

## Доработка практического задания по уроку №5 «Устройство файловой системы Linux. Понятие файла и каталога»

4. Создать группу developer и нескольких пользователей, входящих в нее. Создать директорию для совместной работы. Сделать так, чтобы созданные одними пользователями файлы могли изменять другие пользователи этой группы

Решение

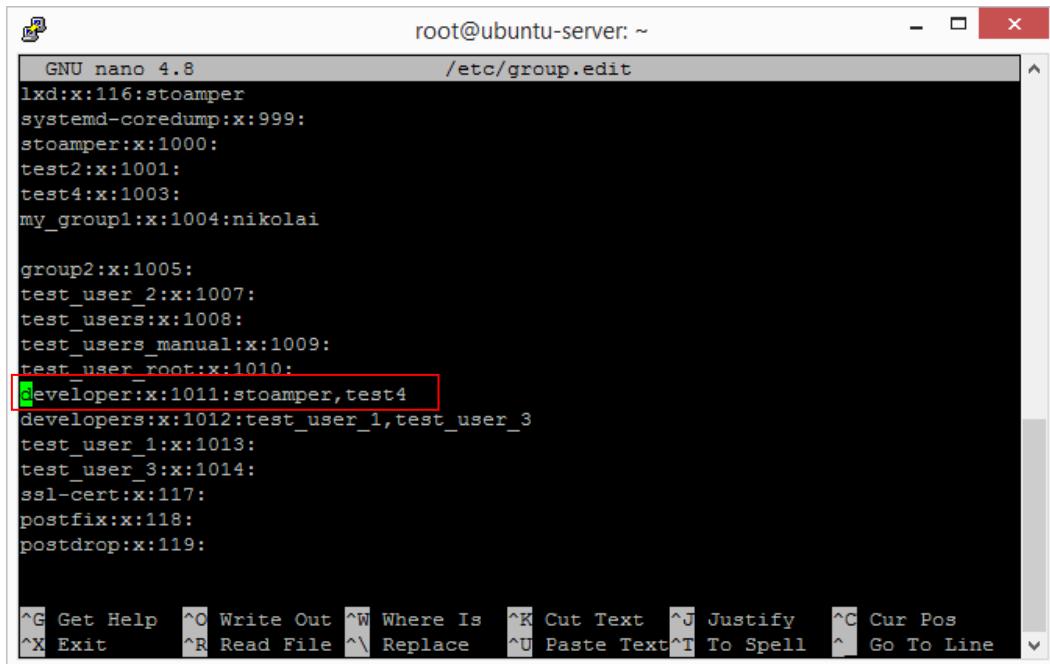
- Создаем директорию developer

```
root@ubuntu-server: /  
#includedir /etc/sudoers.d  
root@ubuntu-server:/bin# ls -l /etc/sudoers  
-r--r----- 1 root root 887 Sep 21 15:09 /etc/sudoers  
root@ubuntu-server:/bin# id  
uid=0(root) gid=0(root) groups=0(root),1011(developer)  
root@ubuntu-server:/bin# cd ..  
root@ubuntu-server:# id  
uid=0(root) gid=0(root) groups=0(root),1011(developer)  
root@ubuntu-server:# cp /bin/id /home/stoamper/  
root@ubuntu-server:# chmod u+s /home/stoamper/id  
root@ubuntu-server:# mkdir developer  
mkdir: cannot create directory 'developer': File exists  
root@ubuntu-server:# cd developer/  
root@ubuntu-server:/developer# ls -la  
total 8  
drwxr-xr-x 2 root developer 4096 Sep 24 11:40 .  
drwxr-xr-x 23 root root 4096 Sep 28 17:16 ..  
-rw-r--r-- 1 root root 0 Sep 24 11:40 test_file.txt  
root@ubuntu-server:/developer# cd ..  
root@ubuntu-server:# rmdir developer/  
rmdir: failed to remove 'developer/': Directory not empty  
root@ubuntu-server:# rm -r developer/  
root@ubuntu-server:# mkdir developer  
root@ubuntu-server:#
```

- Просматриваем права на созданную директорию и с помощью команды chown изменим группу владельцев директории с root на developer

```
root@ubuntu-server: /  
root@ubuntu-server:/bin# id  
uid=0(root) gid=0(root) groups=0(root),1011(developer)  
root@ubuntu-server:/bin# cd ..  
root@ubuntu-server:# id  
uid=0(root) gid=0(root) groups=0(root),1011(developer)  
root@ubuntu-server:# cp /bin/id /home/stoamper/  
root@ubuntu-server:# chmod u+s /home/stoamper/id  
root@ubuntu-server:# mkdir developer  
mkdir: cannot create directory 'developer': File exists  
root@ubuntu-server:# cd developer/  
root@ubuntu-server:/developer# ls -la  
total 8  
drwxr-xr-x 2 root developer 4096 Sep 24 11:40 .  
drwxr-xr-x 23 root root 4096 Sep 28 17:16 ..  
-rw-r--r-- 1 root root 0 Sep 24 11:40 test_file.txt  
root@ubuntu-server:/developer# cd ..  
root@ubuntu-server:# rmdir developer/  
rmdir: failed to remove 'developer/': Directory not empty  
root@ubuntu-server:# rm -r developer/  
root@ubuntu-server:# mkdir developer  
root@ubuntu-server:# ls -lhd developer  
drwxr-xr-x 2 root root 4.0K Oct 2 08:03 developer  
root@ubuntu-server:# chown :developer /developer  
root@ubuntu-server:#
```

