Отчёт по лабораторной работе №6

Управление процессами

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24 сентября 2025

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Цель работы

Цель

Получить навыки управления процессами операционной системы.

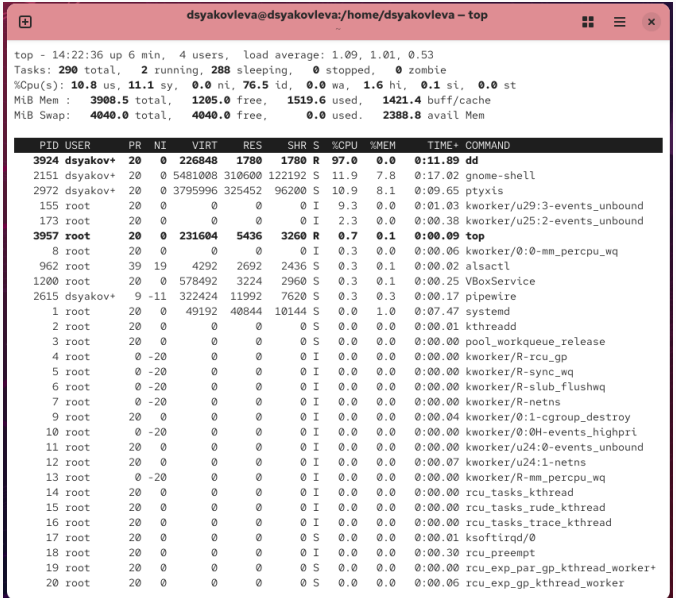
Выполнение лабораторной работы

Управление заданиями

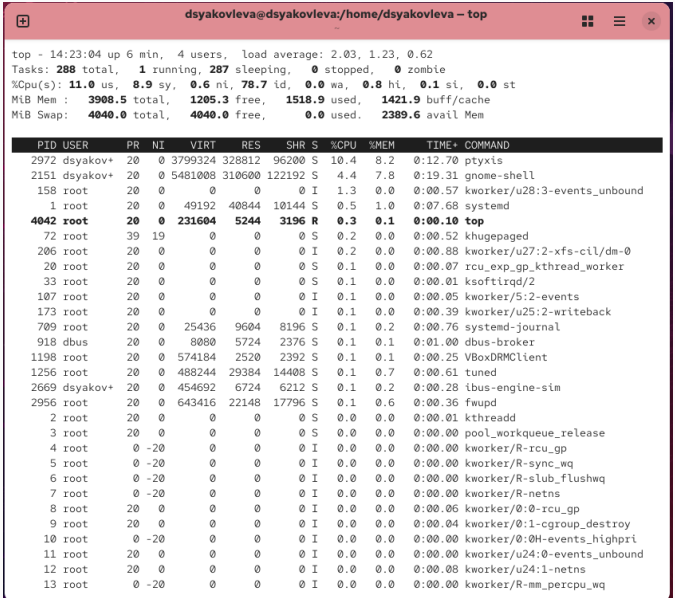
```
dsyakovleva@dsyakovleva:~$ su
Password:
root@dsyakovleva:/home/dsyakovleva# sleep 3600 &
[1] 3405
root@dsyakovleva:/home/dsyakovleva#
root@dsyakovleva:/home/dsyakovleva# dd if=/dev/zero of=/dev/null &
[2] 3531
root@dsyakovleva:/home/dsyakovleva# sleep 7200
^Z
[3]+  Stopped                 sleep 7200
root@dsyakovleva:/home/dsyakovleva# jobs
[1]   Running                 sleep 3600 &
[2]-  Running                 dd if=/dev/zero of=/dev/null &
[3]+  Stopped                 sleep 7200
root@dsyakovleva:/home/dsyakovleva# bg 3
[3]+ sleep 7200 &
root@dsyakovleva:/home/dsyakovleva# jobs
[1]   Running                 sleep 3600 &
[2]-  Running                 dd if=/dev/zero of=/dev/null &
[3]+  Running                 sleep 7200 &
root@dsyakovleva:/home/dsyakovleva# fg 1
sleep 3600
^C
root@dsyakovleva:/home/dsyakovleva# jobs
[2]-  Running                 dd if=/dev/zero of=/dev/null &
[3]+  Running                 sleep 7200 &
root@dsyakovleva:/home/dsyakovleva# fg 2
dd if=/dev/zero of=/dev/null
^C47736287+0 records in
47736286+0 records out
24440978432 bytes (24 GB, 23 GiB) copied, 95.5181 s, 256 MB/s

root@dsyakovleva:/home/dsyakovleva# fg 3
sleep 7200
^C
root@dsyakovleva:/home/dsyakovleva#
```

