

UNIX Lab Assignment 4

Name: Ninad Rao

Roll No. 53

Memory Management Commands:

Free - In UNIX, there exists a command line utility for this and that is free command which displays the total amount of free space available along with the amount of memory used and swap memory in the system, and also the buffers used by the kernel. As free displays the details of the memory related to your system, its syntax doesn't need any arguments to be passed but only options which you can use according to your wish.

```
ninad@ninad-VirtualBox:~$ free
      total        used        free      shared  buff/cache   available
Mem:   2034984     708484     351596      18652     974904     1143296
Swap:  459260          0     459260

nинад@ninад-VirtualBox:~$ free --help

Usage:
  free [options]

Options:
  -b, --bytes          show output in bytes
  --kilo               show output in kilobytes
  --mega               show output in megabytes
  --giga               show output in gigabytes
  --tera               show output in terabytes
  --peta               show output in petabytes
  -k, --kibi            show output in kibibytes
  -m, --mebi            show output in mebibytes
  -g, --gibi            show output in gibibytes
  --tebi               show output in tebibytes
  --pebi               show output in pebibytes
  -h, --human           show human-readable output
  --si                use powers of 1000 not 1024
  -l, --lohi            show detailed low and high memory statistics
  -t, --total           show total for RAM + swap
  -s N, --seconds N    repeat printing every N seconds
  -c N, --count N      repeat printing N times, then exit
  -w, --wide             wide output

  --help      display this help and exit
  -V, --version  output version information and exit

For more details see free(1).
nинад@ninад-VirtualBox:~$
```

Proc - Proc file system (procfs) is virtual file system created on fly when system boots and is dissolved at time of system shut down. It contains useful information about the processes that are currently running, it is regarded as a control and information centre for the kernel. The proc file system also provides a communication medium between kernel space and user space.

```
ninad@ninad-VirtualBox:~$ ls -l /proc
total 0
dr-xr-xr-x 9 root          root          0 Apr  6 11:58  1
dr-xr-xr-x 9 root          root          0 Apr  6 11:58  10
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 12:00 1061
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1062
dr-xr-xr-x 9 root          root          0 Apr  6 11:58 107
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 12:00 1073
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1074
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 12:00 1080
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1081
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 12:00 1087
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1088
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 12:00 1095
dr-xr-xr-x 9 root          root          0 Apr  6 11:58 11
dr-xr-xr-x 9 root          root          0 Apr  6 11:58 110
dr-xr-xr-x 9 root          root          0 Apr  6 11:58 111
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1117
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1122
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1137
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1144
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1159
dr-xr-xr-x 9 root          root          0 Apr  6 11:58 116
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1184
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1188
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1189
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1193
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1196
dr-xr-xr-x 9 root          root          0 Apr  6 11:58 12
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1206
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1210
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1215
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1221
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1229
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1239
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1244
dr-xr-xr-x 9 root          root          0 Apr  6 11:59 1262
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1271
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1279
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1293
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1294
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1295
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1299
dr-xr-xr-x 9 root          root          0 Apr  6 11:58 13
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1300
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1309
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1311
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1316
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1317
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1322
dr-xr-xr-x 9 ninad         ninad         0 Apr  6 11:59 1324
```

```

dr-xr-xr-x  3 root          root          0 Apr  6 12:02 driver
dr-xr-xr-x  3 root          root          0 Apr  6 12:02 dynamic_debug
-r--r--r--  1 root          root          0 Apr  6 12:02 execdomains
-r--r--r--  1 root          root          0 Apr  6 12:02 fb
-r--r--r--  1 root          root          0 Apr  6 11:58 filesystems
dr-xr-xr-x  5 root          root          0 Apr  6 11:58 fs
-r--r--r--  1 root          root          0 Apr  6 11:58 interrupts
-r--r--r--  1 root          root          0 Apr  6 12:02 iomem
-r--r--r--  1 root          root          0 Apr  6 12:02 ioports
dr-xr-xr-x 24 root         root          0 Apr  6 11:58 irq
-r--r--r--  1 root          root          0 Apr  6 11:58 kallsyms
-r----- 1 root          root          140737477885952 Apr  6 11:58 kcore
-r--r--r--  1 root          root          0 Apr  6 11:59 keys
-r--r--r--  1 root          root          0 Apr  6 12:02 key-users
-r----- 1 root          root          0 Apr  6 11:58 kmsg
-r----- 1 root          root          0 Apr  6 12:02 kpagecgroup
-r----- 1 root          root          0 Apr  6 12:02 kpagecount
-r----- 1 root          root          0 Apr  6 12:02 kpageflags
-r----- 1 root          root          0 Apr  6 12:02 loadavg
-r--r--r--  1 root          root          0 Apr  6 12:02 locks
-r--r--r--  1 root          root          0 Apr  6 11:58 mdstat
-r--r--r--  1 root          root          0 Apr  6 11:58 meminfo
-r--r--r--  1 root          root          0 Apr  6 12:02 misc
-r--r--r--  1 root          root          0 Apr  6 11:58 modules
lrwxrwxrwx  1 root          root          11 Apr  6 11:58 mounts -> self/mounts
-rw-r--r--  1 root          root          0 Apr  6 11:58 mtrr
lrwxrwxrwx  1 root          root          8 Apr  6 11:58 net -> self/net
-r----- 1 root          root          0 Apr  6 12:02 pagetypeinfo
-r--r--r--  1 root          root          0 Apr  6 12:02 partitions
dr-xr-xr-x  5 root          root          0 Apr  6 12:02 pressure
-r--r--r--  1 root          root          0 Apr  6 12:02 sched_debug
-r--r--r--  1 root          root          0 Apr  6 12:02 schedstat
dr-xr-xr-x  5 root          root          0 Apr  6 11:58 scsi
lrwxrwxrwx  1 root          root          0 Apr  6 11:58 self -> 1699
-r----- 1 root          root          0 Apr  6 12:02 slabinfo
-r--r--r--  1 root          root          0 Apr  6 12:02 softirqs
-r--r--r--  1 root          root          0 Apr  6 11:59 stat
-r--r--r--  1 root          root          0 Apr  6 11:58 swaps
dr-xr-xr-x  1 root          root          0 Apr  6 11:58 sys
--w----- 1 root          root          0 Apr  6 11:58 sysrq-trigger
dr-xr-xr-x  5 root          root          0 Apr  6 12:02 sysvipc
lrwxrwxrwx  1 root          root          0 Apr  6 11:58 thread-self -> 1699/task/1699
-r----- 1 root          root          0 Apr  6 12:02 timer_list
dr-xr-xr-x  6 root          root          0 Apr  6 12:02 tty
-r--r--r--  1 root          root          0 Apr  6 11:58 uptime
-r--r--r--  1 root          root          0 Apr  6 11:58 version
-r----- 1 root          root          0 Apr  6 12:02 version_signature
-r----- 1 root          root          0 Apr  6 12:02 vmallocinfo
-r--r--r--  1 root          root          0 Apr  6 12:02 vmstat
-r--r--r--  1 root          root          0 Apr  6 12:02 zoneinfo