- С помощью команды `vigr` открываем на редактирование файл с информацией по группам и добавляем в группу developer пользователей `test4` и `stoamper`

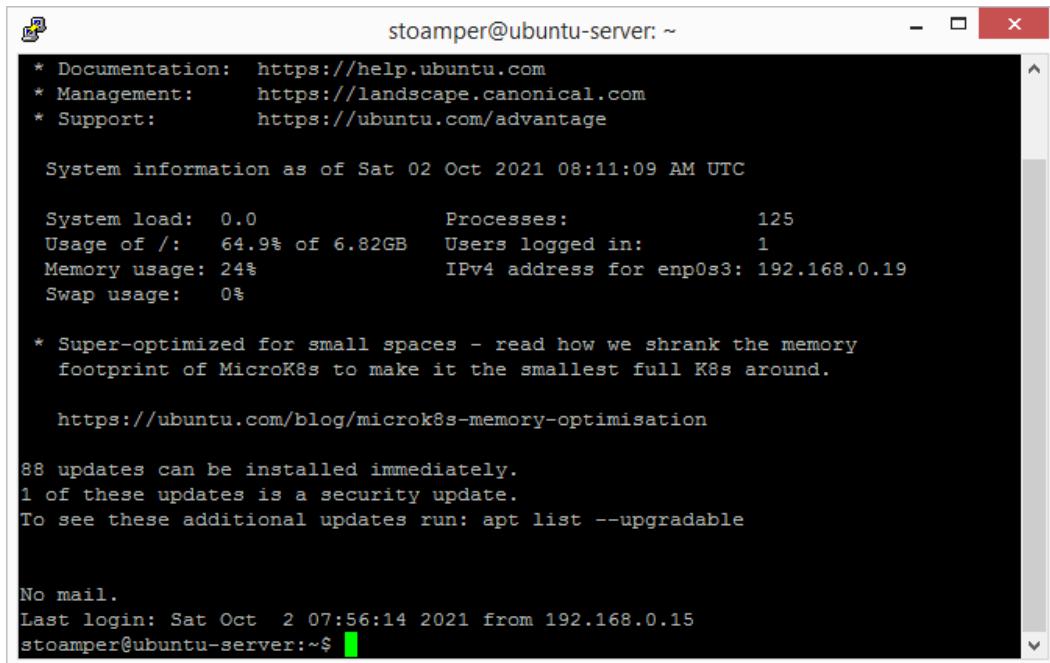


```
GNU nano 4.8          /etc/group.edit
1xd:x:116:stoamper
systemd-coredump:x:999:
stoamper:x:1000:
test2:x:1001:
test4:x:1003:
my_group1:x:1004:nikolai

group2:x:1005:
test_user_2:x:1007:
test_users:x:1008:
test_users_manual:x:1009:
test_user_root:x:1010:
developer:x:1011:stoamper,test4
developers:x:1012:test_user_1,test_user_3
test_user_1:x:1013:
test_user_3:x:1014:
ssl-cert:x:117:
postfix:x:118:
postdrop:x:119:

^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos
^X Exit      ^R Read File  ^\ Replace   ^U Paste Text^T To Spell  ^ Go To Line
```

- Открываем другое окно терминала и заходим под пользователем `stoamper`.



```
* Documentation:  https://help.ubuntu.com
* Management:    https://landscape.canonical.com
* Support:       https://ubuntu.com/advantage

System information as of Sat 02 Oct 2021 08:11:09 AM UTC

System load:  0.0          Processes:           125
Usage of /:   64.9% of 6.82GB  Users logged in:     1
Memory usage: 24%          IPv4 address for enp0s3: 192.168.0.19
Swap usage:   0%

* Super-optimized for small spaces - read how we shrank the memory
  footprint of MicroK8s to make it the smallest full K8s around.

https://ubuntu.com/blog/microk8s-memory-optimisation

88 updates can be installed immediately.
1 of these updates is a security update.
To see these additional updates run: apt list --upgradable

No mail.
Last login: Sat Oct  2 07:56:14 2021 from 192.168.0.15
stoamper@ubuntu-server:~$
```

- С помощью команды `./id` проверяем его свойства. Несмотря на то, что ранее пользователи `stoamper` и `test4` были добавлены в группу `developer`, информация об этом не появилась. Для этого нужно перезайти в терминал.

```

stoamper@ubuntu-server: ~
uid=1000(stoamper) gid=1000(stoamper) groups=1000(stoamper),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),116(lxd)
stoamper@ubuntu-server:~$ ,id

Command ',id' not found, did you mean:

  command 'aid' from deb id-utils (4.6+git20120811-4ubuntu2)
  command 'fid' from deb id-utils (4.6+git20120811-4ubuntu2)
  command 'eid' from deb id-utils (4.6+git20120811-4ubuntu2)
  command 'gid' from deb id-utils (4.6+git20120811-4ubuntu2)
  command 'jid' from deb jid (0.7.3-1)
  command 'kid' from deb python-kid (0.9.6-3build1)
  command 'id' from deb coreutils (8.30-3ubuntu2)
  command 'lid' from deb id-utils (4.6+git20120811-4ubuntu2)

Try: sudo apt install <deb name>

stoamper@ubuntu-server:~$ ./id
uid=1000(stoamper) gid=1000(stoamper) euid=0(root) groups=1000(stoamper),4(adm),
24(cdrom),27(sudo),30(dip),46(plugdev),116(lxd)
stoamper@ubuntu-server:~$ ./id
uid=1000(stoamper) gid=1000(stoamper) euid=0(root) groups=1000(stoamper),4(adm),
24(cdrom),27(sudo),30(dip),46(plugdev),116(lxd)
stoamper@ubuntu-server:~$ 
```

