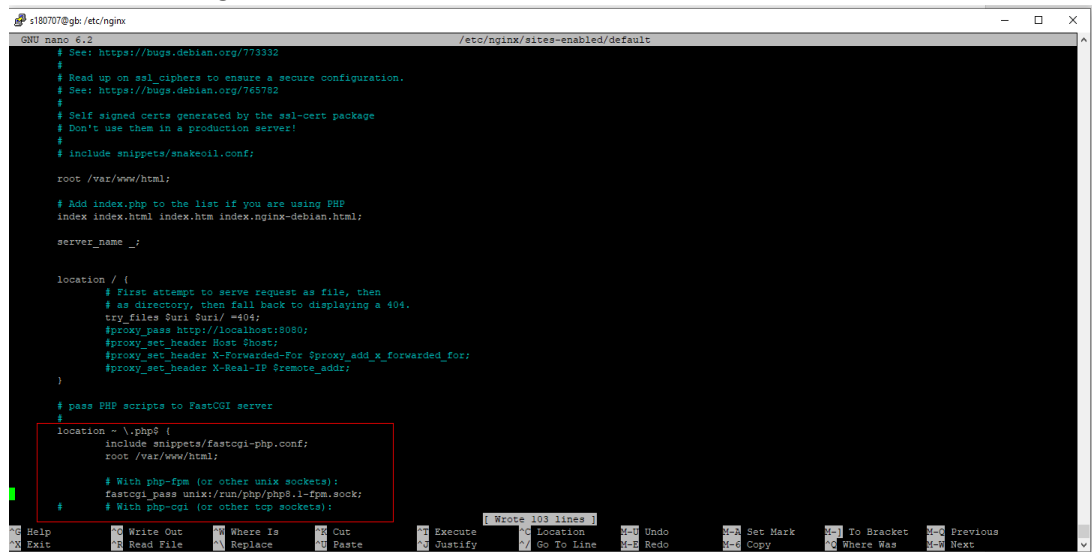


1. Установить Nginx и настроить его на работу с PHP-FPM.

- `sudo apt install nginx`
- `apt install libapache2-mod-php8.1 php8.1`
- `apt install php8.1-fpm`
- `sudo nano /etc/nginx/sites-enabled/default`



```
GNU nano 6.2 /etc/nginx/sites-enabled/default
# See: https://bugs.debian.org/773332
#
# Read up on ssl_ciphers to ensure a secure configuration.
# See: https://bugs.debian.org/765782
#
# Self signed certs generated by the ssl-cert package
# Don't use them in a production server!
#
# include snippets/snakeoil.conf;

root /var/www/html;

# Add index.php to the list if you are using PHP
index index.html index.htm index.nginx-debian.html;

server_name _;

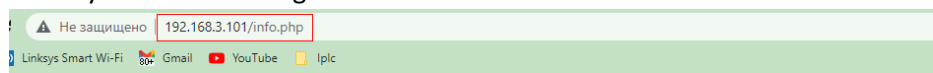
location / {
    # First attempt to serve request as file, then
    # as directory, then fall back to displaying a 404.
    try_files $uri $uri/ =404;
    #proxy_pass http://localhost:8080;
    #proxy_set_header Host $host;
    #proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
    #proxy_set_header X-Real-IP $remote_addr;
}


# pass PHP scripts to FastCGI server
#
location ~ \.php$ {
    include snippets/fastcgi-php.conf;
    root /var/www/html;

    # With php-fpm (or other unix sockets):
    fastcgi_pass unix:/run/php/php8.1-fpm.sock;
    # With php-oci (or other tcp sockets):
}
```

- `cd /var/www/html`
- `sudo nano info.php`


```
<?php
    phpinfo();
?>
```
- `sudo nginx -t`
- `sudo systemctl reload nginx`