```

ninad@ninad-VirtualBox:~\$ █

Meminfo - The '/proc/meminfo' is used to report the amount of free and used memory (both physical and swap) on the system as well as the shared memory and buffers used by the kernel. This file contains information about the system's memory usage.

```
ninad@ninad-VirtualBox:~$ cat /proc/meminfo
MemTotal:       2034984 kB
MemFree:        522900 kB
MemAvailable:   1184944 kB
Buffers:         39016 kB
Cached:          747012 kB
SwapCached:      0 kB
Active:          755836 kB
Inactive:        584164 kB
Active(anon):   554864 kB
Inactive(anon): 17584 kB
Active(file):   200972 kB
Inactive(file): 566580 kB
Unevictable:     32 kB
Mlocked:         32 kB
SwapTotal:      459260 kB
SwapFree:        459260 kB
Dirty:           924 kB
Writeback:        0 kB
AnonPages:      554044 kB
Mapped:          261576 kB
Shmem:           18480 kB
KReclaimable:   52064 kB
Slab:            110564 kB
SReclaimable:   52064 kB
SUnreclaim:     58500 kB
KernelStack:    6780 kB
PageTables:     11628 kB
NFS_Unstable:    0 kB
Bounce:          0 kB
WritebackTmp:    0 kB
CommitLimit:    1476752 kB
Committed_AS:   3347004 kB
VmallocTotal:   34359738367 kB
VmallocUsed:    31356 kB
VmallocChunk:    0 kB
Percpu:          656 kB
HardwareCorrupted: 0 kB
AnonHugePages:   0 kB
ShmemHugePages:  0 kB
ShmemPmdMapped: 0 kB
FileHugePages:   0 kB
FilePmdMapped:   0 kB
HugePages_Total: 0
HugePages_Free:  0
HugePages_Rsvd:  0
HugePages_Surp:  0
Hugepagesize:    2048 kB
Hugetlb:          0 kB
DirectMap4k:    133056 kB
DirectMap2M:    1964032 kB
```

Top - Top command is used to show the Unix processes. It provides a dynamic real-time view of the running system. Usually, this command shows the summary information of the system and the list of processes or threads which are currently managed by the Unix Kernel.

As soon as you run this command it will open an interactive command mode where the top half portion will contain the statistics of processes and resource usage. And the lower half contains a list of the currently running processes. Pressing q will simply exit the command mode.

```
top - 10:33:43 up 1:30, 1 user, load average: 0.00, 0.00, 0.00
Tasks: 175 total, 1 running, 174 sleeping, 0 stopped, 0 zombie
%Cpu(s): 4.8 us, 0.7 sy, 0.3 ni, 93.8 id, 0.3 wa, 0.0 hi, 0.0 si, 0.0 st
Mib Mem : 1987.3 total, 347.8 free, 687.6 used, 951.9 buff/cache
Mib Swap: 448.5 total, 448.5 free, 0.0 used. 1120.8 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1177	ninad	20	0	3759604	379500	133464	S	5.3	18.6	0:40.35	gnome-shell
907	ninad	20	0	572332	96056	51704	S	1.7	4.7	0:07.99	Xorg
1533	ninad	35	15	825404	52540	38740	S	1.7	2.6	0:02.62	gnome-terminal-
1	root	20	0	102064	11776	8540	S	0.0	0.6	0:02.78	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kthreadd
3	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	rcu_gp
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	rcu_par_gp
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/0:0H-kblockd
9	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	mm_percpu_wq
10	root	20	0	0	0	0	S	0.0	0.0	0:00.06	ksoftirqd/0
11	root	20	0	0	0	0	I	0.0	0.0	0:00.38	rcu_sched
12	root	rt	0	0	0	0	S	0.0	0.0	0:00.03	migration/0
13	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_inject/0
14	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/0
15	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kdevtmpfs
16	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	netns
17	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_tasks_kthre
18	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_tasks_rude_
19	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_tasks_trace
20	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kauditd
21	root	20	0	0	0	0	S	0.0	0.0	0:00.00	khungtaskd
22	root	20	0	0	0	0	S	0.0	0.0	0:00.00	oom_reaper
23	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	writeback
24	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kcompactd0
25	root	25	5	0	0	0	S	0.0	0.0	0:00.00	ksmd
26	root	39	19	0	0	0	S	0.0	0.0	0:00.00	khugepaged
72	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kinintegrityd
73	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kblockd
74	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	blkcg_punt_bio
75	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	tpm_dev_wq
76	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	ata_sff
77	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	md
78	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	edac-poller
79	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	devfreq_wq
80	root	rt	0	0	0	0	S	0.0	0.0	0:00.00	watchdogd
82	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	pm_wq
86	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kswapd0
87	root	20	0	0	0	0	S	0.0	0.0	0:00.00	ecryptfs-kthrea
89	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kthrotld
90	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	acpi_thermal_pm
91	root	20	0	0	0	0	S	0.0	0.0	0:00.01	scsi_eh_0
92	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	scsi_tmf_0
93	root	20	0	0	0	0	S	0.0	0.0	0:00.00	scsi_eh_1
94	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	scsi_tmf_1

Htop - Htop command in Linux system is a command line utility that allows the user to interactively monitor the system's vital resources or server's processes in real time. htop is a newer program compared to top command, and it offers many improvements over top command. htop supports mouse operation, uses color in its output and gives visual indications about processor, memory and swap usage. htop also prints full command lines for processes and

allows one to scroll both vertically and horizontally for processes and command lines respectively.

