МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РФ

Федеральное государственное автономное образовательное учреждение высшего образования
«Национальный исследовательский университет ИТМО»

Факультет программной инженерии и компьютерной техники

Лабораторная работа №3.2

по дисциплине

“Технологии виртуализации”

Студент:

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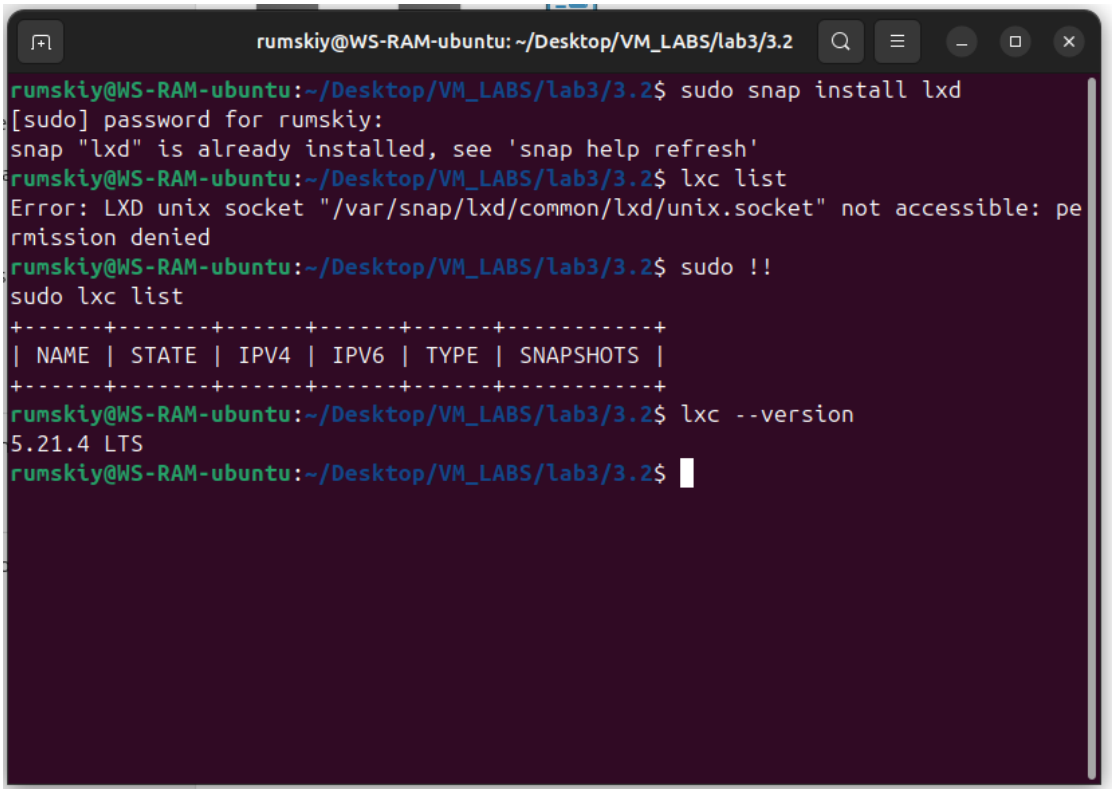
Санкт-Петербург, 2025 год

