	2.6 MB	0 MB/s	0 Mbps
Apache HTTP Server (32 bit) (2)		0%	1.1 MB	0 MB/s	0 Mbps
aTrustAgent.exe (32 bit) (2)		0%	13.4 MB	0 MB/s	0 Mbps
aTrustTray (32 bit) (4)		0.8%	49.5 MB	0.1 MB/s	0 Mbps
aTrustXtunnel.exe (3)		0%	16.7 MB	0 MB/s	0 Mbps
ChatGPT (5)		0%	223.9 MB	0.1 MB/s	0 Mbps
COM Surrogate		0%	1.9 MB	0.1 MB/s	0 Mbps
COM Surrogate		0%	2.0 MB	0 MB/s	0 Mbps
Crashpad Handler		0%	2.6 MB	0 MB/s	0 Mbps
Crashpad Handler		0%	0.4 MB	0 MB/s	0 Mbps

Figure 2 shows the page in Task Manager where you can monitor performance of the CPU, memory, disk, Wi-Fi, and GPU's. This can be useful when you want to monitor the computers overall resource usage in real-time.

Figure 2: *Windows Task Manager Performance Page.*

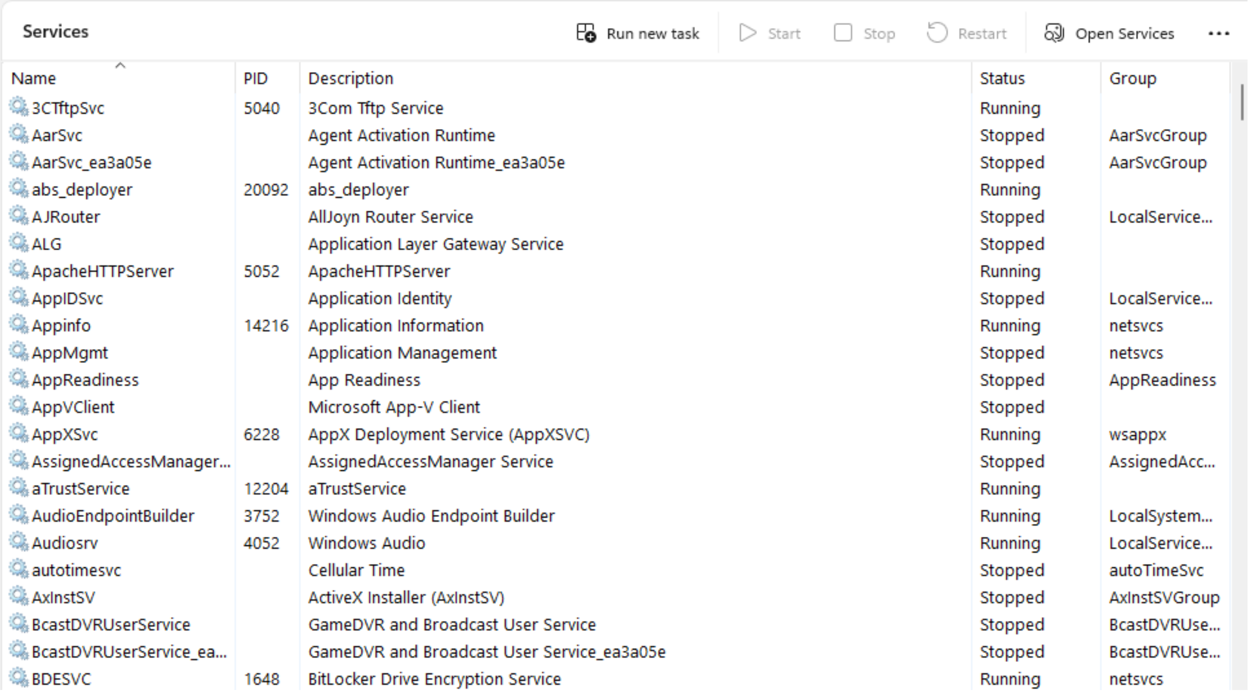


Active time 1%
Average response time 1.2 ms
Read speed 217 KB/s
Write speed 778 KB/s

Capacity:	477 GB
Formatted:	477 GB
System disk:	Yes
Page file:	Yes
Type:	SSD

Figure 3 is the Services page where it shows the PID, description, status, and group of a service. Here, you can stop or start a service deepening on your needs and can be helpful in IT troubleshooting if issues arise.

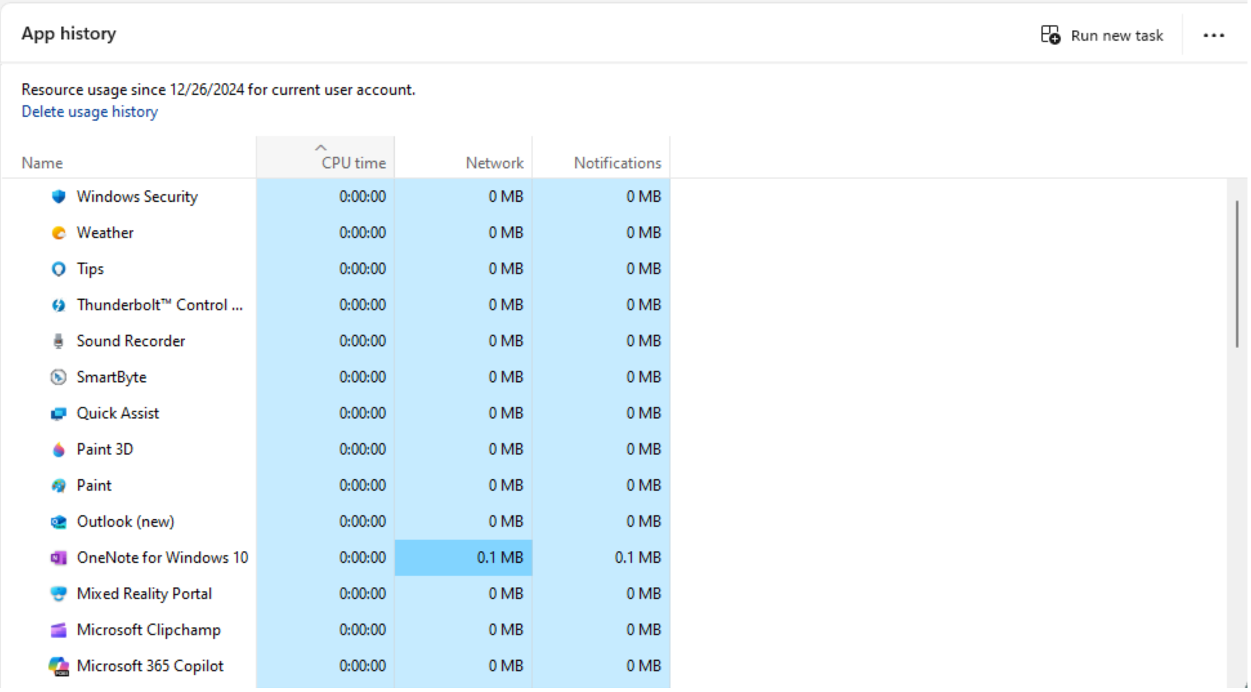
Figure 3: *Windows Task Manager Services*