```

CPU[|||||] 6.0%] Tasks: 108, 240 thr; 1 running
Mem[||||||||||||||||| 671M/1.94G] Load average: 0.30 0.18 0.15
Swap[ 0K/448M] Uptime: 00:10:48

PID USER PRI NI VIRT RES SHR S CPU% MEM% TIME+ Command
1159 ninad 20 0 3391M 350M 129M S 2.7 17.7 0:11.41 /usr/bin/gnome-shell
1064 ninad 20 0 159M 11596 3792 S 2.0 0.6 0:00.14 /usr/bin/VBoxClient --clipboard
889 ninad 20 0 545M 82496 51720 S 1.3 4.1 0:03.27 /usr/lib/xorg/Xorg vt2 -displayfd 3 -auth /run/user/1000/gdm/Xauthority -background none -noreset -keeppty -verbose 3
1062 ninad 20 0 159M 11596 3792 S 1.3 0.6 0:00.14 /usr/bin/VBoxClient --clipboard
1084 ninad 20 0 160M 2776 2408 S 0.7 0.1 0:01.33 /usr/bin/VBoxClient --draganddrop
2402 ninad 20 0 1924 4608 3256 R 0.0 0.2 0:00.11 http
1510 ninad 20 0 803M 4976 38188 S 0.0 2.5 0:01.51 /usr/libexec/gnome-terminal-server
1081 ninad 20 0 160M 2776 2408 S 0.0 0.1 0:01.33 /usr/bin/VBoxClient --draganddrop
872 ninad 20 0 19236 10548 8224 S 0.0 0.5 0:00.30 /lib/systemd/systemd --user
955 ninad 20 0 317M 8784 7784 S 0.0 0.4 0:00.04 /usr/libexec/gvfs-afc-volume-monitor
2452 ninad 20 0 3391M 350M 129M S 0.0 17.7 0:00.04 /usr/bin/gnome-shell
530 messagebus 20 0 8864 5912 3848 S 0.0 0.3 0:00.34 /usr/bin/dbus-daemon --system --address=systemd: --nofork --nopidfile --systemd-activation --syslog-only
549 root 20 0 243M 10352 7208 S 0.0 0.5 0:00.15 /usr/lib/policykit-1/polkitd --no-debug
975 ninad 20 0 545M 82496 51720 S 0.0 4.1 0:00.34 /usr/lib/xorg/Xorg vt2 -displayfd 3 -auth /run/user/1000/gdm/Xauthority -background none -noreset -keeppty -verbose 3
1 root 20 0 99M 11544 8336 S 0.0 0.6 0:02.00 /sbin/init splash
220 root 19 -1 75884 37140 35512 S 0.0 1.8 0:00.37 /lib/systemd/systemd-journald
242 root 20 0 23744 7148 3936 S 0.0 0.4 0:00.20 /lib/systemd/systemd-udevd
484 systemd-r 20 0 24100 12104 8056 S 0.0 0.6 0:00.15 /lib/systemd/systemd-resolved
500 systemd-t 20 0 90456 6384 5504 S 0.0 0.3 0:00.00 /lib/systemd/systemd-timesyncd
486 systemd-t 20 0 90456 6384 5504 S 0.0 0.3 0:00.13 /lib/systemd/systemd-timesyncd
524 root 20 0 241M 7500 6592 S 0.0 0.4 0:00.01 /usr/lib/accountservice/accounts-daemon
597 root 20 0 241M 7500 6592 S 0.0 0.4 0:00.00 /usr/lib/accountservice/accounts-daemon
520 root 20 0 241M 7500 6592 S 0.0 0.4 0:00.03 /usr/lib/accountservice/accounts-daemon
521 root 20 0 2548 784 712 S 0.0 0.6 0:00.01 /usr/sbin/acpid
523 avahd 20 0 8532 3620 3292 S 0.0 0.2 0:00.03 avahd-daemon: running [ninad-VirtualBox.local]
527 root 20 0 18052 2916 2716 S 0.0 0.1 0:00.00 /usr/sbin/cron -f
522 root 20 0 37208 9068 7332 S 0.0 0.4 0:00.05 /usr/sbin/cupsd -l
579 root 20 0 336M 19488 16744 S 0.0 1.0 0:00.01 /usr/sbin/NetworkManager --no-daemon
600 root 20 0 336M 19488 16744 S 0.0 0.4 0:00.02 /usr/sbin/NetworkManager --no-daemon
531 root 20 0 336M 19488 16744 S 0.0 1.0 0:00.16 /usr/sbin/NetworkManager --no-daemon
546 root 20 0 47956 20228 11988 S 0.0 1.0 0:00.17 /usr/bin/python3 /usr/bin/networkd-dispatcher --run-startup-triggers
551 root 20 0 243M 10352 7208 S 0.0 0.5 0:00.00 /usr/lib/policykit-1/polkitd --no-debug
598 root 20 0 243M 10352 7208 S 0.0 0.5 0:00.03 /usr/lib/policykit-1/polkitd --no-debug
582 syslog 20 0 219M 4560 3788 S 0.0 0.2 0:00.01 /usr/sbin/syslogd -n -lNONE
583 syslog 20 0 219M 4560 3788 S 0.0 0.2 0:00.01 /usr/sbin/syslogd -n -lNONE
584 syslog 20 0 219M 4560 3788 S 0.0 0.2 0:00.02 /usr/sbin/syslogd -n -lNONE
554 syslog 20 0 219M 4560 3788 S 0.0 0.2 0:00.05 /usr/sbin/syslogd -n -lNONE
722 root 20 0 612M 25704 15020 S 0.0 1.3 0:00.01 /usr/lib/snapd/snapd
723 root 20 0 612M 25704 15020 S 0.0 1.3 0:00.00 /usr/lib/snapd/snapd
724 root 20 0 612M 25704 15020 S 0.0 1.3 0:00.00 /usr/lib/snapd/snapd
725 root 20 0 612M 25704 15020 S 0.0 1.3 0:00.00 /usr/lib/snapd/snapd
730 root 20 0 612M 25704 15020 S 0.0 1.3 0:00.20 /usr/lib/snapd/snapd
731 root 20 0 612M 25704 15020 S 0.0 1.3 0:00.02 /usr/lib/snapd/snapd
746 root 20 0 612M 25704 15020 S 0.0 1.3 0:00.00 /usr/lib/snapd/snapd

```

```

ninad@ninad-VirtualBox:~$ htop -v
htop 2.2.0 - (C) 2004-2019 Hisham Muhammad
Released under the GNU GPL.

```

Df - The df command is used to display information related to file systems about total space and available space. Unix df command is used to display the disk space used in the file system. The 'df' stands for "disk filesystem." It defines the number of blocks used, the number of blocks available, and the directory where the file system is mounted.