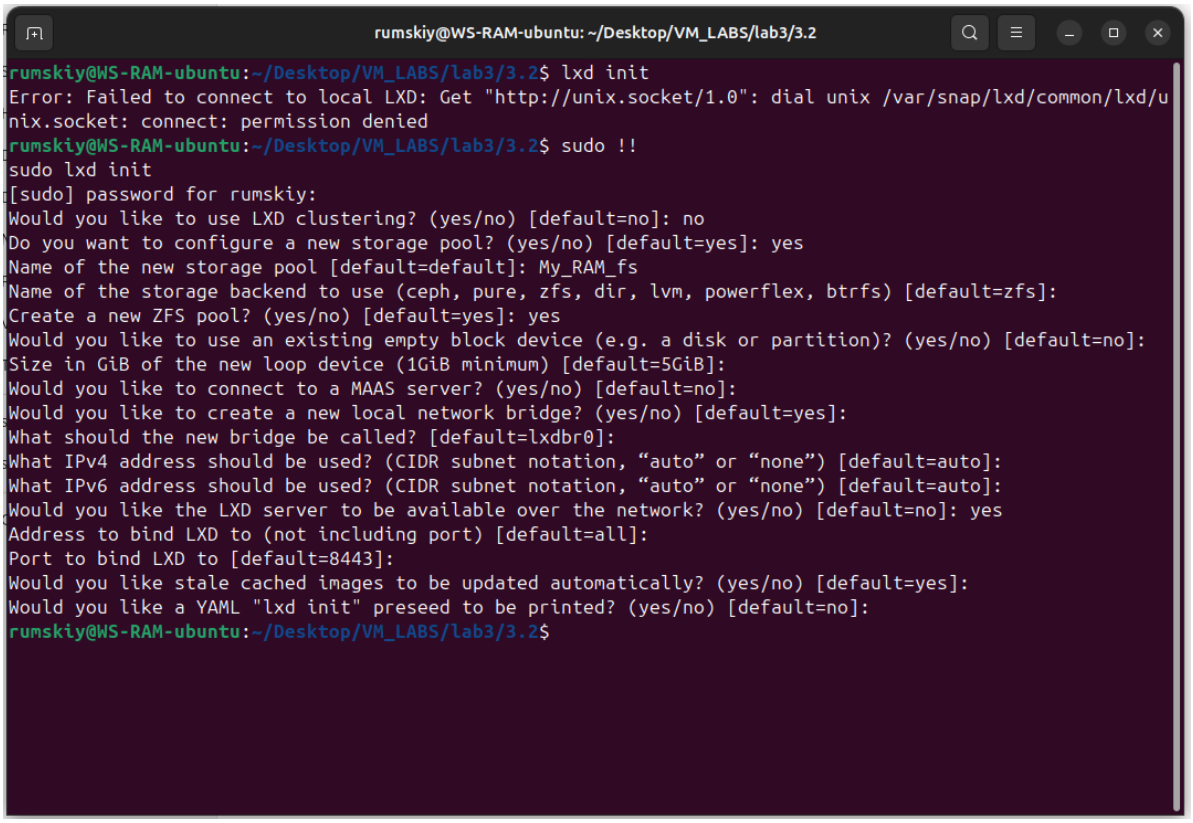
Задача

Ознакомиться с функционалом LXC & LDCX

Установка



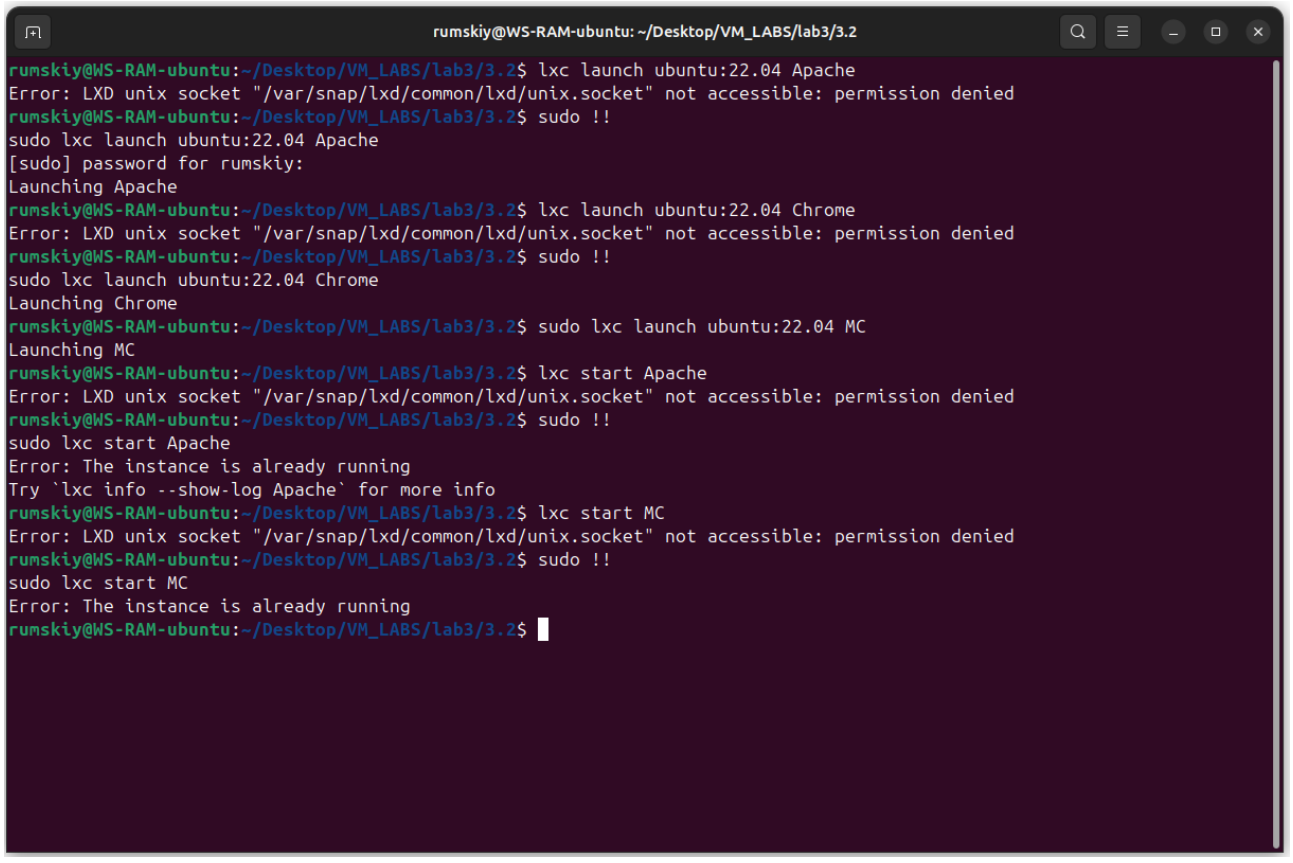
Настройка



Конфигурация компонентов

```
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo lxc profile list
+---------+---------------------+---------+
|  NAME   |     DESCRIPTION     | USED BY |
+---------+---------------------+---------+
| default | Default LXD profile | 0       |
+---------+---------------------+---------+
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ lxc network list
Error: LXD unix socket "/var/snap/lxd/common/lxd/unix.socket" not accessible: permission denied
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo !!
sudo lxc network list
+---------+----------+---------+----------------+---------------------------+-------------+---------+---------+
|  NAME   |   TYPE   | MANAGED |      IPV4      |           IPV6            | DESCRIPTION | USED BY |  STATE  |
+---------+----------+---------+----------------+---------------------------+-------------+---------+---------+
| docker0 | bridge   | NO      |                |                           |             | 0       |         |
+---------+----------+---------+----------------+---------------------------+-------------+---------+---------+
| enp0s3  | physical | NO      |                |                           |             | 0       |         |
+---------+----------+---------+----------------+---------------------------+-------------+---------+---------+
| lxdbr0  | bridge   | YES     | 10.138.209.1/24 | fd42:deb4:517c:4182::1/64 |             | 1       | CREATED |
+---------+----------+---------+----------------+---------------------------+-------------+---------+---------+
| virbr0  | bridge   | NO      |                |                           |             | 0       |         |
+---------+----------+---------+----------------+---------------------------+-------------+---------+---------+
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ lxc storage list
Error: LXD unix socket "/var/snap/lxd/common/lxd/unix.socket" not accessible: permission denied
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo !!
sudo lxc storage list
+-----------+--------+-------------------------------------------+-------------+---------+---------+
|   NAME    | DRIVER |                  SOURCE                   | DESCRIPTION | USED BY |  STATE  |
+-----------+--------+-------------------------------------------+-------------+---------+---------+
| My_RAM_fs | zfs    | /var/snap/lxd/common/lxd/disks/My_RAM_fs.img |             | 1       | CREATED |
+-----------+--------+-------------------------------------------+-------------+---------+---------+
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$
```

Создание контейнеров



```
rumskiy@WS-RAM-ubuntu: ~/Desktop/VM_LABS/lab3/3.2
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ lxc launch ubuntu:22.04 Apache
Error: LXD unix socket "/var/snap/lxd/common/lxd/unix.socket" not accessible: permission denied
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo !!
sudo lxc launch ubuntu:22.04 Apache
[sudo] password for rumskiy:
Launching Apache
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ lxc launch ubuntu:22.04 Chrome
Error: LXD unix socket "/var/snap/lxd/common/lxd/unix.socket" not accessible: permission denied
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo !!
sudo lxc launch ubuntu:22.04 Chrome
Launching Chrome
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo lxc launch ubuntu:22.04 MC
Launching MC
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ lxc start Apache
Error: LXD unix socket "/var/snap/lxd/common/lxd/unix.socket" not accessible: permission denied
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo !!
sudo lxc start Apache
Error: The instance is already running
Try `lxc info --show-log Apache` for more info
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ lxc start MC
Error: LXD unix socket "/var/snap/lxd/common/lxd/unix.socket" not accessible: permission denied
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo !!
sudo lxc start MC
Error: The instance is already running
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$
```

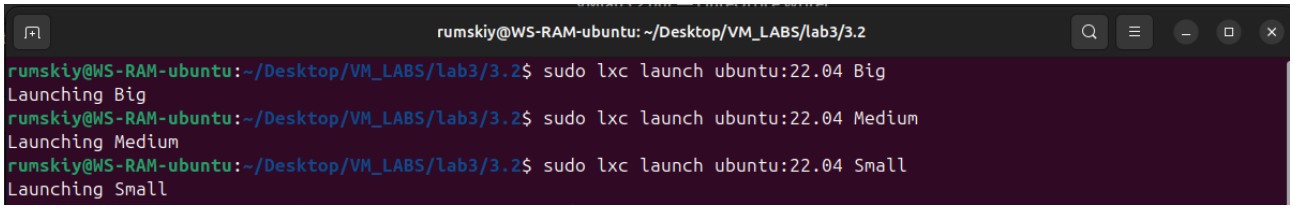
```
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo lxc list
+--------+---------+----------------------+-----------------------------------------------+-----------+-----------+
|  NAME  |  STATE  |         IPV4         |                     IPV6                      |   TYPE    | SNAPSHOTS |
+--------+---------+----------------------+-----------------------------------------------+-----------+-----------+
| Apache | RUNNING | 10.138.209.104 (eth0) | fd42:deb4:517c:4182:216:3eff:fee8:9ef1 (eth0) | CONTAINER | 0         |
+--------+---------+----------------------+-----------------------------------------------+-----------+-----------+
| Chrome | RUNNING | 10.138.209.123 (eth0) | fd42:deb4:517c:4182:216:3eff:fe2e:4cf7 (eth0) | CONTAINER | 0         |
+--------+---------+----------------------+-----------------------------------------------+-----------+-----------+
| MC     | RUNNING | 10.138.209.46 (eth0)  | fd42:deb4:517c:4182:216:3eff:fec6:8277 (eth0) | CONTAINER | 0         |
+--------+---------+----------------------+-----------------------------------------------+-----------+-----------+
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$
```

```
rumskiy@WS-RAM-ubuntu: ~/Desktop/VM_LABS/lab3/3.2
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo lxc list -c 4
+----------------------+
|         IPV4         |
+----------------------+
| 10.138.209.46 (eth0) |
+----------------------+
| 10.138.209.104 (eth0) |
+----------------------+
| 10.138.209.123 (eth0) |
+----------------------+
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo lxc list status=STOPPED
+------+-------+------+------+------+-----------+
| NAME | STATE | IPV4 | IPV6 | TYPE | SNAPSHOTS |
+------+-------+------+------+------+-----------+
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$
```