Name	PID	Description	Status	Group
3CTftpSvc	5040	3Com Tftp Service	Running	
AarSvc		Agent Activation Runtime	Stopped	AarSvcGroup
AarSvc_ea3a05e		Agent Activation Runtime_ea3a05e	Stopped	AarSvcGroup
abs_deployer	20092	abs_deployer	Running	
AJRouter		AllJoyn Router Service	Stopped	LocalService...
ALG		Application Layer Gateway Service	Stopped	
ApacheHTTPServer	5052	ApacheHTTPServer	Running	
AppIDSvc		Application Identity	Stopped	LocalService...
Appinfo	14216	Application Information	Running	netsvcs
AppMgmt		Application Management	Stopped	netsvcs
AppReadiness		App Readiness	Stopped	AppReadiness
AppVClient		Microsoft App-V Client	Stopped	
AppXSvc	6228	AppX Deployment Service (AppXSVC)	Running	wsappx
AssignedAccessManager...		AssignedAccessManager Service	Stopped	AssignedAcc...
aTrustService	12204	aTrustService	Running	
AudioEndpointBuilder	3752	Windows Audio Endpoint Builder	Running	LocalSystem...
Audiosrv	4052	Windows Audio	Running	LocalService...
autotimesvc		Cellular Time	Stopped	autoTimeSvc
AxInstSV		ActiveX Installer (AxInstSV)	Stopped	AxInstSVGroup
BcastDVRUserService		GameDVR and Broadcast User Service	Stopped	BcastDVRUse...
BcastDVRUserService_ea...		GameDVR and Broadcast User Service_ea3a05e	Stopped	BcastDVRUse...
BDESVC	1648	BitLocker Drive Encryption Service	Running	netsvcs

Figure 4 shows the app history. Here you will see the resource usage for each app that the computer runs.

Figure 4: *Windows Task Manager App History*

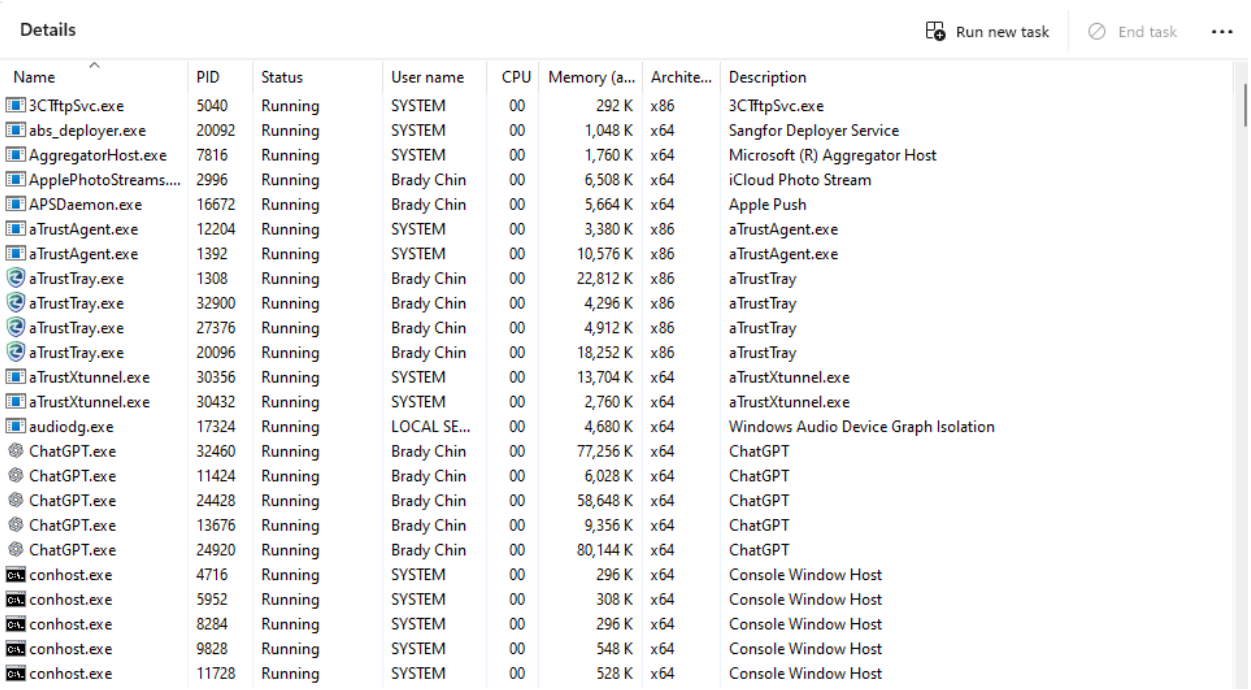


Resource usage since 12/26/2024 for current user account.

Name	CPU time	Network	Notifications
Windows Security	0:00:00	0 MB	0 MB
Weather	0:00:00	0 MB	0 MB
Tips	0:00:00	0 MB	0 MB
Thunderbolt™ Control ...	0:00:00	0 MB	0 MB
Sound Recorder	0:00:00	0 MB	0 MB
SmartByte	0:00:00	0 MB	0 MB
Quick Assist	0:00:00	0 MB	0 MB
Paint 3D	0:00:00	0 MB	0 MB
Paint	0:00:00	0 MB	0 MB
Outlook (new)	0:00:00	0 MB	0 MB
OneNote for Windows 10	0:00:00	0.1 MB	0.1 MB
Mixed Reality Portal	0:00:00	0 MB	0 MB
Microsoft Clipchamp	0:00:00	0 MB	0 MB
Microsoft 365 Copilot	0:00:00	0 MB	0 MB

Figure 5 shows the Details page that displays all the running processes. This differs from the Services page because the Services page manages system services while Details manages active processes.