Управление заданиями



Управление заданиями



Управление процессами

```
root@dsyakovleva:/home/dsyakovleva#
root@dsyakovleva:/home/dsyakovleva# dd if=/dev/zero of=/dev/null &
[1] 4518
root@dsyakovleva:/home/dsyakovleva# dd if=/dev/zero of=/dev/null &
[2] 4556
root@dsyakovleva:/home/dsyakovleva# dd if=/dev/zero of=/dev/null &
[3] 4558
root@dsyakovleva:/home/dsyakovleva# ps aux | grep dd
root           2  0.0  0.0      0     0 ?        S    14:16   0:00 [kthreadd]
root          12  0.0  0.0      0     0 ?        I    14:16   0:00 [kworker/u24:1-ipv6_addrconf]
root         109  0.0  0.0      0     0 ?        I<   14:16   0:00 [kworker/R-ipv6_addrconf]
root        1200  0.0  0.0 578492  3224 ?        Sl   14:16   0:00 /usr/sbin/VBoxService --pidfile /va
r/run/vboxadd-service.sh
dsyakov+    2725  0.0  0.6 1036404 25008 ?       Ssl  14:17   0:00 /usr/libexec/evolution-addressbook-
factory
root        4518 98.5  0.0 226848  1780 pts/0    R    14:24   0:34 dd if=/dev/zero of=/dev/null
root        4556 98.6  0.0 226848  1792 pts/0    R    14:24   0:30 dd if=/dev/zero of=/dev/null
root        4558 98.4  0.0 226848  1672 pts/0    R    14:24   0:29 dd if=/dev/zero of=/dev/null
root        4628  0.0  0.0 227688  2036 pts/0    S+   14:24   0:00 grep --color=auto dd
root@dsyakovleva:/home/dsyakovleva#
```