PHP Version 8.1.2-1ubuntu2.11

System	Linux gb 5.15.0-69-generic #76-Ubuntu SMP Fri Mar 17 17:19:29 UTC 2023 x86_64
Build Date	Feb 22 2023 22:56:18
Build System	Linux
Server API	FPM/FastCGI
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/8.1/fpm
Loaded Configuration File	/etc/php/8.1/fpm/php.ini
Scan this dir for additional .ini files	/etc/php/8.1/fpm/conf.d
Additional .ini files parsed	/etc/php/8.1/fpm/conf.d/10-opcache.ini, /etc/php/8.1/fpm/conf.d/10-pdo.ini, /etc/php/8.1/fpm/conf.d/20-calendar.ini, /etc/php/8.1/fpm/conf.d/20-ctype.ini, /etc/php/8.1/fpm/conf.d/20-exif.ini, /etc/php/8.1/fpm/conf.d/20-fi.ini, /etc/php/8.1/fpm/conf.d/20-fileinfo.ini, /etc/php/8.1/fpm/conf.d/20-ftp.ini, /etc/php/8.1/fpm/conf.d/20-gettext.ini, /etc/php/8.1/fpm/conf.d/20-iconv.ini, /etc/php/8.1/fpm/conf.d/20-phar.ini, /etc/php/8.1/fpm/conf.d/20-posix.ini, /etc/php/8.1/fpm/conf.d/20-readline.ini, /etc/php/8.1/fpm/conf.d/20-shmop.ini, /etc/php/8.1/fpm/conf.d/20-sockets.ini, /etc/php/8.1/fpm/conf.d/20-sysmsg.ini, /etc/php/8.1/fpm/conf.d/20-syssem.ini, /etc/php/8.1/fpm/conf.d/20-sysvshm.ini, /etc/php/8.1/fpm/conf.d/20-tokenizer.ini
PHP API	20210902
PHP Extension	20210902
Zend Extension	420210902
Zend Extension Build	API420210902.NTS
PHP Extension Build	API20210902.NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	disabled
IPv6 Support	enabled
DTrace Support	available, disabled
Registered PHP Streams	https, ftps, compress.zlib, php, file, glob, data, http, ftp, phar
Registered Stream Socket Transports	tcp, udp, unix, udg, ssl, tls, tlsv1.0, tlsv1.1, tlsv1.2, tlsv1.3
Registered Stream Filters	zlib.*, string.rot13, string.toupper, string.tolower, convert.*, consumed, dechunk, convert.iconv.*

This program makes use of the Zend Scripting Language Engine:
Zend Engine v4.1.2. Copyright (c) Zend Technologies
with Zend OPcache v8.1.2-1ubuntu2.11, Copyright (c), by Zend Technologies



2. Установить Apache. Настроить обработку PHP. Добиться одновременной работы с Nginx.

- `sudo apt install apache2`
- `sudo nano /etc/apache2/ports.conf`
Listen 8080
- `sudo nano /etc/apache2/sites-enabled/000-default.conf`
<VirtualHost *:8080>
- `sudo apachectl -t`
- `sudo systemctl start apache2`

```
s180707@gb: /etc/nginx
LISTEN 0      4096      127.0.0.53:80      0.0.0.0:*        users:((("systemd-resolve",pid=635,fd=14))
LISTEN 0      128       0.0.0.0:22        0.0.0.0:*        users:((("sshd",pid=703,fd=3))
LISTEN 0      511       [::]:80          [::]:*           users:((("nginx",pid=1669,fd=7),("nginx",pid=1664,fd=7))
LISTEN 0      128       [::]:22         [::]:*           users:((("sshd",pid=703,fd=4))

s180707@gb:/etc/nginx$ sudo nano /etc/apache2/ports.conf
s180707@gb:/etc/nginx$ sudo nano /etc/apache2/sites-enabled/000-default.conf
s180707@gb:/etc/nginx$ sudo systemctl reload apache2
apache2.service is not active, cannot reload.
s180707@gb:/etc/nginx$ sudo systemctl start apache2
s180707@gb:/etc/nginx$ sudo ss -ntlp

State      Recv-Q      Send-Q       Local Address:Port      Peer Address:Port
Process
LISTEN     0            511          0.0.0.0:80              0.0.0.0:*
users:((("nginx",pid=1669,fd=6),("nginx",pid=1664,fd=6))
LISTEN     0            4096        127.0.0.53:80          0.0.0.0:*
users:((("systemd-resolve",pid=635,fd=14))
LISTEN     0            128          0.0.0.0:22             0.0.0.0:*
users:((("sshd",pid=703,fd=3))
LISTEN     0            511          *:8080                  *:
users:((("apache2",pid=2700,fd=4),("apache2",pid=2699,fd=4),("apache2",pid=2698,fd=4))
LISTEN     0            511          [::]:80                 [::]:*
users:((("nginx",pid=1669,fd=7),("nginx",pid=1664,fd=7))
LISTEN     0            128          [::]:22                 [::]:*
users:((("sshd",pid=703,fd=4))
s180707@gb:/etc/nginx$
```

