upGrad

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Demo 1: Nginx

Introduction

Following are the learning objectives of this demonstration:

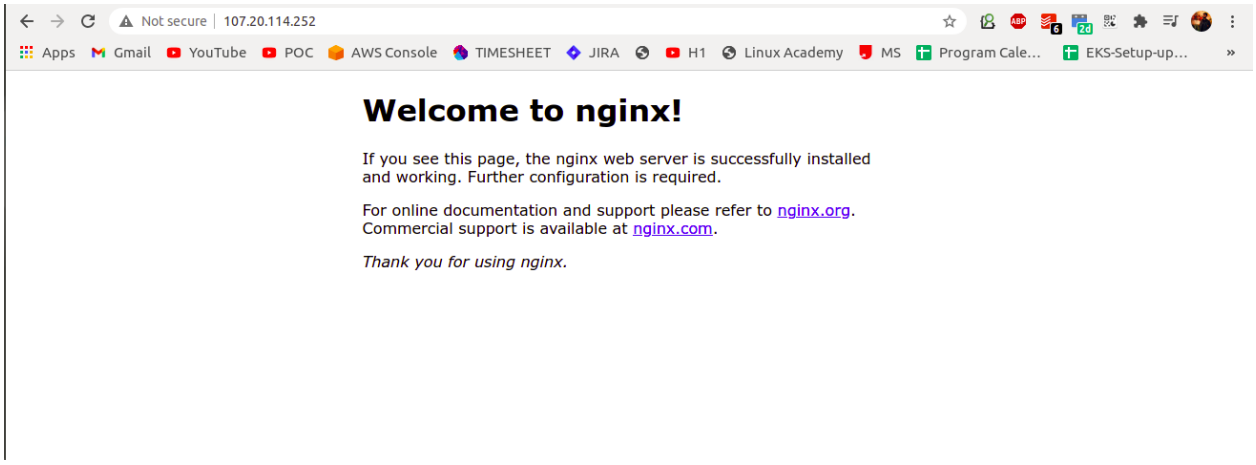
- Learning about Nginx installation
- Taking a look at the Nginx folder structure
- Understanding server blocks and custom conf files
- Hosting two websites: Hello upGradlearners.com and DevOpslearner.com

Nginx Installation

1. Run the following commands:
   sudo apt-get update
   sudo apt-get install nginx -y
   sudo service nginx start

```
ubuntu@ip-172-31-5-46:~$ sudo service nginx start
ubuntu@ip-172-31-5-46:~$
ubuntu@ip-172-31-5-46:~$
ubuntu@ip-172-31-5-46:~$ sudo service nginx status
● nginx.service - A high performance web server and a reverse proxy server
   Loaded: loaded (/lib/systemd/system/nginx.service; enabled; vendor preset: enabled)
   Active: active (running) since Sat 2021-03-06 09:17:12 UTC; 4s ago
     Docs: man:nginx(8)
  Process: 16812 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
  Process: 16801 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
 Main PID: 16815 (nginx)
    Tasks: 2 (limit: 2348)
   CGroup: /system.slice/nginx.service
           ├─16815 nginx: master process /usr/sbin/nginx -g daemon on; master_process on;
           └─16819 nginx: worker process

Mar 06 09:17:12 ip-172-31-5-46 systemd[1]: Starting A high performance web server and a reverse proxy server...
Mar 06 09:17:12 ip-172-31-5-46 systemd[1]: nginx.service: Failed to parse PID from file /run/nginx.pid: Invalid argument
Mar 06 09:17:12 ip-172-31-5-46 systemd[1]: Started A high performance web server and a reverse proxy server.
ubuntu@ip-172-31-5-46:~$
ubuntu@ip-172-31-5-46:~$
```

2. Now, hit the instance IP from the web browser to check whether the Nginx installation is done properly.



3. Run **ps -ef --forest | grep nginx** to check the processes running.

```
ubuntu@ip-172-31-5-46:~$
ubuntu@ip-172-31-5-46:~$ ps -ef --forest | grep nginx
ubuntu   18534 18304  0 10:32 pts/1    00:00:00             \_ grep --color=auto nginx
root     18483     1  0 10:30 ?        00:00:00 nginx: master process /usr/sbin/nginx -g daemon on; master_process on;
www-data 18484 18483  0 10:30 ?        00:00:00  \_ nginx: worker process
ubuntu@ip-172-31-5-46:~$
ubuntu@ip-172-31-5-46:~$
ubuntu@ip-172-31-5-46:~$
```

