Лабораторная работа №5

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Проверил: Босенко Т.М.

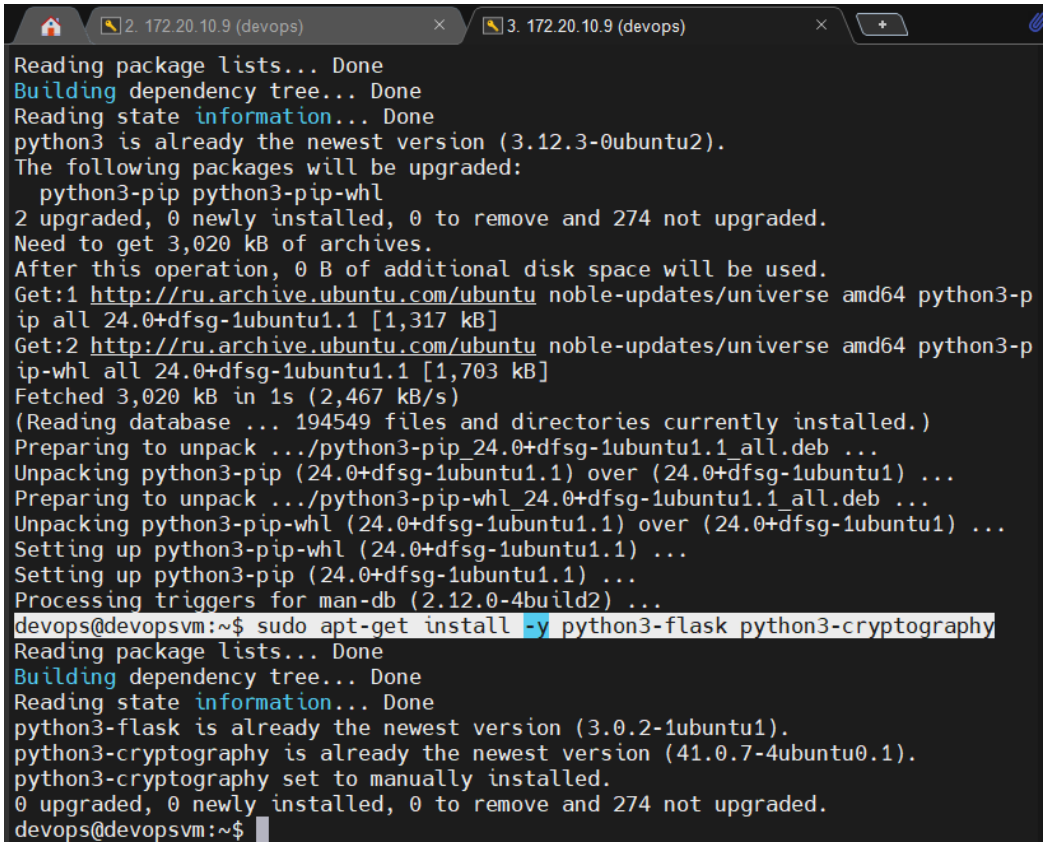
1.1 Sudo update

```
Last login: Wed Sep 18 10:30:11 2024 from 10.193.19.171
devops@devopsvm:~$ sudo apt-get update
[sudo] password for devops:
Hit:1 http://ru.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://ru.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://ru.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 https://dl.google.com/linux/chrome/deb stable InRelease [1,825 B]
Get:6 http://ru.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [611 kB]
Get:7 http://ru.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [148 kB]
Get:8 http://ru.archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [114 kB]
Get:9 http://ru.archive.ubuntu.com/ubuntu noble-updates/main Icons (48x48) [30.1 kB]
Get:10 http://ru.archive.ubuntu.com/ubuntu noble-updates/main Icons (64x64) [43.9 kB]
Get:11 http://ru.archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [10.4 kB]
Get:12 http://ru.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [405 kB]
Get:13 http://ru.archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [77.1 kB]
Get:14 http://ru.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:15 http://ru.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 c-n-f Metadata [424
 B]
Get:16 http://ru.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [710 kB]
Get:17 http://ru.archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [211 kB]
Get:18 http://ru.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [305 kB]
Get:19 http://ru.archive.ubuntu.com/ubuntu noble-updates/universe Icons (48x48) [167 kB]
Get:20 http://ru.archive.ubuntu.com/ubuntu noble-updates/universe Icons (64x64) [266 kB]
Get:21 http://ru.archive.ubuntu.com/ubuntu noble-updates/universe amd64 c-n-f Metadata [19.9
kB]
Get:22 http://ru.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Packages [15.0 kB]
Get:23 http://ru.archive.ubuntu.com/ubuntu noble-updates/multiverse Translation-en [3,820 B]
Get:24 http://ru.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:25 http://ru.archive.ubuntu.com/ubuntu noble-updates/multiverse Icons (48x48) [1,867 B]
```