The screenshot shows a web browser displaying the "Apache2 Default Page" with the message "It works!". The page content includes a welcome message and a "Configuration Overview" section. The "Configuration Overview" section states that Ubuntu's Apache2 default configuration is different from the upstream default and is optimized for interaction with Ubuntu tools. It mentions that the configuration is documented in `/usr/share/doc/apache2/README.Debian.gz` and refers to the documentation for the web server itself. It also mentions that the configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:

```
/etc/apache2/
|-- apache2.conf
|-- ports.conf
|-- mods-enabled
|   |-- *.load
|   |-- *.conf
|-- conf-enabled
|   |-- *.conf
|-- sites-enabled
|   |-- *.conf
```

The "Configuration Overview" section also lists the following configuration files and their purposes:

- `apache2.conf` is the main configuration file. It puts the pieces together by including configuration files when starting up the web server.
- `ports.conf` is always included from the main configuration file. It is used to listening ports for incoming connections, and this file can be customized as well.
- Configuration files in the `mods-enabled/`, `conf-enabled/` and `sites-enabled/` directories contain configuration snippets which manage modules, global configuration and virtual host configurations, respectively.

The right side of the screenshot shows the Chrome DevTools Network tab. The "Response Headers" section is expanded, showing the following information:

- Status Code: 200 OK
- Remote Address: 192.168.3.101:80
- Referrer Policy: strict-origin-when-cross-origin
- Response Headers:
 - Connection: keep-alive
 - Date: Mon, 17 Apr 2023 17:57:39 GMT
 - ETag: "643d7ce8-29af"
 - Last-Modified: Mon, 17 Apr 2023 17:07:52 GMT
 - Server: nginx/1.18.0 (Ubuntu)
- Request Headers:
 - Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
 - Accept-Encoding: gzip, deflate
 - Accept-Language: ru-RU,ru;q=0.9,en-US;q=0.8,en;q=0.7
 - Cache-Control: max-age=0
 - Connection: keep-alive
 - DNT: 1
 - Host: 192.168.3.101
 - If-Modified-Since: Mon, 17 Apr 2023 17:07:52 GMT
 - If-None-Match: W/"643d7ce8-29af"
 - Upgrade-Insecure-Requests: 1
 - User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/112.0.0.0 Safari/537.36

3. Настроить схему обратного прокси для Nginx (динамика - на Apache).