Nginx Folder Structure

1. When you run **service nginx start**, Nginx reads its configuration file **nginx.conf** present in the **/etc/nginx** folder.

```
ubuntu@ip-172-31-5-46:~$
ubuntu@ip-172-31-5-46:~$ cd /etc/nginx/
ubuntu@ip-172-31-5-46:/etc/nginx$ ls
conf.d        fastcgi_params  koi-win     modules-available  nginx.conf    scgi_params      sites-enabled  uwsgi_params
fastcgi.conf  koi-utf         mime.types  modules-enabled    proxy_params  sites-available  snippets       win-utf
ubuntu@ip-172-31-5-46:/etc/nginx$
ubuntu@ip-172-31-5-46:/etc/nginx$
```

2. nginx.conf looks like the file given below.

user www-data; # ***user by which worker process will be launched***
worker_processes auto; # ***how many worker process will be launched***
pid /run/nginx.pid; # ***pid information***
include /etc/nginx/modules-enabled/*.conf; # ***okay, its saying along with me read these files too***

```
events {
        worker_connections 768;  # how much each worker can handle connections
                                 # so if total worker are 4, total connections nginx wi
accept will be 4 * 768
}

http {
        sendfile on;
        tcp_nopush on;
        tcp_nodelay on;
        keepalive_timeout 65;
        types_hash_max_size 2048;

        include /etc/nginx/mime.types;
        default_type application/octet-stream;
        ssl_protocols TLSv1 TLSv1.1 TLSv1.2; # Dropping SSLv3, ref: POODLE
        ssl_prefer_server_ciphers on;

        access_log /var/log/nginx/access.log; # where nginx will store its access logs
        error_log /var/log/nginx/error.log; # where nginx will store error logs
        gzip on;
        include /etc/nginx/conf.d/*.conf; # along with me read these files too
        include /etc/nginx/sites-enabled/*;  # along with me read these files too
}
```

3. Now, the question arises: From where is the "welcome to nginx" page is getting served? Let's take a look at the folders present in the nginx.conf file one by one, starting with the 'default' file present at path **/etc/nginx/sites-enabled/.**

```
ubuntu@ip-172-31-5-46:/etc/nginx/sites-enabled$ ls
default
ubuntu@ip-172-31-5-46:/etc/nginx/sites-enabled$ cat default
##
# You should look at the following URL's in order to grasp a solid understanding
# of Nginx configuration files in order to fully unleash the power of Nginx.
# https://www.nginx.com/resources/wiki/start/
# https://www.nginx.com/resources/wiki/start/topics/tutorials/config_pitfalls/
# https://wiki.debian.org/Nginx/DirectoryStructure
#
# In most cases, administrators will remove this file from sites-enabled/ and
# leave it as reference inside of sites-available where it will continue to be
# updated by the nginx packaging team.
#
# This file will automatically load configuration files provided by other
```

4.

```
        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;
        }
```

Hosting Multiple Websites on Nginx

Hosting two websites: upGradlearner.com and DevOpslearner.com using custom conf files

1. Create two files in the **/etc/nginx/sites-enabled** directory of your instance.

```
ubuntu@ip-172-31-5-46:/etc/nginx/sites-enabled$
ubuntu@ip-172-31-5-46:/etc/nginx/sites-enabled$ ls
default  devops  upgrad
ubuntu@ip-172-31-5-46:/etc/nginx/sites-enabled$
ubuntu@ip-172-31-5-46:/etc/nginx/sites-enabled$
ubuntu@ip-172-31-5-46:/etc/nginx/sites-enabled$
ubuntu@ip-172-31-5-46:/etc/nginx/sites-enabled$
ubuntu@ip-172-31-5-46:/etc/nginx/sites-enabled$
```