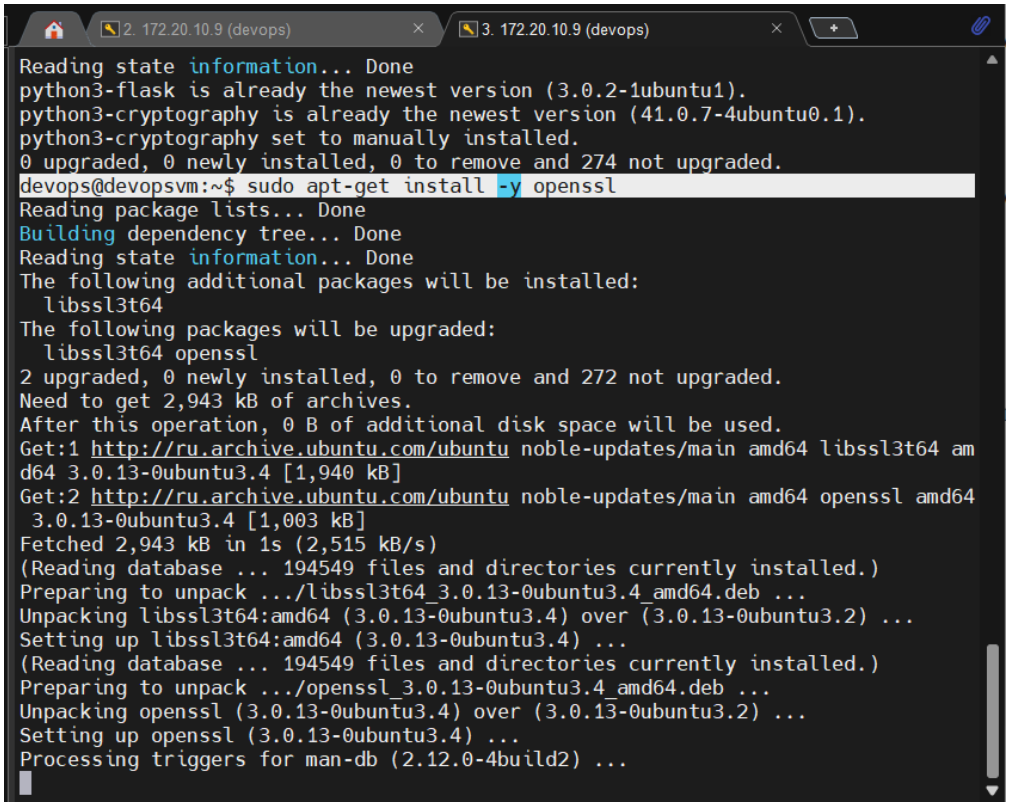
1.2 Установите Python 3 и необходимые библиотеки: sudo apt-get install -y python3 python3-pip sudo apt-get install -y python3-flask python3-cryptography

```
2. 172.20.10.9 (devops)   3. 172.20.10.9 (devops)
Get:49 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en
Get:50 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Component
Get:51 http://security.ubuntu.com/ubuntu noble-security/universe Icons (48x48) [
Get:52 http://security.ubuntu.com/ubuntu noble-security/universe Icons (64x64) [
Get:53 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Met
B]
Get:54 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Package
Get:55 http://security.ubuntu.com/ubuntu noble-security/multiverse Translation-e
Get:56 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Compone
Get:57 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 c-n-f M
B]
Fetched 5,539 kB in 11s (498 kB/s)

sudo apt-get install -y python3 python3-pip
^C
devops@devopsvm:~$ sudo apt-get install -y python3 python3-pip
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
python3 is already the newest version (3.12.3-0ubuntu2).
The following packages will be upgraded:
  python3-pip python3-pip-whl
2 upgraded, 0 newly installed, 0 to remove and 274 not upgraded.
Need to get 3,020 kB of archives.
After this operation, 0 B of additional disk space will be used.
Get:1 http://ru.archive.ubuntu.com/ubuntu noble-updates/universe amd64 python3-p
ip all 24.0+dfsg-1ubuntu1.1 [1,317 kB]
Get:2 http://ru.archive.ubuntu.com/ubuntu noble-updates/universe amd64 python3-p
ip-whl all 24.0+dfsg-1ubuntu1.1 [1,703 kB]
Fetched 3,020 kB in 1s (2,467 kB/s)
(Reading database ... 75%
```