```
ninad@ninad-VirtualBox:~$ df
Filesystem 1K-blocks Used Available Use% Mounted on
udev 987940 0 987940 0% /dev
tmpfs 203500 1324 202176 1% /run
/dev/sda5 9736500 7792380 1429816 85% /
tmpfs 1017492 0 1017492 0% /dev/shm
tmpfs 5120 4 5116 1% /run/lock
tmpfs 1017492 0 1017492 0% /sys/fs/cgroup
/dev/loop0 56832 56832 0 100% /snap/core18/1988
/dev/loop2 52352 52352 0 100% /snap/snap-store/518
/dev/loop3 224256 224256 0 100% /snap/gnome-3-34-1804/66
/dev/loop1 56832 56832 0 100% /snap/core18/1997
/dev/loop4 31872 31872 0 100% /snap/snapd/11036
/dev/loop5 66432 66432 0 100% /snap/gtk-common-themes/1514
/dev/loop6 33152 33152 0 100% /snap/snapd/11402
/dev/sda1 523248 4 523244 1% /boot/efi
tmpfs 203496 20 203476 1% /run/user/1000
/dev/sr0 59724 59724 0 100% /media/ninad/VBox_GAs_6.1.18
```

```
ninad@ninad-VirtualBox:~$ df --help
```

Usage: df [OPTION]... [FILE]...

Show information about the file system on which each FILE resides, or all file systems by default.

Mandatory arguments to long options are mandatory for short options too.

-a, --all	include pseudo, duplicate, inaccessible file systems
-B, --block-size=SIZE	scale sizes by SIZE before printing them; e.g., '-BM' prints sizes in units of 1,048,576 bytes; see SIZE format below
-h, --human-readable	print sizes in powers of 1024 (e.g., 1023M)
-H, --si	print sizes in powers of 1000 (e.g., 1.1G)
-i, --inodes	list inode information instead of block usage
-k	like --block-size=1K
-l, --local	limit listing to local file systems
--no-sync	do not invoke sync before getting usage info (default)
--output[=FIELD_LIST]	use the output format defined by FIELD_LIST, or print all fields if FIELD_LIST is omitted.
-P, --portability	use the POSIX output format
--sync	invoke sync before getting usage info
--total	elide all entries insignificant to available space, and produce a grand total
-t, --type=TYPE	limit listing to file systems of type TYPE
-T, --print-type	print file system type
-x, --exclude-type=TYPE	limit listing to file systems not of type TYPE
-v	(ignored)
--help	display this help and exit
--version	output version information and exit

Display values are in units of the first available SIZE from --block-size, and the DF_BLOCK_SIZE, BLOCK_SIZE and BLOCSIZE environment variables. Otherwise, units default to 1024 bytes (or 512 if POSIXLY_CORRECT is set).

The SIZE argument is an integer and optional unit (example: 10K is 10*1024). Units are K,M,G,T,P,E,Z,Y (powers of 1024) or KB,MB,... (powers of 1000).

FIELD_LIST is a comma-separated list of columns to be included. Valid field names are: 'source', 'fstype', 'itotal', 'iused', 'iavail', 'ipcent', 'size', 'used', 'avail', 'pcent', 'file' and 'target' (see info page).

GNU coreutils online help: <<https://www.gnu.org/software/coreutils/>>
Full documentation at: <<https://www.gnu.org/software/coreutils/df>>
or available locally via: info '(coreutils) df invocation'

Du - Du command, short for disk usage, is used to estimate file space usage. The du command can be used to track the files and directories which are consuming excessive amounts of space on the hard disk drive. The du command is a standard Linux/Unix command that allows a user to gain disk usage information quickly. It is best applied to specific directories and allows many variations for customizing the output to meet your needs.

```
ninad@ninad-VirtualBox:~$ du /home/ninad
4      /home/ninad/.local/share/flatpak/db
8      /home/ninad/.local/share/flatpak
4      /home/ninad/.local/share/applications
4      /home/ninad/.local/share/backgrounds
4      /home/ninad/.local/share/sounds
4      /home/ninad/.local/share/ibus-table
4      /home/ninad/.local/share/icc
112     /home/ninad/.local/share/gvfs-metadata
244     /home/ninad/.local/share/tracker/data
248     /home/ninad/.local/share/tracker
4      /home/ninad/.local/share/nautilus/scripts
8      /home/ninad/.local/share/nautilus
4      /home/ninad/.local/share/evolution/memos/trash
8      /home/ninad/.local/share/evolution/memos
8      /home/ninad/.local/share/evolution/tasks/system
4      /home/ninad/.local/share/evolution/tasks/trash
16      /home/ninad/.local/share/evolution/tasks
4      /home/ninad/.local/share/evolution/calendar/system
4      /home/ninad/.local/share/evolution/calendar/trash
12      /home/ninad/.local/share/evolution/calendar
4      /home/ninad/.local/share/evolution/addressbook/system/photos
92      /home/ninad/.local/share/evolution/addressbook/system
4      /home/ninad/.local/share/evolution/addressbook/trash
100     /home/ninad/.local/share/evolution/addressbook
4      /home/ninad/.local/share/evolution/mail/trash
8      /home/ninad/.local/share/evolution/mail
148     /home/ninad/.local/share/evolution
60      /home/ninad/.local/share/xorg
8      /home/ninad/.local/share/gnome-shell
12      /home/ninad/.local/share/keyrings
4      /home/ninad/.local/share/gnome-settings-daemon
640     /home/ninad/.local/share
644     /home/ninad/.local
4      /home/ninad/Music
4      /home/ninad/Documents
4      /home/ninad/Desktop
4      /home/ninad/Templates
12      /home/ninad/.config/dconf
8      /home/ninad/.config/gedit
4      /home/ninad/.config/enchant
4      /home/ninad/.config/gnome-session/saved-session
8      /home/ninad/.config/gnome-session
84      /home/ninad/.config/pulse
4      /home/ninad/.config/procps
4      /home/ninad/.config/nautilus
4      /home/ninad/.config/update-notifier
16      /home/ninad/.config/evolution/sources
20      /home/ninad/.config/evolution
8      /home/ninad/.config/gtk-3.0
4      /home/ninad/.config/goa-1.0
4560    /home/ninad/.mozilla/firefox/49852gtd.default-release/security_state
32088   /home/ninad/.mozilla/firefox/49852gtd.default-release
8      /home/ninad/.mozilla/firefox/iuj6vozf.default
4      /home/ninad/.mozilla/firefox/Crash Reports/events
16      /home/ninad/.mozilla/firefox/Crash Reports
32128   /home/ninad/.mozilla/firefox
4      /home/ninad/.mozilla/extensions
32140   /home/ninad/.mozilla
4      /home/ninad/Pictures
4      /home/ninad/Public
4      /home/ninad/.gnupg/private-keys-v1.d
16      /home/ninad/.gnupg
443584   /home/ninad
ninad@ninad-VirtualBox:~$ █
```

Vmstat - Vmstat command in Unix is a performance monitoring command of the system as it gives the information about processes, memory, paging, block IO, disk and CPU scheduling. All these functionalities make the command vmstat also known as virtual memory statistic reporter. The very first report produced gives the average details since the last reboot. After that, additional reports are produced which provide reports over a sampling period of time. All these process and reports are instantaneous in either case