Figure 5: *Windows Task Manager Details*

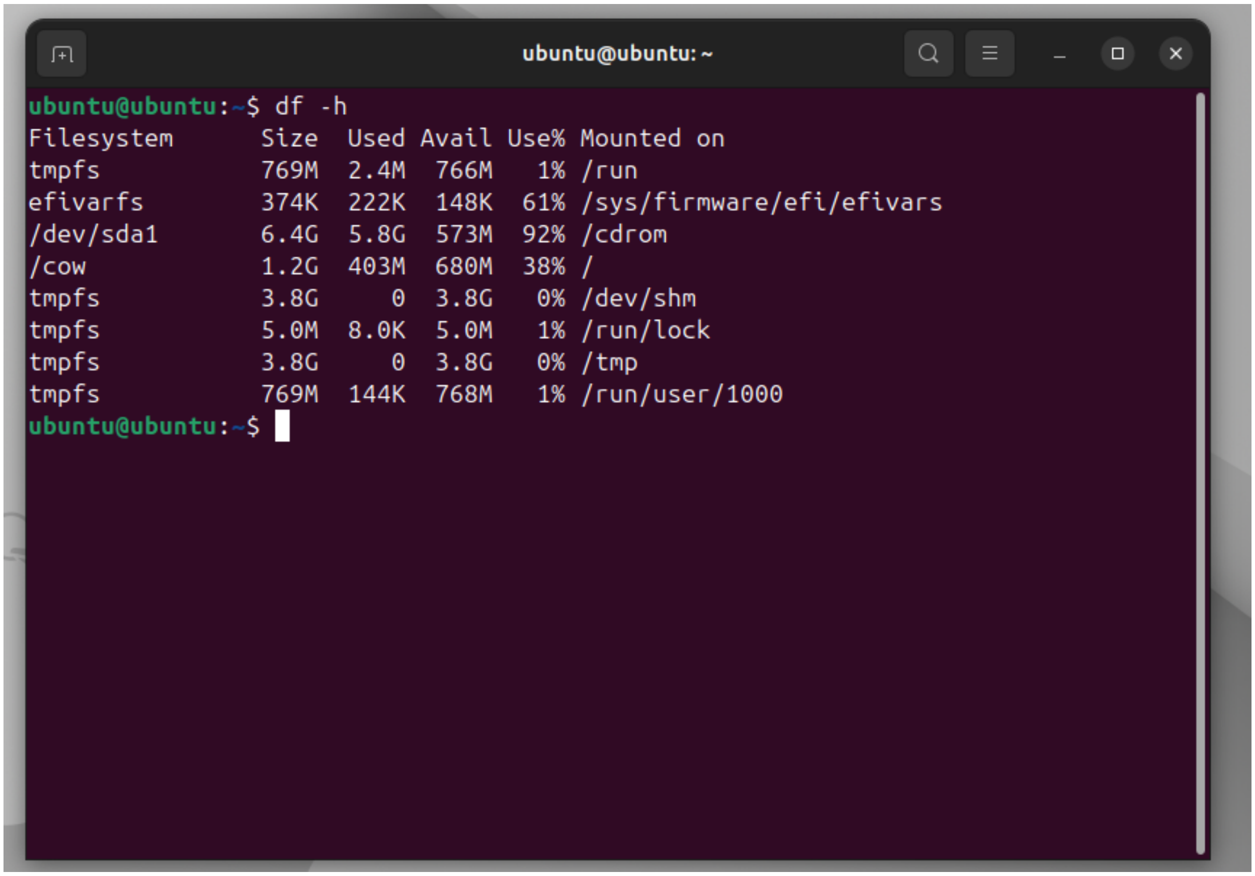


Name	PID	Status	User name	CPU	Memory (a...	Archite...	Description
3CTftpSvc.exe	5040	Running	SYSTEM	00	292 K	x86	3CTftpSvc.exe
abs_deployer.exe	20092	Running	SYSTEM	00	1,048 K	x64	Sangfor Deployer Service
AggregatorHost.exe	7816	Running	SYSTEM	00	1,760 K	x64	Microsoft (R) Aggregator Host
ApplePhotoStreams....	2996	Running	Brady Chin	00	6,508 K	x64	iCloud Photo Stream
APSDaemon.exe	16672	Running	Brady Chin	00	5,664 K	x64	Apple Push
aTrustAgent.exe	12204	Running	SYSTEM	00	3,380 K	x86	aTrustAgent.exe
aTrustAgent.exe	1392	Running	SYSTEM	00	10,576 K	x86	aTrustAgent.exe
aTrustTray.exe	1308	Running	Brady Chin	00	22,812 K	x86	aTrustTray
aTrustTray.exe	32900	Running	Brady Chin	00	4,296 K	x86	aTrustTray
aTrustTray.exe	27376	Running	Brady Chin	00	4,912 K	x86	aTrustTray
aTrustTray.exe	20096	Running	Brady Chin	00	18,252 K	x86	aTrustTray
aTrustXtunnel.exe	30356	Running	SYSTEM	00	13,704 K	x64	aTrustXtunnel.exe
aTrustXtunnel.exe	30432	Running	SYSTEM	00	2,760 K	x64	aTrustXtunnel.exe
audiodg.exe	17324	Running	LOCAL SE...	00	4,680 K	x64	Windows Audio Device Graph Isolation
ChatGPT.exe	32460	Running	Brady Chin	00	77,256 K	x64	ChatGPT
ChatGPT.exe	11424	Running	Brady Chin	00	6,028 K	x64	ChatGPT
ChatGPT.exe	24428	Running	Brady Chin	00	58,648 K	x64	ChatGPT
ChatGPT.exe	13676	Running	Brady Chin	00	9,356 K	x64	ChatGPT
ChatGPT.exe	24920	Running	Brady Chin	00	80,144 K	x64	ChatGPT
conhost.exe	4716	Running	SYSTEM	00	296 K	x64	Console Window Host
conhost.exe	5952	Running	SYSTEM	00	308 K	x64	Console Window Host
conhost.exe	8284	Running	SYSTEM	00	296 K	x64	Console Window Host
conhost.exe	9828	Running	SYSTEM	00	548 K	x64	Console Window Host
conhost.exe	11728	Running	SYSTEM	00	528 K	x64	Console Window Host

Linux

Figure 6 is an example of the shell command that can be run to see the disk usage. This is done by running shell command “df -h”. You can see the total, used, and available space for all systems.