- `sudo nano /etc/nginx/sites-enabled/default`

```
GNU nano 6.2 default
# Note: You should disable gzip for SSL traffic.
# See: https://bugs.debian.org/773332
#
# Read up on ssl_ciphers to ensure a secure configuration.
# See: https://bugs.debian.org/765782
#
# Self signed certs generated by the ssl-cert package
# Don't use them in a production server!
#
# include snippets/snakeoil.conf;

root /var/www/html;

# Add index.php to the list if you are using PHP
index index.html index.htm index.nginx-debian.html;

server_name _;

location / {
    # First attempt to serve request as file, then
    # as directory, then fall back to displaying a 404.
    try_files $uri $uri/ =404;
    proxy_pass http://localhost:8080;
    proxy_set_header Host $host;
    proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
    proxy_set_header X-Real-IP $remote_addr;
}

# pass PHP scripts to FastCGI server
#
#location ~ \.php$ {
#    include snippets/fastcgi-php.conf;
#    root /var/www/html;

# With php-fpm (or other unix sockets):
fastcgi_pass unix:/run/php/php8.1-fpm.sock;
# With php-cgi (or other tcp sockets):
fastcgi_pass 127.0.0.1:9000;
#}

# Static files location
location ~* ^.+.(txt|pdf|docx|xlsx|pptx|xls|exe|pdf|ppt|txt|tiff|png|jpe|gif|jpeg|jpg|woff|svg|ttf|eot)$ {
    root /var/www/html;
}


# deny access to .htaccess files, if Apache's document root
# concurs with nginx's one
#
```

- `sudo nginx -t`
- `sudo systemctl reload nginx`

← → ↻ Не защищено 192.168.3.101/info.php

JAVA Linksys Smart Wi-Fi Gmail YouTube Iplc

PHP Version 8.1.2-1ubuntu2.11



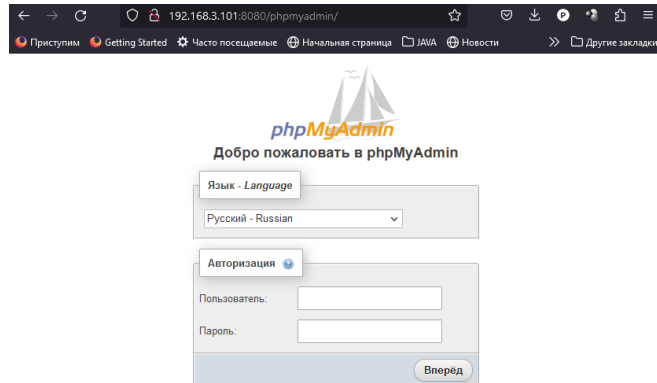
System	Linux gb 5.15.0-69-generic #76-Ubuntu SMP Fri Mar 17 17:19:29 UTC 2023 x86_64
Build Date	Feb 22 2023 22:56:18
Build System	Linux
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/8.1/apache2
Loaded Configuration File	/etc/php/8.1/apache2/php.ini
Scan this dir for additional .ini files	/etc/php/8.1/apache2/conf.d
Additional .ini files parsed	/etc/php/8.1/apache2/conf.d/10-opcache.ini, /etc/php/8.1/apache2/conf.d/10-pdo.ini, /etc/php/8.1/apache2/conf.d/20-calendar.ini, /etc/php/8.1/apache2/conf.d/20-ctype.ini, /etc/php/8.1/apache2/conf.d/20-exif.ini, /etc/php/8.1/apache2/conf.d/20-fn.ini, /etc/php/8.1/apache2/conf.d/20-fileinfo.ini, /etc/php/8.1/apache2/conf.d/20-ftp.ini, /etc/php/8.1/apache2/conf.d/20-gettext.ini, /etc/php/8.1/apache2/conf.d/20-iconv.ini, /etc/php/8.1/apache2/conf.d/20-phar.ini, /etc/php/8.1/apache2/conf.d/20-posix.ini, /etc/php/8.1/apache2/conf.d/20-readline.ini, /etc/php/8.1/apache2/conf.d/20-shmop.ini, /etc/php/8.1/apache2/conf.d/20-sockets.ini, /etc/php/8.1/apache2/conf.d/20-sysmsg.ini, /etc/php/8.1/apache2/conf.d/20-sysvsem.ini, /etc/php/8.1/apache2/conf.d/20-sysvshm.ini, /etc/php/8.1/apache2/conf.d/20-tokenizer.ini
PHP API	20210902
PHP Extension	20210902
Zend Extension	420210902
Zend Extension Build	API420210902.NTS
PHP Extension Build	API20210902.NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	disabled
IPv6 Support	enabled
DTrace Support	available, disabled
Registered PHP Streams	https, ftps, compress.zlib, php, file, glob, data, http, ftp, phar
Registered Stream Socket Transports	tcp, udp, unix, udg, ssl, tls, tlsv1.0, tlsv1.1, tlsv1.2, tlsv1.3
Registered Stream Filters	zlib*, string.rot13, string.toupper, string.tolower, convert.*, consumed, dechunk, convert.iconv.*

4. Установить MySQL. Создать новую базу данных и таблицу в ней.

