

Отчёт о лабораторной работе

Лабораторная работа 6 Управление процессами

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Содержание

1. Цель работы

Получить навыки управления процессами операционной системы.

2. Задание

1. Продемонстрируйте навыки управления заданиями операционной системы (см. раздел 6.4.1).
2. Продемонстрируйте навыки управления процессами операционной системы (см. раздел 6.4.2).
3. Выполните задания для самостоятельной работы (см. раздел 6.5)

3. Выполнение лабораторной работы

3.1 Работа с фоновыми и приостановленными процессами

Получаем полномочия администратора и запускаем процессы в фоновом режиме и на переднем плане (рис. [fig:001?]).

```
Activities Terminal Sep 7 16:32 en
root@ndbaranov:~
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# sleep 3600 &
[1] 5116
[root@ndbaranov ~]# dd if=/dev/zero of=/dev/null &
[2] 5118
[root@ndbaranov ~]# V
bash: V: command not found...
[root@ndbaranov ~]# sleep 7200
^Z
[3]+ Stopped sleep 7200
[root@ndbaranov ~]# jobs
[1] Running sleep 3600 &
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Stopped sleep 7200
[root@ndbaranov ~]# bg 3
[3]+ sleep 7200 &
[root@ndbaranov ~]# jobs
[1] Running sleep 3600 &
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Running sleep 7200 &
[root@ndbaranov ~]# fg 1
sleep 3600
^Z
[1]+ Stopped sleep 3600
[root@ndbaranov ~]# fg 1
sleep 3600
^C
[root@ndbaranov ~]# jobs
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Running sleep 7200 &
[root@ndbaranov ~]# fg 1
-bash: fg: 1: no such job
[root@ndbaranov ~]# fg 2
dd if=/dev/zero of=/dev/null
145184958+0 records in
145184958+0 records out
74334698496 bytes (74 GB, 69 GiB) copied, 128.402 s, 579 MB/s
[root@ndbaranov ~]# fg 3
sleep 7200
^C
[root@ndbaranov ~]#
```

Запуск процессов sleep и dd

Приостанавливаем процесс sleep 7200 с помощью Ctrl+Z и проверяем статус заданий (рис. [fig:001?]).

```
Activities Terminal Sep 7 16:32 en
root@ndbaranov:~
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# sleep 3600 &
[1] 5116
[root@ndbaranov ~]# dd if=/dev/zero of=/dev/null &
[2] 5118
[root@ndbaranov ~]# V
bash: V: command not found...
[root@ndbaranov ~]# sleep 7200
^Z
[3]+ Stopped sleep 7200
[root@ndbaranov ~]# jobs
[1] Running sleep 3600 &
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Stopped sleep 7200
[root@ndbaranov ~]# bg 3
[3]+ sleep 7200 &
[root@ndbaranov ~]# jobs
[1] Running sleep 3600 &
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Running sleep 7200 &
[root@ndbaranov ~]# fg 1
sleep 3600
^Z
[1]+ Stopped sleep 3600
[root@ndbaranov ~]# fg 1
sleep 3600
^C
[root@ndbaranov ~]# jobs
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Running sleep 7200 &
[root@ndbaranov ~]# fg 1
-bash: fg: 1: no such job
[root@ndbaranov ~]# fg 2
dd if=/dev/zero of=/dev/null
145184958+0 records in
145184958+0 records out
74334698496 bytes (74 GB, 69 GiB) copied, 128.402 s, 579 MB/s
[root@ndbaranov ~]# fg 3
sleep 7200
^C
[root@ndbaranov ~]#
```

Приостановка процесса и проверка jobs

Возобновляем выполнение приостановленного процесса в фоновом режиме (рис. [fig:001?]).

```
Activities Terminal Sep 7 16:32 en
root@ndbaranov:~
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# sleep 3600 &
[1] 5116
[root@ndbaranov ~]# dd if=/dev/zero of=/dev/null &
[2] 5118
[root@ndbaranov ~]# V
bash: V: command not found...
[root@ndbaranov ~]# sleep 7200
^Z
[3]+ Stopped sleep 7200
[root@ndbaranov ~]# jobs
[1] Running sleep 3600 &
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Stopped sleep 7200
[root@ndbaranov ~]# bg 3
[3]+ sleep 7200 &
[root@ndbaranov ~]# jobs
[1] Running sleep 3600 &
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Running sleep 7200 &
[root@ndbaranov ~]# fg 1
sleep 3600
^Z
[1]+ Stopped sleep 3600
[root@ndbaranov ~]# fg 1
sleep 3600
^C
[root@ndbaranov ~]# jobs
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Running sleep 7200 &
[root@ndbaranov ~]# fg 1
-bash: fg: 1: no such job
[root@ndbaranov ~]# fg 2
dd if=/dev/zero of=/dev/null
145184958+0 records in
145184958+0 records out
74334698496 bytes (74 GB, 69 GiB) copied, 128.402 s, 579 MB/s
[root@ndbaranov ~]# fg 3
sleep 7200
^C
[root@ndbaranov ~]#
```