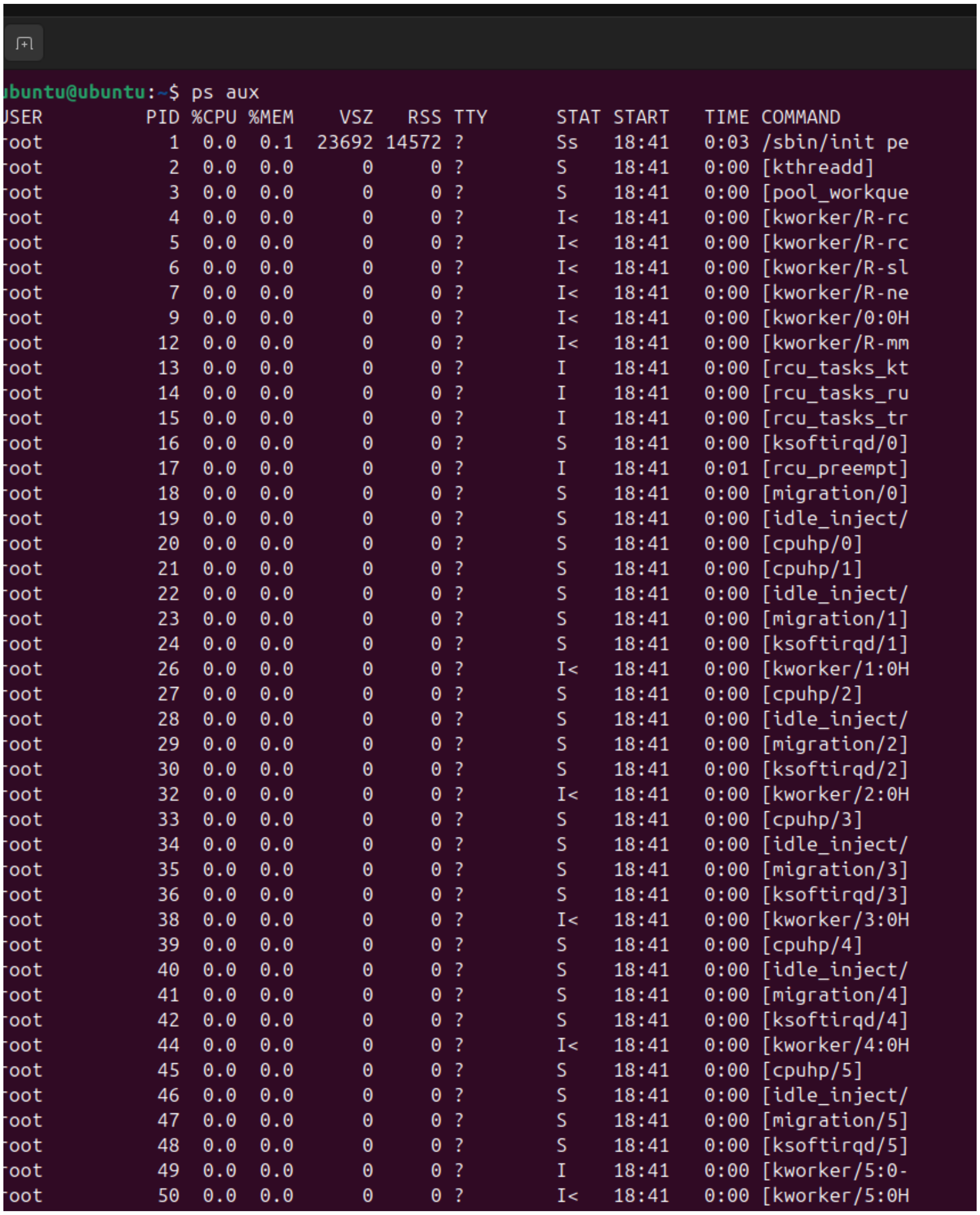
Figure 6: *Linux disk space usage.*



```
ubuntu@ubuntu:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
tmpfs           769M  2.4M  766M   1% /run
efivarfs        374K  222K  148K  61% /sys/firmware/efi/efivars
/dev/sda1       6.4G  5.8G  573M  92% /cdrom
/cow            1.2G  403M  680M  38% /
tmpfs           3.8G     0  3.8G   0% /dev/shm
tmpfs           5.0M  8.0K  5.0M   1% /run/lock
tmpfs           3.8G     0  3.8G   0% /tmp
tmpfs           769M  144K  768M   1% /run/user/1000
ubuntu@ubuntu:~$
```

Figure 7 is an example of shell command “ps aux”. This lists all running processes with detailed information, such as the process owner, CPU usage, memory usage, and the command that started the process.

