Раздел 1

1. Создайте на сервере для 1 практики ключ ssh при помощи программы ssh-keygen

```
eltex-pg1-v20@eltex-2025-summer-10:40> ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/eltex-pg1-v20/.ssh/id_rsa):
/home/eltex-pg1-v20/.ssh/id_rsa already exists.
Overwrite (y/n)? y
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/eltex-pg1-v20/.ssh/id_rsa
Your public key has been saved in /home/eltex-pg1-v20/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:7IhNGOehxvxoXUDvdmsmGcgX8CDCEdU/Xe0hchwGS8Y eltex-pg1-v20@eltex-2025-summer
The key's randomart image is:
+---[RSA 3072]----+
| .++o.+  .+ooo   |
|  .. o.= oEo= o  |
|    . +.+..+ o . |
|   o B *o..   .  |
|    * = S..      |
|   . B * + .     |
|    + = + +      |
|   .     +       |
|                 |
+----[SHA256]-----+
eltex-pg1-v20@eltex-2025-summer-10:40>
```

2. Скопируйте созданный ключ на сервер для 2 практики для пользователя root при помощи программы ssh-copy-id

```
eltex-pg1-v20@eltex-2025-summer-10:50> ssh-copy-id -i ~/.ssh/*.pub root@172.16.9.194
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/eltex-pg1-v20/.ssh/id_rsa.pub"
The authenticity of host '172.16.9.194 (172.16.9.194)' can't be established.
ED25519 key fingerprint is SHA256:YNVzj+RtetZfXv5XUn/CUjeEcaMD4eg3jy8EuGGIS+o.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
root@172.16.9.194's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'root@172.16.9.194'"
and check to make sure that only the key(s) you wanted were added.
```

3. Подключитесь к серверу для 2 практики под пользователем root и сравните содержимое файла открытого ключа на сервере 1 ~/.ssh/*.pub и файла ~/.ssh/authorized_keys на сервере для 2 практики, а так же права доступа для каждого из файлов

```
eltex-pg1-v20@eltex-2025-summer-11:07> cat ~/.ssh/*.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQC1n58eYCAuudbDfY5HzI+ip7LUiniXIf/bRmhQA92fN2xPEZtHy9oZbnGMTsdbP+CvM9+9mwyNFxEYCkUL
8LkKAEA5h6zcLwNArglEFgyNDBrpO1gYXszDfCpVPHWLJTk5wUjmuODqFkL7dT8gxRuwRS2p/KzpVCV9L7TYByd2fZPPmWvAP07VmDp8uPiblqOIuQYx8z5b
8JbSeep3Kx0ebf5B9BVVZ8wtGULf4TInxHiLb54ElwsJKWasK5KA/ALzXfY3YpXPwi2MaedknjA5UizgNp7qM9iDy8L+7Xd5U39L5KacPo1QAEY9K2csOlDa
I6tsQB8gWTHV/670MTeDQFwW4LsWP71dpAnnar9N+bHABajSbubQTIkzzHBPVD2nBnUOKSvDxMzPXD7qPvqm7zFPQFxZxZvhdaHSQ73URY+grh9qOoBpRoKY
QOB+5pWG4So+Du1G1eAI5vhAafaGximXUA/Q50YW/K2OArwkQ63p9BcIcBS8g3ZBh04YLg0= eltex-pg1-v20@eltex-2025-summer
eltex-pg1-v20@eltex-2025-summer-11:07> ls -l ~/.ssh/*.pub
-rw-r--r-- 1 eltex-pg1-v20 eltex-pg1-v20 585 Jul 11 10:40 /home/eltex-pg1-v20/.ssh/id_rsa.pub
eltex-pg1-v20@eltex-2025-summer-11:07>
```

```
root@eltex-practice2-pg1-v20:~# cat ~/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQC1n58eYCAuudbDfY5HzI+ip7LUiniXIf/bRmhQA92fN2xPEZtHy9oZbnGMTsdbP+CvM9+9mwyNFxEYCkUL
8LkKAEA5h6zcLwNArglEFgyNDBrpO1gYXszDfCpVPHWLJTk5wUjmuODqFkL7dT8gxRuwRS2p/KzpVCV9L7TYByd2fZPPmWvAP07VmDp8uPiblqOIuQYx8z5b
8JbSeep3Kx0ebf5B9BVVZ8wtGULf4TInxHiLb54ElwsJKWasK5KA/ALzXfY3YpXPwi2MaedknjA5UizgNp7qM9iDy8L+7Xd5U39L5KacPo1QAEY9K2csOlDa
I6tsQB8gWTHV/670MTeDQFwW4LsWP71dpAnnar9N+bHABajSbubQTIkzzHBPVD2nBnUOKSvDxMzPXD7qPvqm7zFPQFxZxZvhdaHSQ73URY+grh9qOoBpRoKY
QOB+5pWG4So+Du1G1eAI5vhAafaGximXUA/Q50YW/K2OArwkQ63p9BcIcBS8g3ZBh04YLg0= eltex-pg1-v20@eltex-2025-summer
root@eltex-practice2-pg1-v20:~# ls -l ~/.ssh/authorized_keys
-rw------- 1 root root 585 Jul 11 03:51 /root/.ssh/authorized_keys
root@eltex-practice2-pg1-v20:~#
```