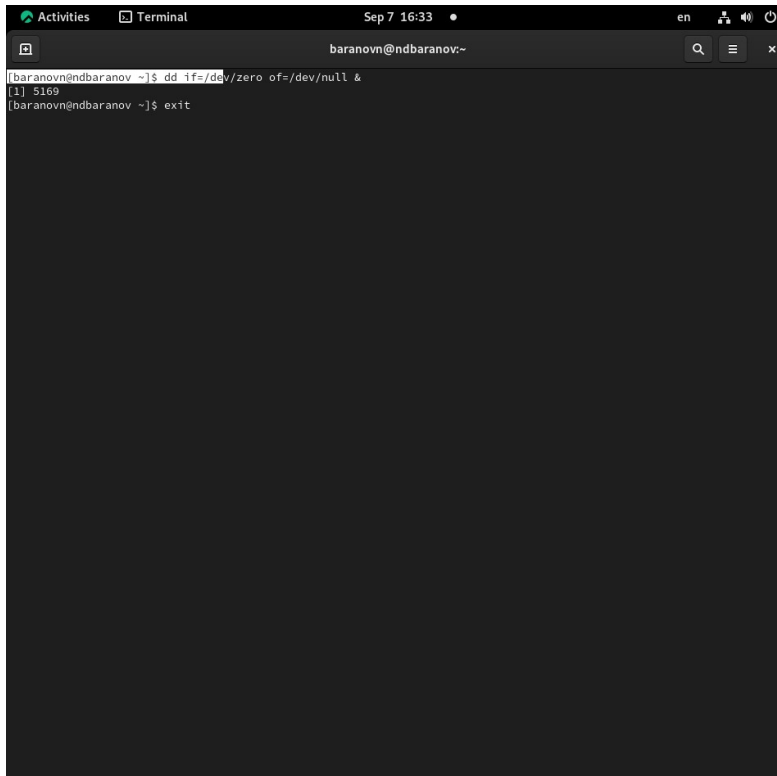
Возобновление процесса в фоне

Переводим процесс на передний план и завершаем его (рис. [fig:001?]).

```
Activities Terminal Sep 7 16:32 en
root@ndbaranov:~
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# sleep 3600 &
[1] 5116
[root@ndbaranov ~]# dd if=/dev/zero of=/dev/null &
[2] 5118
[root@ndbaranov ~]# V
bash: V: command not found...
[root@ndbaranov ~]# sleep 7200
^Z
[3]+ Stopped sleep 7200
[root@ndbaranov ~]# jobs
[1] Running sleep 3600 &
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Stopped sleep 7200
[root@ndbaranov ~]# bg 3
[3]+ sleep 7200 &
[root@ndbaranov ~]# jobs
[1] Running sleep 3600 &
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Running sleep 7200 &
[root@ndbaranov ~]# fg 1
sleep 3600
^Z
[1]+ Stopped sleep 3600
[root@ndbaranov ~]# fg 1
sleep 3600
^C
[root@ndbaranov ~]# jobs
[2]- Running dd if=/dev/zero of=/dev/null &
[3]+ Running sleep 7200 &
[root@ndbaranov ~]# fg 1
-bash: fg: 1: no such job
[root@ndbaranov ~]# fg 2
dd if=/dev/zero of=/dev/null
145184958+0 records in
145184958+0 records out
74334698496 bytes (74 GB, 69 GiB) copied, 128.402 s, 579 MB/s
[root@ndbaranov ~]# fg 3
sleep 7200
^C
[root@ndbaranov ~]#
```

Завершение процессов

Запускаем процесс dd в фоновом режиме от обычного пользователя и выходим из терминала (рис. [fig:002?]).

A terminal window titled 'Terminal' with a dark background. The window shows the user 'baranov' at the prompt 'baranov@ndbaranov:~'. The user enters the command 'dd if=/dev/zero of=/dev/null &'. The terminal shows the process ID '[1] 5169'. The user then enters 'exit', and the terminal shows '[baranov@ndbaranov ~]\$ exit'.