1.3 Установите OpenSSL: sudo apt-get install -y openssl



Шаг 2. Создание сертификатов X.509 для аутентификации

2.1. Сгенерируйте корневой сертификат центра сертификации (CA):

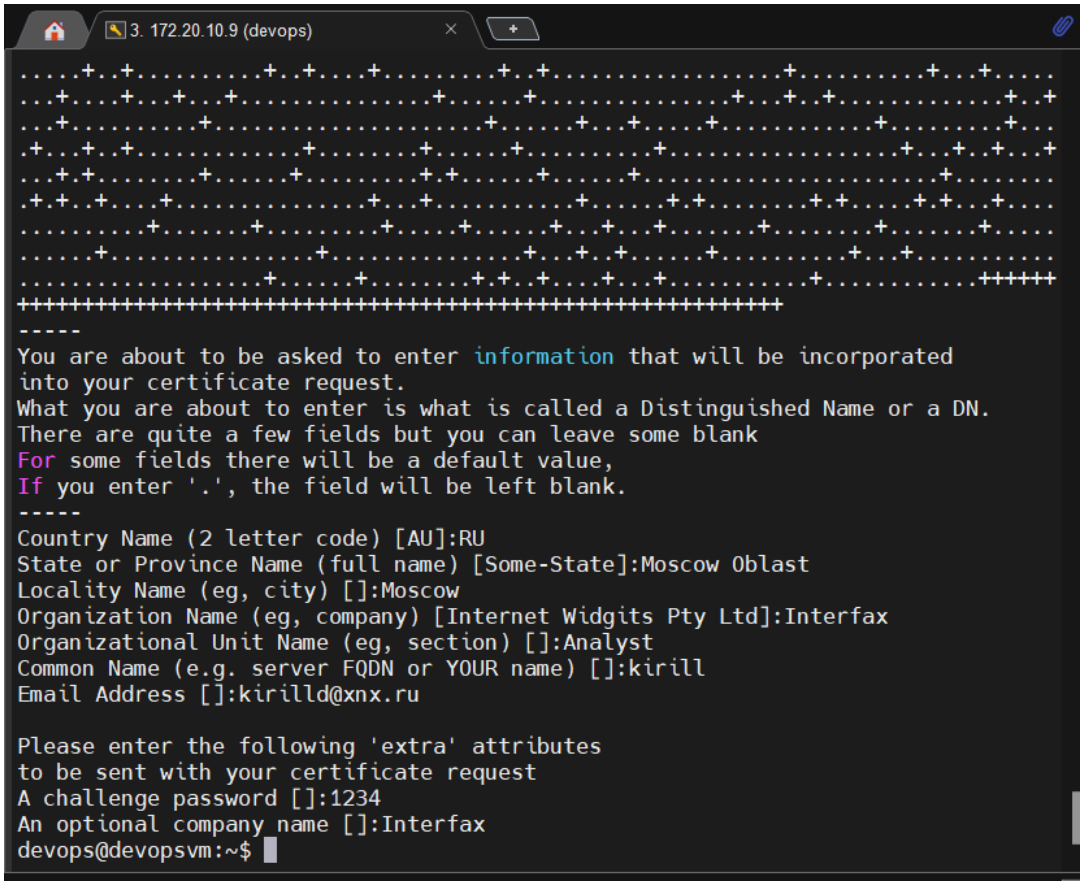
```
-----
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [AU]:RU
State or Province Name (full name) [Some-State]:Moscow Oblast
Locality Name (eg, city) []:Moscow
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Interfax
Organizational Unit Name (eg, section) []:Analyst
Common Name (e.g. server FQDN or YOUR name) []:kirill
Email Address []:kirilld@xnx.ru
devops@devopsvm:~$
```