2. The contents of the two files should look like the following.

devops

```
server {
        listen 80;
        listen [::]:80;

        root /var/www/html/devops;

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

        server_name devopslearner.com;

        location / {
```

```
                # First attempt to serve request as file, then
                # as directory, then fall back to displaying a 404.
                try_files $uri $uri/ =404;
        }
}
```

upgrad

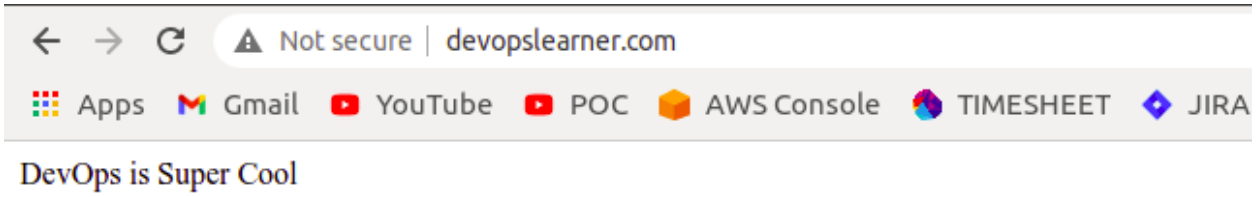
```
server {
        listen 80;
        listen [::]:80;

        root /var/www/html/upgrad;

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

        server_name upgradlearner.com;

        location / {
                # First attempt to serve request as file, then
                # as directory, then fall back to displaying a 404.
                try_files $uri $uri/ =404;
        }
}
```

3. Now, put the 'index.html' at the respective roots of the websites mentioned above.

/var/www/html/upgrad/index.html	/var/www/html/devops/index.html
<html> <head> <title> upGrad Website </title> </head> <body> Hello upGrad Learners	<html> <head> <title> DevOps Website </title> </head> <body> DevOps is Super Cool

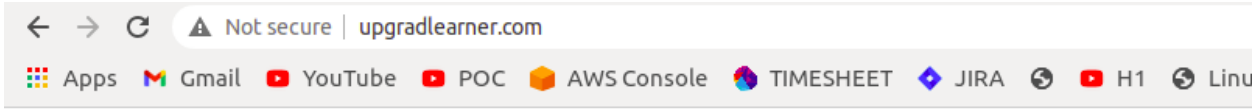
</body> </html>	</body> </html>

4. Hit the two websites mentioned above.



DevOps is Super Cool

5.



Hello upGrad Learners

6. Remember that as you have not registered your domain anywhere, it will not resolve to the instance's IP address automatically. So, you need to make changes in your local machine's **/etc/host** file to map both websites to the instance's IP address.

```
$ vi /etc/hosts
$ cat /etc/hosts
127.0.0.1        locahost
54.236.221.246 upgradlearner.com
54.236.221.246 devopslearner.com
$
```

Demo 2: Scaling

Introduction

Let's see how we can scale an application in an AWS environment.

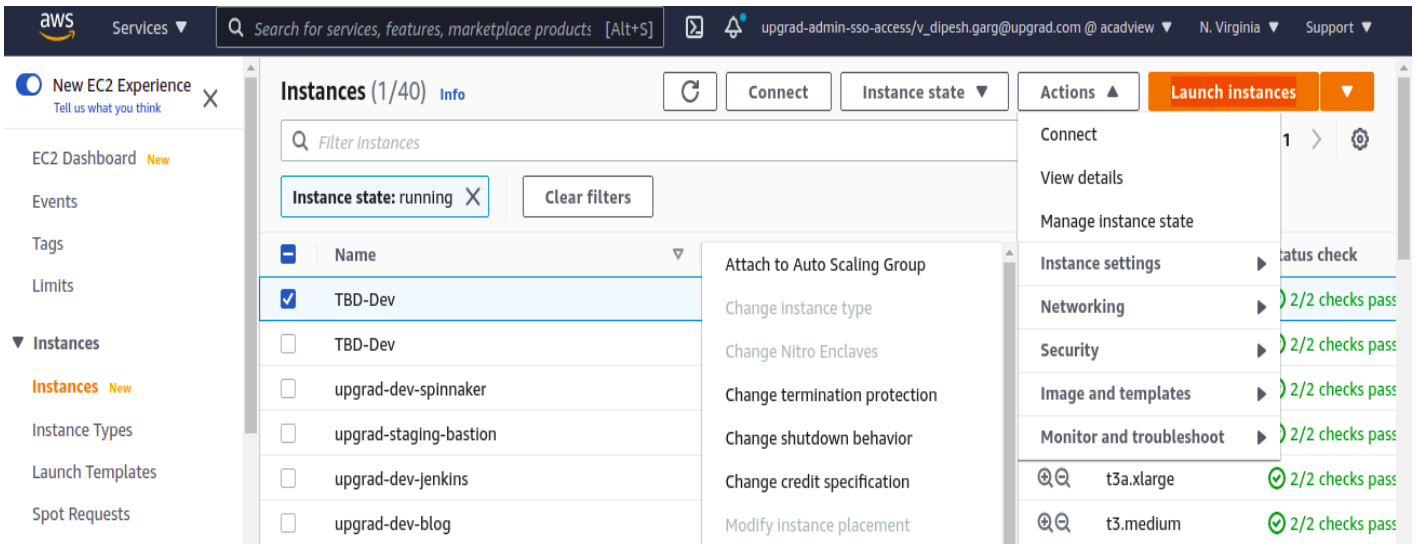
- Vertical scaling in EC2 and RDS
- Horizontal scaling using ASG (auto scaling groups)

