

Web Application Development

© Alexander Menshchikov, ITMO 2022

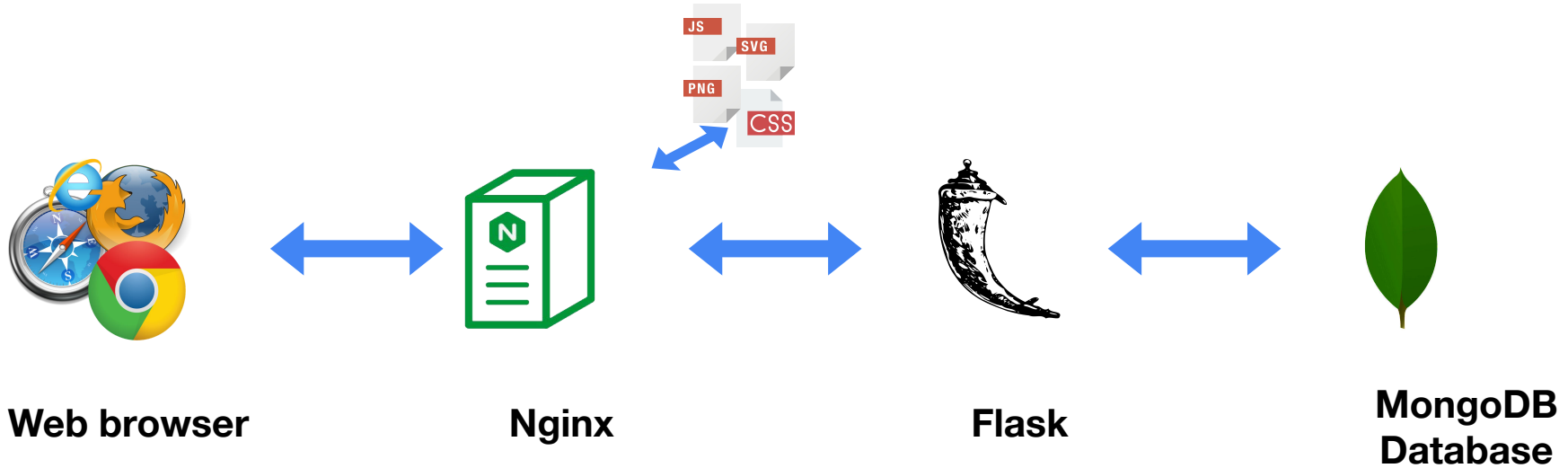


Production

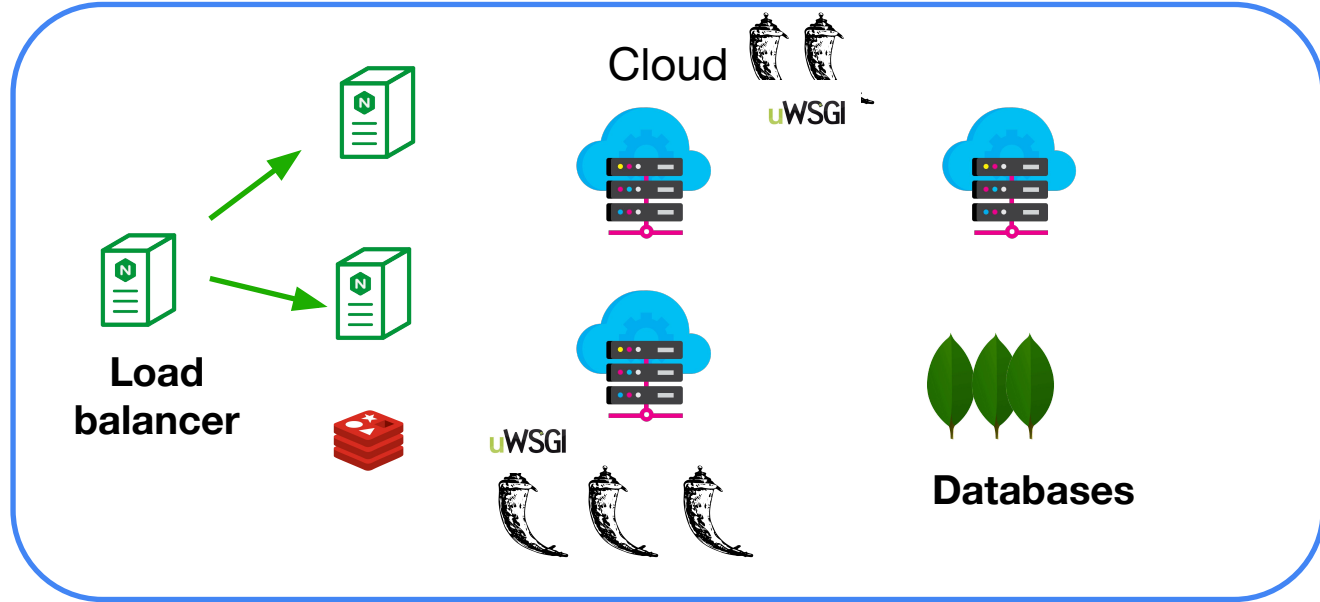


Production

Web Application Architecture



Web Application Architecture

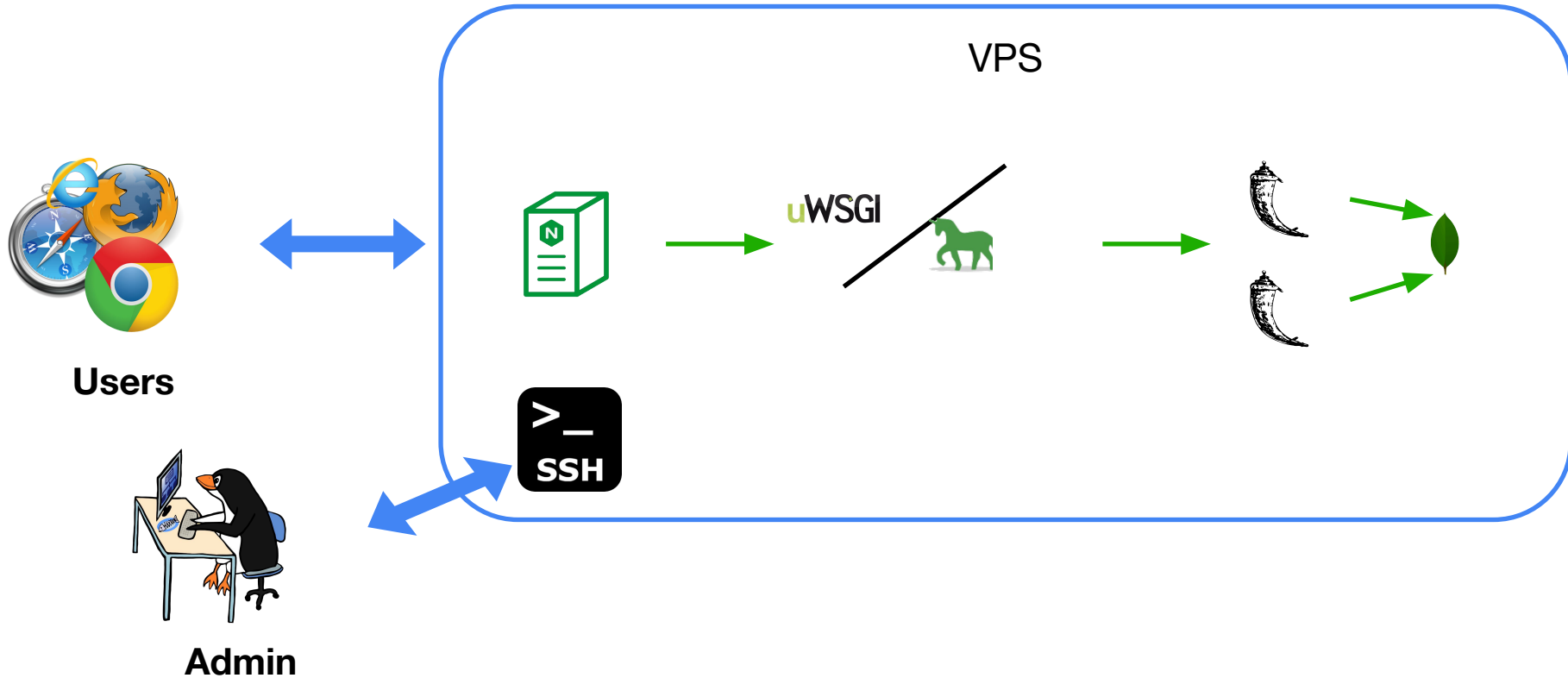


Infrastructure providers



...

Simple infrastructure



Algorithm

- Generate SSH keys
- Buy VPS
- Connect via SSH
- Basic OS configuration
- Setup environment

SSH keygen

```
> ssh-keygen
```

Generating public/private rsa key pair.

Enter file in which to save the key (/<_your_path_>/.ssh/id_rsa):

```
> [enter]
```

OK

```
> cat /<_your_path_>/.ssh/id_rsa.pub
```

```
ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAQADy21Sz18T67eA6O/Romm30cyv1LnTP3OlwpyLE4r97CUGy6Axs
pjGoYLIwU4NpeGZouD2/wHkPmXC40QzLY7mxqKzmvZJtfe2KCrHR4z+eopeGqU5+jHyBtASci+4rOXvh