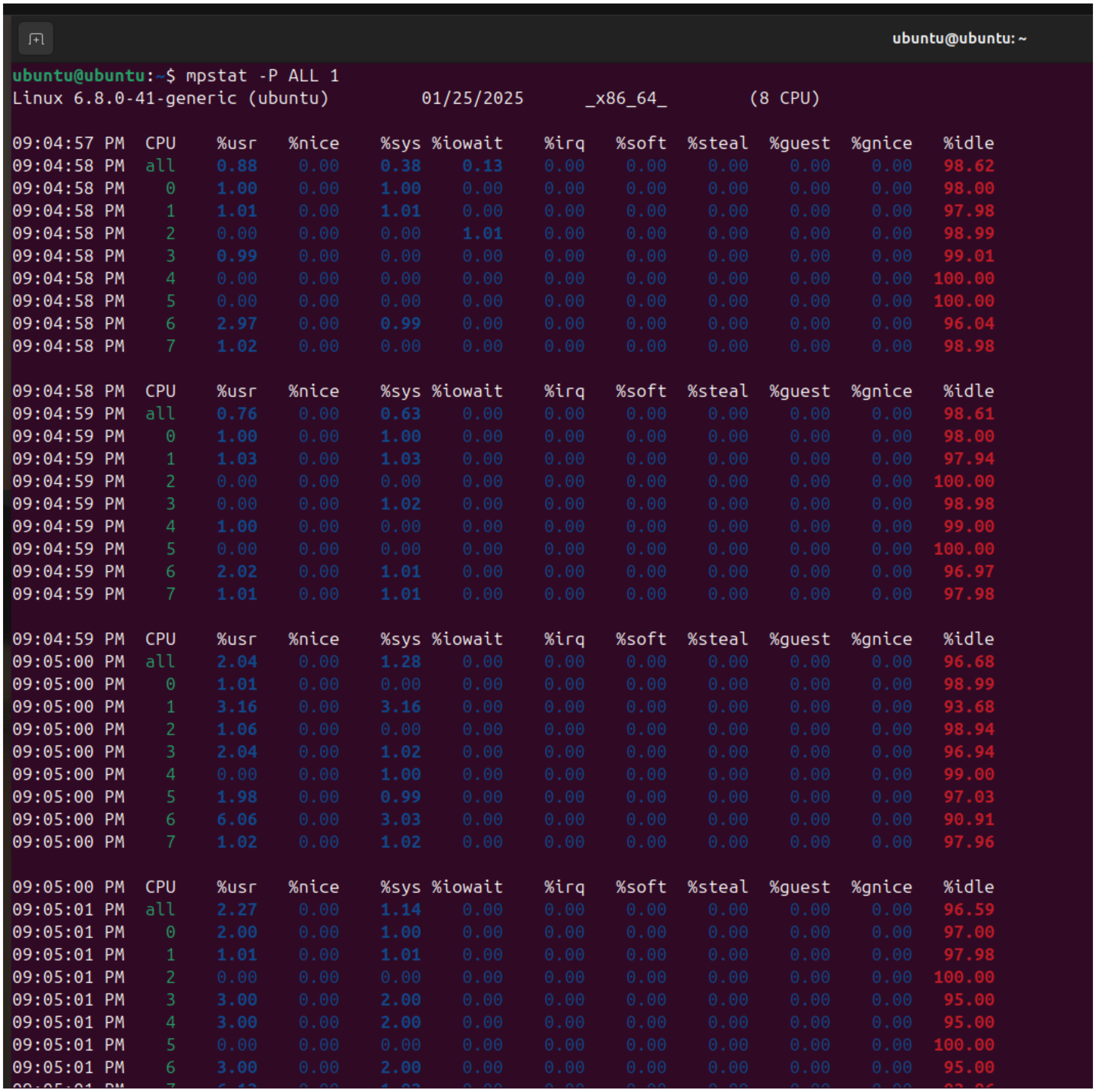
Figure 7: *Linux running processes*



```
ubuntu@ubuntu:~$ ps aux
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.1  23692 14572 ?        Ss   18:41   0:03 /sbin/init pe
root           2  0.0  0.0      0     0 ?        S    18:41   0:00 [kthreadd]
root           3  0.0  0.0      0     0 ?        S    18:41   0:00 [pool_workque
root           4  0.0  0.0      0     0 ?        I<   18:41   0:00 [kworker/R-rc
root           5  0.0  0.0      0     0 ?        I<   18:41   0:00 [kworker/R-rc
root           6  0.0  0.0      0     0 ?        I<   18:41   0:00 [kworker/R-sl
root           7  0.0  0.0      0     0 ?        I<   18:41   0:00 [kworker/R-ne
root           9  0.0  0.0      0     0 ?        I<   18:41   0:00 [kworker/0:0H
root          12  0.0  0.0      0     0 ?        I<   18:41   0:00 [kworker/R-mm
root          13  0.0  0.0      0     0 ?        I    18:41   0:00 [rcu_tasks_kt
root          14  0.0  0.0      0     0 ?        I    18:41   0:00 [rcu_tasks_ru
root          15  0.0  0.0      0     0 ?        I    18:41   0:00 [rcu_tasks_tr
root          16  0.0  0.0      0     0 ?        S    18:41   0:00 [ksoftirqd/0]
root          17  0.0  0.0      0     0 ?        I    18:41   0:01 [rcu_preempt]
root          18  0.0  0.0      0     0 ?        S    18:41   0:00 [migration/0]
root          19  0.0  0.0      0     0 ?        S    18:41   0:00 [idle_inject/
root          20  0.0  0.0      0     0 ?        S    18:41   0:00 [cpuhp/0]
root          21  0.0  0.0      0     0 ?        S    18:41   0:00 [cpuhp/1]
root          22  0.0  0.0      0     0 ?        S    18:41   0:00 [idle_inject/
root          23  0.0  0.0      0     0 ?        S    18:41   0:00 [migration/1]
root          24  0.0  0.0      0     0 ?        S    18:41   0:00 [ksoftirqd/1]
root          26  0.0  0.0      0     0 ?        I<   18:41   0:00 [kworker/1:0H
root          27  0.0  0.0      0     0 ?        S    18:41   0:00 [cpuhp/2]
root          28  0.0  0.0      0     0 ?        S    18:41   0:00 [idle_inject/
root          29  0.0  0.0      0     0 ?        S    18:41   0:00 [migration/2]
root          30  0.0  0.0      0     0 ?        S    18:41   0:00 [ksoftirqd/2]
root          32  0.0  0.0      0     0 ?        I<   18:41   0:00 [kworker/2:0H
root          33  0.0  0.0      0     0 ?        S    18:41   0:00 [cpuhp/3]
root          34  0.0  0.0      0     0 ?        S    18:41   0:00 [idle_inject/
root          35  0.0  0.0      0     0 ?        S    18:41   0:00 [migration/3]
root          36  0.0  0.0      0     0 ?        S    18:41   0:00 [ksoftirqd/3]
root          38  0.0  0.0      0     0 ?        I<   18:41   0:00 [kworker/3:0H
root          39  0.0  0.0      0     0 ?        S    18:41   0:00 [cpuhp/4]
root          40  0.0  0.0      0     0 ?        S    18:41   0:00 [idle_inject/
root          41  0.0  0.0      0     0 ?        S    18:41   0:00 [migration/4]
root          42  0.0  0.0      0     0 ?        S    18:41   0:00 [ksoftirqd/4]
root          44  0.0  0.0      0     0 ?        I<   18:41   0:00 [kworker/4:0H
root          45  0.0  0.0      0     0 ?        S    18:41   0:00 [cpuhp/5]
root          46  0.0  0.0      0     0 ?        S    18:41   0:00 [idle_inject/
root          47  0.0  0.0      0     0 ?        S    18:41   0:00 [migration/5]
root          48  0.0  0.0      0     0 ?        S    18:41   0:00 [ksoftirqd/5]
root          49  0.0  0.0      0     0 ?        I    18:41   0:00 [kworker/5:0-
root          50  0.0  0.0      0     0 ?        I<   18:41   0:00 [kworker/5:0H
```

Figure 8 displays CPU usage statistics for all CPU cores (-P ALL) every second (1), helping monitor CPU load in real time (Jevtic, G., 2025).