- После перезапуска терминала информация обновилась

```

stoamper@ubuntu-server: ~
System information as of Sat 02 Oct 2021 08:11:09 AM UTC

System load: 0.0          Processes: 125
Usage of /: 64.9% of 6.82GB  Users logged in: 1
Memory usage: 24%          IPv4 address for enp0s3: 192.168.0.19
Swap usage: 0%          

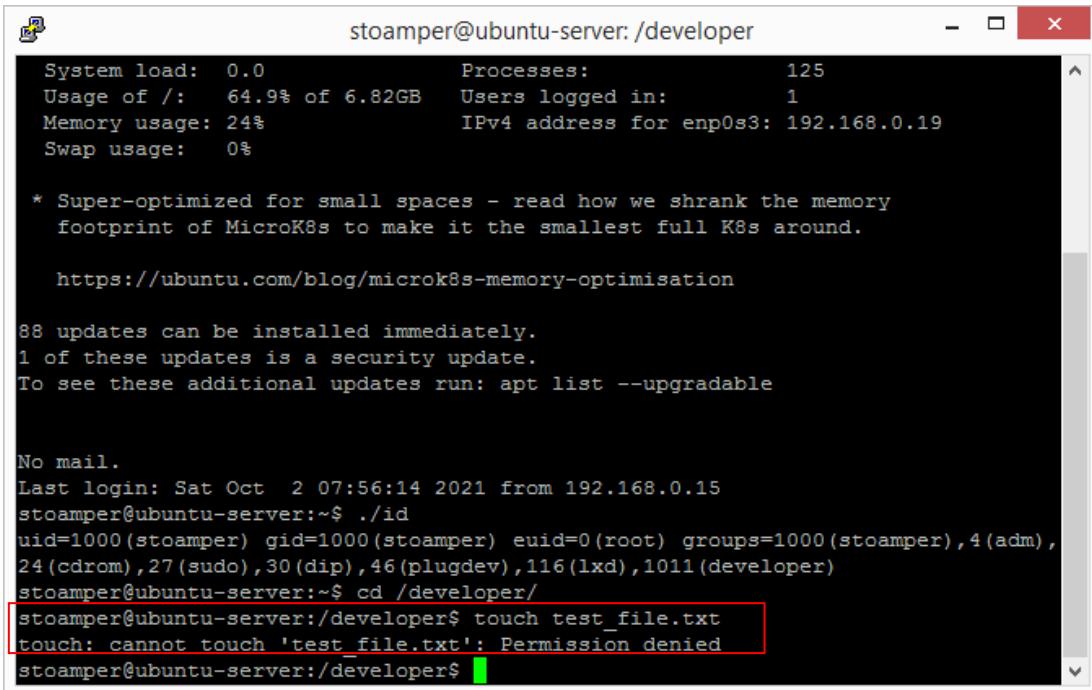
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No mail.
Last login: Sat Oct  2 07:56:14 2021 from 192.168.0.15
stoamper@ubuntu-server:~$ ./id
uid=1000(stoamper) gid=1000(stoamper) euid=0(root) groups=1000(stoamper),4(adm),
24(cdrom),27(sudo),30(dip),46(plugdev),116(lxd),1011(developer)
stoamper@ubuntu-server:~$ 
```

- Переходим в директорию developer и пробуем создать файл.



