

ЛАБОРАТОРНАЯ РАБОТА №7 КОНТРОЛЬ ИСПОЛЬЗОВАНИЯ РЕСУРСОВ ОС LINUX

Цель работы – практическое знакомство с командами, используемыми для контроля использования ресурсов и виртуальной файловой системой /proc

Задание 1.

Вывести список всех процессов системы.

Результат:

```
ubuntu@ubuntu:~$ ps aux
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START  TIME COMMAND
root      1  0.1  0.2 102892 11868 ?        Ss   18:34  0:01 /sbin/init s
root      2  0.0  0.0     0     0 ?        S    18:34  0:00 [kthreadd]
root      3  0.0  0.0     0     0 ?        I<  18:34  0:00 [rcu_gp]
root      4  0.0  0.0     0     0 ?        I<  18:34  0:00 [rcu_par_gp]
root      5  0.0  0.0     0     0 ?        I<  18:34  0:00 [slub_flushw]
root      6  0.0  0.0     0     0 ?        I<  18:34  0:00 [netns]
root      8  0.0  0.0     0     0 ?        I<  18:34  0:00 [kworker/0:0]
root     10  0.0  0.0     0     0 ?        I<  18:34  0:00 [mm_percpu_w]
root     11  0.0  0.0     0     0 ?        S    18:34  0:00 [rcu_tasks_r]
root     12  0.0  0.0     0     0 ?        S    18:34  0:00 [rcu_tasks_t]
root     13  0.0  0.0     0     0 ?        S    18:34  0:00 [ksoftirqd/0]
root     14  0.0  0.0     0     0 ?        I    18:34  0:00 [rcu_sched]
root     15  0.0  0.0     0     0 ?        S    18:34  0:00 [migration/0]
root     16  0.0  0.0     0     0 ?        S    18:34  0:00 [idle_inject]
root     18  0.0  0.0     0     0 ?        S    18:34  0:00 [cpuhp/0]
root     19  0.0  0.0     0     0 ?        S    18:34  0:00 [cpuhp/1]
root     20  0.0  0.0     0     0 ?        S    18:34  0:00 [idle_inject]
root     21  0.1  0.0     0     0 ?        S    18:34  0:00 [migration/1]
root     22  0.1  0.0     0     0 ?        S    18:34  0:00 [ksoftirqd/1]
root     24  0.0  0.0     0     0 ?        I<  18:34  0:00 [kworker/1:0]
root     25  0.0  0.0     0     0 ?        S    18:34  0:00 [kdevtmpfs]
root     26  0.0  0.0     0     0 ?        I<  18:34  0:00 [inet_frag_w]
root     27  0.0  0.0     0     0 ?        S    18:34  0:00 [kauditfd]
root     28  0.0  0.0     0     0 ?        S    18:34  0:00 [khungtaskd]
root     29  0.0  0.0     0     0 ?        S    18:34  0:00 [oom_reaper]
root     30  0.0  0.0     0     0 ?        I<  18:34  0:00 [writeback]
root     31  0.0  0.0     0     0 ?        S    18:34  0:00 [kcompactd0]
```

Задание 2:

Вывести дерево процессов.

Результат:

```
ubuntu@ubuntu:~$ pstree
systemd─ ModemManager─2*[{ModemManager}]
      └─ NetworkManager─2*[{NetworkManager}]
        ├ accounts-daemon─2*[{accounts-daemon}]
        └─ acpid
      ├ avahi-daemon─ avahi-daemon
      └─ colord─2*[{colord}]
      └─ cron
      ├ cups-browsed─2*[{cups-browsed}]
      └─ cupsd
      └─ dbus-daemon
      └─ gdm3─ gdm-session-wor─ gdm-x-session─ Xorg─ {Xorg}
          └─ gnome-session-b─ ssh-agent
              └─ 2*[{gnome+}]
          └─ 2*[{gdm-x-session}]
          └─ 2*[{gdm-session-wor}]
      └─ 2*[{gdm3}]
      └─ gnome-keyring-d─3*[{gnome-keyring-d}]
      └─ irqbalance─ {irqbalance}
      └─ 2*[kerneloops]
      └─ networkd-dispat
      └─ polkitd─2*[{polkitd}]
      └─ rsyslogd─3*[{rsyslogd}]
      └─ rtkit-daemon─2*[{rtkit-daemon}]
      └─ snapd─11*[{snapd}]
      └─ switcheroo-cont─2*[{switcheroo-cont}]
      └─ systemd─(sd-pam)
          └─ at-spi-bus-laun─ dbus-daemon
              └─ 3*[{at-spi-bus-laun}]
```