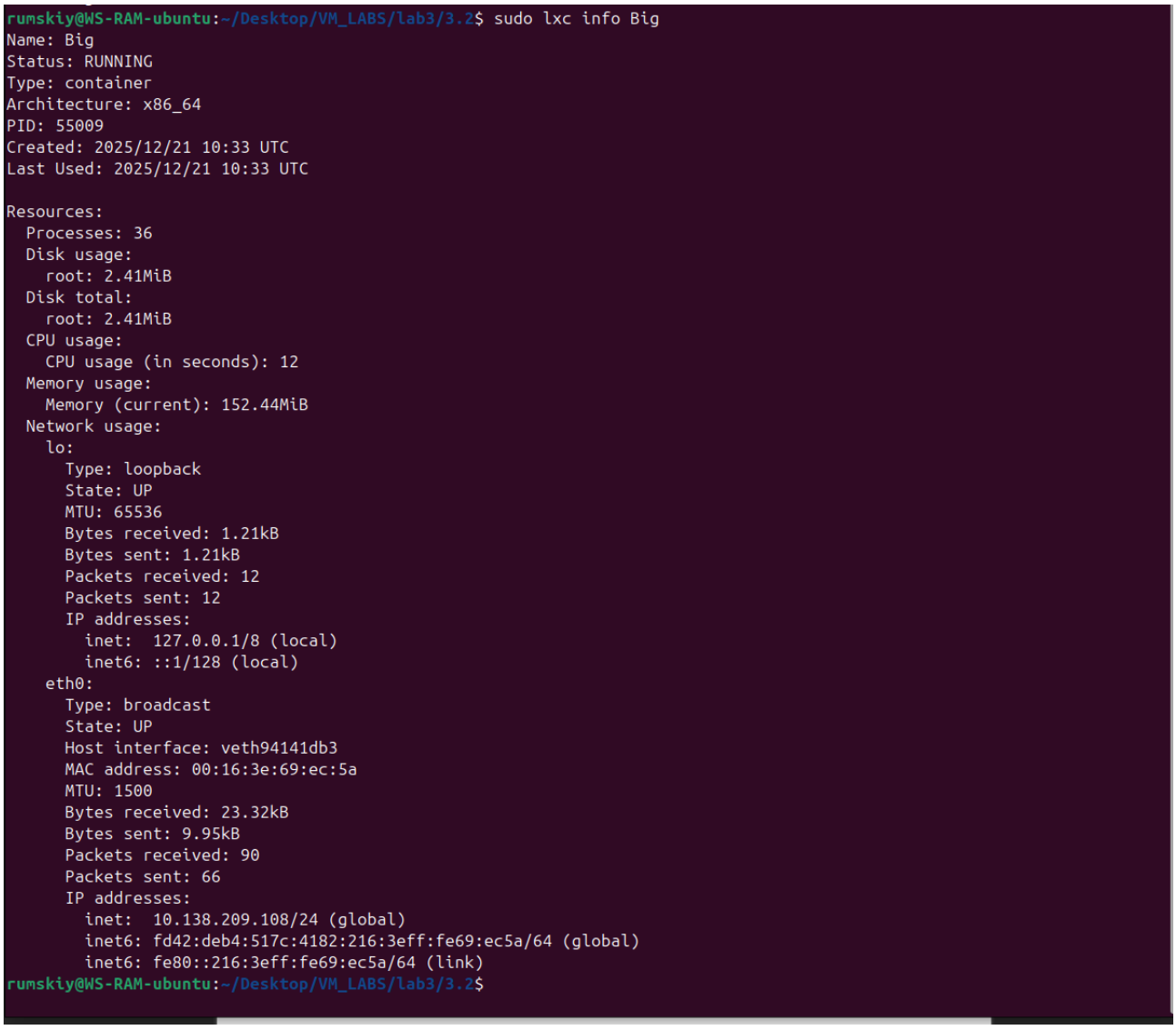
```
rumskiy@WS-RAM-ubuntu: ~/Desktop/VM_LABS/lab3/3.2
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo lxc delete MC --force
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ lxc list -c t
Error: LXD unix socket "/var/snap/lxd/common/lxd/unix.socket" not accessible: permission denied
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo !!
sudo lxc list -c t
+-----------+
|   TYPE    |
+-----------+
| CONTAINER |
+-----------+
| CONTAINER |
+-----------+
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$
```