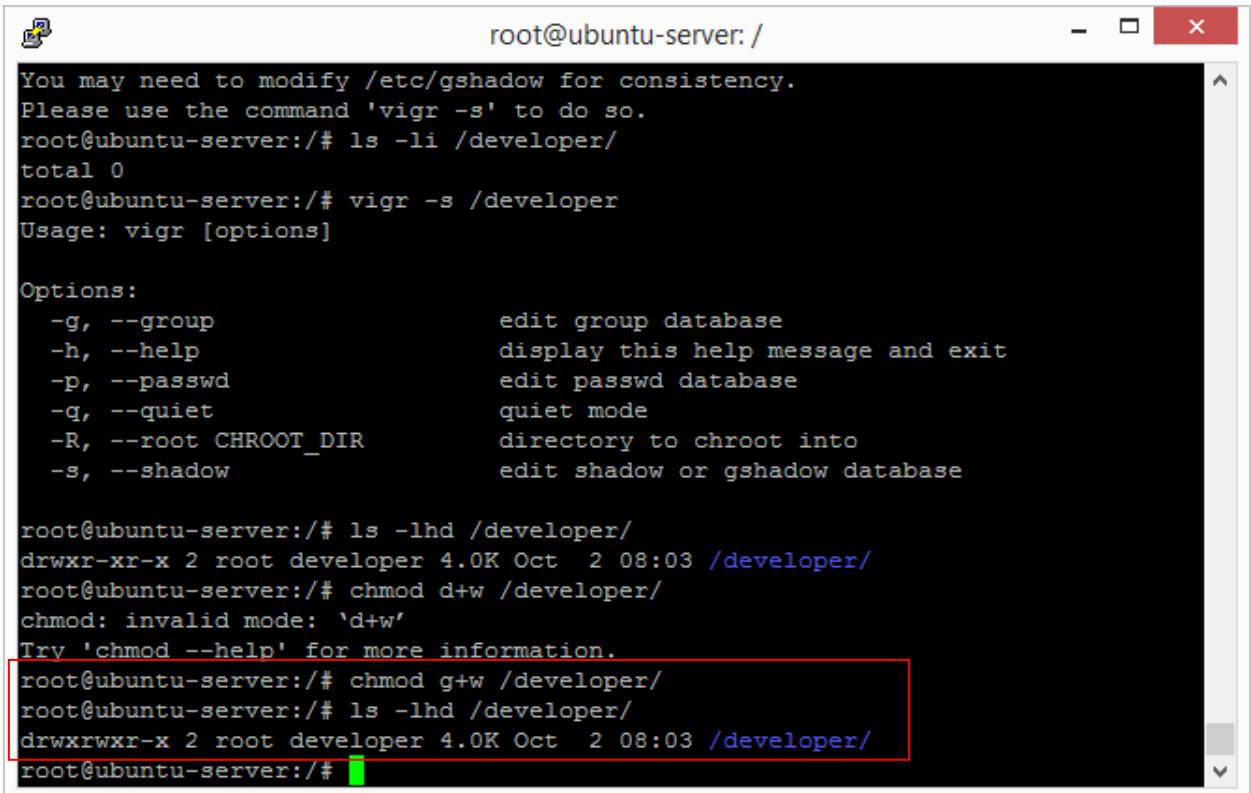
```
stoamper@ubuntu-server: /developer
System load: 0.0          Processes: 125
Usage of /: 64.9% of 6.82GB  Users logged in: 1
Memory usage: 24%          IPv4 address for enp0s3: 192.168.0.19
Swap usage: 0%
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No mail.
Last login: Sat Oct  2 07:56:14 2021 from 192.168.0.15
stoamper@ubuntu-server:~$ ./id
uid=1000(stoamper) gid=1000(stoamper) euid=0(root) groups=1000(stoamper),4(adm),
24(cdrom),27(sudo),30(dip),46(plugdev),116(lxd),1011(developer)
stoamper@ubuntu-server:~$ cd /developer/
stoamper@ubuntu-server:/developer$ touch test_file.txt
touch: cannot touch 'test_file.txt': Permission denied
stoamper@ubuntu-server:/developer$
```

- Возникает ошибка по причине отсутствия у группы developer права на запись в эту директорию. Чтобы изменить права воспользуемся командой chmod g+w /developer. Теперь для группы developer доступны права на запись

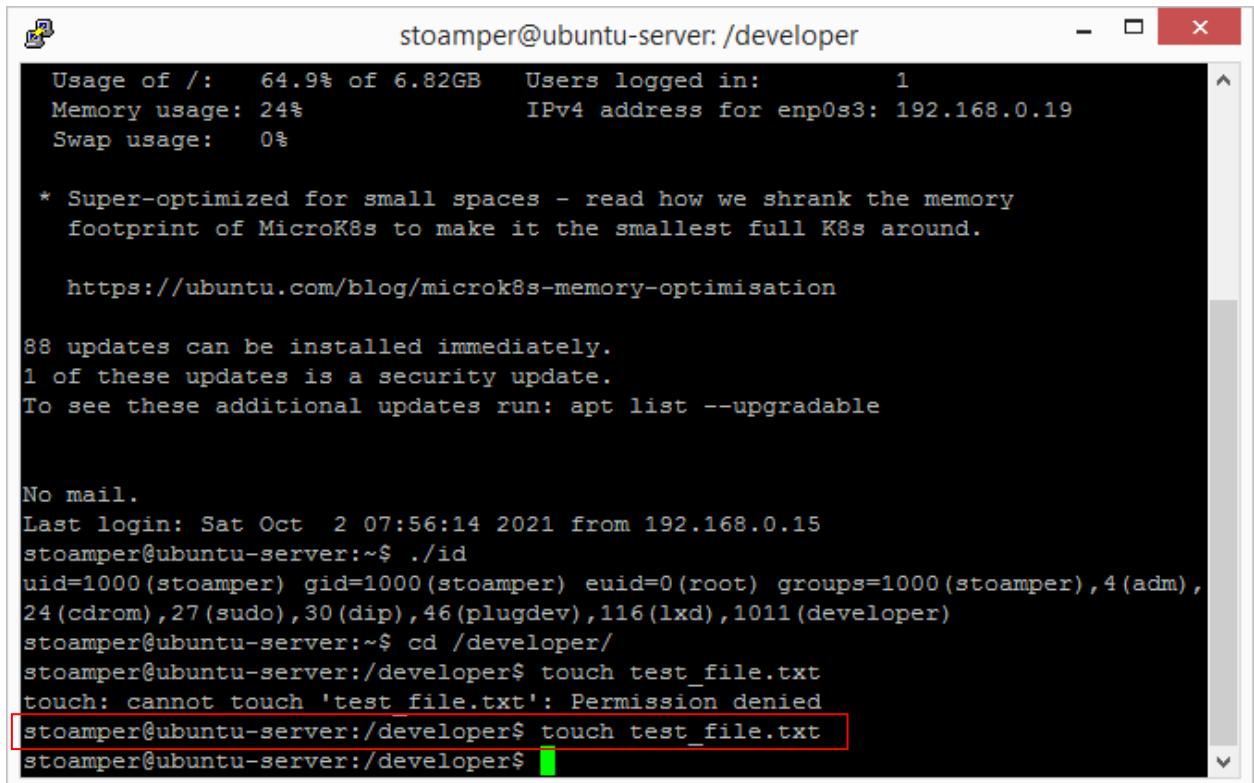


```
root@ubuntu-server: /
You may need to modify /etc/gshadow for consistency.
Please use the command 'vigr -s' to do so.
root@ubuntu-server:~# ls -li /developer/
total 0
root@ubuntu-server:~# vigr -s /developer
Usage: vigr [options]

Options:
  -g, --group                  edit group database
  -h, --help                    display this help message and exit
  -p, --passwd                 edit passwd database
  -q, --quiet                  quiet mode
  -R, --root CHROOT_DIR        directory to chroot into
  -s, --shadow                 edit shadow or gshadow database

root@ubuntu-server:~# ls -lhd /developer/
drwxr-xr-x 2 root developer 4.0K Oct  2 08:03 /developer/
root@ubuntu-server:~# chmod d+w /developer/
chmod: invalid mode: 'd+w'
Try 'chmod --help' for more information.
root@ubuntu-server:~# chmod g+w /developer/
root@ubuntu-server:~# ls -lhd /developer/
drwxrwxr-x 2 root developer 4.0K Oct  2 08:03 /developer/
root@ubuntu-server:~#
```