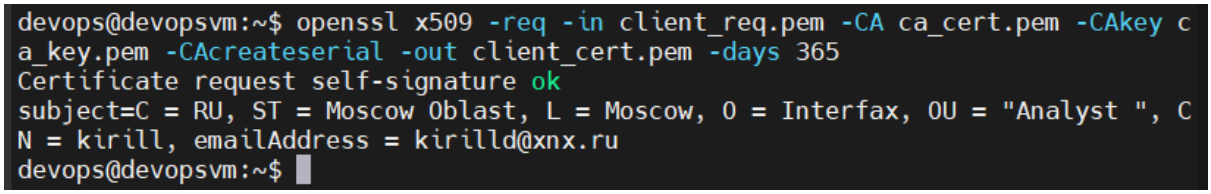
2.2 Создайте сертификаты для клиентских и серверных узлов:

```
Country Name (2 letter code) [AU]:RU
State or Province Name (full name) [Some-State]:Moscow Oblast
Locality Name (eg, city) []:Moscow
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Interfax
Organizational Unit Name (eg, section) []:Analyst
Common Name (e.g. server FQDN or YOUR name) []:kirill
Email Address []:kirilld@xnx.ru

Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:1
String too short, must be at least 4 bytes long
A challenge password []:1234
An optional company name []:interfax
devops@devopsvm:~$
```

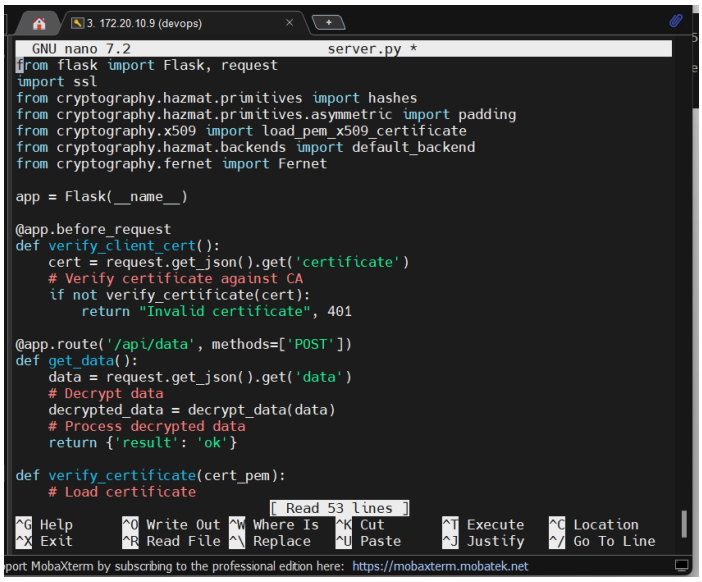
```
devops@devopsvm:~$ openssl x509 -req -in server_req.pem -CA ca_cert.pem -CAkey c
a_key.pem - CAcreateserial -out server_cert.pem -days 365
x509: Use -help for summary.
devops@devopsvm:~$
port MobaXterm by subscribing to the professional edition here:  https://mobaxterm.mobatek.net
```