4. Создайте пользователя user1 при помощи команды useradd, укажите необходимость создания домашнего каталога и shell /bin/bash. Создайте пароль пользователю user1

```
cat ~/.ssh/authorized_keys | ls -l ~/.ssh/authorized_keys
   11  sudo groupadd user; history 1 >> practice2_eltex-pg1-v20_part1.log
   15  sudo useradd -g user1 -s /bin/bash user1 ; history 1 >> practice2_eltex-pg1-v20_part1.log
root@eltex-practice2-pg1-v20:~# passwd user1
New password:
Retype new password:
passwd: password updated successfully
root@eltex-practice2-pg1-v20:~#
```

5. Создайте пользователя user2 и user3 при помощи команды adduser

```
root@eltex-practice2-pg1-v20:~# adduser user2; adduser user3 && history 1 >> practice2_eltex-pg1-v20_part1.log
info: Adding user `user2' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `user2' (1002) ...
info: Adding new user `user2' (1002) with group `user2 (1002)' ...
info: Creating home directory `/home/user2' ...
info: Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for user2
Enter the new value, or press ENTER for the default
        Full Name []: KA
        Room Number []: 7
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n] Y
info: Adding new user `user2' to supplemental / extra groups `users' ...
info: Adding user `user2' to group `users' ...
info: Adding user `user3' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `user3' (1003) ...
info: Adding new user `user3' (1003) with group `user3 (1003)' ...
info: Creating home directory `/home/user3' ...
```

6. Для пользователя user3 смените shell на /usr/sbin/nologin (man usermod), выполните вход под этим пользователем при помощи утилиты su, сначала без дополнительных параметров, затем с явным указанием shell /bin/bash в параметрах su. Выполните logout

```
root@eltex-practice2-pg1-v20:~# su -s /bin/bash user3
user3@eltex-practice2-pg1-v20:/root$ logout
bash: logout: not login shell: use `exit'
user3@eltex-practice2-pg1-v20:/root$ exit
exit
root@eltex-practice2-pg1-v20:~# su user3
This account is currently not available.
root@eltex-practice2-pg1-v20:~#
```

7. Создайте новую группу и добавьте её для всех пользователей user* как дополнительную, посмотрите список групп всех пользователей user*

```
root@eltex-practice2-pg1-v20:~# addgroup user_x
info: Selecting GID from range 1000 to 59999 ...
info: Adding group `user_x' (GID 1004) ...
root@eltex-practice2-pg1-v20:~# usermod -aG user_x user1; usermod -aG user_x user2; usermod -aG user_x user3 && history
1 >> practice2_eltex-pg1-v20_part1.log
root@eltex-practice2-pg1-v20:~# man getent
root@eltex-practice2-pg1-v20:~# getent group user_x && history 1 >> practice2_eltex-pg1-v20_part1.log
user_x:x:1004:user1,user2,user3
root@eltex-practice2-pg1-v20:~#
```