```

ninad@ninad-VirtualBox:~$ vmstat
procs -----memory----- swap-----io---- system---cpu-----
 r b swpd free buff cache si so bi bo in cs us sy id wa st
 3 0 0 240212 49632 1032088 0 0 602 77 141 578 4 1 94 0 0
ninad@ninad-VirtualBox:~$ vmstat -a
procs -----memory----- swap-----io---- system---cpu-----
 r b swpd free inact active si so bi bo in cs us sy id wa st
 4 0 0 240212 603152 991696 0 0 601 77 141 578 4 1 94 0 0
ninad@ninad-VirtualBox:~$ vmstat -f
      2523 forks
ninad@ninad-VirtualBox:~$ vmstat -d
disk-----reads----- writes-----IO-----
 total merged sectors ms total merged sectors ms cur sec
loop0 43 0 694 21 0 0 0 0 0 0 0
loop1 58 0 2190 22 0 0 0 0 0 0 0
loop2 48 0 718 21 0 0 0 0 0 0 0
loop3 62 0 2146 20 0 0 0 0 0 0 0
loop4 48 0 724 13 0 0 0 0 0 0 0
loop5 543 0 35150 3018 0 0 0 0 0 0 4
loop6 43 0 694 12 0 0 0 0 0 0 0
loop7 12 0 36 9 0 0 0 0 0 0 0
sr0 40 0 184 11 0 0 0 0 0 0 0
sda 26681 7871 1853248 17368 3183 3067 243442 2143 0 24
ninad@ninad-VirtualBox:~$ vmstat -t
procs -----memory----- swap-----io---- system---cpu-----timestamp-----
 r b swpd free buff cache si so bi bo in cs us sy id wa st
 4 0 0 240212 49640 1032088 0 0 597 77 141 576 4 1 94 0 0 2021-04-06 12:25:45
IST
ninad@ninad-VirtualBox:~$ vmstat -s
 2034984 K total memory
 713044 K used memory
 991704 K active memory
 603152 K inactive memory
 240212 K free memory
 49640 K buffer memory
1032088 K swap cache
 459260 K total swap
 0 K used swap
 459260 K free swap
 5272 non-nice user cpu ticks
 1602 nice user cpu ticks
 1478 system cpu ticks
151114 idle cpu ticks
 422 IO-wait cpu ticks
 0 IRQ cpu ticks
 12 softirq cpu ticks
 0 stolen cpu ticks
 947888 pages paged in
121721 pages paged out
 0 pages swapped in
 0 pages swapped out
 225304 interrupts

 1617690531 boot time
 2526 forks
ninad@ninad-VirtualBox:~$ █

```

Dmidecode - Dmidecode also referred to as Desktop Management Interface table decoder, records data from DMI tables and produces it in human readable format. dmidecode command is used when the user wants to retrieve system's hardware related information such as Processor, RAM(DIMMs), BIOS detail, Memory, Serial numbers etc. of Linux system in a readable format. dmidecode command not only displays the system's current hardware configuration but also the maximum supported CPU and memory.

```
ninad@ninad-VirtualBox:~$ sudo dmidecode -t processor
[sudo] password for ninad:
# dmidecode 3.2
Getting SMBIOS data from sysfs.
SMBIOS 2.5 present.

ninad@ninad-VirtualBox:~$ sudo dmidecode -t bios
# dmidecode 3.2
Getting SMBIOS data from sysfs.
SMBIOS 2.5 present.

Handle 0x0000, DMI type 0, 20 bytes
BIOS Information
  Vendor: innotek GmbH
  Version: VirtualBox
  Release Date: 12/01/2006
  Address: 0xE0000
  Runtime Size: 128 kB
  ROM Size: 128 kB
  Characteristics:
    ISA is supported
    PCI is supported
    Boot from CD is supported
    Selectable boot is supported
    8042 keyboard services are supported (int 9h)
    CGA/mono video services are supported (int 10h)
    ACPI is supported

ninad@ninad-VirtualBox:~$ dmidecode --help
Usage: dmidecode [OPTIONS]
Options are:
  -d, --dev-mem FILE      Read memory from device FILE (default: /dev/mem)
  -h, --help                Display this help text and exit
  -q, --quiet              Less verbose output
  -s, --string KEYWORD    Only display the value of the given DMI string
  -t, --type TYPE          Only display the entries of given type
  -H, --handle HANDLE      Only display the entry of given handle
  -u, --dump                Do not decode the entries
    --dump-bin FILE        Dump the DMI data to a binary file
    --from-dump FILE       Read the DMI data from a binary file
    --no-sysfs              Do not attempt to read DMI data from sysfs files
    --oem-string N          Only display the value of the given OEM string
  -V, --version              Display the version and exit
ninad@ninad-VirtualBox:~$
```

Sar - It can be used to monitor Linux system's resources like CPU usage, Memory utilization, I/O devices consumption, Network monitoring, Disk usage, process and thread allocation, battery performance, Plug and play devices, Processor performance, file system and more. Linux system Monitoring and analyzing aids understanding system resource usage which can help to improve system performance to handle more requests.

```

ninad@ninad-VirtualBox:~$ sar -V
sysstat version 12.2.0
(C) Sebastien Godard (sysstat <at> orange.fr)
ninad@ninad-VirtualBox:~$ sar -u 2 5
Linux 5.8.0-48-generic (ninad-VirtualBox) 06/04/21 _x86_64_ (1 CPU)

12:32:13 PM IST CPU %user %nice %system %iowait %steal %idle
12:32:15 PM IST all 1.52 0.00 0.00 0.00 0.00 98.48
12:32:17 PM IST all 1.51 0.00 0.50 0.00 0.00 97.99
12:32:19 PM IST all 1.02 0.00 0.00 0.51 0.00 98.47
12:32:21 PM IST all 2.51 0.00 0.00 0.00 0.00 97.49
12:32:23 PM IST all 1.52 0.00 0.00 0.51 0.00 97.98
Average: all 1.62 0.00 0.10 0.20 0.00 98.08
ninad@ninad-VirtualBox:~$ sar -r 1 3
Linux 5.8.0-48-generic (ninad-VirtualBox) 06/04/21 _x86_64_ (1 CPU)

12:32:34 PM IST kbmemfree kbavail kbmemused %memused kbbuffers kbcached kbcommit %commit kbactive kbinact kbdirty
12:32:35 PM IST 262028 1118424 659048 32.39 50812 926144 3424552 137.30 986664 587948 64
12:32:36 PM IST 262028 1118424 659048 32.39 50812 926144 3424552 137.30 986664 587948 64
12:32:37 PM IST 262028 1118424 659048 32.39 50812 926144 3424552 137.30 986664 587948 64
Average: 262028 1118424 659048 32.39 50812 926144 3424552 137.30 986664 587948 64
ninad@ninad-VirtualBox:~$ sar -F 2 5
Linux 5.8.0-48-generic (ninad-VirtualBox) 06/04/21 _x86_64_ (1 CPU)