- Пробуем создать файл в данной директории от пользователя stoamper. В этот раз все получилось



```
stoamper@ubuntu-server: /developer
Usage of /: 64.9% of 6.82GB  Users logged in: 1
Memory usage: 24%           IPv4 address for enp0s3: 192.168.0.19
Swap usage: 0%

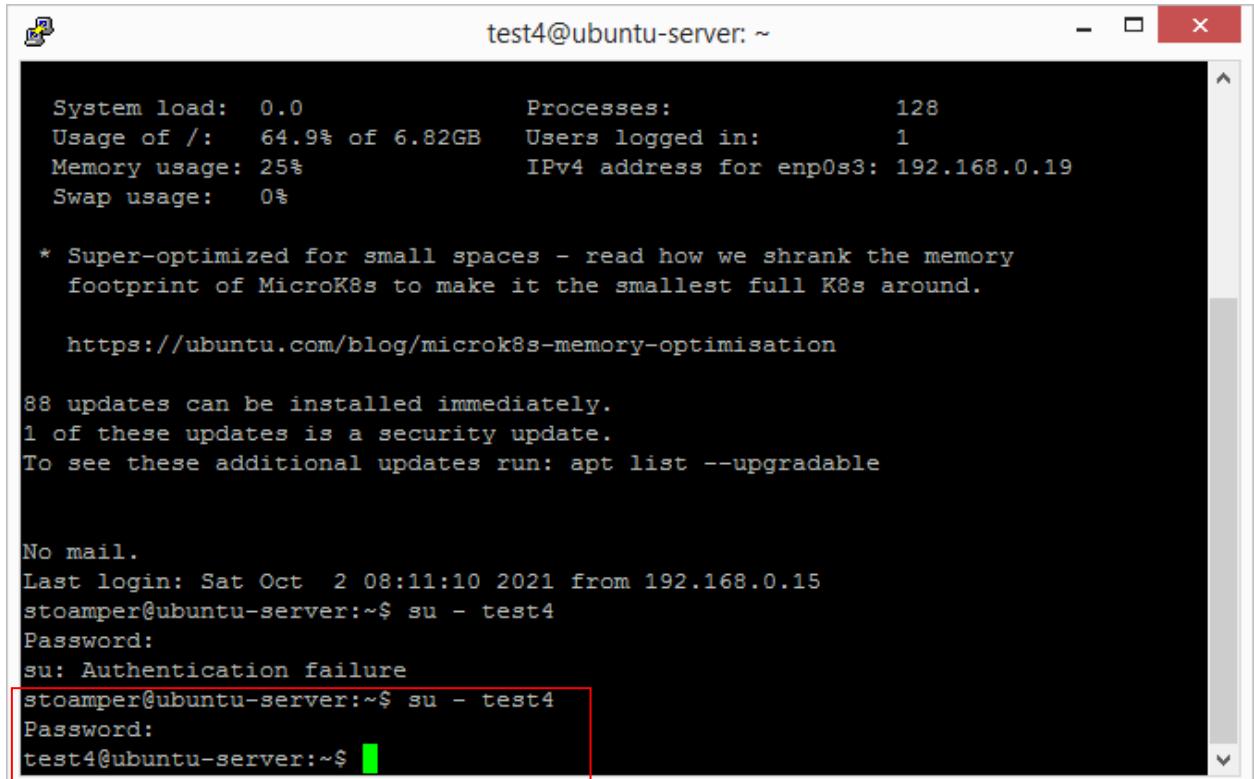
* Super-optimized for small spaces - read how we shrank the memory
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To see these additional updates run: apt list --upgradable

No mail.
Last login: Sat Oct  2 07:56:14 2021 from 192.168.0.15
stoamper@ubuntu-server:~$ ./id
uid=1000(stoamper) gid=1000(stoamper) euid=0(root) groups=1000(stoamper),4(adm),
24(cdrom),27(sudo),30(dip),46(plugdev),116(lxd),1011(developer)
stoamper@ubuntu-server:~$ cd /developer/
stoamper@ubuntu-server:/developer$ touch test_file.txt
touch: cannot touch 'test file.txt': Permission denied
stoamper@ubuntu-server:/developer$ touch test_file.txt
stoamper@ubuntu-server:/developer$
```