Конфигурация

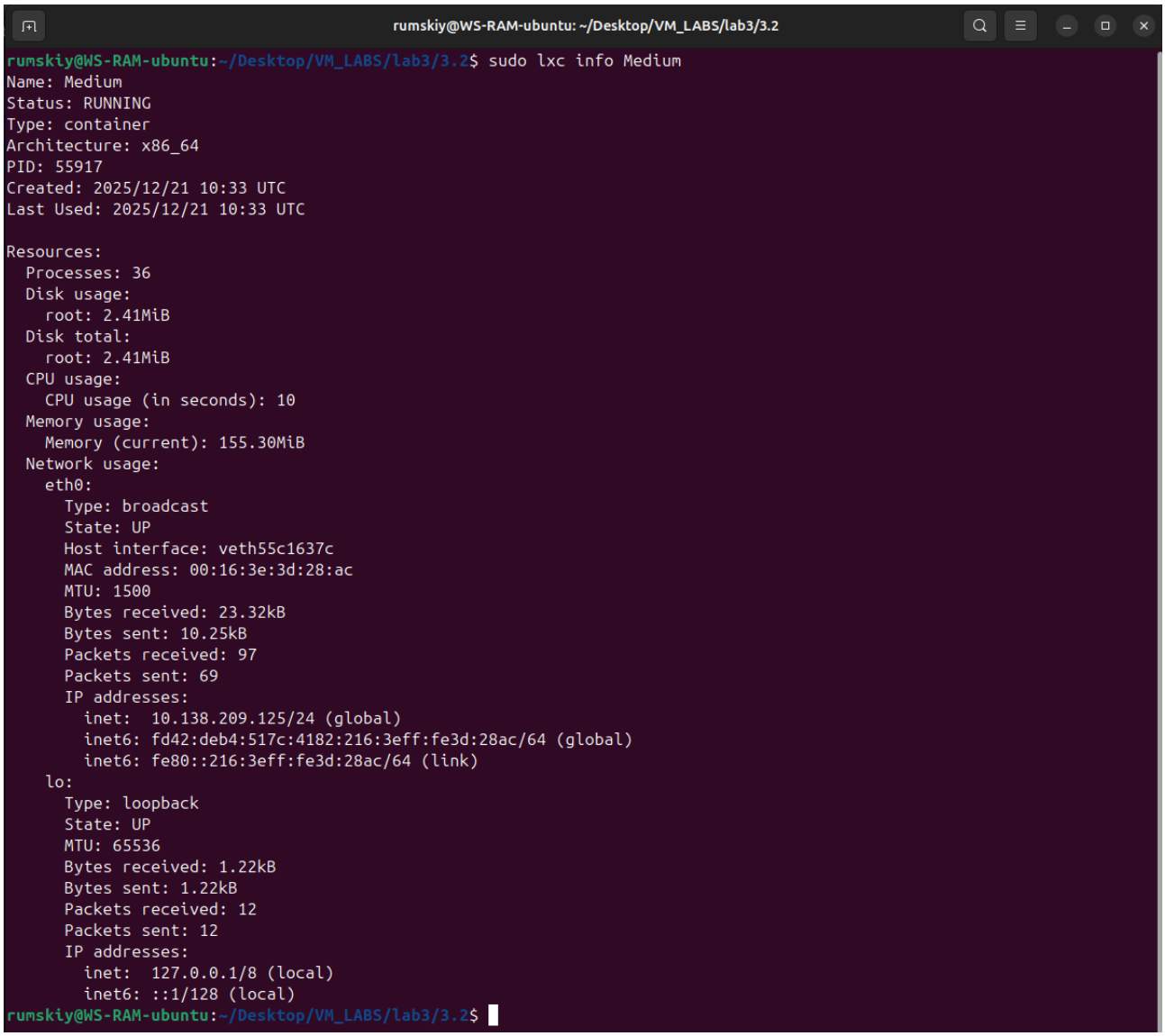
Три контейнера



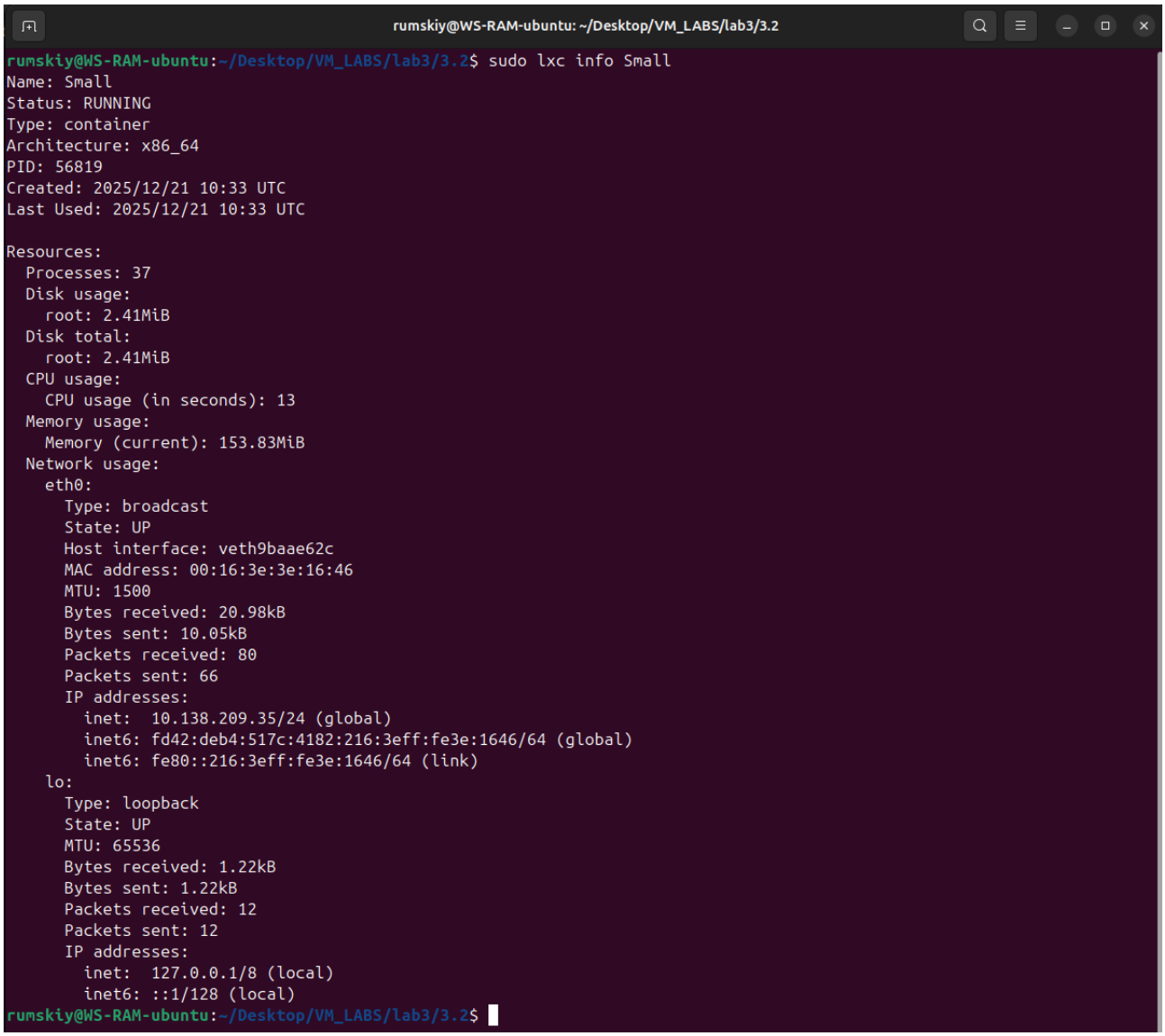
info Big



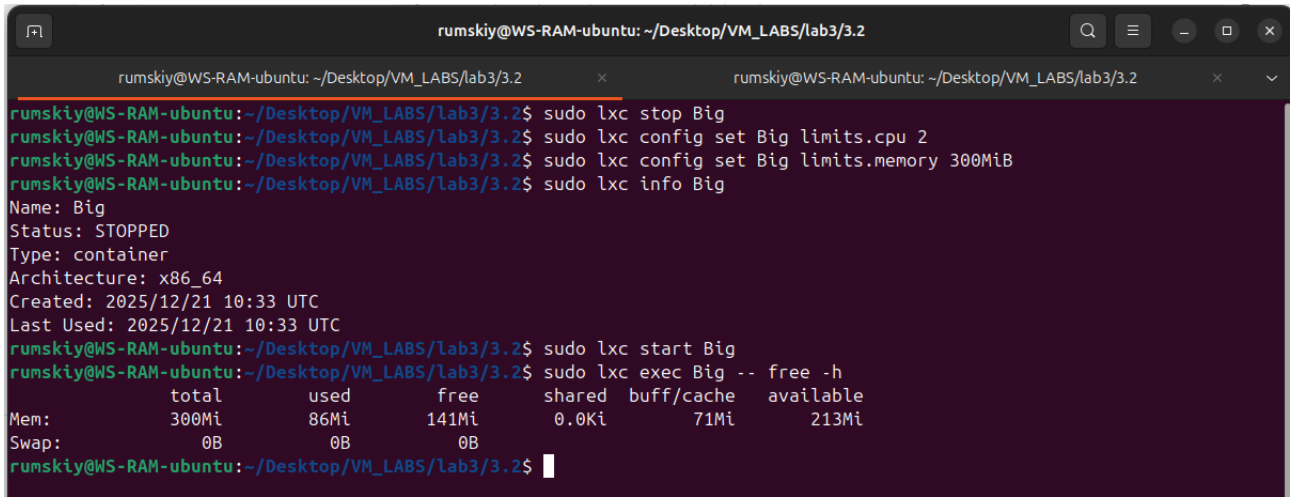
info Medium


rumskiy@WS-RAM-ubuntu: ~/Desktop/VM_LABS/lab3/3.2
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo lxc info Medium
Name: Medium
Status: RUNNING
Type: container
Architecture: x86_64
PID: 55917
Created: 2025/12/21 10:33 UTC
Last Used: 2025/12/21 10:33 UTC
Resources:
Processes: 36
Disk usage:
root: 2.41MiB
Disk total:
root: 2.41MiB
CPU usage:
CPU usage (in seconds): 10
Memory usage:
Memory (current): 155.30MiB
Network usage:
eth0:
Type: broadcast
State: UP
Host interface: veth55c1637c
MAC address: 00:16:3e:3d:28:ac
MTU: 1500
Bytes received: 23.32kB
Bytes sent: 10.25kB
Packets received: 97
Packets sent: 69
IP addresses:
inet: 10.138.209.125/24 (global)
inet6: fd42:deb4:517c:4182:216:3eff:fe3d:28ac/64 (global)
inet6: fe80::216:3eff:fe3d:28ac/64 (link)
lo:
Type: loopback
State: UP
MTU: 65536
Bytes received: 1.22kB
Bytes sent: 1.22kB
Packets received: 12
Packets sent: 12
IP addresses:
inet: 127.0.0.1/8 (local)
inet6: ::1/128 (local)
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$