m8yrm1VQzm1ST9fcF4gQNkbnXrrl5q3hoHgJPGe5enOjorvHam1LDXF6EaLmUuKrx5qfNzkOq6eMVE5C
tc/oOy/uWehpk1c+cFiAPWiR6EVwMv5eDJUrEBWvkYCR5jYFCHipHgG5BnzUvqf0Uhf0NP2cjChZ9xPm
ZQ3sZUDOZ2pRBhN1BxMUSuKXiWxlmaPMkvtm74BzKJit8fXowVHD
```

Buy VPS

- vultr.com



- digitalocean.com



- vscale.io



- I will provide a VPS for each group project (if you need one)

Buy VPS

production 

SPB

Online



Ubuntu 18.04 64bit

512 MB RAM 20 GB SSD 1 CPU 200 P

Server settings

Usage Graphs

History

Backups

Hostname and tags

Hostname  cs793178

Tags  Add tags 

Public network settings

IP address 95.213.251.120

Subnet mask 255.255.255.0

PTR-record Edit record 

Gateway 95.213.251.1

SSH keys for root user

n0str

Connect via SSH

```
> ssh root@95.213.251.120
```

```
The authenticity of host '95.213.251.120 (95.213.251.120)' can't be  
established.
```

```
ECDSA key fingerprint is SHA256:.../...
```

```
Are you sure you want to continue connecting (yes/no/[fingerprint])?
```

```
> yes
```

```
Welcome to Ubuntu 18.04.4 LTS (GNU/Linux 4.15.0-76-generic x86_64)
```

```
root@cs793178:~#
```

Basic os configuration

- Update packages
- Create users
- Check SSH settings
- Setup firewall
- Add SSH keys of the team members

Setup environment

- Install GIT, Python
- Install Nginx web server
- Install MongoDB
- Install other software
- Configure Nginx and MongoDB
- Clone and run the web application

Vim

:w - write (save) the file, but don't exit

:wq - write (save) and quit

:q! - quit and throw away unsaved changes

/pattern - search for pattern

i - insert before the cursor

o - append (open) a new line below the current line

Escape - exit insert mode

.vimrc

```
syntax on
```

```
colorscheme desert
```

```
set tabstop=4
```

```
set shiftwidth=4
```

```
set expandtab
```