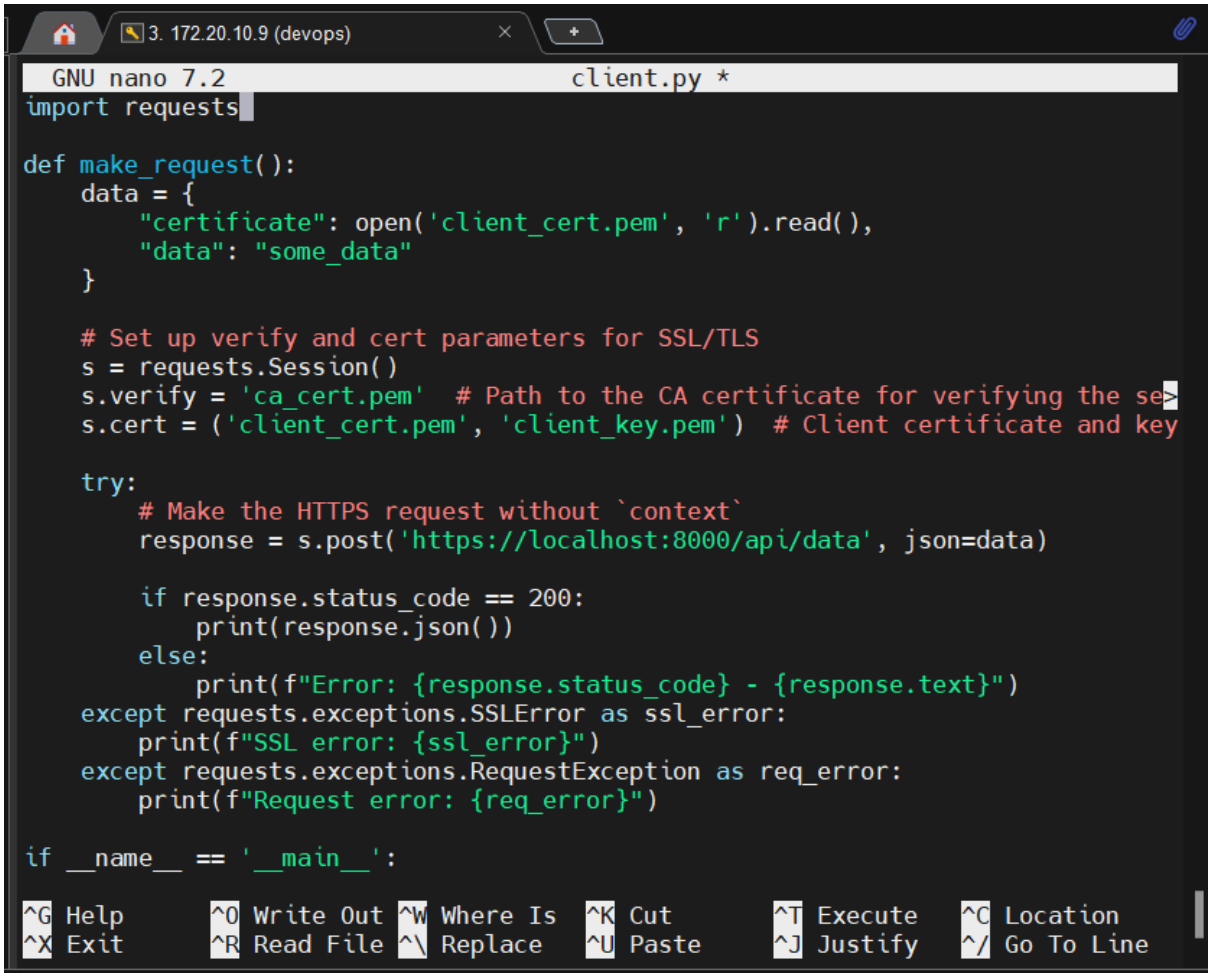


Шаг 3. Реализация аутентификации на основе сертификатов

3.1. Создайте файл server.py