

Практическая работа 5

Настройка Nginx, конфигурация Upstreams

1. Базовое REST приложение

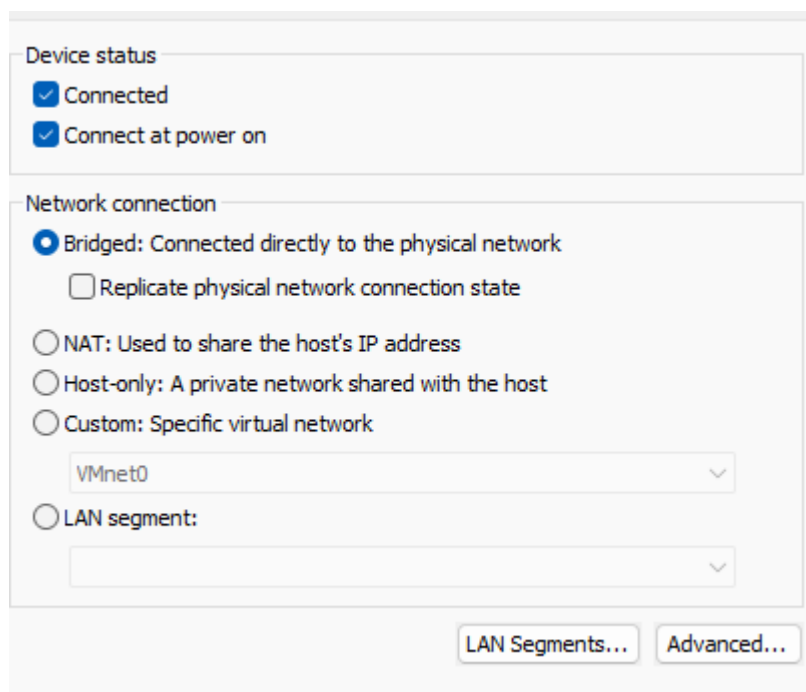
```
from flask import Flask
import sys

app = Flask(__name__)

@app.route("/")
def hello():
    return "Hello, World!"

if __name__ == "__main__":
    port = int(sys.argv[1]) if len(sys.argv) > 1 else 5000
    app.run(host="127.0.0.1", port=port)
```

2. Использовал Vmware место Virtualbox.



The screenshot shows the 'Network connection' settings for a VMware virtual machine. Under 'Device status', both 'Connected' and 'Connect at power on' are checked. In the 'Network connection' section, 'Bridged: Connected directly to the physical network' is selected with a radio button. Below it, 'Replicate physical network connection state' is unchecked. Other options like 'NAT', 'Host-only', and 'Custom' are unselected. The 'VMnet0' dropdown is visible, and 'LAN segment:' is also unselected. At the bottom, there are buttons for 'LAN Segments...' and 'Advanced...'.

Vmware -> 192.168.0.11

Пинг с хостовой ОС Windows:

```
C:\Users\djurd>ping 192.168.0.11

Pinging 192.168.0.11 with 32 bytes of data:
Reply from 192.168.0.11: bytes=32 time<1ms TTL=64
Reply from 192.168.0.11: bytes=32 time<1ms TTL=64
Reply from 192.168.0.11: bytes=32 time<1ms TTL=64
Reply from 192.168.0.11: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.0.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

3. 3 реплики приложения на интерфейсе **127.0.0.1** (localhost), чтобы реплики были доступны только внутри виртуальной машины. Это гарантирует, что они не будут напрямую доступны с хостовой машины.

```
(.venv) djurdje@djurdje:~/Desktop/lr5$ * Serving Flask app 'app'
* Debug mode: off
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5003
Press CTRL+C to quit
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5001
Press CTRL+C to quit
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5002
Press CTRL+C to quit
127.0.0.1 - - [13/Jan/2025 12:11:39] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [13/Jan/2025 12:11:39] "GET /favicon.ico HTTP/1.1" 404 -
127.0.0.1 - - [13/Jan/2025 12:11:42] "GET / HTTP/1.1" 200 -

tcp        0      0 127.0.0.1:5001 <--> 0.0.0.0:5001 LISTEN
tcp        0      0 127.0.0.1:5002 <--> 0.0.0.0:5002 LISTEN
tcp        0      0 127.0.0.1:5003 <--> 0.0.0.0:5003 LISTEN
djurdje@djurdje:~/Desktop/lr5$
```

4. nginx

Сначала нужно установить nginx