Задание 3:

С помощью команды top получить список 5 процессов, потребляющих наибольшее количество процессорного времени.

Результат:

(Комбинация shift + t для сортировки по TIME+)

```
top - 18:47:39 up 13 min, 1 user, load average: 0.02, 0.09, 0.14
Tasks: 191 total, 1 running, 190 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.3 us, 0.8 sy, 0.0 ni, 98.8 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 3924.1 total, 104.8 free, 779.9 used, 3039.4 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 2651.3 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
4560	ubuntu	20	0	3928352	352876	125992	S	0.0	8.8	0:20.00	gnome-+
4416	ubuntu	20	0	256212	73960	45632	S	0.7	1.8	0:04.55	Xorg
155	root	0	-20	0	0	0	I	0.0	0.0	0:04.17	kworker+
1218	root	20	0	949448	55364	20204	S	0.0	1.4	0:02.35	snapd
104	root	20	0	0	0	0	I	0.0	0.0	0:01.17	kworker+
1	root	20	0	102892	11868	8604	S	0.0	0.3	0:01.07	systemd
1148	root	20	0	0	0	0	I	0.0	0.0	0:01.07	kworker+
21	root	rt	0	0	0	0	S	0.0	0.0	0:00.83	migrat+
4914	ubuntu	20	0	823280	51340	38696	S	0.3	1.3	0:00.75	gnome-+
4909	ubuntu	20	0	1138016	79020	47588	S	0.0	2.0	0:00.70	nautilus

Задание 4:

Найти 2 процесса, имеющих более ДВУХ потоков. Использовать
состояние процесса

The screenshot shows the top command interface. At the top, it displays system statistics: CPU usage (0[|||), memory usage (Mem[|||||1.13G/3.83G]), swap usage (Swp[OK/OK]), tasks (Tasks: 102, 235 thr, 88 kthr; 1 running, 2.0% Load average: 0.15 0.11 0.12), and uptime (Uptime: 00:18:36). Below this is a table of processes. The columns are: Sort by, PID, USER, PRI, NI, VIRT, RES, SHR, S, CPU%, MEM%, and TIME. The table lists various processes like ubuntu, root, avahi, messagebus, and syslog, along with their resource usage. The bottom of the interface has a toolbar with buttons for Enter, Sort, Esc, and Cancel.

Sort by	PID	USER	PRI	NI	VIRT	RES	SHR	S	CPU%	MEM%	TIME
PID	4416	ubuntu	20	0	251M	75520	45632	S	1.2	1.9	0:05.
USER	4421	ubuntu	20	0	251M	75520	0	S	0.8	1.9	0:01.
PRIORITY	4560	ubuntu	20	0	3846M	354M	123M	S	0.4	9.0	0:12.
NICE	4585	ubuntu	20	0	3846M	354M	0	S	0.4	9.0	0:05.
M_VIRT	5844	ubuntu	20	0	5756	4140	3180	R	0.4	0.1	0:00.
M_RESIDENT	1	root	20	0	101M	13192	8604	S	0.0	0.3	0:01.
M_SHARE	943	root	19	-1	36088	10940	9356	S	0.0	0.3	0:00.
STATE	978	root	20	0	25112	7816	4144	S	0.0	0.2	0:00.
PERCENT_CPU	1175	systemd-re	20	0	24428	13124	9156	S	0.0	0.3	0:00.
PERCENT_MEM	1176	systemd-ti	20	0	90912	6108	5320	S	0.0	0.2	0:00.
TIME	1187	systemd-ti	20	0	90912	6108	0	S	0.0	0.2	0:00.
Command	1202	root	20	0	2548	692	628	S	0.0	0.0	0:00.
	1205	avahi	20	0	8576	3540	3212	S	0.0	0.1	0:00.
	1206	messagebus	20	0	8972	6072	3980	S	0.0	0.2	0:00.
	1208	root	20	0	266M	19120	16552	S	0.0	0.5	0:00.
	1213	root	20	0	81832	3696	3392	S	0.0	0.1	0:00.
	1214	root	20	0	48560	26664	11980	S	0.0	0.5	0:00.
	1215	root	20	0	229M	9580	6756	S	0.0	0.2	0:00.
	1217	syslog	20	0	219M	5112	3804	S	0.0	0.1	0:00.
	1218	root	20	0	927M	56216	20684	S	0.0	1.4	0:00.

ubuntu@ubuntu:~\$ ps -o thcount 4560
THCNT
11
ubuntu@ubuntu:~\$ ps -o thcount 4416
THCNT
2
ubuntu@ubuntu:~\$ █

Задание 5:

Используя команду top, изменить приоритеты 2 процессов.

Результат:

PID to renice [default pid = 4416]										
PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+ COMMAND
4416	ubuntu	20	0	261376	79136	45644	S	6.2	2.0	0:12.93 Xorg
4527	ubuntu	9	-11	1679728	19872	15372	S	6.2	0.5	0:00.37 pulsea+
1	root	20	0	103924	13192	8604	S	0.0	0.3	0:01.33 systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.01 kthrea+
3	root	39	19	0	0	0	I	0.0	0.0	0:00.00 rcu_gp
4	root	39	19	0	0	0	I	0.0	0.0	0:00.00 rcu_pa+
5	root	0	-20	0	0	0	I	0.0	0.0	0:00.00 slab_f+
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00 netns
8	root	0	-20	0	0	0	I	0.0	0.0	0:00.00 kwork+
10	root	0	-20	0	0	0	I	0.0	0.0	0:00.00 mm_per+
11	root	20	0	0	0	0	S	0.0	0.0	0:00.00 rcu_ta+
12	root	20	0	0	0	0	S	0.0	0.0	0:00.00 rcu_ta+
13	root	20	0	0	0	0	S	0.0	0.0	0:00.49 ksofti+
14	root	20	0	0	0	0	I	0.0	0.0	0:00.57 rcu_sc+
15	root	rt	0	0	0	0	S	0.0	0.0	0:00.00 migrat+
16	root	-51	0	0	0	0	S	0.0	0.0	0:00.00 idle_i+
18	root	20	0	0	0	0	S	0.0	0.0	0:00.00 cpuhp/0
19	root	20	0	0	0	0	S	0.0	0.0	0:00.00 cpuhp/1
20	root	-51	0	0	0	0	S	0.0	0.0	0:00.00 idle_i+
21	root	rt	0	0	0	0	S	0.0	0.0	0:00.86 migrat+
22	root	20	0	0	0	0	S	0.0	0.0	0:04.46 ksofti+
24	root	0	-20	0	0	0	I	0.0	0.0	0:00.00 kwork+
3	root	39	19	0	0	0	I	0.0	0.0	0:00.00 rcu_gp
4	root	39	19	0	0	0	I	0.0	0.0	0:00.00 rcu_pa+

Задание 6:

Получить список открытых файлов пользователя aa

Результат:

```
ubuntu@ubuntu:~$ lsof -u ubuntu
```

entfd]							
goa-ident 1546 ubuntu	5u	unix 0x0000000000000000	0t0	26170	typ		
e=STREAM							
goa-ident 1546 ubuntu	6u	a_inode	0,14	0	13457	[ev	
entfd]							
goa-ident 1546 ubuntu	7r	a_inode	0,14	0	13457	ino	
tify							
gvfs-afc- 1549 ubuntu	cwd	DIR	0,27	420	723	/ho	
me/ubuntu							
gvfs-afc- 1549 ubuntu	rtd	DIR	0,27	240	2	/	
gvfs-afc- 1549 ubuntu	txt	REG	0,29	113032	35175	/us	
r/libexec/gvfs-afc-volume-monitor							
gvfs-afc- 1549 ubuntu	mem	REG	0,27		35175	/us	
r/libexec/gvfs-afc-volume-monitor (path dev=0,29)							
gvfs-afc- 1549 ubuntu	mem	REG	0,27		13300	/us	
r/lib/locale/C.UTF-8/LC_CTYPE (path dev=0,29)							
gvfs-afc- 1549 ubuntu	mem	REG	0,27		13299	/us	
r/lib/locale/C.UTF-8/LC_COLLATE (path dev=0,29)							
gvfs-afc- 1549 ubuntu	mem	REG	0,27		13311	/us	
r/lib/locale/locale-archive (path dev=0,29)							
gvfs-afc- 1549 ubuntu	mem	REG	0,27		31993	/us	
r/lib/x86_64-linux-gnu/libpcre2-8.so.0.9.0 (path dev=0,29)							
gvfs-afc- 1549 ubuntu	mem	REG	0,27		31044	/us	
r/lib/x86_64-linux-gnu/libblkid.so.1.1.0 (path dev=0,29)							
gvfs-afc- 1549 ubuntu	mem	REG	0,27		31462	/us	
r/lib/x86_64-linux-gnu/libgpg-error.so.0.28.0 (path dev=0,29)							
gvfs-afc- 1549 ubuntu	mem	REG	0,27		31432	/us	
r/lib/x86_64-linux-gnu/libgmp.so.10.4.0 (path dev=0,29)							
gvfs-afc- 1549 ubuntu	mem	REG	0,27		31618	/us	

Задание 7:

Получить текущее состояние системной памяти

Результат:

```
ubuntu@ubuntu:~$ free -h
              total        used        free      shared  buff/cache   available
Mem:       3.8Gi       823Mi     203Mi     363Mi       2.8Gi     2.5Gi
Swap:      0B         0B         0B
ubuntu@ubuntu:~$
```

Задание 8:

Получить справку об использовании дискового пространства.

Результат:

```
ubuntu@ubuntu:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            1.9G   0    1.9G  0% /dev
tmpfs           393M  1.4M  392M  1% /run
/dev/sr0         4.1G  4.1G   0 100% /cdrom
/dev/loop0       2.3G  2.3G   0 100% /rofs
/cow            2.0G  357M  1.6G  19% /
tmpfs           2.0G   0    2.0G  0% /dev/shm
tmpfs           5.0M  8.0K  5.0M  1% /run/lock
tmpfs           2.0G   0    2.0G  0% /sys/fs/cgroup
tmpfs           2.0G   0    2.0G  0% /tmp
/dev/loop1       128K  128K   0 100% /snap/bare/5
/dev/loop2       347M  347M   0 100% /snap/gnome-3-38-2004/119
/dev/loop4       92M   92M   0 100% /snap/gtk-common-themes/1535
/dev/loop3       50M   50M   0 100% /snap/snapd/18357
/dev/loop6       46M   46M   0 100% /snap/snap-store/638
/dev/loop5       64M   64M   0 100% /snap/core20/1828
tmpfs           393M  64K  393M  1% /run/user/999
/dev/loop7       67M   67M   0 100% /snap/core24/1237
/dev/loop8       11M   11M   0 100% /snap/htop/5382
ubuntu@ubuntu:~$
```

Задание 9:

Вывести информацию о каком-либо процессе, используя содержимое каталога /proc

Результат:

```
ubuntu@ubuntu:~$ cat /proc/4560/status
Name: gnome-shell
Umask: 0002
State: S (sleeping)
Tgid: 4560
Ngid: 0
Pid: 4560
PPid: 1421
TracerPid: 0
Uid: 999 999 999 999
Gid: 999 999 999 999
FDSize: 64
Groups: 4 24 27 30 46 120 133 134 999
NSTgid: 4560
NSpid: 4560
NSpgid: 4560
NSsid: 4560
VmPeak: 4200588 kB
VmSize: 4200588 kB
VmLck: 0 kB
VmPin: 0 kB
VmHWM: 366408 kB
VmRSS: 364152 kB
RssAnon: 237984 kB
RssFile: 119668 kB
RssShmem: 6500 kB
VmData: 347080 kB
VmStk: 132 kB
VmExe: 8 kB
```

Задание 10:

Вывести информацию о процессоре ПК, используя содержимое каталога /proc

Результат:

```
ubuntu@ubuntu:~$ cat /proc/cpuinfo
processor       : 0
vendor_id      : AuthenticAMD
cpu family     : 25
model          : 33
model name     : AMD Ryzen 5 5600 6-Core Processor
stepping        : 2
microcode      : 0xffffffff
cpu MHz        : 3500.040
cache size     : 512 KB
physical id    : 0
siblings        : 2
core id         : 0
cpu cores      : 2
apicid          : 0
initial apicid : 0
fpu             : yes
fpu_exception   : yes
cpuid level    : 13
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
                  pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt rdtscp lm co
                  nstant_tsc rep_good noopl nonstop_tsc cpuid extd_apicid tsc_known_freq pnpi pclmu
                  lqdq ssse3 fma cx16 sse4_1 sse4_2 movbe popcnt aes xsave avx f16c rdrand hyperv
                  isorlahf_lm cmp_legacy cr8_legacy abm sse4a misalignsse 3dnowprefetch vmmcall
                  fsgsbase bmi1 avx2 bmi2 invpcid rdseed adx clflushopt sha_ni arat
bugs            : fxsave_leak sysret_ss_attrs null_seg spectre_v1 spectre_v2
bogomips        : 7000.08
TLB size        : 2560 4K pages
```

Задание 11:

Вывести список модулей, используемых в настоящий момент ядром

ОС.

Решение:

```
ubuntu@ubuntu:~$ cat /proc/modules
zfs 3833856 6 - Live 0x0000000000000000 (PO)
zunicode 348160 1 zfs, Live 0x0000000000000000 (PO)
zzstd 487424 1 zfs, Live 0x0000000000000000 (0)
zlua 163840 1 zfs, Live 0x0000000000000000 (0)
zavl 20480 1 zfs, Live 0x0000000000000000 (PO)
icp 323584 1 zfs, Live 0x0000000000000000 (PO)
zcommon 106496 2 zfs,icp, Live 0x0000000000000000 (PO)
znvpair 98304 2 zfs,zcommon, Live 0x0000000000000000 (PO)
spl 118784 6 zfs,zzstd,zavl,icp,zcommon,znvpair, Live 0x0000000000000000 (0)
binfmt_misc 24576 1 - Live 0x0000000000000000
snd_intel8x0 49152 2 - Live 0x0000000000000000
snd_ac97_codec 155648 1 snd_intel8x0, Live 0x0000000000000000
ac97_bus 16384 1 snd_ac97_codec, Live 0x0000000000000000
snd_pcm 135168 2 snd_intel8x0,snd_ac97_codec, Live 0x0000000000000000
snd_seq_midi 20480 0 - Live 0x0000000000000000
snd_seq_midi_event 16384 1 snd_seq_midi, Live 0x0000000000000000
snd_rawmidi 49152 1 snd_seq_midi, Live 0x0000000000000000
intel_rapl_ms 20480 0 - Live 0x0000000000000000
snd_seq 77824 2 snd_seq_midi,snd_seq_midi_event, Live 0x0000000000000000
snd_seq_device 16384 3 snd_seq_midi,snd_rawmidi,snd_seq, Live 0x0000000000000000
0
snd_timer 40960 2 snd_pcm,snd_seq, Live 0x0000000000000000
joydev 32768 0 - Live 0x0000000000000000
intel_rapl_common 40960 1 intel_rapl_ms, Live 0x0000000000000000
snd 102400 11 snd_intel8x0,snd_ac97_codec,snd_pcm,snd_rawmidi,snd_seq,snd_seq_d
evice,snd_timer, Live 0x0000000000000000
soundcore 16384 1 snd, Live 0x0000000000000000
vboxquest 45056 0 - Live 0x0000000000000000
```