- Заходим в другом окне терминала под пользователя test4



```
test4@ubuntu-server: ~
System load: 0.0          Processes: 128
Usage of /: 64.9% of 6.82GB  Users logged in: 1
Memory usage: 25%           IPv4 address for enp0s3: 192.168.0.19
Swap usage: 0%

* Super-optimized for small spaces - read how we shrank the memory
  footprint of MicroK8s to make it the smallest full K8s around.

https://ubuntu.com/blog/microk8s-memory-optimisation

88 updates can be installed immediately.
1 of these updates is a security update.
To see these additional updates run: apt list --upgradable

No mail.
Last login: Sat Oct  2 08:11:10 2021 from 192.168.0.15
stoamper@ubuntu-server:~$ su - test4
Password:
su: Authentication failure
stoamper@ubuntu-server:~$ su - test4
Password:
test4@ubuntu-server:~$
```

- Переходим в директорию developer и пробуем от лица test4 создать файл в данной директории

```

test4@ubuntu-server:~/developer
Usage of /:   64.9% of 6.82GB  Users logged in:      1
Memory usage: 25%                  IPv4 address for enp0s3: 192.168.0.19
Swap usage:   0%
* Super-optimized for small spaces - read how we shrunk the memory
  footprint of MicroK8s to make it the smallest full K8s around.

  https://ubuntu.com/blog/microk8s-memory-optimisation

88 updates can be installed immediately.
1 of these updates is a security update.
To see these additional updates run: apt list --upgradable

No mail.
Last login: Sat Oct  2 08:11:10 2021 from 192.168.0.15
stoamper@ubuntu-server:~$ su - test4
Password:
su: Authentication failure
stoamper@ubuntu-server:~$ su - test4
Password:
test4@ubuntu-server:~$ cd /developer/
test4@ubuntu-server:/developer$ touch test_file_2.txt
test4@ubuntu-server:/developer$ 
```

- Просмотрим содержащиеся в директории developer файлы и права на них

```

stoamper@ubuntu-server:~/developer
https://ubuntu.com/blog/microk8s-memory-optimisation

88 updates can be installed immediately.
1 of these updates is a security update.
To see these additional updates run: apt list --upgradable

No mail.
Last login: Sat Oct  2 07:56:14 2021 from 192.168.0.15
stoamper@ubuntu-server:~$ ./id
uid=1000(stoamper) gid=1000(stoamper) euid=0(root) groups=1000(stoamper),4(adm),
24(cdrom),27(sudo),30(dip),46(plugdev),116(lxd),1011(developer)
stoamper@ubuntu-server:~$ cd /developer/
stoamper@ubuntu-server:/developer$ touch test_file.txt
touch: cannot touch 'test_file.txt': Permission denied
stoamper@ubuntu-server:/developer$ touch test_file.txt
stoamper@ubuntu-server:/developer$ ls -la
total 8
drwxrwxr-x  2 root      developer  4096 Oct  2 08:18 .
drwxr-xr-x 23 root      root       4096 Oct  2 08:03 ..
-rw-r--r--  1 test4    test_users   0 Oct  2 08:18 test_file_2.txt
-rw-rw-r--  1 stoamper  stoamper   0 Oct  2 08:14 test_file.txt
stoamper@ubuntu-server:/developer$ 
```

Как видно, файл test\_file.txt, созданный пользователем stoamper, относится к группе stoamper. Аналогичная история с файлом test\_file\_2.txt.

- Для того, чтобы с файлами могли работать разные пользователи из одной группы воспользуемся командой chmod g+s для директории /developer (g+s установит такое правило, что для всех новых файлов в папке /developer группа владельцев будет устанавливаться та, которая является группой владельцев папки (то есть developer))

```

root@ubuntu-server: ~
Usage: vigr [options]

Options:
  -g, --group          edit group database
  -h, --help           display this help message and exit
  -p, --passwd         edit passwd database
  -q, --quiet          quiet mode
  -R, --root CHROOT_DIR   directory to chroot into
  -s, --shadow         edit shadow or gshadow database

root@ubuntu-server:/# ls -lhd /developer/
drwxr-xr-x 2 root developer 4.0K Oct  2 08:03 /developer/
root@ubuntu-server:/# chmod d+w /developer/
chmod: invalid mode: 'd+w'
Try 'chmod --help' for more information.
root@ubuntu-server:/# chmod g+w /developer/
root@ubuntu-server:/# ls -lhd /developer/
drwxrwxr-x 2 root developer 4.0K Oct  2 08:03 /developer/
root@ubuntu-server:/# chmod g+s /developer/
root@ubuntu-server:/# ls -lhd .
drwxr-xr-x 23 root root 4.0K Oct  2 08:03 .
root@ubuntu-server:/# ls -lhd /developer/
drwxrwsr-x 2 root developer 4.0K Oct  2 08:18 /developer/
root@ubuntu-server:/#