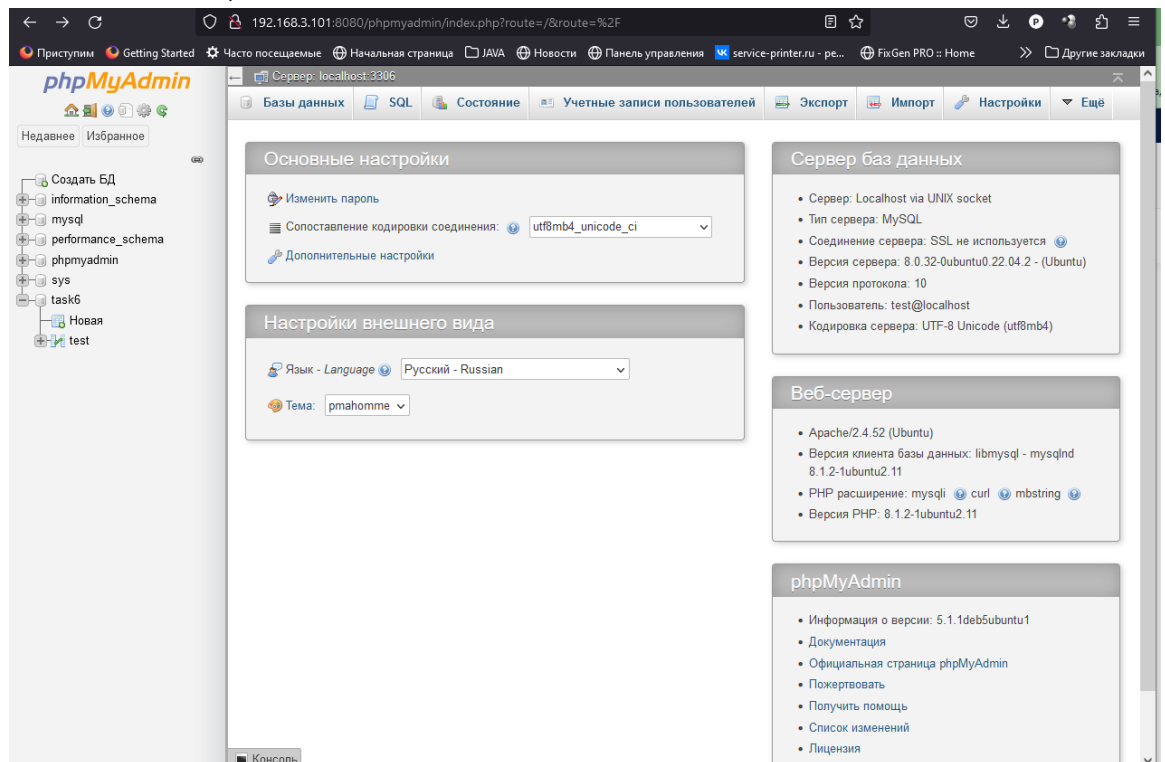
- `sudo apt install mysql-server-8.0`
- `sudo mysql`
- `create database task6`
- `use task6`
- `create table test(id int, description varchar(255));`
- `insert into test(id, description) values (1, 'desc1'),(2, 'desc2'),(3, 'desc3'),(4, 'desc4');`

5. Установить пакет phpmyadmin и запустить его веб-интерфейс для управления MySQL.