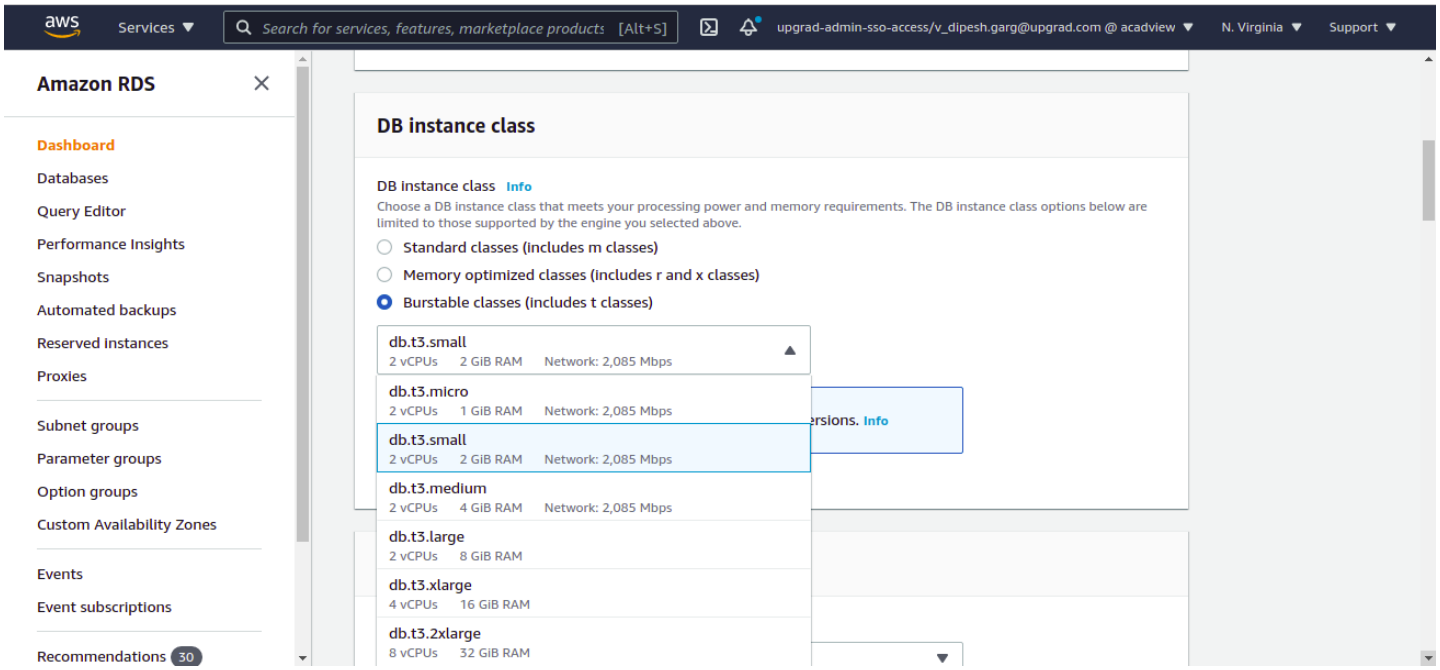
Vertical Scaling in EC2 and RDS

1. Show a running EC2 and RDS, including size, core, etc. and the current utilisation.
2. Vertically scale up and down.

Show the downtime involved in both cases.