Запуск dd и выход

3.2 Мониторинг процессов с помощью top

Запускаем утилиту top для просмотра запущенных процессов (рис. [fig:003?]).

```
Activities Terminal Sep 7 16:33 en
baranov@ndbaranov:~$ top
top - 16:33:55 up 27 min, 2 users, load average: 0.88, 0.63, 0.48
Tasks: 227 total, 4 running, 223 sleeping, 0 stopped, 0 zombie
%cpu(s): 3.0 us, 7.4 sy, 0.0 ni, 85.0 id, 0.1 wa, 4.4 hi, 0.2 si, 0.0 st
Mem Mem : 3655.2 total, 1178.9 free, 1311.3 used, 1429.7 buff/cache
Mem Swap: 4040.0 total, 4040.0 free, 0.0 used, 2343.9 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR   S  %CPU  %MEM    TIME+  COMMAND
 5169 baranovn  20   0 220988   1664   1664  R   94.0   0.0   0:52.22 dd
 2198 baranovn  20   0 5084036 332312 132324  R    4.3   8.9   3:58.41 gnome-s+
 886 root       20   0 30056   11320   9088  S    0.3   0.3   0:00.51 systemd-
2439 baranovn  20   0 603400   15916   10368  S    0.3   0.4   0:00.10 gsd-sma+
 5022 baranovn  20   0 766076   57304   41824  S    0.3   1.5   0:02.57 gnome-t+
 5214 baranovn  20   0 225904   4096   3328  R    0.3   0.1   0:00.08 top
    1 root       20   0 174012   17824   10676  S    0.0   0.5   0:02.43 systemd
    2 root       20   0      0      0      0  S    0.0   0.0   0:00.02 kthreadd
    3 root       20   0      0      0      0  S    0.0   0.0   0:00.00 pool_wo+
    4 root       0 -20      0      0      0  I    0.0   0.0   0:00.00 kworker+
    5 root       0 -20      0      0      0  I    0.0   0.0   0:00.00 kworker+
    6 root       0 -20      0      0      0  I    0.0   0.0   0:00.00 kworker+
    7 root       0 -20      0      0      0  I    0.0   0.0   0:00.00 kworker+
    9 root       0 -20      0      0      0  I    0.0   0.0   0:00.00 kworker+
   11 root       0 -20      0      0      0  I    0.0   0.0   0:00.00 kworker+
   12 root       20   0      0      0      0  I    0.0   0.0   0:10.63 kworker+
   13 root       20   0      0      0      0  I    0.0   0.0   0:00.00 rcu_tas+
```

Мониторинг процессов в top

Видим, что процесс dd продолжает работать после закрытия терминала и потребляет значительные ресурсы CPU.

3.3 Управление приоритетами процессов

Запускаем три процесса dd в фоновом режиме и изменяем приоритет одного из них (рис. [fig:004?]).

```
Activities Terminal Sep 7 16:40 en
root@ndbaranov:~
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# dd if=/dev/zero of=/dev/null &
[1] 5344
[root@ndbaranov ~]# dd if=/dev/zero of=/dev/null &
[2] 5345
[root@ndbaranov ~]# dd if=/dev/zero of=/dev/null &
[3] 5346
[root@ndbaranov ~]# ps aux | grep dd
root      2  0.0  0.0      0  0 ?        S   16:06   0:00 [kthreadd]
root     1092  0.0  0.1 574012 3840 ?        Sl  16:06   0:00 /usr/sbin/VBoxService --pidfile /var/run/vboxadd-s
ervice.sh
baranov   2356  0.0  0.8 955072 32212 ?        Ssl 16:06   0:00 /usr/libexec/evolution-addressbook-factory
root     5344 92.6  0.0 220988 1664 pts/0    R   16:35   0:12 dd if=/dev/zero of=/dev/null
root     5345 92.8  0.0 220988 1664 pts/0    R   16:35   0:12 dd if=/dev/zero of=/dev/null
root     5346 95.2  0.0 220988 1664 pts/0    R   16:35   0:11 dd if=/dev/zero of=/dev/null
root     5352  0.0  0.0 221796 2384 pts/0    S+  16:35   0:00 grep --color=auto dd
[root@ndbaranov ~]# renice -n 5 <PID>
-bash: syntax error near unexpected token 'newline'
[root@ndbaranov ~]# renice -n 5 <PID>
-bash: syntax error near unexpected token 'newline'
[root@ndbaranov ~]# renice -n 5 <PID>renice -n 5 <1092>
-bash: syntax error near unexpected token `1092'
[root@ndbaranov ~]# renice -n 5 <1092>
-bash: syntax error near unexpected token `1092'
[root@ndbaranov ~]# renice -n 5 <5352>
-bash: syntax error near unexpected token `5352'
[root@ndbaranov ~]# renice -n 5 <5346>
-bash: syntax error near unexpected token `5346'
[root@ndbaranov ~]# renice -n 5 5344
5344 (process ID) old priority 0, new priority 5
[root@ndbaranov ~]# ps fax | grep -B5 dd
  PID TTY          STAT       TIME COMMAND
  2 ?                S          0:00 [kthreadd]

  822 ?                S          0:00 /usr/sbin/chronyd -F 2
  829 ?                Sns        0:00 /usr/sbin/alsactl -s -n 19 -c -E ALSA_CONFIG_PATH=/etc/alsa/alsactl.conf --initfile=/lib
/alsa/init/00main rdaemon
  844 ?                Ssl        0:00 /usr/sbin/ModemManager
  847 ?                Ssl        0:00 /usr/bin/python3 -s /usr/sbin/firewalld --nofork --nopid
 1089 ?                Sl         0:01 /usr/bin/VBoxDRMClient
 1092 ?                Sl         0:00 /usr/sbin/VBoxService --pidfile /var/run/vboxadd-service.sh

 2312 ?                Ssl        0:00 \_ /usr/libexec/goa-identity-service
 2317 ?                Ssl        0:00 \_ /usr/libexec/evolution-calendar-factory
 2324 ?                Ssl        0:00 \_ /usr/libexec/gvfs-mtp-volume-monitor
 2334 ?                Ssl        0:00 \_ /usr/libexec/gvfs-gphoto2-volume-monitor
 2344 ?                Ssl        0:00 \_ /usr/libexec/gvfs-goa-volume-monitor
 2356 ?                Ssl        0:00 \_ /usr/libexec/evolution-addressbook-factory
```