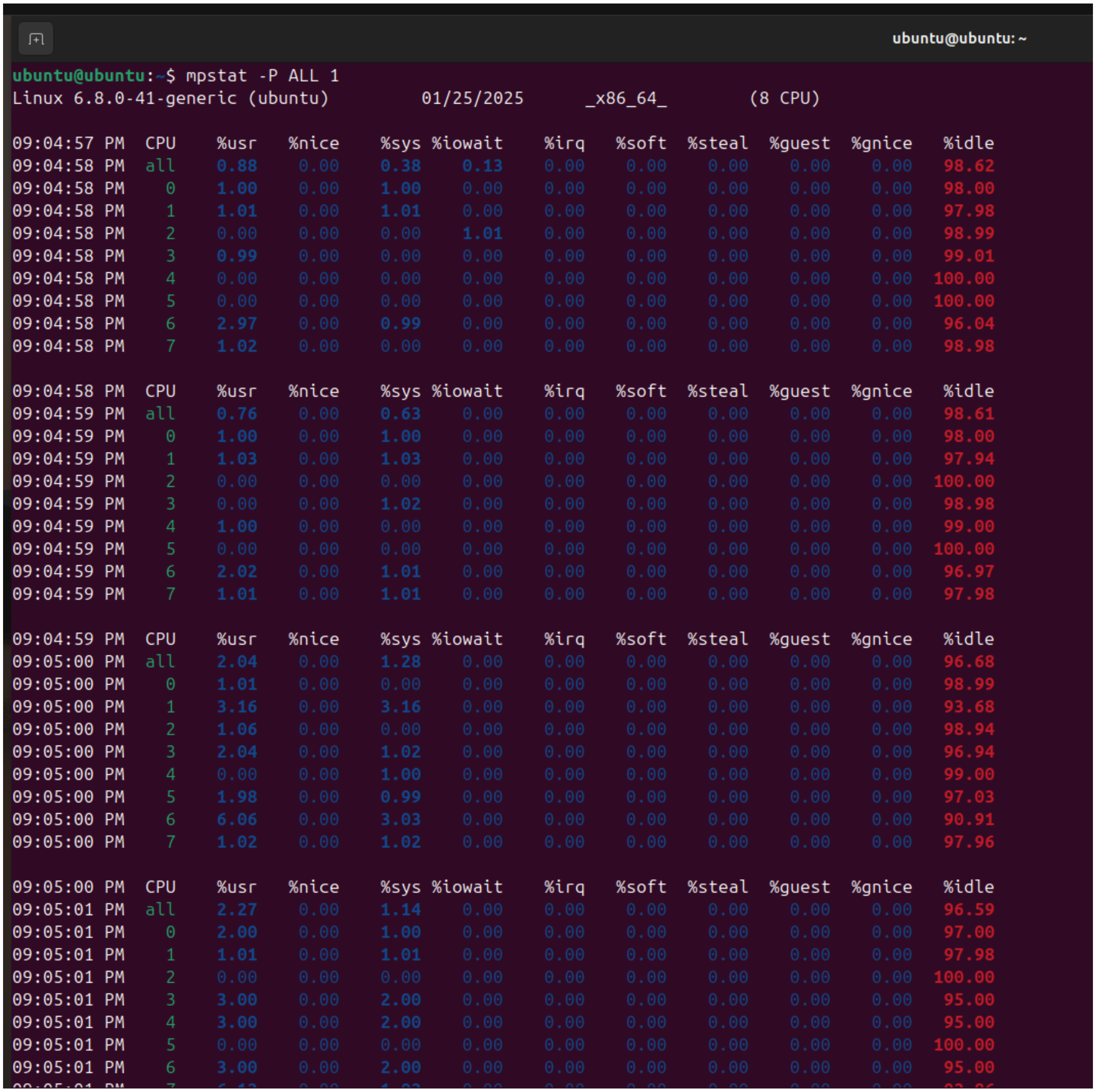
Figure 8: *Linux CPU usage monitoring*



```
ubuntu@ubuntu:~$ mpstat -P ALL 1
Linux 6.8.0-41-generic (ubuntu)         01/25/2025      _x86_64_        (8 CPU)

09:04:57 PM  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
09:04:58 PM  all    0.88    0.00    0.38    0.13    0.00    0.00    0.00    0.00    0.00   98.62
09:04:58 PM    0    1.00    0.00    1.00    0.00    0.00    0.00    0.00    0.00    0.00   98.00
09:04:58 PM    1    1.01    0.00    1.01    0.00    0.00    0.00    0.00    0.00    0.00   97.98
09:04:58 PM    2    0.00    0.00    0.00    1.01    0.00    0.00    0.00    0.00    0.00   98.99
09:04:58 PM    3    0.99    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00   99.01
09:04:58 PM    4    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
09:04:58 PM    5    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
09:04:58 PM    6    2.97    0.00    0.99    0.00    0.00    0.00    0.00    0.00    0.00   96.04
09:04:58 PM    7    1.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00   98.98

09:04:58 PM  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
09:04:59 PM  all    0.76    0.00    0.63    0.00    0.00    0.00    0.00    0.00    0.00   98.61
09:04:59 PM    0    1.00    0.00    1.00    0.00    0.00    0.00    0.00    0.00    0.00   98.00
09:04:59 PM    1    1.03    0.00    1.03    0.00    0.00    0.00    0.00    0.00    0.00   97.94
09:04:59 PM    2    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
09:04:59 PM    3    0.00    0.00    1.02    0.00    0.00    0.00    0.00    0.00    0.00   98.98
09:04:59 PM    4    1.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00   99.00
09:04:59 PM    5    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
09:04:59 PM    6    2.02    0.00    1.01    0.00    0.00    0.00    0.00    0.00    0.00   96.97
09:04:59 PM    7    1.01    0.00    1.01    0.00    0.00    0.00    0.00    0.00    0.00   97.98

09:04:59 PM  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
09:05:00 PM  all    2.04    0.00    1.28    0.00    0.00    0.00    0.00    0.00    0.00   96.68
09:05:00 PM    0    1.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00   98.99
09:05:00 PM    1    3.16    0.00    3.16    0.00    0.00    0.00    0.00    0.00    0.00   93.68
09:05:00 PM    2    1.06    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00   98.94
09:05:00 PM    3    2.04    0.00    1.02    0.00    0.00    0.00    0.00    0.00    0.00   96.94
09:05:00 PM    4    0.00    0.00    1.00    0.00    0.00    0.00    0.00    0.00    0.00   99.00
09:05:00 PM    5    1.98    0.00    0.99    0.00    0.00    0.00    0.00    0.00    0.00   97.03
09:05:00 PM    6    6.06    0.00    3.03    0.00    0.00    0.00    0.00    0.00    0.00   90.91
09:05:00 PM    7    1.02    0.00    1.02    0.00    0.00    0.00    0.00    0.00    0.00   97.96

09:05:00 PM  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
09:05:01 PM  all    2.27    0.00    1.14    0.00    0.00    0.00    0.00    0.00    0.00   96.59
09:05:01 PM    0    2.00    0.00    1.00    0.00    0.00    0.00    0.00    0.00    0.00   97.00
09:05:01 PM    1    1.01    0.00    1.01    0.00    0.00    0.00    0.00    0.00    0.00   97.98
09:05:01 PM    2    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
09:05:01 PM    3    3.00    0.00    2.00    0.00    0.00    0.00    0.00    0.00    0.00   95.00
09:05:01 PM    4    3.00    0.00    2.00    0.00    0.00    0.00    0.00    0.00    0.00   95.00
09:05:01 PM    5    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
09:05:01 PM    6    3.00    0.00    2.00    0.00    0.00    0.00    0.00    0.00    0.00   95.00
```