- `sudo apt install phpmyadmin php-mbstring php-zip php-gd php-json php-curl`

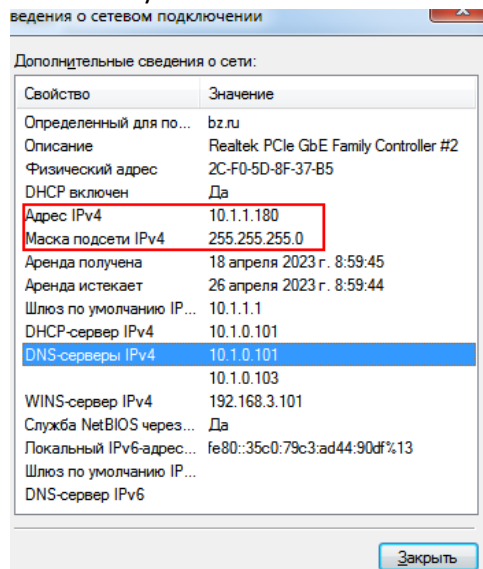


- `sudo mysql -u root -p`
- `CREATE USER 'test'@'localhost' IDENTIFIED BY '****';`
- `GRANT ALL PRIVILEGES ON *.* TO 'test'@'localhost';`
- `FLUSH PRIVILEGES;`



6. Настроить схему балансировки трафика между несколькими серверами Apache на стороне Nginx с помощью модуля ngx_http_upstream_module.

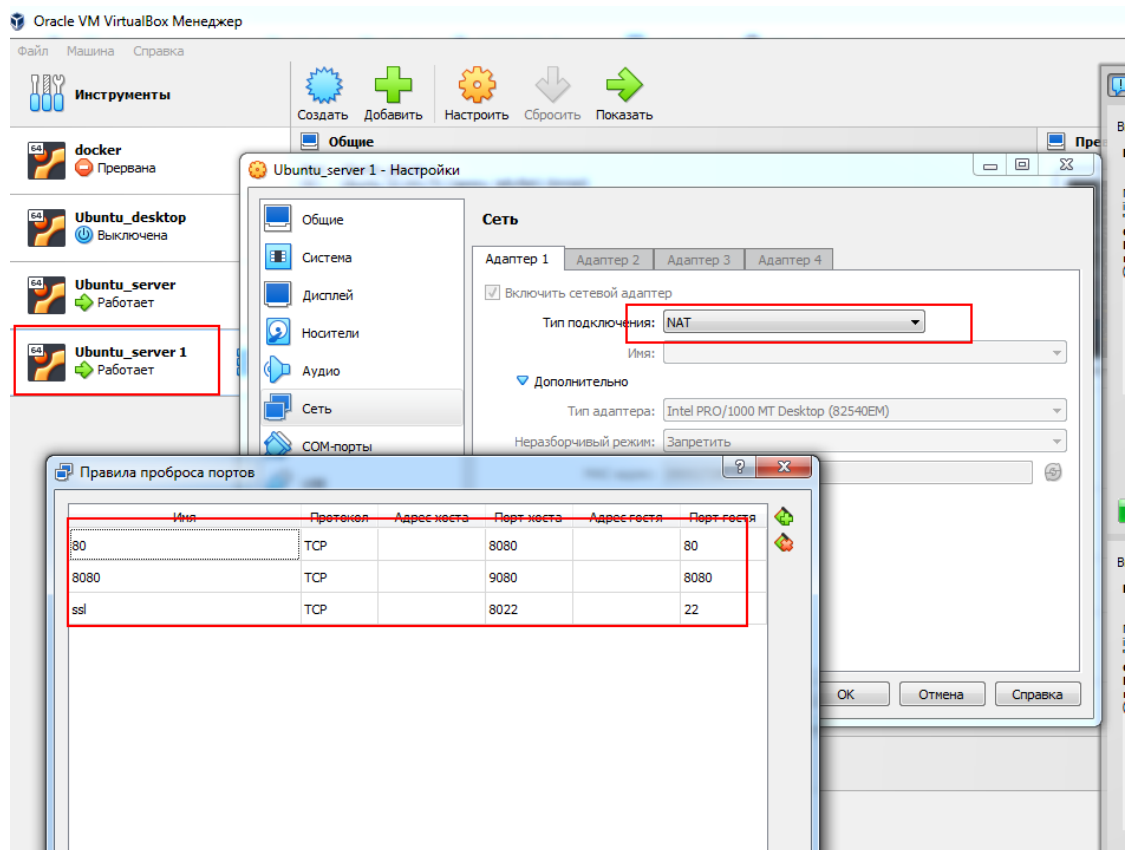
- VirtualBox установлен на IP 10.1.1.180