Изменение приоритета процесса

Просматриваем иерархию процессов и завершаем родительский процесс, что приводит к завершению всех дочерних процессов (рис. [fig:005?]).


```
Activities Terminal Sep 7 16:43 en
baranov@ndbaranov:~
[root@ndbaranov ~]# renice -n 5 <PID>
-bash: syntax error near unexpected token 'newline'
[root@ndbaranov ~]# renice -n 5 <PID>
-bash: syntax error near unexpected token 'newline'
[root@ndbaranov ~]# renice -n 5 <PID>renice -n 5 <1092>
-bash: syntax error near unexpected token '1092'
[root@ndbaranov ~]# renice -n 5 <1092>
-bash: syntax error near unexpected token '1092'
[root@ndbaranov ~]# renice -n 5 <5352>
-bash: syntax error near unexpected token '5352'
[root@ndbaranov ~]# renice -n 5 <5346>
-bash: syntax error near unexpected token '5346'
[root@ndbaranov ~]# renice -n 5 5344
5344 (process ID) old priority 0, new priority 5
[root@ndbaranov ~]# ps fax | grep -B5 dd
PID TTY STAT TIME COMMAND
2 ? S 0:00 [kthreadd]
822 ? S 0:00 /usr/sbin/chrond -F 2
829 ? Ss 0:00 /usr/sbin/alsactl -s -n 19 -c -E ALSA_CONFIG_PATH=/etc/alsa/alsactl.conf --initfile=/lib
/alsa/init/00main rdacmon
844 ? Ssl 0:00 /usr/sbin/ModemManager
847 ? Ssl 0:00 /usr/bin/python3 -s /usr/sbin/firewalld --nofork --nospid
1089 ? Sl 0:01 /usr/bin/VBoxDRMClient
1092 ? Sl 0:00 /usr/sbin/VBoxService --pidfile /var/run/vboxadd-service.sh
2312 ? Ssl 0:00 \_ /usr/libexec/goa-identity-service
2317 ? Ssl 0:00 \_ /usr/libexec/evolution-calendar-factory
2324 ? Ssl 0:00 \_ /usr/libexec/gvfs-mtp-volume-monitor
2334 ? Ssl 0:00 \_ /usr/libexec/gvfs-gphoto2-volume-monitor
2344 ? Ssl 0:00 \_ /usr/libexec/gvfs-goa-volume-monitor
2356 ? Ssl 0:00 \_ /usr/libexec/evolution-addressbook-factory
2885 ? Ssl 0:00 \_ /usr/libexec/gvfsd-metadata
5257 ? Ssl 0:01 \_ /usr/libexec/gnome-terminal-server
5275 pts/0 Ss 0:00 \_ bash
5302 pts/0 S 0:00 \_ su -
5313 pts/0 S 0:00 \_ -bash
5344 pts/0 RN 5:22 \_ dd if=/dev/zero of=/dev/null
5345 pts/0 R 5:21 \_ dd if=/dev/zero of=/dev/null
5346 pts/0 R 5:20 \_ dd if=/dev/zero of=/dev/null
5370 pts/0 R+ 0:00 \_ ps fax
5371 pts/0 S+ 0:00 \_ grep --color=auto -B5 dd
[root@ndbaranov ~]# kill -9 <2885>
-bash: syntax error near unexpected token '2885'
[root@ndbaranov ~]# kill -9 <5313>
-bash: syntax error near unexpected token '5313'
[root@ndbaranov ~]# kill -9 5313
Killed
[baranov@ndbaranov ~]$
```