info Small

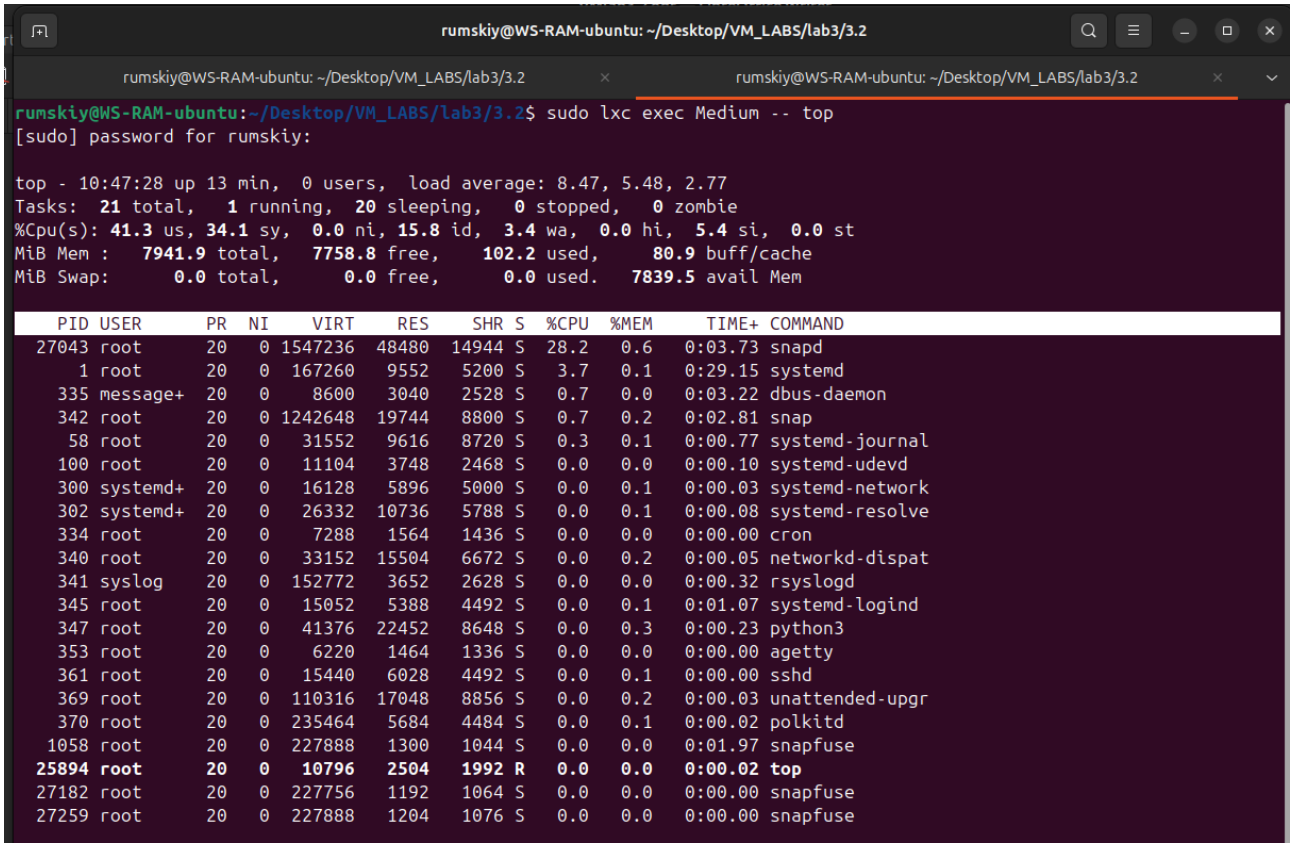


Работа с Big

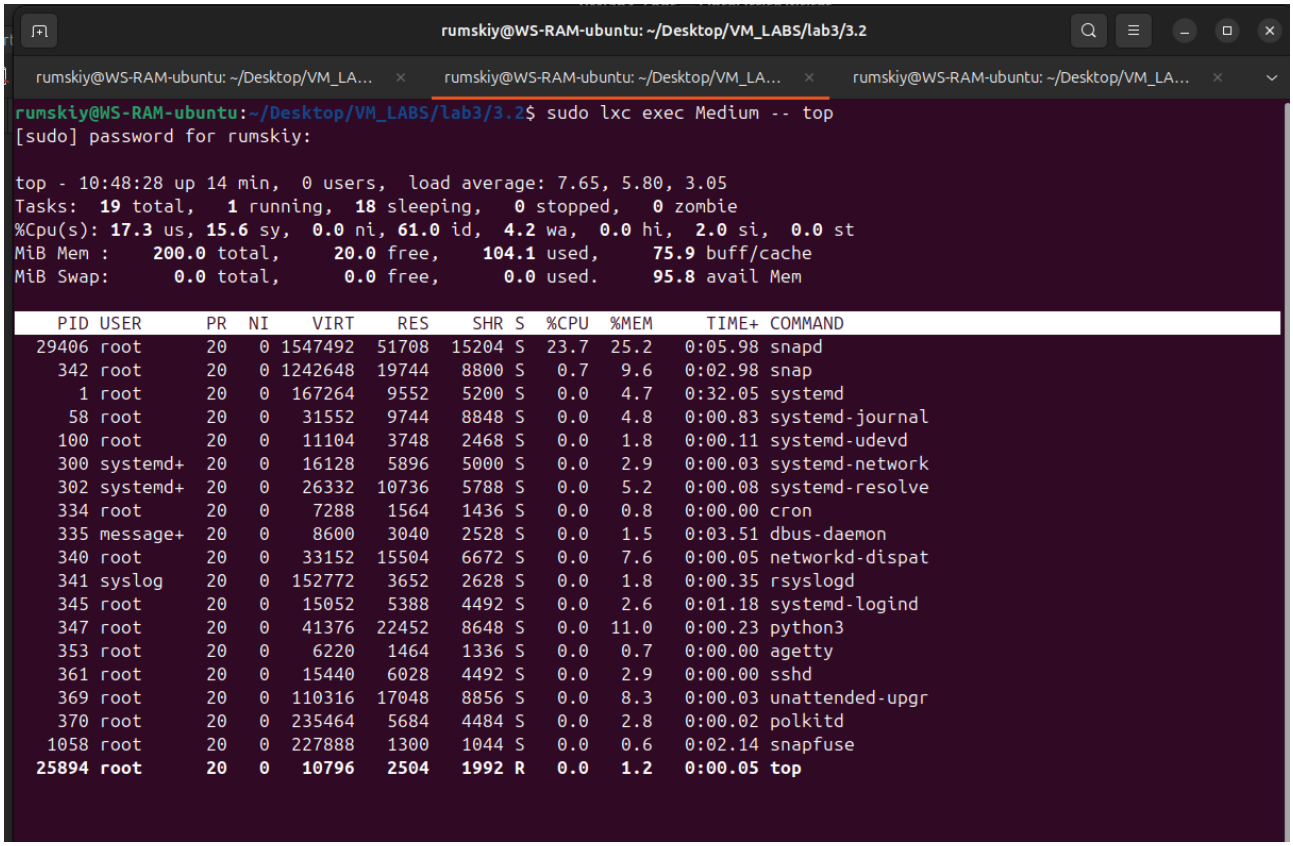


Работа с Medium

До изменения объёма ОЗУ

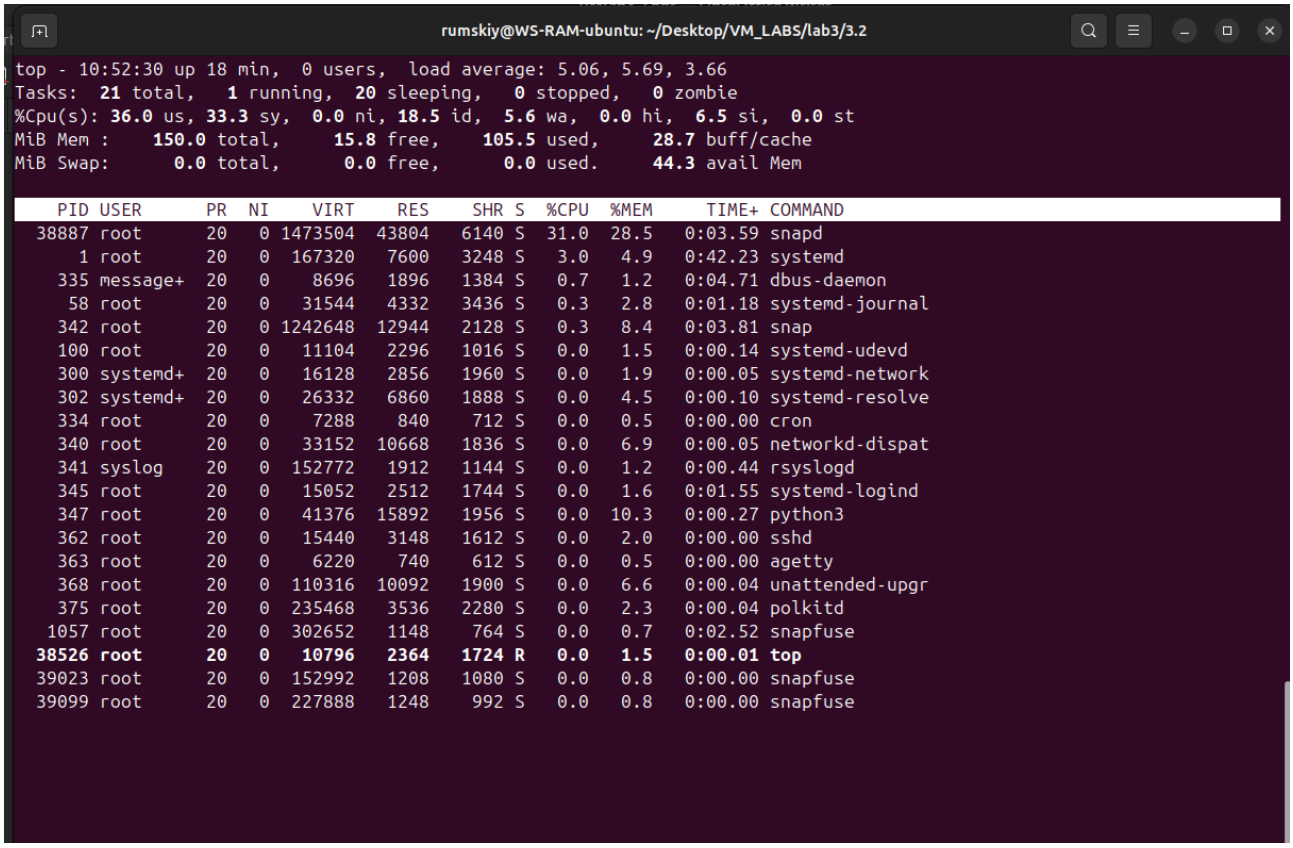


После

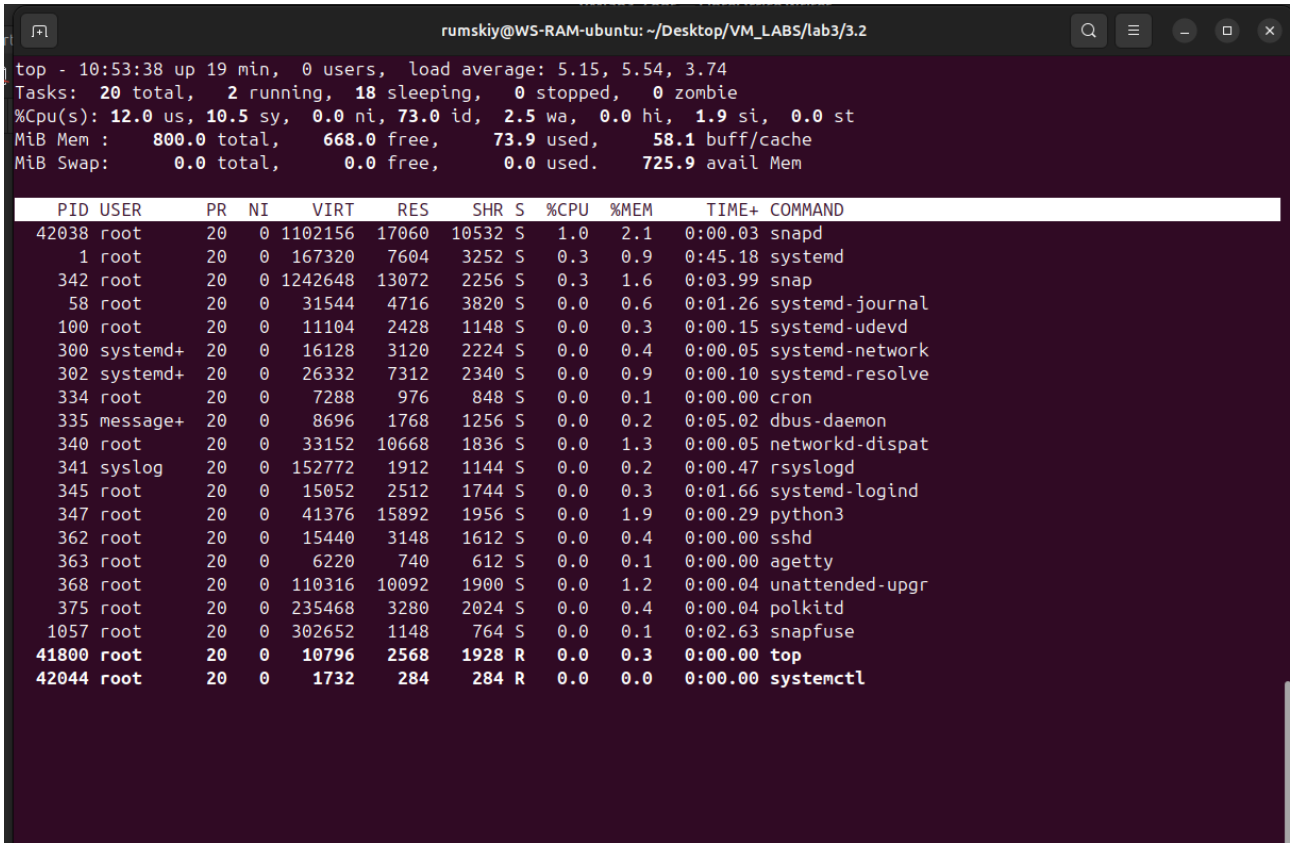

rumskiy@WS-RAM-ubuntu: ~/Desktop/VM_LABS/lab3/3.2
rumskiy@WS-RAM-ubuntu: ~/Desktop/VM_LA...
rumskiy@WS-RAM-ubuntu: ~/Desktop/VM_LA...
rumskiy@WS-RAM-ubuntu: ~/Desktop/VM_LA...
rumskiy@WS-RAM-ubuntu:~/Desktop/VM_LABS/lab3/3.2$ sudo lxc exec Medium -- top
[sudo] password for rumskiy:
top - 10:48:28 up 14 min, 0 users, load average: 7.65, 5.80, 3.05
Tasks: 19 total, 1 running, 18 sleeping, 0 stopped, 0 zombie
%Cpu(s): 17.3 us, 15.6 sy, 0.0 ni, 61.0 id, 4.2 wa, 0.0 hi, 2.0 si, 0.0 st
MiB Mem : 200.0 total, 20.0 free, 104.1 used, 75.9 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 95.8 avail Mem
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
29406 root 20 0 1547492 51708 15204 S 23.7 25.2 0:05.98 snapd
342 root 20 0 1242648 19744 8800 S 0.7 9.6 0:02.98 snap