Рис. 4: Запуск процессов dd

Управление процессами

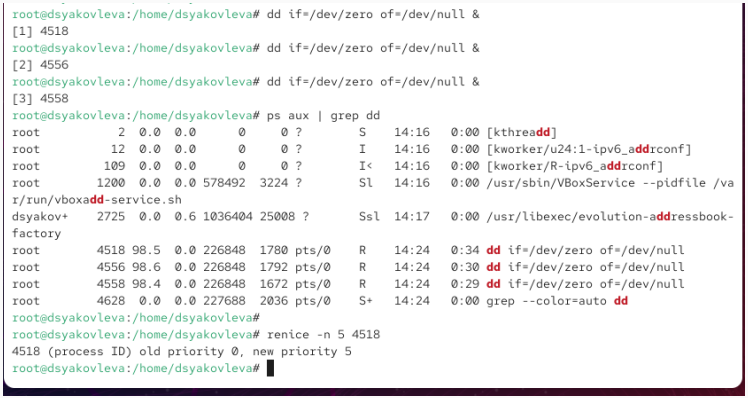


Рис. 5: Изменение приоритета процесса

Управление процессами

```
  962 ?        SNs    0:00 /usr/sbin/alsactl -s -n 19 -c -E ALSA_CONFIG_PATH=/etc/alsa/alsactl.conf
initfile=/lib/alsa/init/00main rdaemon
  995 ?        S      0:00 /usr/sbin/chronyd -F 2
 1011 ?        Ssl    0:00 /usr/sbin/ModemManager
 1032 ?        Ssl    0:01 /usr/bin/python3 -sP /usr/sbin/firewalld --nofork --nopid
 1198 ?        Sl     0:00 /usr/bin/VBoxDRMClient
 1200 ?        Sl     0:00 /usr/sbin/VBoxService --pidfile /var/run/vboxaddd-service.sh

 2562 ?        Ssl    0:00  \_ /usr/libexec/gvfs-goa-volume-monitor
 2598 ?        Ssl    0:00  \_ /usr/libexec/evolution-calendar-factory
 2615 ?        S<sl   0:00  \_ /usr/bin/pipewire
 2616 ?        S<sl   0:00  \_ /usr/bin/wireplumber
 2617 ?        S<sl   0:00  \_ /usr/bin/pipewire-pulse
 2725 ?        Ssl    0:00  \_ /usr/libexec/evolution-addressbook-factory

 2972 ?        Ssl    0:26  \_ /usr/bin/ptyxis --gapplication-service
 2984 ?        Ssl    0:00  |   \_ /usr/libexec/ptyxis-agent --socket-fd=3
 3074 pts/0    Ss     0:00  |       \_ /usr/bin/bash
 3289 pts/0    S      0:00  |           \_ su
 3334 pts/0    S      0:00  |               \_ bash
 4518 pts/0    RN     2:57  |                   \_ dd if=/dev/zero of=/dev/null
 4556 pts/0    R      2:53  |                   \_ dd if=/dev/zero of=/dev/null
 4558 pts/0    R      2:52  |                   \_ dd if=/dev/zero of=/dev/null
 4912 pts/0    R+     0:00  |                   \_ ps fax
 4913 pts/0    S+     0:00  |                   \_ grep --color=auto -B5 dd
oot@dsyakovleva:/home/dsyakovleva#
```

Рис. 6: Просмотр иерархии процессов

```
root@dsyakovleva:/home/dsyakovleva#
root@dsyakovleva:/home/dsyakovleva# dd if=/dev/zero of=/dev/null &
[1] 5279
root@dsyakovleva:/home/dsyakovleva# dd if=/dev/zero of=/dev/null &
[2] 5288
root@dsyakovleva:/home/dsyakovleva# dd if=/dev/zero of=/dev/null &
[3] 5293
root@dsyakovleva:/home/dsyakovleva# renice -n 5 5288
5288 (process ID) old priority 0, new priority 5
root@dsyakovleva:/home/dsyakovleva# renice -n 15 5288
5288 (process ID) old priority 5, new priority 15
root@dsyakovleva:/home/dsyakovleva# killall dd
[1]   Terminated              dd if=/dev/zero of=/dev/null
[2]-  Terminated              dd if=/dev/zero of=/dev/null
[3]+  Terminated              dd if=/dev/zero of=/dev/null
root@dsyakovleva:/home/dsyakovleva#
```

Рис. 7: Запуск процессов dd

Задание 2

```
root@dsyakovleva:/home/dsyakovleva#
root@dsyakovleva:/home/dsyakovleva# yes > /dev/null &
[1] 5711
root@dsyakovleva:/home/dsyakovleva# yes > /dev/null &
[2] 5713
root@dsyakovleva:/home/dsyakovleva# yes > /dev/null
^Z
[3]+  Stopped                 yes > /dev/null
root@dsyakovleva:/home/dsyakovleva# fg 3
yes > /dev/null
^C
root@dsyakovleva:/home/dsyakovleva#
```

Рис. 8: Запуск программы yes

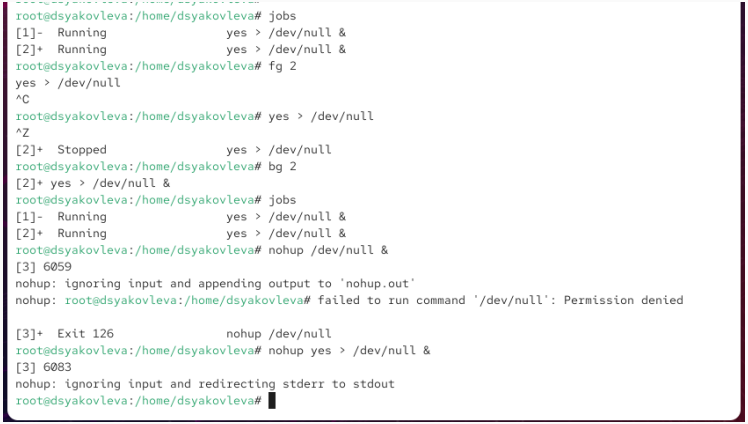
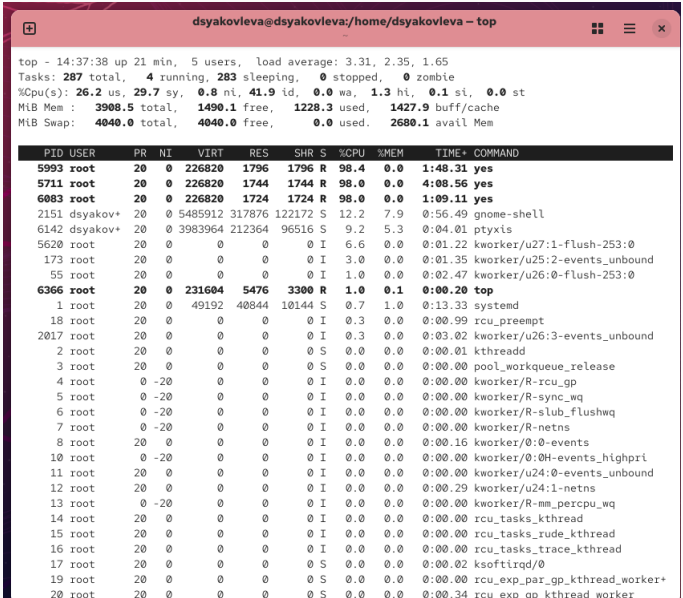