Просмотр иерархии процессов и завершение

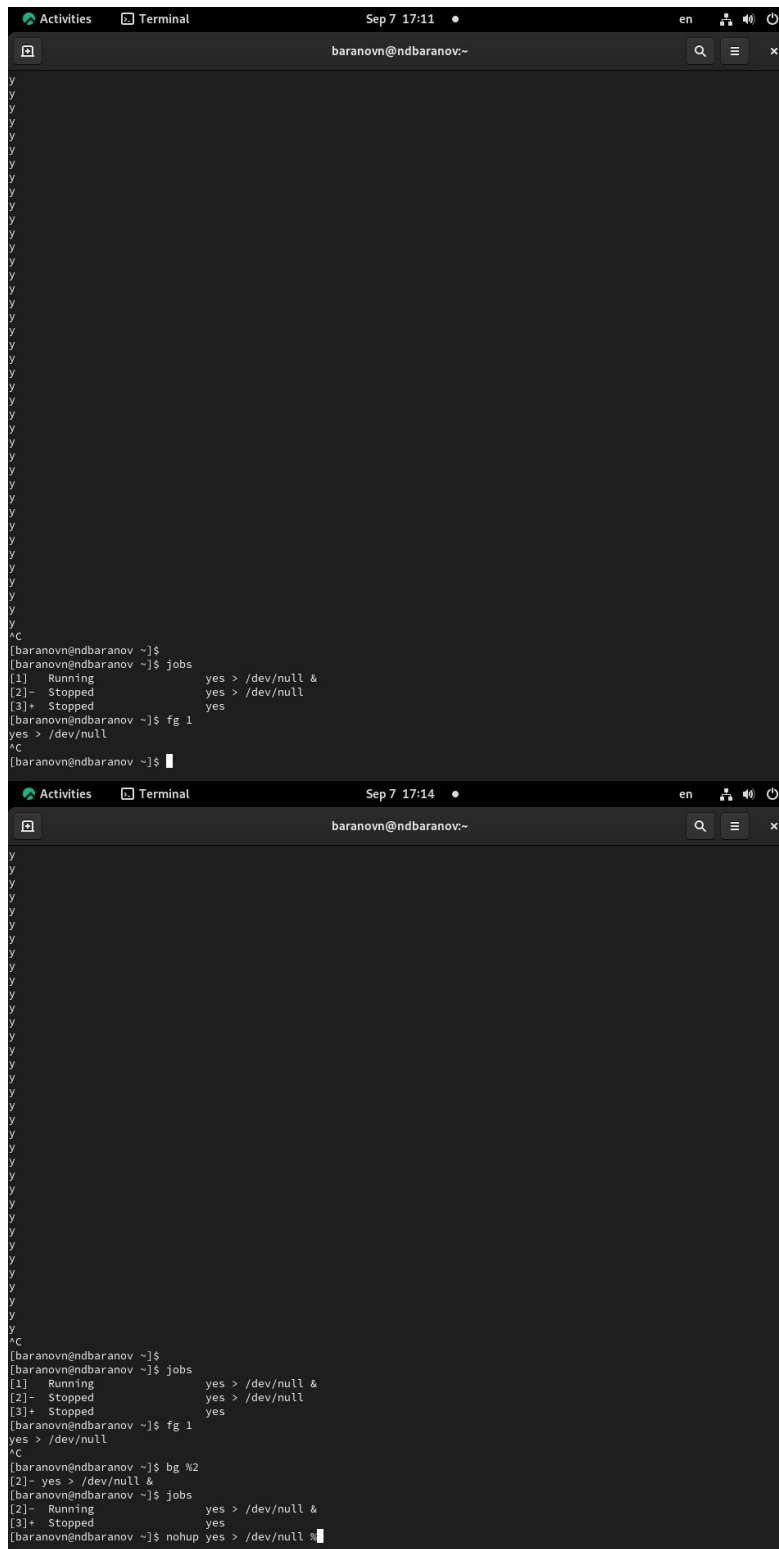
3.4 Работа с программой yes

Запускаем программу yes в различных режимах (рис. [fig:007?]).

```
Activities Terminal Sep 7 17:10 en
[baranov@ndbaranov ~]$ yes > /dev/null &
[1] 3641
[baranov@ndbaranov ~]$
[baranov@ndbaranov ~]$
[baranov@ndbaranov ~]$ yes > /dev/null
^Z
[2]+  Stopped                  yes > /dev/null
[baranov@ndbaranov ~]$ yes > /dev/null
^C
[baranov@ndbaranov ~]$
```

Работа с программой yes

Управляем заданиями: переводим между foreground и background, проверяем статусы (рис. [fig:009?], [fig:010?]).



The image displays two screenshots of a Linux terminal window. The top screenshot shows the user running `jobs` and `fg 1` to manage background processes. The bottom screenshot shows the user running `bg %2` and `nohup` to manage and detach background processes.

```
[baranov@ndbaranov ~]$  
[baranov@ndbaranov ~]$ jobs  
[1]-  Running                  yes > /dev/null &  
[2]-  Stopped                  yes > /dev/null  
[3]+  Stopped                  yes  
[baranov@ndbaranov ~]$ fg 1  
yes > /dev/null  
^C  
[baranov@ndbaranov ~]$  
  
[baranov@ndbaranov ~]$  
[baranov@ndbaranov ~]$ jobs  
[1]-  Running                  yes > /dev/null &  
[2]-  Stopped                  yes > /dev/null  
[3]+  Stopped                  yes  
[baranov@ndbaranov ~]$ fg 1  
yes > /dev/null  
^C  
[baranov@ndbaranov ~]$ bg %2  
[2]- yes > /dev/null &  
[baranov@ndbaranov ~]$ jobs  
[1]-  Running                  yes > /dev/null &  
[2]-  Running                  yes > /dev/null &  
[3]+  Stopped                  yes  
[baranov@ndbaranov ~]$ nohup yes > /dev/null &
```