12:32:43 PM IST MBfsfree MBfsused %fsused %ufsused Ifree Iused %Iused FILESYSTEM
12:32:45 PM IST 1897 7612 80.05 85.34 398412 224180 36.01 /dev/sda5
12:32:45 PM IST 0 56 100.00 100.00 0 10817 100.00 /dev/loop0
12:32:45 PM IST 0 219 100.00 100.00 0 18508 100.00 /dev/loop1
12:32:45 PM IST 0 56 100.00 100.00 0 10790 100.00 /dev/loop2
12:32:45 PM IST 0 65 100.00 100.00 0 63978 100.00 /dev/loop3
12:32:45 PM IST 0 51 100.00 100.00 0 15847 100.00 /dev/loop4
12:32:45 PM IST 0 32 100.00 100.00 0 474 100.00 /dev/loop5
12:32:45 PM IST 0 31 100.00 100.00 0 470 100.00 /dev/loop6
12:32:45 PM IST 511 0 0.00 0.00 0 0 0.00 /dev/sda1
12:32:45 PM IST 0 58 100.00 100.00 0 0 0.00 /dev/sr0

12:32:45 PM IST MBfsfree MBfsused %fsused %ufsused Ifree Iused %Iused FILESYSTEM
12:32:47 PM IST 1897 7612 80.05 85.34 398412 224180 36.01 /dev/sda5
12:32:47 PM IST 0 56 100.00 100.00 0 10817 100.00 /dev/loop0
12:32:47 PM IST 0 219 100.00 100.00 0 18508 100.00 /dev/loop1
12:32:47 PM IST 0 56 100.00 100.00 0 10790 100.00 /dev/loop2
12:32:47 PM IST 0 65 100.00 100.00 0 63978 100.00 /dev/loop3
12:32:47 PM IST 0 51 100.00 100.00 0 15847 100.00 /dev/loop4
12:32:47 PM IST 0 32 100.00 100.00 0 474 100.00 /dev/loop5
12:32:47 PM IST 0 31 100.00 100.00 0 470 100.00 /dev/loop6
12:32:47 PM IST 511 0 0.00 0.00 0 0 0.00 /dev/sda1
12:32:47 PM IST 0 58 100.00 100.00 0 0 0.00 /dev/sr0

12:32:47 PM IST MBfsfree MBfsused %fsused %ufsused Ifree Iused %Iused FILESYSTEM
12:32:49 PM IST 1897 7612 80.05 85.34 398412 224180 36.01 /dev/sda5
12:32:49 PM IST 0 56 100.00 100.00 0 10817 100.00 /dev/loop0
12:32:49 PM IST 0 219 100.00 100.00 0 18508 100.00 /dev/loop1
12:32:49 PM IST 0 56 100.00 100.00 0 10790 100.00 /dev/loop2
12:32:49 PM IST 0 65 100.00 100.00 0 63978 100.00 /dev/loop3
12:32:49 PM IST 0 51 100.00 100.00 0 15847 100.00 /dev/loop4
12:32:49 PM IST 0 32 100.00 100.00 0 474 100.00 /dev/loop5
12:32:49 PM IST 0 31 100.00 100.00 0 470 100.00 /dev/loop6
12:32:49 PM IST 511 0 0.00 0.00 0 0 0.00 /dev/sda1
12:32:49 PM IST 0 58 100.00 100.00 0 0 0.00 /dev/sr0

12:32:49 PM IST MBfsfree MBfsused %fsused %ufsused Ifree Iused %Iused FILESYSTEM
12:32:51 PM IST 1897 7612 80.05 85.34 398412 224180 36.01 /dev/sda5
12:32:51 PM IST 0 56 100.00 100.00 0 10817 100.00 /dev/loop0
12:32:51 PM IST 0 219 100.00 100.00 0 18508 100.00 /dev/loop1
12:32:51 PM IST 0 56 100.00 100.00 0 10790 100.00 /dev/loop2
12:32:51 PM IST 0 65 100.00 100.00 0 63978 100.00 /dev/loop3
12:32:51 PM IST 0 51 100.00 100.00 0 15847 100.00 /dev/loop4
12:32:51 PM IST 0 32 100.00 100.00 0 474 100.00 /dev/loop5
12:32:51 PM IST 0 31 100.00 100.00 0 470 100.00 /dev/loop6
12:32:51 PM IST 511 0 0.00 0.00 0 0 0.00 /dev/sda1
12:32:51 PM IST 0 58 100.00 100.00 0 0 0.00 /dev/sr0

12:32:51 PM IST MBfsfree MBfsused %fsused %ufsused Ifree Iused %Iused FILESYSTEM
12:32:53 PM IST 1897 7612 80.05 85.34 398412 224180 36.01 /dev/sda5
12:32:53 PM IST 0 56 100.00 100.00 0 10817 100.00 /dev/loop0
12:32:53 PM IST 0 219 100.00 100.00 0 18508 100.00 /dev/loop1
12:32:53 PM IST 0 56 100.00 100.00 0 10790 100.00 /dev/loop2
12:32:53 PM IST 0 65 100.00 100.00 0 63978 100.00 /dev/loop3
12:32:53 PM IST 0 51 100.00 100.00 0 15847 100.00 /dev/loop4
12:32:53 PM IST 0 32 100.00 100.00 0 474 100.00 /dev/loop5
12:32:53 PM IST 0 31 100.00 100.00 0 470 100.00 /dev/loop6
12:32:53 PM IST 511 0 0.00 0.00 0 0 0.00 /dev/sda1
12:32:53 PM IST 0 58 100.00 100.00 0 0 0.00 /dev/sr0

Summary: MBfsfree MBfsused %fsused %ufsused Ifree Iused %Iused FILESYSTEM
Summary: 1897 7612 80.05 85.34 398412 224180 36.01 /dev/sda5
Summary: 0 56 100.00 100.00 0 10817 100.00 /dev/loop0
Summary: 0 219 100.00 100.00 0 18508 100.00 /dev/loop1
Summary: 0 56 100.00 100.00 0 10790 100.00 /dev/loop2
Summary: 0 65 100.00 100.00 0 63978 100.00 /dev/loop3
Summary: 0 51 100.00 100.00 0 15847 100.00 /dev/loop4
Summary: 0 32 100.00 100.00 0 474 100.00 /dev/loop5
Summary: 0 31 100.00 100.00 0 470 100.00 /dev/loop6
Summary: 511 0 0.00 0.00 0 0 0.00 /dev/sda1
Summary: 0 58 100.00 100.00 0 0 0.00 /dev/sr0

```

Pagesize - On Unix-like operating systems, the pagesize command displays the size of a page of memory in bytes, as returned by getpagesize. It returns the bytes of the size of a memory page, in bytes.