8. Создайте каталог /opt/share и назначьте группу из предыдущего пункта его владельцем, установите на этот каталог бит SGID, права для группы rwx.

```
root@eltex-practice2-pg1-v20:~# mkdir -p /opt/share
root@eltex-practice2-pg1-v20:~# chown .user_x /opt/share && history 1 >> practice2_eltex-pg1-v20_part1.log
chown: warning: '.' should be ':': ‘.user_x’
root@eltex-practice2-pg1-v20:~# find / -group user_x
/opt/share
^C
```

```
root@eltex-practice2-pg1-v20:~# chmod g+s+rwx /opt/share/ && history 1 >> practice2_eltex-pg1-v20_part1.log
root@eltex-practice2-pg1-v20:~# ls -ld /opt/share
drwxrwsr-x 2 root user_x 4096 Jul 11 05:50 /opt/share
root@eltex-practice2-pg1-v20:~#
```

9. Для user1 задайте перманентно umask, снимающий право чтения для «прочих»

```
# ~/.profile: executed by the command interpreter for login shells.
# This file is not read by bash(1), if ~/.bash_profile or ~/.bash_login
# exists.
# see /usr/share/doc/bash/examples/startup-files for examples.
# the files are located in the bash-doc package.

# the default umask is set in /etc/profile; for setting the umask
# for ssh logins, install and configure the libpam-umask package.
umask 007

# if running bash
if [ -n "$BASH_VERSION" ]; then
    # include .bashrc if it exists
    if [ -f "$HOME/.bashrc" ]; then
        . "$HOME/.bashrc"
    fi
fi

# set PATH so it includes user's private bin if it exists
if [ -d "$HOME/bin" ] ; then
    PATH="$HOME/bin:$PATH"
fi
```

10. Создайте каждым из пользователей новые файлы в каталоге /opt/share, удалите файлы созданные другими пользователями

```
user1@eltex-practice2-pg1-v20:/$ touch /opt/share/test1.txt
user1@eltex-practice2-pg1-v20:/$ su user2
Password:
user2@eltex-practice2-pg1-v20:/$ touch /opt/share/test2.txt && rm -f /opt/share/test1.txt
user2@eltex-practice2-pg1-v20:/$ ls /opt/share
test2.txt
```

```
user3@eltex-practice2-pg1-v20:~$ touch /opt/share/test3.txt && rm -f /opt/share/test2.txt
user3@eltex-practice2-pg1-v20:~$ ls /opt/share
test3.txt
user3@eltex-practice2-pg1-v20:~$ su user1
Password:
user1@eltex-practice2-pg1-v20:/home/user3$ cd
user1@eltex-practice2-pg1-v20:~$ touch /opt/share/test1.txt && rm -f /opt/share/test3.txt
user1@eltex-practice2-pg1-v20:~$ ls /opt/share
test1.txt
user1@eltex-practice2-pg1-v20:~$
```

11. Повторите предыдущий пункт, предварительно установив sticky bit на каталоге /opt/share

```
root@eltex-practice2-pg1-v20:~# chmod 1755 /opt/share && history 1 >> practice2_eltex-pg1-v20_part1.log
root@eltex-practice2-pg1-v20:~# stat -c "%a" /opt/share && history 1 >> practice2_eltex-pg1-v20_part1.log
3755
```

```
root@eltex-practice2-pg1-v20:~# su user1
user1@eltex-practice2-pg1-v20:/root$ cd
user1@eltex-practice2-pg1-v20:~$ touch /opt/share/test1.txt
user1@eltex-practice2-pg1-v20:~$ ls /opt/share
test1.txt
user1@eltex-practice2-pg1-v20:~$ su user2
Password:
user2@eltex-practice2-pg1-v20:/home/user1$ cd
user2@eltex-practice2-pg1-v20:~$ rm -f /opt/share/test1.txt && touch /opt/share/test2.txt
rm: cannot remove '/opt/share/test1.txt': Permission denied
user2@eltex-practice2-pg1-v20:~$ ls /opt/share
test1.txt
user2@eltex-practice2-pg1-v20:~$ touch /opt/share/test2.txt
touch: cannot touch '/opt/share/test2.txt': Permission denied
user2@eltex-practice2-pg1-v20:~$ su -
Password:
root@eltex-practice2-pg1-v20:~# su -s /bin/bash user3
user3@eltex-practice2-pg1-v20:/root$ cd
user3@eltex-practice2-pg1-v20:~$ rm -f /opt/share/test1.txt && touch /opt/share/test3.txt
rm: cannot remove '/opt/share/test1.txt': Permission denied
user3@eltex-practice2-pg1-v20:~$
```