Figure 9 shows real-time network bandwidth usage, displaying active connections and their data transfer rates. The command “sudo” is used for elevated privileges (geeksforgeeks, 2024, April 24).

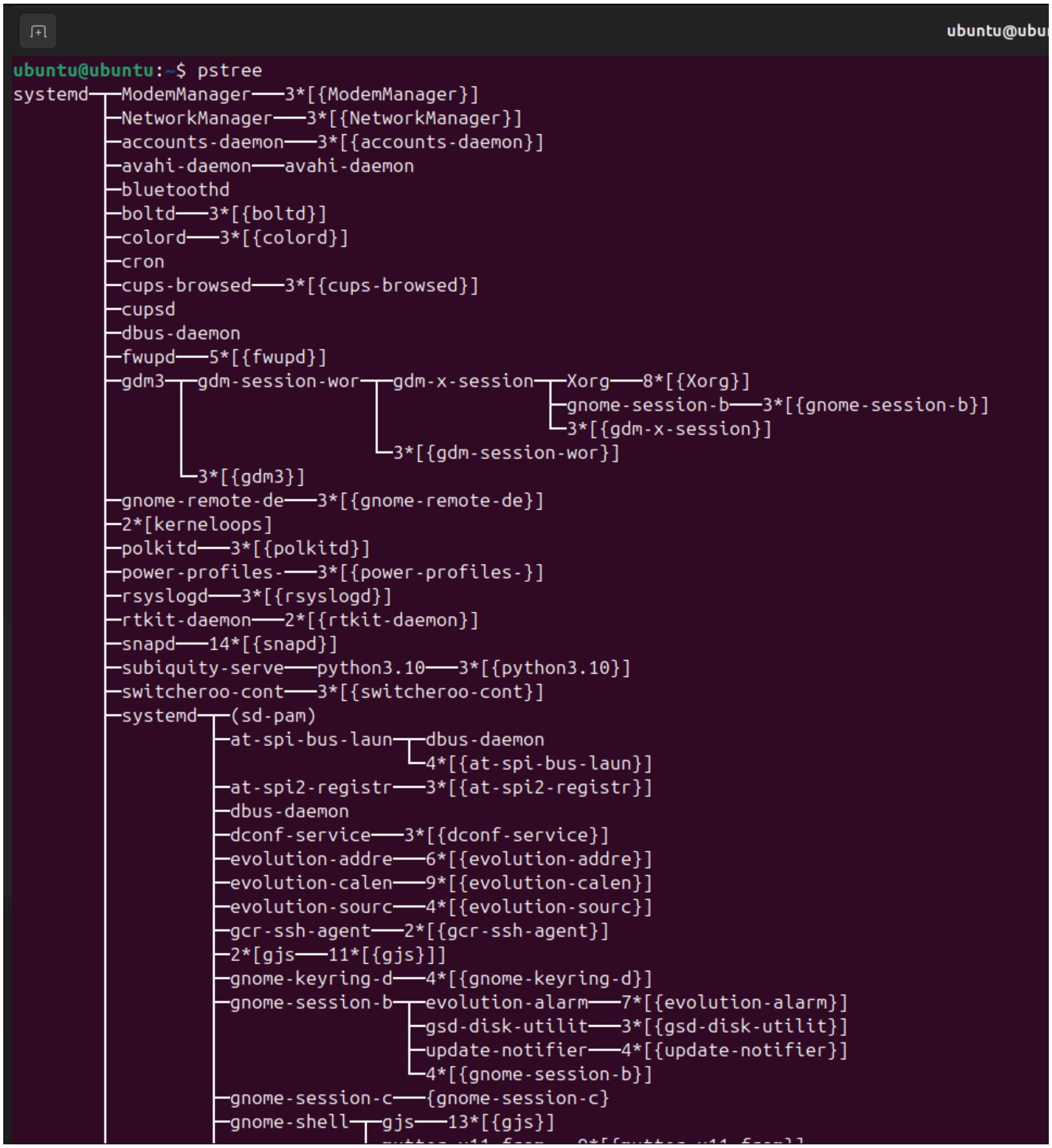
Figure 9: *Linux real time network bandwidth usage.*



```
ubuntu@ubuntu:~$ mpstat -P ALL 1
Linux 6.8.0-41-generic (ubuntu)         01/25/2025      _x86_64_        (8 CPU)

09:04:57 PM  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
09:04:58 PM  all    0.88    0.00    0.38    0.13    0.00    0.00    0.00    0.00    0.00   98.62
09:04:58 PM    0    1.00    0.00    1.00    0.00    0.00    0.00    0.00    0.00    0.00   98.00
09:04:58 PM    1    1.01    0.00    1.01    0.00    0.00    0.00    0.00    0.00    0.00   97.98
09:04:58 PM    2    0.00    0.00    0.00    1.01    0.00    0.00    0.00    0.00    0.00   98.99
09:04:58 PM    3    0.99    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00   99.01
09:04:58 PM    4    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
09:04:58 PM    5    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
09:04:58 PM    6    2.97    0.00    0.99    0.00    0.00    0.00    0.00    0.00    0.00   96.04
09:04:58 PM    7    1.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00   98.98

09:04:58 PM  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
09:04:59 PM  all    0.76    0.00    0.63    0.00    0.00    0.00    0.00    0.00    0.00   98.61
09:04:59 PM    0    1.00    0.00    1.00    0.00    0.00    0.00    0.00    0.00    0.00   98.00
09:04:59 PM    1    1.03    0.00    1.03    0.00    0.00    0.00    0.00    0.00    0.00   97.94
09:04:59 PM    2    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
09:04:59 PM    3    0.00    0.00    1.02    0.00    0.00    0.00    0.00    0.00    0.00   98.98
09:04:59 PM    4    1.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00   99.00
09:04:59 PM    5    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
09:04:59 PM    6    2.02    0.00    1.01    0.00    0.00    0.00    0.00    0.00    0.00   96.97
09:04:59 PM    7    1.01    0.00    1.01    0.00    0.00    0.00    0.00    0.00    0.00   97.98

09:04:59 PM  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
09:05:00 PM  all    2.04    0.00    1.28    0.00    0.00    0.00    0.00    0.00    0.00   96.68
09:05:00 PM    0    1.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00   98.99
09:05:00 PM    1    3.16    0.00    3.16    0.00    0.00    0.00    0.00    0.00    0.00   93.68
09:05:00 PM    2    1.06    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00   98.94
09:05:00 PM    3    2.04    0.00    1.02    0.00    0.00    0.00    0.00    0.00    0.00   96.94
09:05:00 PM    4    0.00    0.00    1.00    0.00    0.00    0.00    0.00    0.00    0.00   99.00
09:05:00 PM    5    1.98    0.00    0.99    0.00    0.00    0.00    0.00    0.00    0.00   97.03
09:05:00 PM    6    6.06    0.00    3.03    0.00    0.00    0.00    0.00    0.00    0.00   90.91
09:05:00 PM    7    1.02    0.00    1.02    0.00    0.00    0.00    0.00    0.00    0.00   97.96

09:05:00 PM  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
09:05:01 PM  all    2.27    0.00    1.14    0.00    0.00    0.00    0.00    0.00    0.00   96.59
09:05:01 PM    0    2.00    0.00    1.00    0.00    0.00    0.00    0.00    0.00    0.00   97.00
09:05:01 PM    1    1.01    0.00    1.01    0.00    0.00    0.00    0.00    0.00    0.00   97.98
09:05:01 PM    2    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
09:05:01 PM    3    3.00    0.00    2.00    0.00    0.00    0.00    0.00    0.00    0.00   95.00
09:05:01 PM    4    3.00    0.00    2.00    0.00    0.00    0.00    0.00    0.00    0.00   95.00
09:05:01 PM    5    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
09:05:01 PM    6    3.00    0.00    2.00    0.00    0.00    0.00    0.00    0.00    0.00   95.00
```