1 root 20 0 167264 9552 5200 S 0.0 4.7 0:32.05 systemd
58 root 20 0 31552 9744 8848 S 0.0 4.8 0:00.83 systemd-journal
100 root 20 0 11104 3748 2468 S 0.0 1.8 0:00.11 systemd-udevd
300 systemd+ 20 0 16128 5896 5000 S 0.0 2.9 0:00.03 systemd-network
302 systemd+ 20 0 26332 10736 5788 S 0.0 5.2 0:00.08 systemd-resolve
334 root 20 0 7288 1564 1436 S 0.0 0.8 0:00.00 cron
335 message+ 20 0 8600 3040 2528 S 0.0 1.5 0:03.51 dbus-daemon
340 root 20 0 33152 15504 6672 S 0.0 7.6 0:00.05 networkd-dispat
341 syslog 20 0 152772 3652 2628 S 0.0 1.8 0:00.35 rsyslogd
345 root 20 0 15052 5388 4492 S 0.0 2.6 0:01.18 systemd-logind
347 root 20 0 41376 22452 8648 S 0.0 11.0 0:00.23 python3
353 root 20 0 6220 1464 1336 S 0.0 0.7 0:00.00 agetty
361 root 20 0 15440 6028 4492 S 0.0 2.9 0:00.00 sshd
369 root 20 0 110316 17048 8856 S 0.0 8.3 0:00.03 unattended-upgr
370 root 20 0 235464 5684 4484 S 0.0 2.8 0:00.02 polkitd
1058 root 20 0 227888 1300 1044 S 0.0 0.6 0:02.14 snapfuse
25894 root 20 0 10796 2504 1992 R 0.0 1.2 0:00.05 top