```

Буква s в правах указывает на то, что команда сработала

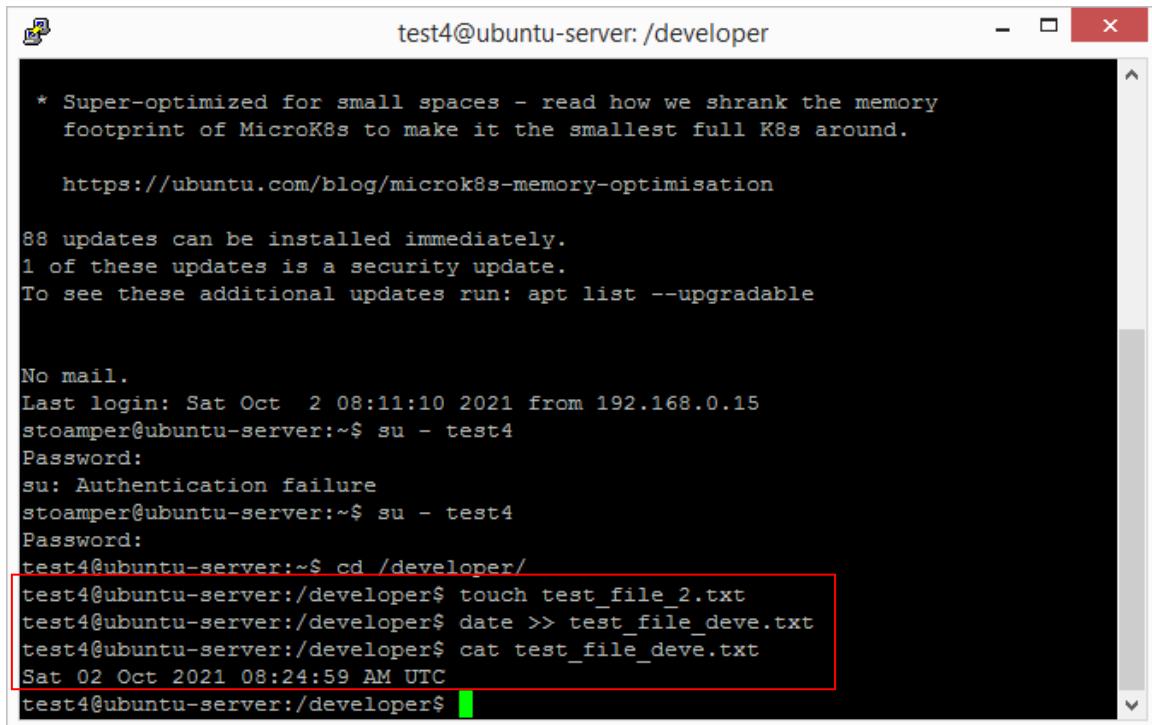
- Создаем файл test\_file\_deve.txt от пользователем stoamper. Проверяем группу, которая имеет доступ к файл (developer). По умолчанию создается та группа, которая нам нужна (developer)

```

stoamper@ubuntu-server: /developer
No mail.
Last login: Sat Oct  2 07:56:14 2021 from 192.168.0.15
stoamper@ubuntu-server:~$ ./id
uid=1000(stoamper) gid=1000(stoamper) euid=0(root) groups=1000(stoamper),4(adm),
24(cdrom),27(sudo),30(dip),46(plugdev),116(lxd),1011(developer)
stoamper@ubuntu-server:~$ cd /developer/
stoamper@ubuntu-server:/developer$ touch test_file.txt
touch: cannot touch 'test_file.txt': Permission denied
stoamper@ubuntu-server:/developer$ touch test_file.txt
stoamper@ubuntu-server:/developer$ ls -la
total 8
drwxrwxr-x  2 root      developer  4096 Oct  2 08:18 .
drwxr-xr-x 23 root      root      4096 Oct  2 08:03 ..
-rw-r--r--  1 test4    test_users  0 Oct  2 08:18 test_file_2.txt
-rw-rw-r--  1 stoamper  stoamper  0 Oct  2 08:14 test_file.txt
stoamper@ubuntu-server:/developer$ chmod g+s /developer/
chmod: changing permissions of '/developer/': Operation not permitted
stoamper@ubuntu-server:/developer$ touch test_file_deve.txt
stoamper@ubuntu-server:/developer$ ls -l
total 0
-rw-r--r--  1 test4    test_users  0 Oct  2 08:18 test_file_2.txt
-rw-rw-r--  1 stoamper  developer  0 Oct  2 08:24 test_file_deve.txt
-rw-rw-r--  1 stoamper  stoamper  0 Oct  2 08:14 test_file.txt
stoamper@ubuntu-server:/developer$