12. Разрешите user1 выполнять привилегированную команду dmesg при помощи команды sudo, а user2 – при помощи скрипта на языке bash с установленным флагом SUID

```
# User privilege specification
root    ALL=(ALL:ALL) ALL
user1 ALL=(ALL) NOPASSWD: /usr/bin/dmesg
# Members of the admin group may gain root privileges
%admin ALL=(ALL) ALL

# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL

# See sudoers(5) for more information on "@include" directives:

@includedir /etc/sudoers.d
```

```
[309344.462871] audit: type=1400 audit(1752509791.733:430): apparmor="DENIED" operation="mknod
untu_pro_esm_cache" name="/usr/lib/python3/dist-packages/uaclient/__pycache__/exceptions.cpyth
" pid=40676 comm="python3" requested_mask="c" denied_mask="c" fsuid=0 ouid=0
[309344.467452] audit: type=1400 audit(1752509791.738:431): apparmor="DENIED" operation="mknod
untu_pro_esm_cache" name="/usr/lib/python3/dist-packages/uaclient/messages/__pycache__/__init_
4315056" pid=40676 comm="python3" requested_mask="c" denied_mask="c" fsuid=0 ouid=0
[309344.468170] audit: type=1400 audit(1752509791.738:432): apparmor="DENIED" operation="mknod
untu_pro_esm_cache" name="/usr/lib/python3/dist-packages/uaclient/messages/__pycache__/urls.cp
056" pid=40676 comm="python3" requested_mask="c" denied_mask="c" fsuid=0 ouid=0
user1@eltex-practice2-pg1-v20:~$
```

```
#!/bin/bash
/usr/bin/dmesg
```

```
root@eltex-practice2-pg1-v20:~# sudo chown root:root /usr/local/bin/dmesg_wrapper
root@eltex-practice2-pg1-v20:~# ls -ld /usr/local/bin/dmesg_wrapper
-rwxr-xr-x 1 root root 27 Jul 14 16:28 /usr/local/bin/dmesg_wrapper
root@eltex-practice2-pg1-v20:~# stat -c "%a" /usr/local/bin/dmesg_wrapper
755
root@eltex-practice2-pg1-v20:~# sudo chmod 4755 /usr/local/bin/dmesg_wrapper
root@eltex-practice2-pg1-v20:~# stat -c "%a" /usr/local/bin/dmesg_wrapper
4755
root@eltex-practice2-pg1-v20:~# ls -ld /usr/local/bin/dmesg_wrapper
-rwsr-xr-x 1 root root 27 Jul 14 16:28 /usr/local/bin/dmesg_wrapper
root@eltex-practice2-pg1-v20:~# su - user2
user2@eltex-practice2-pg1-v20:~$ /usr/local/bin/dmesg_wrapper
dmesg: read kernel buffer failed: Operation not permitted
user2@eltex-practice2-pg1-v20:~$ su -
```

13. Для всех пользователей user* задайте время действия пароля – 10 дней.

```
root@eltex-practice2-pg1-v20:~# for user in $(getent passwd | awk -F: '$1 ~ /^user/ {print $1}'); do
>     sudo chage -M 10 "$user"
>     echo "Настроен срок пароля 10 дней для $user"
> done ; history 1 >> practice2_eltex-pg1-v20_part1.log
Настроен срок пароля 10 дней для user1
Настроен срок пароля 10 дней для user2
Настроен срок пароля 10 дней для user3
root@eltex-practice2-pg1-v20:~#
```

14. Отредактируйте файл /etc/motd, вписав туда свое имя и фамилию

```
 GNU nano 7.2                                                    /etc/m
Комаров Андрей Геннадьевич
```

15. Создайте копию содержимого каталога /etc в каталог /root/etc_backup при помощи программы rcync

```
            840 100%    1.42kB/s    0:00:00 (xfr#858, to-chk=1/1744)
xml/xml-core.xml.old
            673 100%    1.14kB/s    0:00:00 (xfr#859, to-chk=0/1744)
root@eltex-practice2-pg1-v20:~# ls -la /root/etc_backup/
total 940
drwxr-xr-x 109 root root       4096 Jul 14 16:57 .
drwx------   6 root root       4096 Jul 14 17:02 ..
-rw-r--r--   1 root root       3444 Jul  5  2023 adduser.conf
drwxr-xr-x   2 root root       4096 Feb 16 21:04 alternatives
drwxr-xr-x   2 root root       4096 Feb 16 20:57 apparmor
```