Рис. 9: Управление заданиями yes

Задание 2


dsyakovleva@dsyakovleva:/home/dsyakovleva — top
top - 14:37:38 up 21 min, 5 users, load average: 3.31, 2.35, 1.65
Tasks: 287 total, 4 running, 283 sleeping, 0 stopped, 0 zombie
%Cpu(s): 26.2 us, 29.7 sy, 0.8 ni, 41.9 id, 0.0 wa, 1.3 hi, 0.1 si, 0.0 st
MiB Mem : 3908.5 total, 1490.1 free, 1228.3 used, 1427.9 buff/cache
MiB Swap: 4040.0 total, 4040.0 free, 0.0 used. 2680.1 avail Mem
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
5993 root 20 0 226820 1796 1796 R 98.4 0.0 1:48.31 yes
5711 root 20 0 226820 1744 1744 R 98.0 0.0 4:08.56 yes
6083 root 20 0 226820 1724 1724 R 98.0 0.0 1:09.11 yes
2151 dsyakov+ 20 0 5485912 317876 122172 S 12.2 7.9 0:56.49 gnome-shell
6142 dsyakov+ 20 0 3983964 212364 96516 S 9.2 5.3 0:04.01 ptyxis
5620 root 20 0 0 0 0 I 6.6 0.0 0:01.22 kworker/u27:1-flush-253:0
173 root 20 0 0 0 0 I 3.0 0.0 0:01.35 kworker/u25:2-events_unbound
55 root 20 0 0 0 0 I 1.0 0.0 0:02.47 kworker/u26:0-flush-253:0
6366 root 20 0 231604 5476 3300 R 1.0 0.1 0:00.20 top
1 root 20 0 49192 40844 10144 S 0.7 1.0 0:13.33 systemd
18 root 20 0 0 0 0 I 0.3 0.0 0:00.99 rcu_preempt
2017 root 20 0 0 0 0 I 0.3 0.0 0:03.02 kworker/u26:3-events_unbound
2 root 20 0 0 0 0 S 0.0 0.0 0:00.01 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_gp
5 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-sync_wq
6 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-slub_flushwq
7 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-netns
8 root 20 0 0 0 0 I 0.0 0.0 0:00.16 kworker/0:0-events
10 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/0:0H-events_highpri
11 root 20 0 0 0 0 I 0.0 0.0 0:00.00 kworker/u24:0-events_unbound
12 root 20 0 0 0 0 I 0.0 0.0 0:00.29 kworker/u24:1-netns
13 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-mm_percpu_wq
14 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rcu_tasks_kthread
15 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rcu_tasks_rude_kthread
16 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rcu_tasks_trace_kthread
17 root 20 0 0 0 0 S 0.0 0.0 0:00.02 ksoftirqd/0
19 root 20 0 0 0 0 S 0.0 0.0 0:00.00 rcu_exp_par_gp_kthread_worker+
20 root 20 0 0 0 0 S 0.0 0.0 0:00.34 rcu_exp_gp_kthread_worker

```
root@dsyakovleva:/home/dsyakovleva#
root@dsyakovleva:/home/dsyakovleva# yes > /dev/null &
[1] 6568
root@dsyakovleva:/home/dsyakovleva# yes > /dev/null &
[2] 6621
root@dsyakovleva:/home/dsyakovleva# yes > /dev/null &
[3] 6632
root@dsyakovleva:/home/dsyakovleva# kill 6621
[2]-  Terminated              yes > /dev/null
root@dsyakovleva:/home/dsyakovleva# fg 1
yes > /dev/null
^C
root@dsyakovleva:/home/dsyakovleva#
```