- Ubuntu_server (10.1.1.155) – сервер балансировщик и сервер Nginx + Apache

```
s180707@gb:/etc/nginx/sites-available$ sudo nginx -t
[sudo] password for s180707:
nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
nginx: configuration file /etc/nginx/nginx.conf test is successful
s180707@gb:/etc/nginx/sites-available$ sudo systemctl reload nginx
s180707@gb:/etc/nginx/sites-available$ ip -c -a
Usage: ip [ OPTIONS ] OBJECT { COMMAND | help }
ip [ -force ] -batch filename
where OBJECT := { address | addrlabel | fou | help | ila | ioam | l2tp | link |
macsec | maddress | monitor | mptcp | mroute | mrule |
neighbor | neighbour | netconf | netns | nexthop | ntable |
ntbl | route | rule | sr | tap | tcpmetrics |
token | tunnel | tuntap | vrf | xfrm }
OPTIONS := { -V[ersion] | -s[tatistics] | -d[etails] | -r[esolve] |
-h[uman-readable] | -i[ec] | -j[son] | -p[retty] |
-f[amily] { inet | inet6 | mpls | bridge | link } |
-4 | -6 | -M | -B | -O |
-l[oops] { maximum-addr-flush-attempts } | -br[ief] |
-o[neline] | -t[imestamp] | -ts[hort] | -b[atch] [filename] |
-rc[vbuf] [size] | -n[etns] name | -N[umeric] | -a[ll] |
-c[olor]}
s180707@gb:/etc/nginx/sites-available$ ip -c a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:d3:81:0c brd ff:ff:ff:ff:ff:ff
    inet 10.1.1.155/24 metric 100 brd 10.1.1.255 scope global dynamic enp0s3
        valid_lft 600525sec preferred_lft 600525sec
    inet6 fe80::a00:27ff:fed3:810c/64 scope link
        valid_lft forever preferred_lft forever
3: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
    link/ether 02:42:00:01:6f:af brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
        valid_lft forever preferred_lft forever
s180707@gb:/etc/nginx/sites-available$
```

- Ubuntu_server1 (NAT) - сервер Nginx + Apache



- На Ubuntu_server (10.1.1.155)
sudo nano /etc/nginx/sites-enabled/default

```

GNU nano 6.2                                     default
location / {
    # First attempt to serve request as file, then
    # as directory, then fall back to displaying a 404.
    #try_files $uri $uri/ =404;
    #proxy_pass http://localhost:8080;
    proxy_pass http://backends;

    proxy_set_header Host $host;

    #proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
    proxy_set_header X-Forwarded-Proto $scheme;

    proxy_set_header X-Real-IP $remote_addr;
}

# pass PHP scripts to FastCGI server
#
#location ~ /\.php$ {
#    include snippets/fastcgi-php.conf;
#    root /var/www/html;

#    # With php-fpm (or other unix sockets):
#    fastcgi_pass unix:/run/php/php8.1-fpm.sock;
#    # With php-cgi (or other tcp sockets):
#    fastcgi_pass 127.0.0.1:9000;
#}

# Static files location
location ~* ^.+.(ttf|eot|svg|woff|jpg|jpeg|gif|png|ico|css|zip|tgz|gz|rar|bz2|doc|docx|xlsx|pptx|xls|>
    root /var/www/html;
}

# deny access to .htaccess files, if Apache's document root
# concurs with nginx's one
#
#location ~ /\.ht {
#    deny all;
#}
}

upstream backends {
    server 127.0.0.1:8080 weight=1;
    server 10.1.1.180:9080 weight=1;
}