```
sudo apt install nginx
```

nginx конфигурация

```

upstream flask_backends {
    server 127.0.0.1:5001;
    server 127.0.0.1:5002;
    server 127.0.0.1:5003;
}

server {
    listen 443 ssl;
    server_name 192.168.0.11;

    ssl_certificate /etc/nginx/ssl/server.crt;
    ssl_certificate_key /etc/nginx/ssl/server.key;

    location / {
        proxy_pass http://flask_backends;
        proxy_set_header Host $host;
        proxy_set_header X-Real-IP $remote_addr;
        proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
    }
}

server {
    listen 80;
    return 301 https://$host$request_uri;
}

```

Потом сгенерировать openssl сертификат:

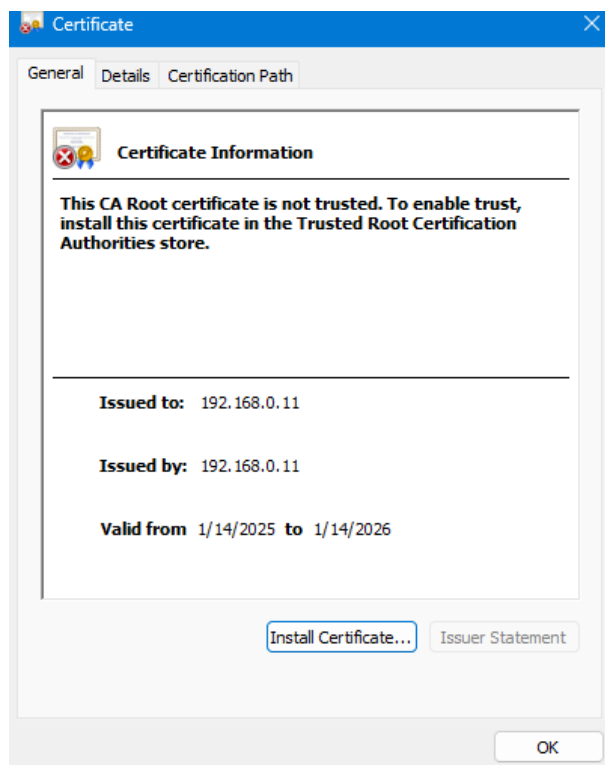
```

sudo openssl req -x509 -nodes -days 365 -newkey rsa:2048 \
    -keyout /etc/nginx/ssl/server.key \
    -out /etc/nginx/ssl/server.crt \
    -subj "/C=RS/ST=Belgrade/L=Belgrade/O=ITMO/OU=test/CN=192.168.0.11" \
    -addext "subjectAltName=IP:192.168.0.11"

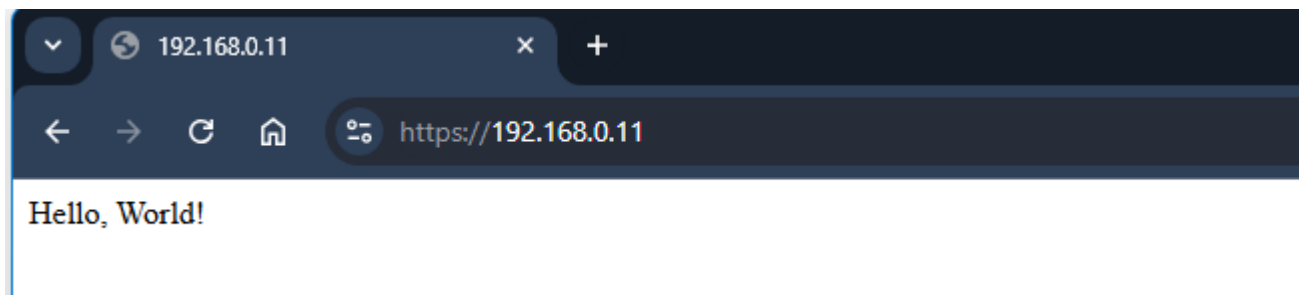
```

Одно важное примечание - это добавка subjectAltName. Браузеры это проверяют дополнительно, с сравнению с проверкой через терминал, где достаточно указать только CN.

На конец нужно установить сгенерированный сертификат на хостовой машине. (в моем случае Windows)



Сейчас можем проверить что можно подключатся с хостовой машине и если сертификат правильный.



Certificate Viewer: 192.168.0.11

General

Details

Issued To

Common Name (CN)	192.168.0.11
Organization (O)	ITMO
Organizational Unit (OU)	test

Issued By

Common Name (CN)	192.168.0.11
Organization (O)	ITMO
Organizational Unit (OU)	test

Validity Period

Issued On	Tuesday, January 14, 2025 at 5:55:17 AM
Expires On	Wednesday, January 14, 2026 at 5:55:17 AM

SHA-256 Fingerprints

Certificate	1d457dbd39bca698f28a0e0984d2167ad12a166a6bd22aa90b3c49bd5d3e4c96
Public Key	da7757c594d56cee4fc0387cb4e8655ea334366f280bcecfed8d14b0786e903

При запросе на порт 80 идет редирект:

```
C:\Users\djurd>curl -v http://192.168.0.11
* Trying 192.168.0.11:80...
* Connected to 192.168.0.11 (192.168.0.11) port 80
> GET / HTTP/1.1
> Host: 192.168.0.11
> User-Agent: curl/8.9.1
> Accept: */*
>
< HTTP/1.1 301 Moved Permanently
< Server: nginx/1.24.0 (Ubuntu)
< Date: Tue, 14 Jan 2025 05:15:06 GMT
< Content-Type: text/html
< Content-Length: 178
< Connection: keep-alive
< Location: https://192.168.0.11/
<
```