16. Заархивируйте содержимое каталога /root/etc_backup архиватором tar, используйте алгоритмы сжатия gzip, bzip2, 7zip, сравните размеры полученных файлов

```
root@eltex-practice2-pg1-v20:~# ls -hl archive.*
-rw-r--r-- 1 root root 4.5M Jul 15 07:44 archive.7z
-rw-r--r-- 1 root root 553K Jul 15 07:48 archive.tar.bz2
-rw-r--r-- 1 root root 583K Jul 15 07:38 archive.tar.gz
root@eltex-practice2-pg1-v20:~#
```

17. Отредактируйте файл /etc/motd, вписав туда текущую дату и время, синхронизируйте каталог /root/etc_backup с каталогом /etc при помощи rsync, добавьте файл motd в архив, сжатый gzip

```
root@eltex-practice2-pg1-v20:~# cat /etc/motd
Комаров Андрей Геннадьевич
Tue Jul 15 07:51:50 AM UTC 2025
root@eltex-practice2-pg1-v20:~#
```

```
root@eltex-practice2-pg1-v20:~# rsync -av --delete /etc/ /root/etc_backup/
sending incremental file list

sent 69,867 bytes  received 260 bytes  140,254.00 bytes/sec
total size is 2,366,423  speedup is 33.74
root@eltex-practice2-pg1-v20:~#
```

```
root@eltex-practice2-pg1-v20:~# gunzip archive.tar.gz && history 1 >> practice2_eltex-pg1-v20_part1.log
root@eltex-practice2-pg1-v20:~# tar -rf archive.tar -C /etc motd && history 1 >> practice2_eltex-pg1-v20_part1.log
root@eltex-practice2-pg1-v20:~# gzip archive.tar && history 1 >> practice2_eltex-pg1-v20_part1.log
root@eltex-practice2-pg1-v20:~# ls
archive.7z  archive.tar.bz2  archive.tar.gz  etc_backup  practice2_eltex-pg1-v20_part1.log
root@eltex-practice2-pg1-v20:~#
```

18. Сравните содержимое архива, упакованного bzip2 с сорержимым каталога /root/etc_backup

```
root@eltex-practice2-pg1-v20:~# tar -tvjf archive.tar.bz2 | sort -k6 > archive_contents.txt && history 1 >> practice2_el
tex-pg1-v20_part1.log
root@eltex-practice2-pg1-v20:~# ls -lR /root/etc_backup | awk '{print $1, $3, $4, $5, $6, $7, $8, $9}' | sort -k8 > dir_
contents.txt && history 1 >> practice2_eltex-pg1-v20_part1.log
root@eltex-practice2-pg1-v20:~# diff -u archive_contents.txt dir_contents.txt && history 1 >> practice2_eltex-pg1-v20_pa
rt1.log
--- archive_contents.txt        2025-07-15 08:07:50.434323096 +0000
+++ dir_contents.txt    2025-07-15 08:08:24.785969564 +0000
@@ -1,1744 +1,2452 @@
-drwxr-xr-x root/root         0 2025-07-14 16:57 root/etc_backup/
-rw-r--r-- root/root      3444 2023-07-05 17:42 root/etc_backup/adduser.conf
-drwxr-xr-x root/root         0 2025-02-16 21:04 root/etc_backup/alternatives/
-lrwxrwxrwx root/root         0 2025-02-16 21:04 root/etc_backup/alternatives/arptables-restore -> /usr/sbin/arptables-n
ft-restore
```

19. Распакуйте архивы etc_backup, упакованные gzip и 7zip в каталоги /root/etc_backup_gzip и /root/etc_backup_7zip, сравните программой diff файлы motd в этих каталогах.

```
root@eltex-practice2-pg1-v20:~# diff -u etc_backup_gzip/motd etc_backup_7zip/etc_backup/motd
--- etc_backup_gzip/motd        2025-07-15 07:51:50.000000000 +0000
+++ etc_backup_7zip/etc_backup/motd     2025-07-14 16:57:11.273723400 +0000
@@ -1,2 +1 @@
 Комаров Андрей Геннадьевич
-Tue Jul 15 07:51:50 AM UTC 2025
root@eltex-practice2-pg1-v20:~#
```