3.5 Мониторинг и завершение процессов

Запускаем несколько процессов `yes` и мониторим их в `top` (рис. [fig:011?]).

```
Activities Terminal Sep 7 17:19 en
baranovn@ndbaranov:~
top - 17:19:20 up 32 min, 2 users, load average: 4.37, 3.59, 2.24
Tasks: 229 total, 9 running, 220 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.0 us, 0.6 sy, 0.0 ni, 94.7 id, 0.0 wa, 4.7 hi, 0.0 si, 0.0 st
MiB Mem : 3655.2 total, 2069.9 free, 1179.7 used, 651.3 buff/cache
MiB Swap: 4040.0 total, 4040.0 free, 0.0 used, 2475.0 avail Mem

  PID USER      PR  NI  VIRT  RES  SHR  S  %CPU  %MEM     TIME+ COMMAND
 3940 root        20   0 220948 1664 1664 R 100.0   0.0   2:44.17 yes
 3461 root        20   0 220948 1664 1664 R 100.0   0.0  12:45.46 yes
 3719 baranovn    20   0 220948 1664 1664 R 100.0   0.0   5:10.21 yes
 2211 baranovn  20   0 5002020 291952 130572 S  6.5   7.8   0:46.55 gnome-shell
 3983 baranovn  20   0 903500 53488 40196 S  1.5   1.4   0:00.47 gnome-terminal-
 10 root        20   0 0 0 0 R 0.8  0.0   0:01.14 kworker/u16:0-events_unbound
 48 root        20   0 0 0 0 I 0.5  0.0   0:02.57 kworker/u16:2-events_unbound
 1 root        20   0 174012 16452 10684 S  0.0   0.4   0:03.03 systemd
 2 root        20   0 0 0 0 S 0.0  0.0   0:00.05 kthreadd
 3 root        20   0 0 0 0 S 0.0  0.0   0:00.00 pool_workqueue_
 4 root        0 -20 0 0 0 I 0.0  0.0   0:00.00 kworker/R-rcu_g
 5 root        0 -20 0 0 0 I 0.0  0.0   0:00.00 kworker/R-sync_
 6 root        0 -20 0 0 0 I 0.0  0.0   0:00.00 kworker/R-slub_
 7 root        0 -20 0 0 0 I 0.0  0.0   0:00.00 kworker/R-nets
 9 root        0 -20 0 0 0 I 0.0  0.0   0:00.00 kworker/0:0H-events_highpri
11 root        0 -20 0 0 0 I 0.0  0.0   0:00.00 kworker/R-mm_pe
13 root        20   0 0 0 0 I 0.0  0.0   0:00.00 rcu_tasks_kthre
14 root        20   0 0 0 0 I 0.0  0.0   0:00.00 rcu_tasks_rude_
15 root        20   0 0 0 0 I 0.0  0.0   0:00.00 rcu_tasks_trace
16 root        20   0 0 0 0 S 0.0  0.0   0:00.04 ksoftirqd/0
17 root        20   0 0 0 0 R 0.0  0.0   0:00.50 rcu_preempt
18 root        20   0 0 0 0 S 0.0  0.0   0:00.00 rcu_exp_par_gp
19 root        20   0 0 0 0 S 0.0  0.0   0:00.12 rcu_exp_gp_kthr
20 root        rt  0 0 0 0 S 0.0  0.0   0:00.03 migration/0
21 root       -51  0 0 0 0 S 0.0  0.0   0:00.00 idle_inject/0
23 root        20   0 0 0 0 S 0.0  0.0   0:00.00 cpuhp/0
24 root        20   0 0 0 0 S 0.0  0.0   0:00.00 cpuhp/1
25 root       -51  0 0 0 0 S 0.0  0.0   0:00.00 idle_inject/1
26 root        rt  0 0 0 0 S 0.0  0.0   0:01.01 migration/1
27 root        20   0 0 0 0 S 0.0  0.0   0:00.04 ksoftirqd/1
29 root        0 -20 0 0 0 I 0.0  0.0   0:00.00 kworker/1:0H-events_highpri
30 root        20   0 0 0 0 S 0.0  0.0   0:00.00 cpuhp/2
31 root       -51  0 0 0 0 S 0.0  0.0   0:00.00 idle_inject/2
32 root        rt  0 0 0 0 S 0.0  0.0   0:01.21 migration/2
33 root        20   0 0 0 0 S 0.0  0.0   0:00.11 ksoftirqd/2
35 root        0 -20 0 0 0 I 0.0  0.0   0:00.00 kworker/2:0H-events_highpri
36 root        20   0 0 0 0 S 0.0  0.0   0:00.00 cpuhp/3
37 root       -51  0 0 0 0 S 0.0  0.0   0:00.00 idle_inject/3
38 root        rt  0 0 0 0 S 0.0  0.0   0:01.03 migration/3
39 root        20   0 0 0 0 S 0.0  0.0   0:00.29 ksoftirqd/3
40 root        20   0 0 0 0 I 0.0  0.0   0:00.49 kworker/3:0-ata_sff
41 root        0 -20 0 0 0 I 0.0  0.0   0:00.00 kworker/3:0H-events_highpri
43 root        20   0 0 0 0 S 0.0  0.0   0:00.03 kdevtmpfs
```

