

# Reverse Proxy

## Required Resources

In this Lab we need 3 Ubuntu Virtual machines. 2 will be Apache web servers and the third one will be used as a reverse proxy server using nginx.

For this lab you can use any virtualization technology available on your Windows host PC to create the 3 VMs. Either VirtualBox or Hyper-V.

If you wish to use Hyper-V then just Quick create an Ubuntu VM from the quick create screen just modify the VMs name and Virtual switch used [should be an external switch].

If you chose to use Virtual box then create the 3 VMs suing a bridged network adapter.

## Setting up the VMs

To set up the environment we need to install nginx on the Proxy VM and Apache and php on the web server VMs:

1. **Proxy setup:** on the proxy vm use the command **sudo apt install nginx**.
2. **Web Server Setup:** on both servers do the following:
  - a. `sudo apt install apache2 php`
  - b. open the file browser using sodo privileges by typing `sudo nautilus`.
  - c. Navigate to `/var/www/html`
  - d. rename `index.html` to `index.php`.
  - e. Open the `index.html` file in a text editor and delete all its contents.
  - f. Write the following inside the file and save it:

```
1 <html>
2 <head>
3 <title>Webserver 1</title>
4 </head>
5 <body>
6 <h1 align=center>Welcome To Webserver 1</h1>
7 <p align=center>My IP address is: <?php echo $_SERVER["SERVER_ADDR"];?></p>
8 <p align=center>Your IP address is: <?php echo $_SERVER["REMOTE_ADDR"];?></p>
9 </body>
10 </html>
```

do the same on sever 2:

```
1 <html>
2 <head>
3 <title>Webserver 2</title>
4 </head>
5 <body>
6 <h1 align = center>Welcome to Webserver 2</h1>
7 <p align =center>My IP address is: <?php echo $_SERVER["SERVER_ADDR"];?></p>
8 <p align =center>Your IP address is: <?php echo $_SERVER["REMOTE_ADDR"];?></p>
9 </body>
10 </html>
```

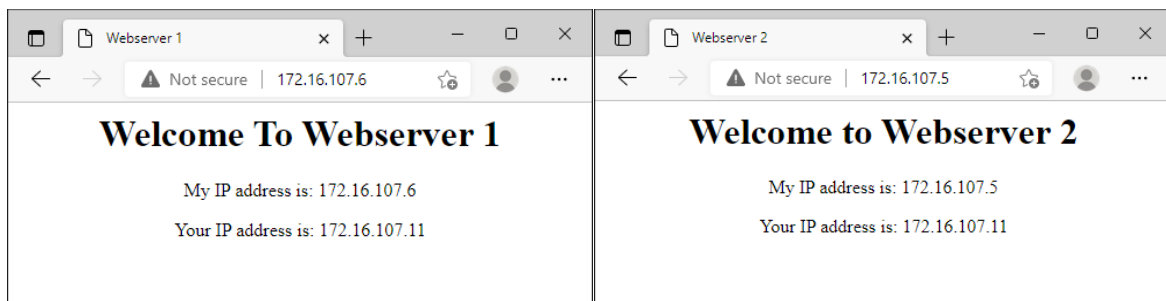
to test you server configuration first document the IP address of each server:

Webserver1 IP address: \_\_\_\_\_

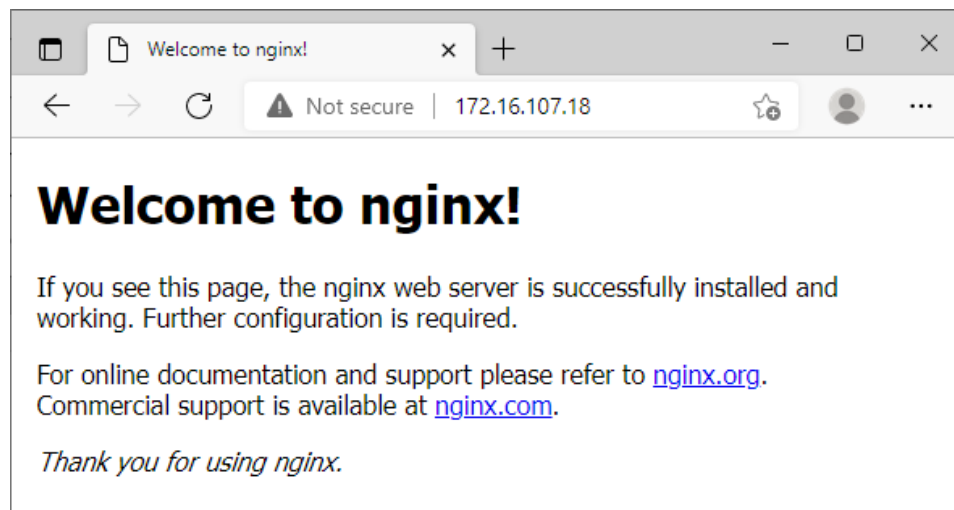
Webserver2 IP address: \_\_\_\_\_

Proxy IP address: \_\_\_\_\_

open a browser from your host machine and open the IP address of each server, you should get something like the following:

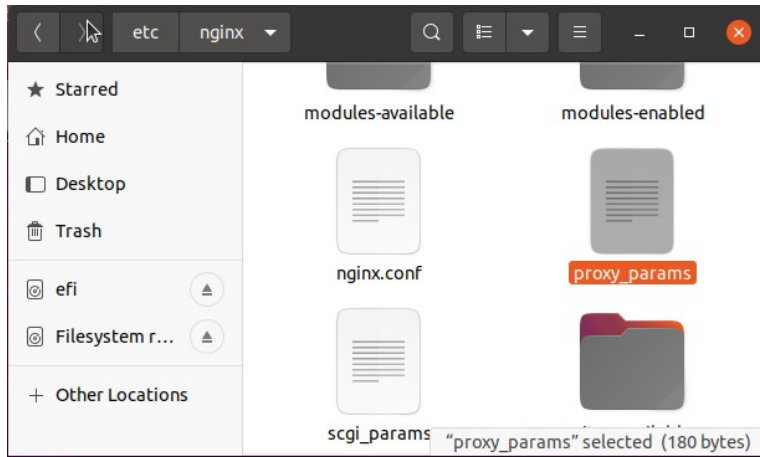


also your nginx server should look something like this:



## Setting up Reverse Proxy

1. On the proxy server open the file browser with sudo privileges and navigate to /etc/nginx:



2. open proxy\_params in an editor:

```
1 proxy_set_header Host $http_host;  
2 proxy_set_header X-Real-IP $remote_addr;  
3 proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;  
4 proxy_set_header X-Forwarded-Proto $scheme;  
_
```

since what the reverse proxy is doing is really taking the client requests and making the request on its behalf that means all http headers in the request will be overwritten with the proxy host information instead of the client information. This will make the client anonymous to the web server. This would affect our access logs in such away that the servers would think that their only client is the proxy server.

For detailed information about the each of the above fields refer to the nginx server documentation.

3. Open the site enabled directory. Normally all sites should be created in the sites available and sim-linked inside the sites enabled but to simplify things we will create it directly in the sites enabled directory.
4. Create a new file and name it webserver1.conf with the contents below then save and close the file:

```
1 server{
2     listen 80;
3     server_name webserver1;
4
5     location /{
6         proxy_pass http://webserver1/;
7         include /etc/nginx/proxy_params;
8     }
9 }
10 }
```

5. Restart the nginx service **sudo service nginx reload && sudo service nginx restart.**
6. On nginx server edit the `/etc/hosts` file to include both of your web server IPs as follows:

```
GNU nano 4.8 /etc/hosts
127.0.0.1    localhost
127.0.1.1    student-Virtual-Machine
172.16.107.6 webserver1
172.16.107.5 webserver2
```

note: your IPs will be different.

7. On your windows host machine open the notepad application as an administrator and open the file `c:\windows\system32\drivers\etc\hosts` and add the following lines noting that the IP should be your nginx server IP:  
172.16.107.18 webserver1  
172.16.107.18 webserver2
8. open Microsoft Edge on the windows host machine and navigate to the address <http://webserver1>. This should open webserver1 website as shown:



9. Create a config file for webserver2 then reload and restart the nginx service and open <http://webseerver2> from the windows host machine.