Рис. 11: Завершение процессов yes

Задание 2

```
root@dsyakovleva:/home/dsyakovleva# yes > /dev/null &
[1] 6568
root@dsyakovleva:/home/dsyakovleva# yes > /dev/null &
[2] 6621
root@dsyakovleva:/home/dsyakovleva# yes > /dev/null &
[3] 6632
root@dsyakovleva:/home/dsyakovleva# kill 6621
[2]-  Terminated              yes > /dev/null
root@dsyakovleva:/home/dsyakovleva# fg 1
yes > /dev/null
^C
root@dsyakovleva:/home/dsyakovleva#
root@dsyakovleva:/home/dsyakovleva# kill -1 5993
root@dsyakovleva:/home/dsyakovleva# kill -1 5711
root@dsyakovleva:/home/dsyakovleva# kill -1 6083
root@dsyakovleva:/home/dsyakovleva#
root@dsyakovleva:/home/dsyakovleva# yes > /dev/null &
[4] 6825
root@dsyakovleva:/home/dsyakovleva# yes > /dev/null &
[5] 6827
root@dsyakovleva:/home/dsyakovleva# killall yes
[3]   Terminated              yes > /dev/null
[4]-  Terminated              yes > /dev/null
[5]+  Terminated              yes > /dev/null
root@dsyakovleva:/home/dsyakovleva#
```

Задание 2

```
root@dsyakovleva:/home/dsyakovleva# yes > /dev/null &
[1] 6939
root@dsyakovleva:/home/dsyakovleva# nice -n 5 yes > /dev/null &
[2] 7064
root@dsyakovleva:/home/dsyakovleva# ps -l
F S   UID     PID    PPID  C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
4 S     0    6243    6205  0  80   0 - 58153 do_wai pts/1    00:00:00 su
4 S     0    6265    6243  0  80   0 - 57575 do_wai pts/1    00:00:00 bash
4 R     0    6939    6265 97  80   0 - 56705 -      pts/1    00:01:03 yes
4 R     0    7064    6265 97  85   5 - 56705 -      pts/1    00:00:03 yes
4 R     0    7066    6265 99  80   0 - 57682 -      pts/1    00:00:00 ps
root@dsyakovleva:/home/dsyakovleva# renice -n 5 6939
6939 (process ID) old priority 0, new priority 5
root@dsyakovleva:/home/dsyakovleva# ps -l
F S   UID     PID    PPID  C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
4 S     0    6243    6205  0  80   0 - 58153 do_wai pts/1    00:00:00 su
4 S     0    6265    6243  0  80   0 - 57575 do_wai pts/1    00:00:00 bash
4 R     0    6939    6265 97  85   5 - 56705 -      pts/1    00:01:41 yes
4 R     0    7064    6265 97  85   5 - 56705 -      pts/1    00:00:42 yes
4 R     0    7156    6265 99  80   0 - 57682 -      pts/1    00:00:00 ps
root@dsyakovleva:/home/dsyakovleva# killall yes
[1]-  Terminated              yes > /dev/null
[2]+  Terminated              nice -n 5 yes > /dev/null
root@dsyakovleva:/home/dsyakovleva#
```

Рис. 13: Завершение процессов командой killall

Контрольные вопросы

Основные команды

- `jobs` — просмотр текущих заданий
- Ctrl+Z — приостановка задания
- Ctrl+C — завершение задания
- `fg` / `bg` — перевод задания в передний или фоновый режим

Работа с процессами

- `ps aux`, `ps fax` — список процессов и их иерархия
- `kill <PID>` — завершение процесса
- `killall <имя>` — завершение всех процессов с именем
- `top` — мониторинг процессов, завершение по клавише `k`
- `nice`, `renice` — управление приоритетами процессов

Итоги работы

Вывод

Были приобретены практические навыки управления заданиями и процессами в Linux:

* запуск программ в фоновом и переднем режиме,
* приостановка и возобновление выполнения,
* завершение отдельных процессов и групп процессов,
* работа с приоритетами с помощью `nice` и `renice`.