Работа с Small

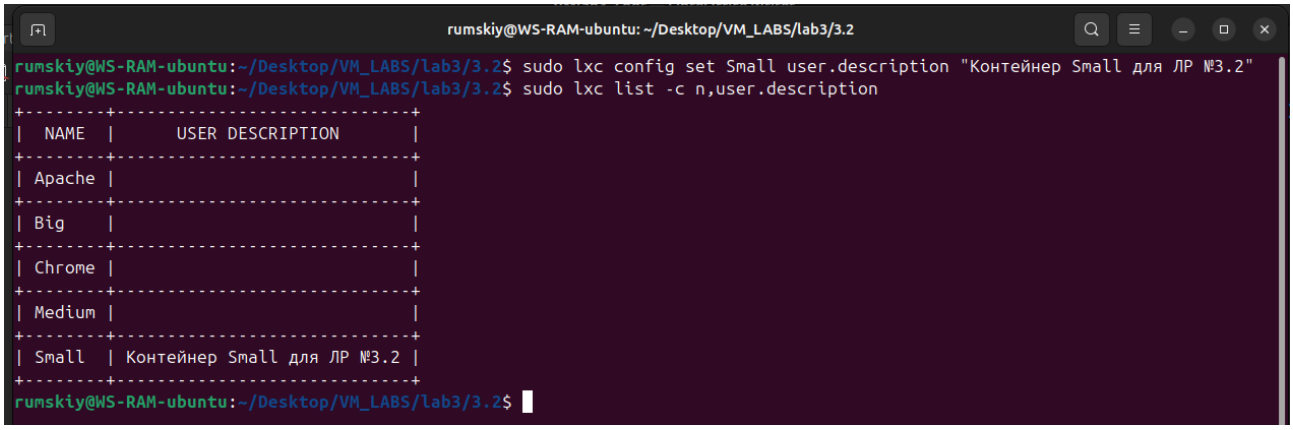
До изменения объёма ОЗУ



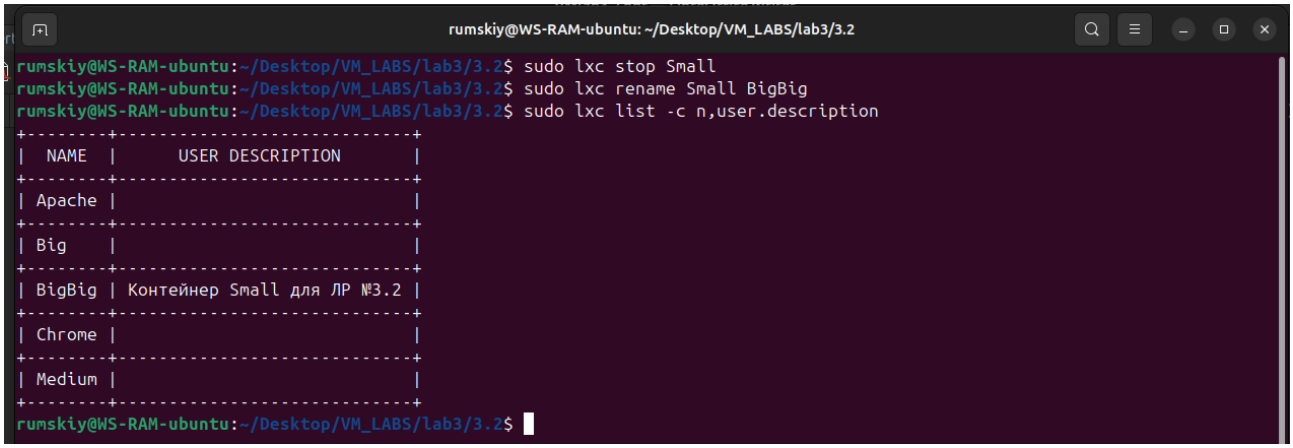
После



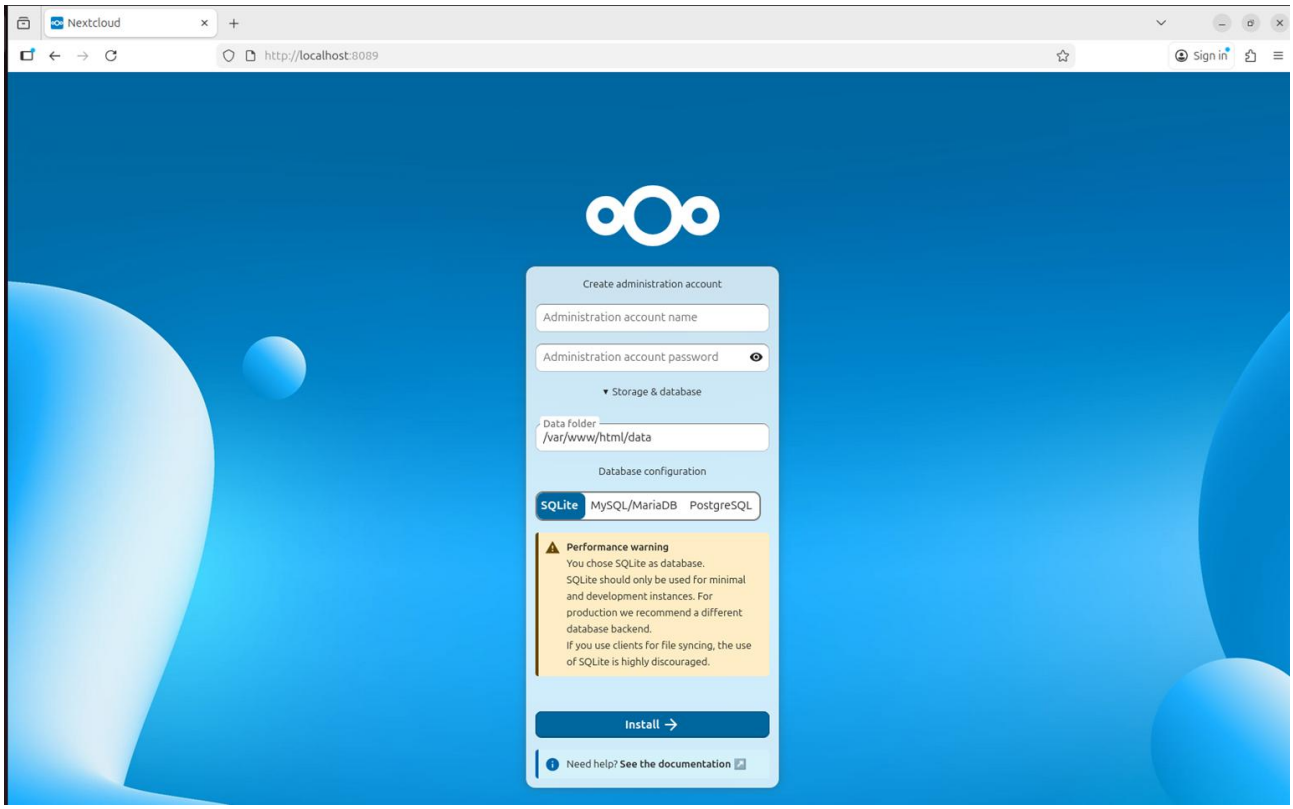
Описание



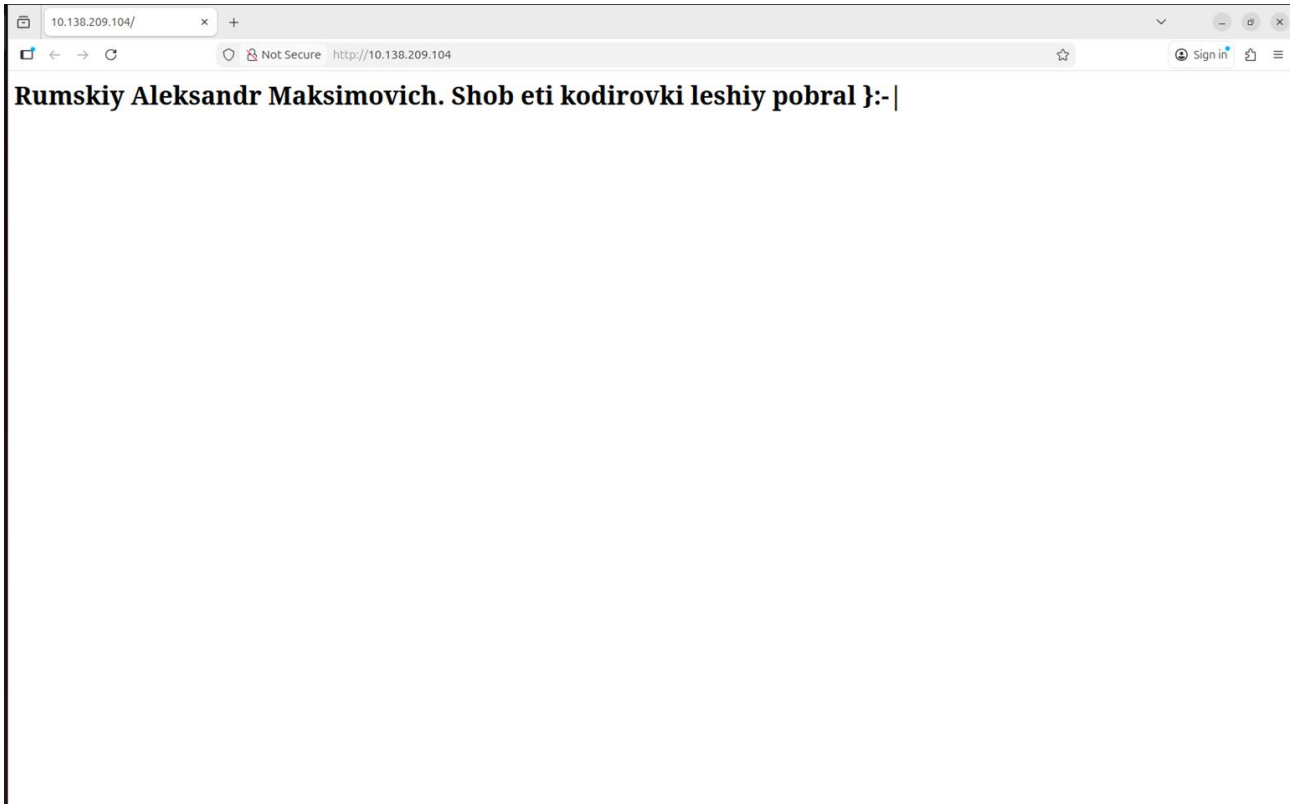
Смена имени