```
ninad@ninad-VirtualBox:~$ pagesize
4096
ninad@ninad-VirtualBox:~$ pagesize --help
pagesize: unrecognized option '--help'
pagesize [options] target
options:
  -h, --help, -h           Prints this message
  -a, --all, -a            show all supported page sizes
  -H, --huge-only, -H     show only huge page sizes
ninad@ninad-VirtualBox:~$
```

Glances - Glances is a cross-platform command-line curses-based system monitoring tool written in Python language which uses the psutil library to grab information from the system. With Glance, we can monitor CPU, Load Average, Memory, Network Interfaces, Disk I/O, Processes and File System spaces utilization.

```
ninad@ninad-VirtualBox (Ubuntu 20.04 64bit / Linux 5.8.0-48-generic) - IP 10.0.2.15/24 Pub 49.32.217.98 Uptime: 6:49:00
CPU [|||||] 5.1% CPU \ 5.1% nice: 0.0% ctx_sw: 206 MEM - 47.2% active: 924M SWAP - 1.0% LOAD 1-core
MEM [|||||||||||||||||] 47.2% user: 4.1% irq: 0.0% inter: 90 total: 1.94G inactive: 628M total: 448M
SWAP [ ] 1.0% system: 1.0% iowait: 0.0% sw_int: 84 used: 937M buffers: 59.6M used: 4.29M
idle: 94.9% steal: 0.0% free: 1.03G cached: 957M free: 444M
1 min: 0.54 5 min: 0.26 15 min: 0.14