```

```
sudo nginx -t
sudo systemctl reload nginx
```

- **Ha Ubuntu_server1 (NAT)**
cd /var/www/html
sudo nano info.php

```
<?php
    echo "Hello World!";
?>
```


- Так как выбран метод балансировки **round-robin** с равными весами, то при запросах по очереди будут открываться следующие страницы:

1. Ubuntu_server (10.1.1.155)

← → ↻ Не защищено 10.1.1.155/info.php ☆ ⓘ

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PHP Version 8.1.2-1ubuntu2.11



System	Linux gb 5.15.0-69-generic #76-Ubuntu SMP Fri Mar 17 17:19:29 UTC 2023 x86_64
Build Date	Feb 22 2023 22:56:18
Build System	Linux
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/8.1/apache2
Loaded Configuration File	/etc/php/8.1/apache2/php.ini
Scan this dir for additional .ini files	/etc/php/8.1/apache2/conf.d
Additional .ini files parsed	/etc/php/8.1/apache2/conf.d/10-mysqld.ini, /etc/php/8.1/apache2/conf.d/10-opcache.ini, /etc/php/8.1/apache2/conf.d/10-pdo.ini, /etc/php/8.1/apache2/conf.d/15-xsl.ini, /etc/php/8.1/apache2/conf.d/20-bz2.ini, /etc/php/8.1/apache2/conf.d/20-calendar.ini, /etc/php/8.1/apache2/conf.d/20-ctype.ini, /etc/php/8.1/apache2/conf.d/20-curl.ini, /etc/php/8.1/apache2/conf.d/20-dom.ini, /etc/php/8.1/apache2/conf.d/20-exif.ini, /etc/php/8.1/apache2/conf.d/20-fli.ini, /etc/php/8.1/apache2/conf.d/20-fileinfo.ini, /etc/php/8.1/apache2/conf.d/20-ftp.ini, /etc/php/8.1/apache2/conf.d/20-gd.ini, /etc/php/8.1/apache2/conf.d/20-gettext.ini, /etc/php/8.1/apache2/conf.d/20-iconv.ini, /etc/php/8.1/apache2/conf.d/20-mbstring.ini, /etc/php/8.1/apache2/conf.d/20-mysql.ini, /etc/php/8.1/apache2/conf.d/20-pdo_mysql.ini, /etc/php/8.1/apache2/conf.d/20-phar.ini, /etc/php/8.1/apache2/conf.d/20-posix.ini, /etc/php/8.1/apache2/conf.d/20-readline.ini, /etc/php/8.1/apache2/conf.d/20-shmop.ini, /etc/php/8.1/apache2/conf.d/20-simplexml.ini, /etc/php/8.1/apache2/conf.d/20-sockets.ini, /etc/php/8.1/apache2/conf.d/20-sysmsg.ini, /etc/php/8.1/apache2/conf.d/20-sysvsem.ini, /etc/php/8.1/apache2/conf.d/20-sysvshm.ini, /etc/php/8.1/apache2/conf.d/20-tokenizer.ini, /etc/php/8.1/apache2/conf.d/20-xmlreader.ini, /etc/php/8.1/apache2/conf.d/20-xmlwriter.ini, /etc/php/8.1/apache2/conf.d/20-xsl.ini, /etc/php/8.1/apache2/conf.d/20-zip.ini
PHP API	20210902
PHP Extension	20210902
Zend Extension	420210902
Zend Extension Build	API420210902,NTS
PHP Extension Build	API20210902,NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	provided by mbstring
IPv6 Support	enabled
DTrace Support	available, disabled

2. C Ubuntu_server1 (NAT)

← → ↻ Не защищено 10.1.1.155/info.php

Приложения Xerox WorkCentre... LN-dev KB Доска ИИФОР

Hello World!