Мониторинг процессов yes в топ

Пытаемся завершить процессы с разными правами (рис. [fig:012?]).

```
Activities Terminal Sep 7 17:27 en
root@ndbaranov:~
4 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-rcu_g
5 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-sync_
6 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-slub_
7 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-netns
9 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/0:0H-events_highpri
11 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-mm_pe
13 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rcu_tasks_kthre
14 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rcu_tasks_rude
15 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rcu_tasks_trace
16 root 20 0 0 0 0 S 0.0 0.0 0:00.06 ksoftirqd/0
17 root 20 0 0 0 0 I 0.0 0.0 0:00.51 rcu_preempt
18 root 20 0 0 0 0 S 0.0 0.0 0:00.00 rcu_exp_par_gp_
19 root 20 0 0 0 0 S 0.0 0.0 0:00.12 rcu_exp_gp_kthr
20 root rt 0 0 0 0 S 0.0 0.0 0:00.03 migration/0
21 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/0
23 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/0
24 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/1
25 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/1
26 root rt 0 0 0 0 S 0.0 0.0 0:01.01 migration/1
27 root 20 0 0 0 0 S 0.0 0.0 0:00.05 ksoftirqd/1
29 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/1:0H-events_highpri
30 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/2
31 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/2
32 root rt 0 0 0 0 S 0.0 0.0 0:01.21 migration/2
33 root 20 0 0 0 0 S 0.0 0.0 0:00.11 ksoftirqd/2
35 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/2:0H-events_highpri
36 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/3
37 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/3
38 root rt 0 0 0 0 S 0.0 0.0 0:01.03 migration/3
39 root 20 0 0 0 0 S 0.0 0.0 0:00.29 ksoftirqd/3
40 root 20 0 0 0 0 I 0.0 0.0 0:00.49 kworker/3:0-ata_sff
[baranov@ndbaranov ~]$ kill 3461
bash: kill: (3461) - Operation not permitted
[baranov@ndbaranov ~]$ kill %2
bash: kill: %2: no such job
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# kill 3461
[root@ndbaranov ~]# kill %2
-bash: kill: %2: no such job
[root@ndbaranov ~]#
[root@ndbaranov ~]# kill %1
-bash: kill: %1: no such job
[root@ndbaranov ~]# jobs
[root@ndbaranov ~]# kill -1 %3
-bash: kill: %3: no such job
[root@ndbaranov ~]# jobs
[root@ndbaranov ~]# top
```

Попытка завершения процессов

Используем killall для массового завершения процессов (рис. [fig:013?]).

```
Activities Terminal Sep 7 17:32 en
root@ndbaranov:~
32 root rt 0 0 0 0 S 0.0 0.0 0:01.22 migration/2
33 root 20 0 0 0 0 S 0.0 0.0 0:00.11 ksoftirqd/2
35 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/2:0H-events_highpri
36 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuph/3
37 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/3
38 root rt 0 0 0 0 S 0.0 0.0 0:01.03 migration/3
39 root 20 0 0 0 0 S 0.0 0.0 0:00.29 ksoftirqd/3
41 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/3:0H-events_highpri
43 root 20 0 0 0 0 S 0.0 0.0 0:00.03 kdevtmpfs
44 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-inet_

[root@ndbaranov ~]# killall
bash: killall: command not found...

killall[root@ndbaranov ~]#
[root@ndbaranov ~]# killall
Usage: killall [OPTION]... [--] NAME...
    killall -l, --list
    killall -V, --version

-e, --exact          require exact match for very long names
-i, --ignore-case    case insensitive process name match
-g, --process-group  kill process group instead of process
-y, --younger-than   kill processes younger than TIME
-o, --older-than     kill processes older than TIME
-I, --interactive    ask for confirmation before killing
-l, --list           list all known signal names
-q, --quiet          don't print complaints
-f, --regex          interpret NAME as an extended regular expression
-s, --signal SIGNAL  send this signal instead of SIGTERM
-u, --user USER      kill only process(es) running as USER
-v, --verbose        report if the signal was successfully sent
-V, --version        display version information
-w, --wait           wait for processes to die
-n, --ns PID         match processes that belong to the same namespaces
                    as PID
-Z, --context REGEXP kill only process(es) having context
                    (must precede other arguments)

[root@ndbaranov ~]# killall yes
[root@ndbaranov ~]# yes > /dev/null &
[1] 4152
[root@ndbaranov ~]# nice -n 5 yes > /dev/null &
[2] 4153
[root@ndbaranov ~]# ps -l -p 4152,4153
F S  UID  PID  PPID  C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
0 R   0   4152  4090  95  80   0 - 55237 -   pts/1    00:00:58 yes
0 R   0   4153  4090  96  85   5 - 55237 -   pts/1    00:00:31 yes
[root@ndbaranov ~]# renice -n 0 4153
4153 (process ID) old priority 5, new priority 0
[root@ndbaranov ~]#
```