NETWORK Rx/s Tx/s TASKS 176 (416 thr), 1 run, 138 slp, 37 oth sorted automatically by CPU consumption
enp0s3 0b 0b CPU% MEM% VIRT RES PID USER TIME+ THR NI S R/s W/s Command
lo 0b 0b 3.7 2.6 431M 51.6M 7547 ninad 0:04 1 0 R 0 0 /usr/bin/python3 /usr/bin/glances
DefaultGateway 13ms 1.0 17.8 3.57G 354M 1159 ninad 0:26 6 0 S 0 0 /usr/bin/gnome-shell
FILE SYS Used Total 0.3 0.3 555M 87.2M 889 ninad 0:13 5 0 S 0 0 /usr/libexec/gnome-terminal-server
/ (sda5) 7.54G 9.29G 0.3 0.1 160M 2.71M 1081 ninad 0:07 4 0 S 0 0 /usr/bin/VBoxClient --draganddrop
_ninad/VBox_GAs_6.1.18 58.3M 0.3 0.1 297M 2.62M 854 root 0:08 9 0 S ? ? /usr/sbin/VBoxService --pidfile /var/run/vboxadd-service.sh
0.3 0.0 0 0 2453 root 0:08 1 0 I ? ? [kworker/u2:0:events_freezable_power_]
0.3 0.0 0 0 3988 root 0:08 1 0 I ? ? [kworker/u2:2:events]
0.0 2.9 763M 58.2M 1377 ninad 0:06 6 0 S 0 0 /usr/libexec/evolution-data-server/evolution-alarm-notify
0.0 2.7 762M 53.8M 1505 ninad 0:06 6 0 S 0 0 /usr/bin/gnome-shell
0.0 2.1 4229M 49.6M 6479 root 0:01 1 0 S 0 0 /usr/bin/python3 /usr/bin/glances -s -B 127.0.0.1
0.0 2.0 46.40.5M 1508 ninad 0:04 0 0 S 0 0 /usr/bin/gnome-terminal-server -gapplication-service
0.0 1.8 74.1M 36.3M 220 root 0:01 1 -1 S 0 0 /lib/systemd/systemd-journal
0.0 1.8 614M 35.2M 937 ninad 0:00 4 0 S 0 0 /usr/libexec/gnome-terminal
0.0 1.5 275M 29.9M 1189 ninad 0:01 4 0 S 0 0 /usr/libexec/bus-extension-gtk3
0.0 1.5 699M 29.1M 1229 ninad 0:00 9 0 S 0 0 /usr/libexec/evolution-calendar-factory
0.0 1.4 666M 28.7M 1244 ninad 0:00 6 0 S 0 0 /usr/libexec/evolution-addressbook-factory
0.0 1.4 677M 27.4M 1309 ninad 0:00 4 0 S 0 0 /usr/libexec/gsd-media-keys
0.0 1.3 487M 26.8M 1617 ninad 0:00 4 0 S 0 0 update-notifier
0.0 1.3 343M 25.8M 1311 ninad 0:00 4 0 S 0 0 /usr/libexec/gsd-power
0.0 1.3 560M 25.7M 1294 ninad 0:00 4 0 S 0 0 /usr/libexec/gsd-color
0.0 1.3 342M 25.6M 1355 ninad 0:00 4 0 S 0 0 /usr/libexec/gsd-xsettings
0.0 1.3 2.49G 25.3M 1279 ninad 0:00 5 0 S 0 0 /usr/bin/uis /usr/share/gnome-shell/org.gnome.Shell.Notifications
0.0 1.3 343M 25.0M 1300 ninad 0:00 4 0 S 0 0 /usr/libexec/gsd-keyboard
0.0 1.2 612M 24.7M 559 root 0:01 9 0 S ? ? /usr/libexec/snapd
0.0 1.2 342M 24.3M 1341 ninad 0:00 3 0 S 0 0 /usr/libexec/gsd-wacom
0.0 1.2 462M 24.3M 1221 ninad 0:00 4 0 S 0 0 /usr/libexec/evolution-source-registry
0.0 1.2 198M 24.3M 1193 ninad 0:00 3 0 S 0 0 /usr/libexec/bus-x11 --kill-daemon
0.0 1.2 508M 23.6M 881 ninad 0:00 5 19 S 0 0 /usr/libexec/tracker-miner-fs
0.0 1.1 124M 21.6M 633 root 0:00 2 0 S 0 0 ? ? /usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-shutdown --wait-for-sign
0.0 1.0 46.1M 19.3M 546 root 0:00 1 0 S 0 0 /usr/bin/python3 /usr/bin/networkd-dispatcher --run-startup-triggers
0.0 1.0 567M 19.2M 1215 ninad 0:00 6 0 S 0 0 /usr/libexec/gnome-shell-calendar-server
0.0 1.0 330M 18.9M 531 root 0:00 3 0 S ? ? /usr/libexec/NetworkManager --no-daemon
0.0 0.9 1.35G 18.0M 878 ninad 0:00 4 -11 S 0 0 /usr/bin/pulseaudio --daemonize=0 --log-target=journal
0.0 0.8 160M 18.0M 1062 ninad 0:00 3 0 S 0 0 /usr/bin/VBoxClient --clipboard
0.0 0.8 482M 15.6M 1144 ninad 0:00 4 0 S 0 0 /usr/libexec/gnome-session-binary --systemd-service --session=ubuntu
0.0 0.8 373M 15.5M 1295 ninad 0:00 4 0 S 0 0 /usr/libexec/gsd-datetime
0.0 0.8 280M 15.2M 5087 root 0:00 3 0 S ? ? /usr/lib/packagekit/packagekittd
0.0 0.7 319M 14.8M 657 whoopsie 0:00 3 0 S ? ? /usr/bin/whoopsie -f
```

Smem - Memory management by monitoring memory usage is one of the important things to do on our Linux system, Smem is one of the memory usage monitoring tools available in Linux. Smem displays the memory usage of the processes on the command line, smem also displays a Graphical Output using color-coded pie and/or bar chart. With smem, we can easily visualize memory use on our system.

PID	User	Command	Swap	USS	PSS	RSS
1073	ninad	/usr/bin/VBoxClient --seaml	0	104	271	1316
1080	ninad	/usr/bin/VBoxClient --draga	0	112	276	1324
1087	ninad	/usr/bin/VBoxClient --vmsvg	0	148	293	1256
1061	ninad	/usr/bin/VBoxClient --clipb	0	160	298	1300
1074	ninad	/usr/bin/VBoxClient --seaml	0	212	511	3264
1137	ninad	/usr/libexec/gnome-session-	0	472	522	5220
1081	ninad	/usr/bin/VBoxClient --draga	0	236	552	3424
1122	ninad	/usr/bin/dbus-daemon --conf	0	572	705	4148
1088	ninad	/usr/bin/VBoxClient --vmsvg	0	380	742	3856
1322	ninad	/usr/libexec/gsd-screensave	0	712	772	6108
1210	ninad	/usr/libexec/xdg-permission	0	736	798	6172
1293	ninad	/usr/libexec/gsd-a11y-setti	0	752	822	6524
1239	ninad	/usr/libexec/dconf-service	0	780	828	5600
1614	ninad	/usr/libexec/gvfsd-metadata	0	768	830	6320
887	ninad	/usr/lib/gdm3/gdm-x-session	0	780	842	6684
1188	ninad	/usr/libexec/ibus-memconf	0	764	897	7084
924	ninad	/usr/libexec/gvfs-ftp-volum	0	828	901	6584
1117	ninad	/usr/libexec/at-spi-bus-lau	0	856	939	6908
1196	ninad	/usr/libexec/ibus-portal	0	820	957	7196
1432	ninad	/usr/libexec/ibus-engine-si	0	824	974	7372
928	ninad	/usr/libexec/gvfs-goa-volum	0	872	977	6536
1317	ninad	/usr/libexec/gsd-rfkill	0	924	991	6624
1337	ninad	/usr/libexec/gsd-usb-protoc	0	920	1006	7392
1206	ninad	/usr/libexec/at-spi2-regist	0	972	1069	7544
1299	ninad	/usr/libexec/gsd-housekeepi	0	1040	1176	8244
897	ninad	/usr/libexec/gvfsd	0	1008	1184	7664
962	ninad	/usr/libexec/gvfs-gphoto2-v	0	1080	1217	7252
912	ninad	/usr/libexec/gvfsd-fuse /ru	0	1152	1222	6840
1345	ninad	/usr/libexec/gsd-wwan	0	1108	1422	8364
1333	ninad	/usr/libexec/gsd-sound	0	1232	1445	9448
1332	ninad	/usr/libexec/gsd-disk-utili	0	1264	1450	7048
955	ninad	/usr/libexec/gvfs-afc-volum	0	1240	1514	8928
1271	ninad	/usr/libexec/gvfsd-trash --	0	1376	1611	8988
891	ninad	/usr/bin/dbus-daemon --sess	0	1532	1670	5136
1184	ninad	ibus-daemon --panel disable	0	1668	1805	8292
1316	ninad	/usr/libexec/gsd-print-noti	0	1528	1890	11180
953	ninad	/usr/libexec/goa-identity-s	0	1936	2102	9432
1324	ninad	/usr/libexec/gsd-sharing	0	1624	2145	10140
913	ninad	/usr/libexec/gvfs-udisks2-v	0	1960	2346	10660
981	ninad	/usr/libexec/gnome-session-	0	1896	2355	14036
1393	ninad	/usr/libexec/gsd-printer	0	2032	2443	15180
1590	ninad	bash	0	2528	2604	4904
1295	ninad	/usr/libexec/gsd-datetime	0	2168	2619	16288
1330	ninad	/usr/libexec/gsd-smartcard	0	3084	3284	10160
872	ninad	/lib/systemd/systemd --user	0	2320	3467	10540
1144	ninad	/usr/libexec/gnome-session-	0	2928	3470	16008
1215	ninad	/usr/libexec/gnome-shell-ca	0	3440	5149	20404
1221	ninad	/usr/libexec/evolution-sour	0	4360	5800	25100
1193	ninad	/usr/libexec/ibus-x11 --kil	0	6252	7062	24980
1617	ninad	update-notifier	0	6608	7778	27280
1294	ninad	/usr/libexec/gsd-color	0	7132	7995	26512
878	ninad	/usr/bin/pulseaudio --daemo	0	7144	8021	18944
1309	ninad	/usr/libexec/gsd-media-keys	0	7200	8416	28248
1355	ninad	/usr/libexec/gsd-xsettings	0	7916	8794	26928
1229	ninad	/usr/libexec/evolution-cale	0	5680	8871	30840
1244	ninad	/usr/libexec/evolution-addr	0	5296	9118	30124
1279	ninad	/usr/bin/gjs /usr/share/gno	0	5108	10502	26520
932	ninad	/usr/libexec/goa-daemon	0	6660	11490	36768
881	ninad	/usr/libexec/tracker-miner-	0	10560	11755	24452
1189	ninad	/usr/libexec/ibus-extension	0	11344	12216	30808
5769	ninad	/usr/bin/python3 /usr/bin/s	0	11268	12511	17700
1062	ninad	/usr/bin/VBoxClient --clipb	0	12536	12911	16376
1509	ninad	/usr/bin/seahorse --gapplic	0	15724	17545	41640
1505	ninad	/usr/bin/gnome-calendar --g	0	13264	19595	55640
1510	ninad	/usr/libexec/gnome-terminal	0	14808	21304	51132
1377	ninad	/usr/libexec/evolution-data	0	15028	22148	60296
889	ninad	/usr/lib/xorg/Xorg vt2 -dis	0	37168	56469	83584
1159	ninad	/usr/bin/gnome-shell	0	267268	299094	360996

ninad@ninad-VirtualBox:~\$ █