Figure 10 shows running processes in a hierarchical tree format, displaying parent-child relationships between processes.

Figure 10: *Linux running processes in a tree format*



```
ubuntu@ubuntu:~$ pstree
systemd─┬─ModemManager───3*[{ModemManager}]
        ├─NetworkManager───3*[{NetworkManager}]
        ├─accounts-daemon───3*[{accounts-daemon}]
        ├─avahi-daemon───avahi-daemon
        ├─bluetoothd
        ├─boltd───3*[{boltd}]
        ├─colord───3*[{colord}]
        ├─cron
        ├─cups-browsed───3*[{cups-browsed}]
        ├─cupsd
        ├─dbus-daemon
        ├─fwupd───5*[{fwupd}]
        ├─gdm3─┬─gdm-session-wor─┬─gdm-x-session─┬─Xorg───8*[{Xorg}]
        │      │                 │               ├─gnome-session-b───3*[{gnome-session-b}]
        │      │                 │               └─3*[{gdm-x-session}]
        │      │                 └─3*[{gdm-session-wor}]
        │      └─3*[{gdm3}]
        ├─gnome-remote-de───3*[{gnome-remote-de}]
        ├─2*[kerneloops]
        ├─polkitd───3*[{polkitd}]
        ├─power-profiles-───3*[{power-profiles-}]
        ├─rsyslogd───3*[{rsyslogd}]
        ├─rtkit-daemon───2*[{rtkit-daemon}]
        ├─snapd───14*[{snapd}]
        ├─subiquity-serve───python3.10───3*[{python3.10}]
        ├─switcheroo-cont───3*[{switcheroo-cont}]
        ├─systemd─┬─(sd-pam)
        │         ├─at-spi-bus-laun─┬─dbus-daemon
        │         │                 └─4*[{at-spi-bus-laun}]
        │         ├─at-spi2-registr───3*[{at-spi2-registr}]
        │         ├─dbus-daemon
        │         ├─dconf-service───3*[{dconf-service}]
        │         ├─evolution-addre───6*[{evolution-addre}]
        │         ├─evolution-calen───9*[{evolution-calen}]
        │         ├─evolution-sourc───4*[{evolution-sourc}]
        │         ├─gcr-ssh-agent───2*[{gcr-ssh-agent}]
        │         ├─2*[gjs───11*[{gjs}]]
        │         ├─gnome-keyring-d───4*[{gnome-keyring-d}]
        │         ├─gnome-session-b─┬─evolution-alarm───7*[{evolution-alarm}]
        │         │                 ├─gsd-disk-utilit───3*[{gsd-disk-utilit}]
        │         │                 ├─update-notifier───4*[{update-notifier}]
        │         │                 └─4*[{gnome-session-b}]
        │         ├─gnome-session-c───{gnome-session-c}
        │         ├─gnome-shell─┬─gjs───13*[{gjs}]
        │         │             ├─mutter-x11-fram───9*[{mutter-x11-fram}]
```

Conclusion

Windows and Linux processes management utilities serve similar functions but are performed differently. Windows relies on graphical interfaces making it user-friendly and more easily readable while Linux uses command-line tools offering more flexibility.

References

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