Завершение процессов *killall*

3.6 Сравнение приоритетов процессов

Запускаем процессы *yes* с разными приоритетами и сравниваем их (рис. [fig:013?]).

```
Activities Terminal Sep 7 17:32 en
root@ndbaranov:~
32 root rt 0 0 0 0 S 0.0 0.0 0:01.22 migration/2
33 root 20 0 0 0 0 S 0.0 0.0 0:00.11 ksoftirqd/2
35 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/2:0H-events_highpri
36 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/3
37 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/3
38 root rt 0 0 0 0 S 0.0 0.0 0:01.03 migration/3
39 root 20 0 0 0 0 S 0.0 0.0 0:00.29 ksoftirqd/3
41 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/3:0H-events_highpri
43 root 20 0 0 0 0 S 0.0 0.0 0:00.03 kdevtmpfs
44 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-inet_

[root@ndbaranov ~]# killall
bash: killall: command not found...

killall[root@ndbaranov ~]#
[root@ndbaranov ~]# killall
Usage: killall [OPTION]... [--] NAME...
    killall -l, --list
    killall -V, --version

-e, --exact          require exact match for very long names
-i, --ignore-case    case insensitive process name match
-g, --process-group  kill process group instead of process
-y, --younger-than   kill processes younger than TIME
-o, --older-than     kill processes older than TIME
-l, --interactive    ask for confirmation before killing
-l, --list           list all known signal names
-q, --quiet          don't print complaints
-f, --regex          interpret NAME as an extended regular expression
-s, --signal SIGNAL  send this signal instead of SIGTERM
-u, --user USER      kill only process(es) running as USER
-v, --verbose        report if the signal was successfully sent
-V, --version        display version information
-w, --wait           wait for processes to die
-n, --ns PID         match processes that belong to the same namespaces
                    as PID
-Z, --context REGEXP kill only process(es) having context
                    (must precede other arguments)

[root@ndbaranov ~]# killall yes
[root@ndbaranov ~]# yes > /dev/null &
[1] 4152
[root@ndbaranov ~]# nice -n 5 yes > /dev/null &
[2] 4153
[root@ndbaranov ~]# ps -l -p 4152,4153
F S  UID  PID  PPID  C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
0 R   0   4152  4090  95  80   0 - 55237 -   pts/1    00:00:58 yes
0 R   0   4153  4090  96  85   5 - 55237 -   pts/1    00:00:31 yes
[root@ndbaranov ~]# renice -n 0 4153
4153 (process ID) old priority 5, new priority 0
[root@ndbaranov ~]#
```

Сравнение приоритетов процессов

Изменяем приоритет процесса с помощью renice (рис. [fig:013?]).

```
Activities Terminal Sep 7 17:32 en
root@ndbaranov:~
32 root rt 0 0 0 0 S 0.0 0.0 0:01.22 migration/2
33 root 20 0 0 0 0 S 0.0 0.0 0:00.11 ksoftirqd/2
35 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/2:0H-events_highpri
36 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/3
37 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/3
38 root rt 0 0 0 0 S 0.0 0.0 0:01.03 migration/3
39 root 20 0 0 0 0 S 0.0 0.0 0:00.29 ksoftirqd/3
41 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/3:0H-events_highpri
43 root 20 0 0 0 0 S 0.0 0.0 0:00.03 kdevtmpfs
44 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/R-inet_

[root@ndbaranov ~]# killall
bash: killall: command not found...

kkillall[root@ndbaranov ~]#
[root@ndbaranov ~]# killall
Usage: killall [OPTION]... [--] NAME...
    killall -l, --list
    killall -V, --version

-e, --exact      require exact match for very long names
-i, --ignore-case case insensitive process name match
-g, --process-group kill process group instead of process
-y, --younger-than kill processes younger than TIME
-o, --older-than kill processes older than TIME
-I, --interactive ask for confirmation before killing
-l, --list       list all known signal names
-q, --quiet      don't print complaints
-f, --regex      interpret NAME as an extended regular expression
-s, --signal SIGNAL send this signal instead of SIGTERM
-u, --user USER  kill only process(es) running as USER
-v, --verbose    report if the signal was successfully sent
-V, --version    display version information
-w, --wait       wait for processes to die
-n, --ns PID     match processes that belong to the same namespaces
                  as PID
-Z, --context REGEXP kill only process(es) having context
                  (must precede other arguments)

[root@ndbaranov ~]# killall yes
[root@ndbaranov ~]# yes > /dev/null &
[1] 4152
[root@ndbaranov ~]# nice -n 5 yes > /dev/null &
[2] 4153
[root@ndbaranov ~]# ps -l -p 4152,4153
F S  UID  PID  PPID  C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
0 R   0    4152  4090  95  80   0 - 55237 -   pts/1    00:00:58 yes
0 R   0    4153  4090  96  85   5 - 55237 -   pts/1    00:00:31 yes
[root@ndbaranov ~]# renice -n 0 4153
4153 (process ID) old priority 5, new priority 0
[root@ndbaranov ~]#
```

Изменение приоритета renice

4. Выводы

М получили навыки управления процессами операционной системы.

Список литературы