для реализации серверной части:

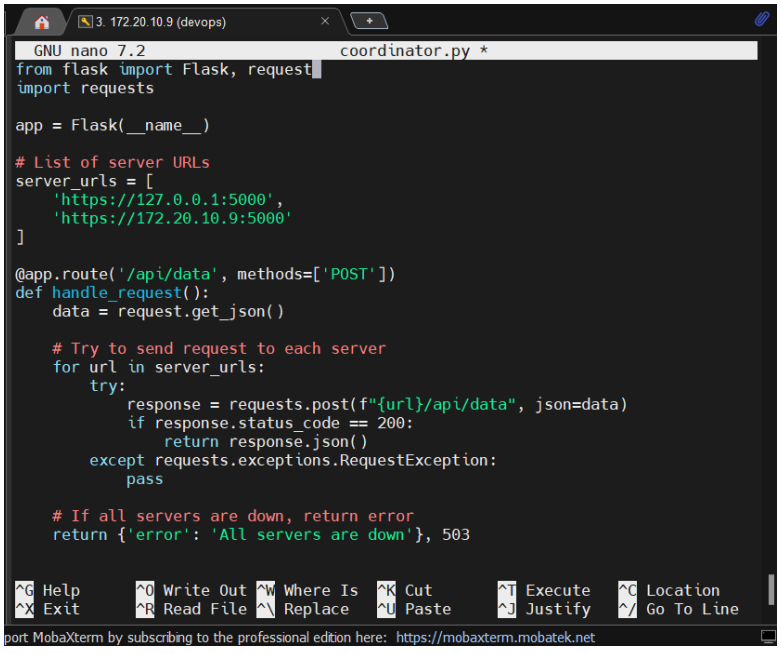


Шаг 4. Создайте client.py для шифрования данных:

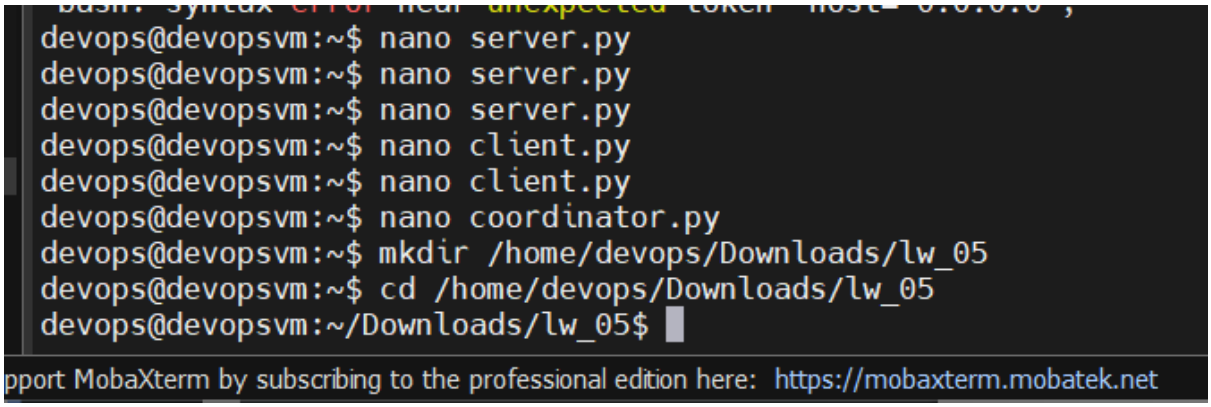


Шаг 5. Настройка отказоустойчивости

5.1. Создайте файл coordinator.py для реализации координатора распределенной

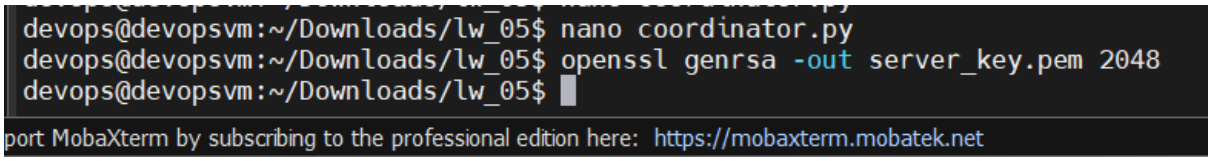


Откройте терминал и перейдите туда-то

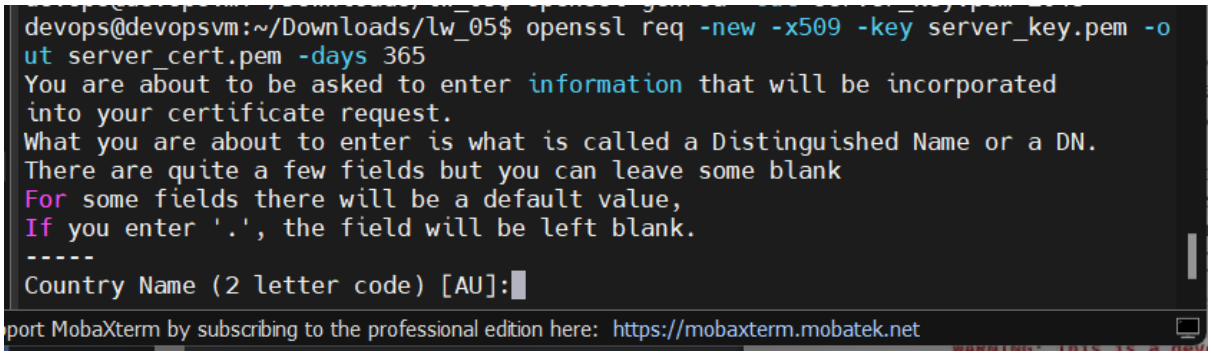


Сгенерируйте приватный ключ для сервера:

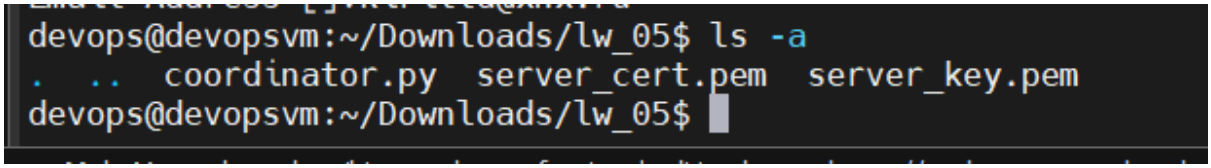
Эта команда создаст файл server_key.pem с приватным ключом длиной 2048 бит.



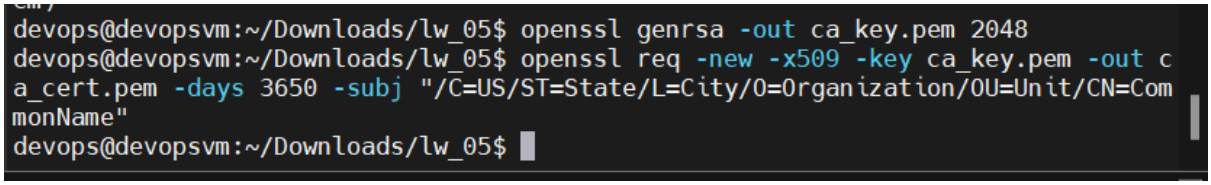
Создайте сертификат X.509 для сервера, используя сгенерированный ключ:



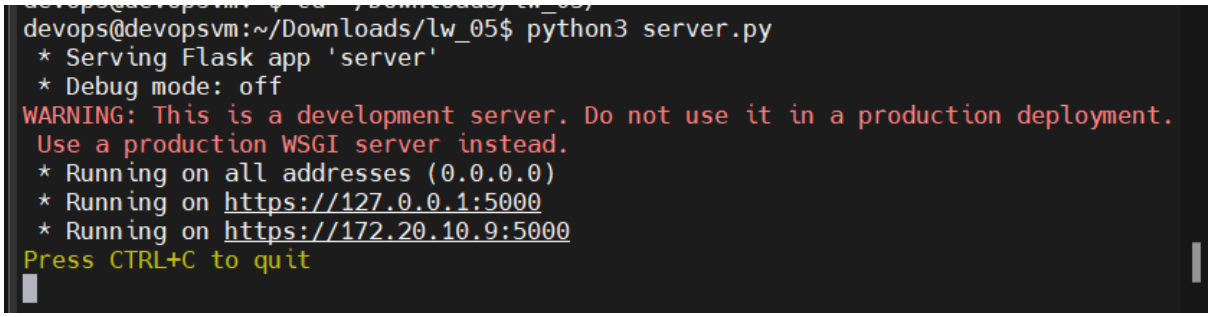
В директории появилось два файла:



Создадим ключ длиной 2048 бит, а так же, создадим само-подписанный сертификат центра сертификации

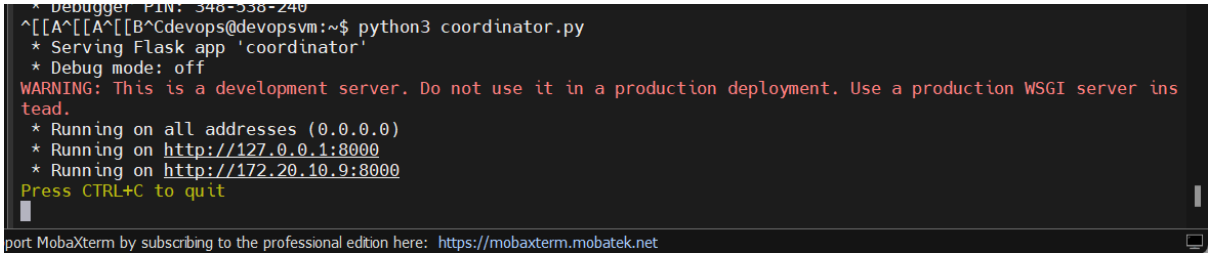


5.2 Запустить server.py на нескольких машинах (или на одном при тестировании) для обеспечения отказоустойчивости.

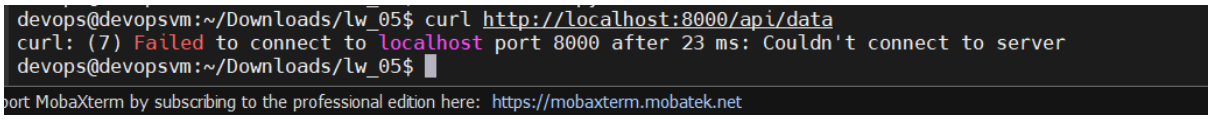


Теперь server_urls содержит адреса ваших реальных серверов, запущенных на 127.0.0.1:5000 и 172.20.10.9:5000. Ваш прокси-сервер будет пытаться отправить запросы на эти адреса, пока не получит успешный ответ.

Запуск coordinator



Выдает ошибку



Я не понимаю, почему оно выдает ошибку, постараюсь за выходные переработать