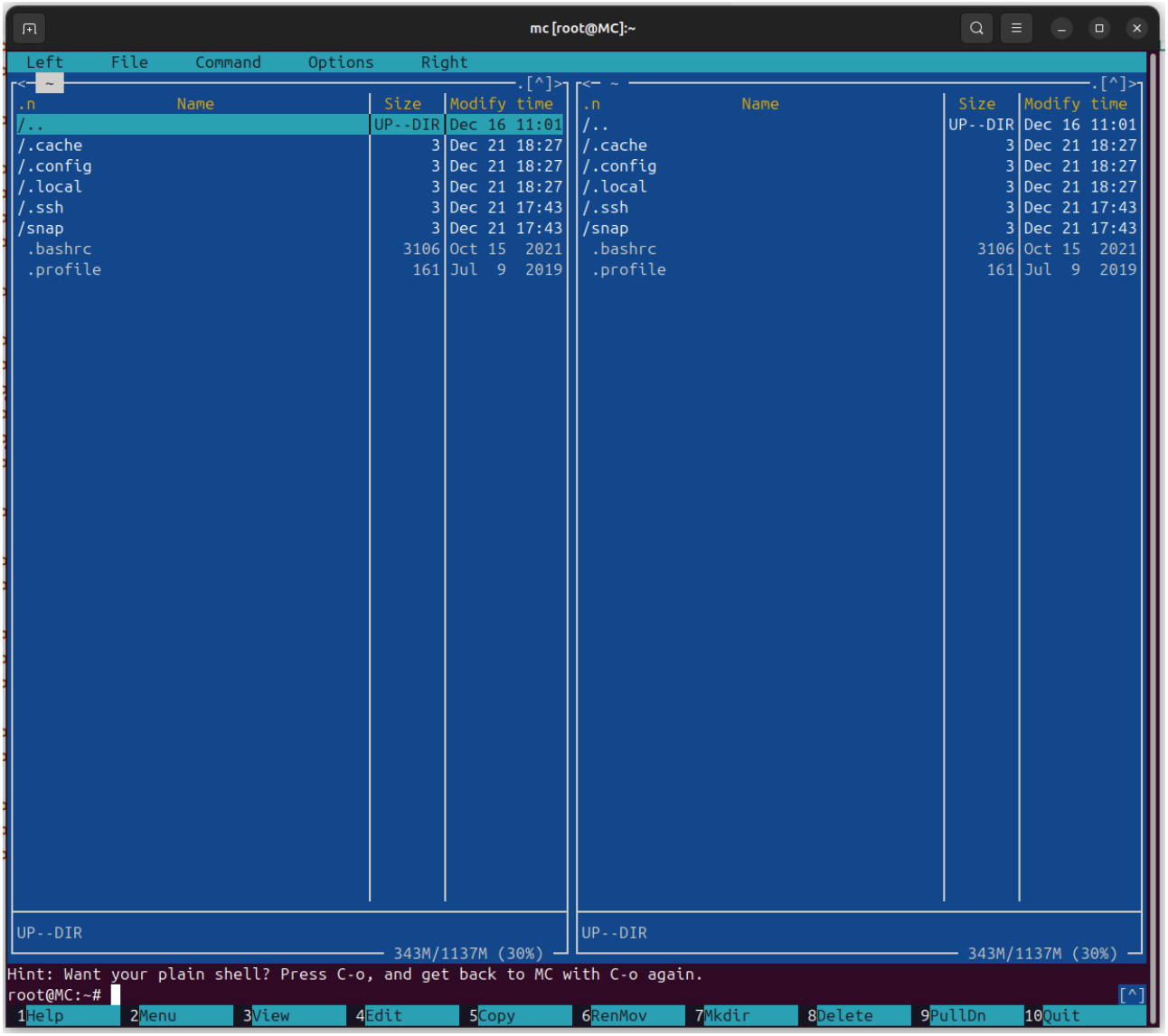
NextCloud



Apache



MidnightCommander



Вывод

В ходе данной лабораторной работы я ознакомился с утилитами создания и управления линукс контейнерами lxd и lxc. Изучил основные команды, методы конфигурации характеристик машин и сетей.