Deploy

Local

On your computer

Development

Global, for testing

Staging

Pre-release

Production

Live

Deploy



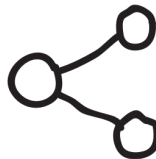
Deploy in our world



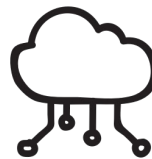
Configure



**Setup
access**



**Get sources
from GIT**



**Connect
all parts**



Monitoring



Nginx

```
server {  
    listen 80;  
    server_name website.itmo.xyz;  
  
    location / {  
        proxy_pass http://localhost:5000/;  
    }  
}
```

/etc/nginx/sites-available/default

Nginx

0.0.0.0:80



Nginx

localhost:5000



Flask



Nginx basic auth

```
> apt install -y apache2-utils
```

```
> htpasswd -c /etc/nginx/.htpasswd user
```

New password:

Re-type new password:

Adding password for user user

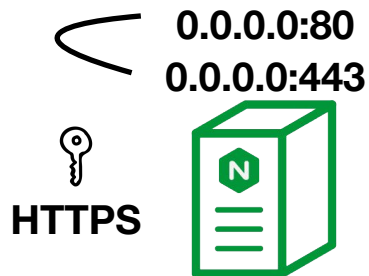
```
... add to /etc/nginx/sites-available/...
```

```
    auth_basic          "You shall not pass";
```

```
    auth_basic_user_file /etc/nginx/.htpasswd;
```

```
> service nginx reload
```

Nginx



localhost:5000



Raw HTTP

```
20:47:42.411987 IP localhost.5000 > localhost.34592: Flags [P.], seq 18:155, ack 561, win 512, options [nop,nop,TS val 1843124502 ecr 1843124502], length 137
E...'.@.+. .... ..) ...8S.....
m...m...Content-Type: text/html; charset=utf-8
Content-Length: 774
Server: Werkzeug/1.0.1 Python/3.6.9
Date: Fri, 24 Apr 2020 17:47:42 GMT

20:47:42.411992 IP localhost.34592 > localhost.5000: Flags [.], ack 155, win 511, options [nop,nop,TS val 1843124502 ecr 1843124502], length 0
E..4x.@. .... ..8S..).....(....
m...m...

20:47:42.412039 IP localhost.5000 > localhost.34592: Flags [P.], seq 155:929, ack 561, win 512, options [nop,nop,TS val 1843124502 ecr 1843124502], length 774
E...'.@. .... ..) ...8S...../.....
m...m...<!DOCTYPE html>
<html>
  <head>
    <title>This is an example page</title>
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
```

Certbot

```
apt-get update  
apt install certbot python3-certbot-nginx  
certbot --nginx
```



Nginx config

Nginx with SSL

```
server {  
    if ($host = l5.itmo.xyz) {  
        return 301 https://$host$request_uri;  
    } # managed by Certbot  
  
    listen 80 ;  
    server_name l5.itmo.xyz;  
    return 404; # managed by Certbot  
}
```

```
server {  
    access_log access.log;  
    access_log error.log;  
  
    location / {  
        proxy_pass http://localhost:5000/;  
    }  
  
    server_name l5.itmo.xyz; # managed by Certbot  
  
    listen 443 ssl; # managed by Certbot  
    ssl_certificate /etc/letsencrypt/live/l5.itmo.xyz/fullchain.pem; #  
    ssl_certificate_key /etc/letsencrypt/live/l5.itmo.xyz/privkey.pem;  
    include /etc/letsencrypt/options-ssl-nginx.conf; # managed by Cert  
    ssl_dhparam /etc/letsencrypt/ssl-dhparams.pem; # managed by Certbo  
}
```

Screen

```
apt install screen  
screen  
screen -r  
screen -ls  
Ctrl+a Ctrl+d  
exit
```

Systemd

```
[Unit]
Description=Example WAD application
After=network.target

[Service]
User=root
WorkingDirectory=/root/demo/
ExecStart=/usr/bin/python3 01_logging.py
Restart=always

[Install]
WantedBy=multi-user.target
```

/etc/systemd/system/wad.service

```
systemctl enable wad.service
systemctl daemon-reload
```

```
service wad status
service wad start
service wad stop
service wad restart
```

```
journalctl -u wad.service
journalctl -u wad.service
--since "15 minutes ago»
```