```

- Убеждаемся, что пользователь test4 также имеет доступ к файлу (записываем в него текущую дату и время)



```
test4@ubuntu-server: /developer
* Super-optimized for small spaces - read how we shrank the memory
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No mail.
Last login: Sat Oct  2 08:11:10 2021 from 192.168.0.15
stoamper@ubuntu-server:~$ su - test4
Password:
su: Authentication failure
stoamper@ubuntu-server:~$ su - test4
Password:
test4@ubuntu-server:~$ cd /developer/
test4@ubuntu-server:/developer$ touch test_file_2.txt
test4@ubuntu-server:/developer$ date >> test_file_deve.txt
test4@ubuntu-server:/developer$ cat test_file_deve.txt
Sat 02 Oct 2021 08:24:59 AM UTC
test4@ubuntu-server:/developer$
```

5. Создать в директории для совместной работы поддиректорию для обмена файлами, но чтобы удалять файлы могли только их создатели

Решение

- Создаем поддиректорию для обмена файлами test4\_only

The screenshot shows a terminal window titled "root@ubuntu-server: /developer". The terminal output is as follows:

```
root@ubuntu-server: /developer
https://ubuntu.com/blog/microk8s-memory-optimisation

88 updates can be installed immediately.
1 of these updates is a security update.
To see these additional updates run: apt list --upgradable

No mail.
Last login: Sat Oct  2 08:17:10 2021 from 192.168.0.15
stoamper@ubuntu-server:~$ vigr
vigr: Permission denied.
vigr: Couldn't lock file: Permission denied
vigr: /etc/group is unchanged
stoamper@ubuntu-server:~$ vigr -s
vigr: Permission denied.
vigr: Couldn't lock file: Permission denied
vigr: /etc/gshadow is unchanged
stoamper@ubuntu-server:~$ sudo su -
[sudo] password for stoamper:
root@ubuntu-server:~# vigr
vigr: /etc/group is unchanged
root@ubuntu-server:~# cd /developer/
root@ubuntu-server:/developer# mkdir test4_only
root@ubuntu-server:/developer#
```

- С помощью команды chmod +t устанавливаем дополнительный атрибут, благодаря которому удалять файлы сможет только владелец

The screenshot shows a terminal window titled "root@ubuntu-server: /developer". The terminal output is as follows:

```
vigr: Permission denied.
vigr: Couldn't lock file: Permission denied
vigr: /etc/gshadow is unchanged
stoamper@ubuntu-server:~$ sudo su -
[sudo] password for stoamper:
root@ubuntu-server:~# vigr
vigr: /etc/group is unchanged
root@ubuntu-server:~# cd /developer/
root@ubuntu-server:/developer# mkdir test4_only
root@ubuntu-server:/developer# ls -lhd /developer/test4_only/
drwxr-sr-x 2 root developer 4.0K Oct  2 09:37 /developer/test4_only/
root@ubuntu-server:/developer# chmod g+w test4_only/
root@ubuntu-server:/developer# chmod +t test4_only/
root@ubuntu-server:/developer# ls -lhd
drwxrwsr-x 3 root      developer 4096 Oct  2 09:37 .
root@ubuntu-server:/developer# ls -la
total 16
drwxrwsr-x  3 root      developer 4096 Oct  2 09:37 .
drwxr-xr-x 23 root      root      4096 Oct  2 08:03 ..
drwxrwsr-t  2 root      developer 4096 Oct  2 09:37 test4_only
-rw-r--r--  1 test4    test_users   0 Oct  2 08:18 test_file_2.txt
-rw-rw-r--  1 stoamper  developer    32 Oct  2 08:24 test_file_deve.txt
-rw-rw-r--  1 stoamper  stoamper    0 Oct  2 08:14 test_file.txt
root@ubuntu-server:/developer#
```

- Создаем с пользователя test4 файл test.txt. Меняем пользователя на stoamper и пытаемся изменить данный файл. Прав на изменение файла нет

stoamper@ubuntu-server: /developer/test4\_only

```
-- INSERT -- W10: Warning: Changing a readonly file
```

- Удаление файла также произвести не получится

```
stoamper@ubuntu-server: /developer/test4_only
```

```
System load: 0.0 Processes: 140
Usage of /: 64.9% of 6.82GB Users logged in: 1
Memory usage: 26% IPv4 address for enp0s3: 192.168.0.19
Swap usage: 0%
```

```
* Super-optimized for small spaces - read how we shrank the memory
  footprint of MicroK8s to make it the smallest full K8s around.

https://ubuntu.com/blog/microk8s-memory-optimisation

88 updates can be installed immediately.
1 of these updates is a security update.
To see these additional updates run: apt list --upgradable

No mail.

Last login: Sat Oct  2 09:38:34 2021 from 192.168.0.15
stoamper@ubuntu-server:~$ cd /developer/test4_only/
stoamper@ubuntu-server:/developer/test4_only$ rm test.txt
rm: remove write-protected regular empty file 'test.txt'?
stoamper@ubuntu-server:/developer/test4_only$ rm test.txt
rm: remove write-protected regular empty file 'test.txt'? y
rm: cannot remove 'test.txt': Operation not permitted
stoamper@ubuntu-server:/developer/test4_only$
```