You need to stop the EC2 before changing the instance type.

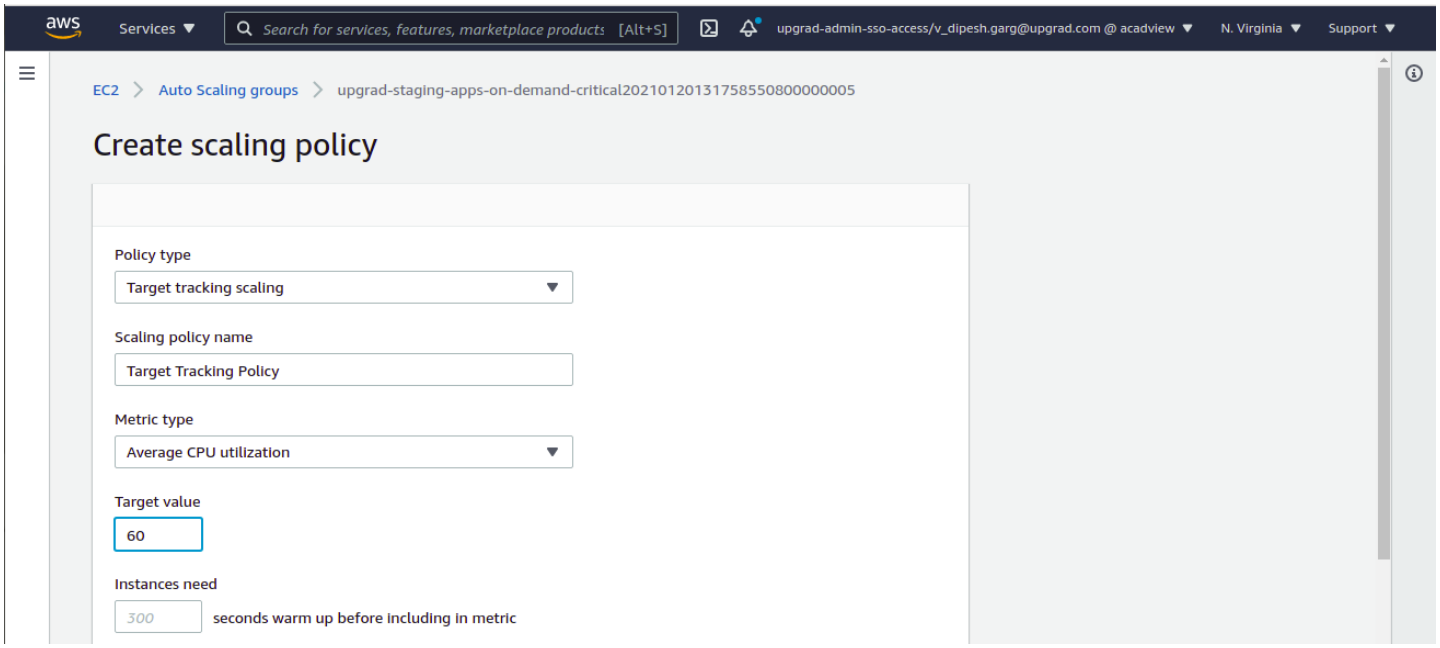




Horizontal Scaling

1. In the ASG console, create an ASG of two desired instances.

2. Set the auto scaling policy of Target 60% CPU.



Demo 3: Load Balancing

- Implementing different types of load balancing using Nginx
- Load balancing in an AWS environment

Let's create a load balancer between the two websites **facebook.com** and **upgrad.com** with the help of nginx. When you hit the nginx web server on your browser, it will serve from any of the two websites based on the load balancing technique.

Create a file with the name **upgrad** in the path **/etc/nginx/sites-enabled/** with the content given below and mention upstream backend as mentioned below with proper parameters to configure different types of load balancers using Nginx.

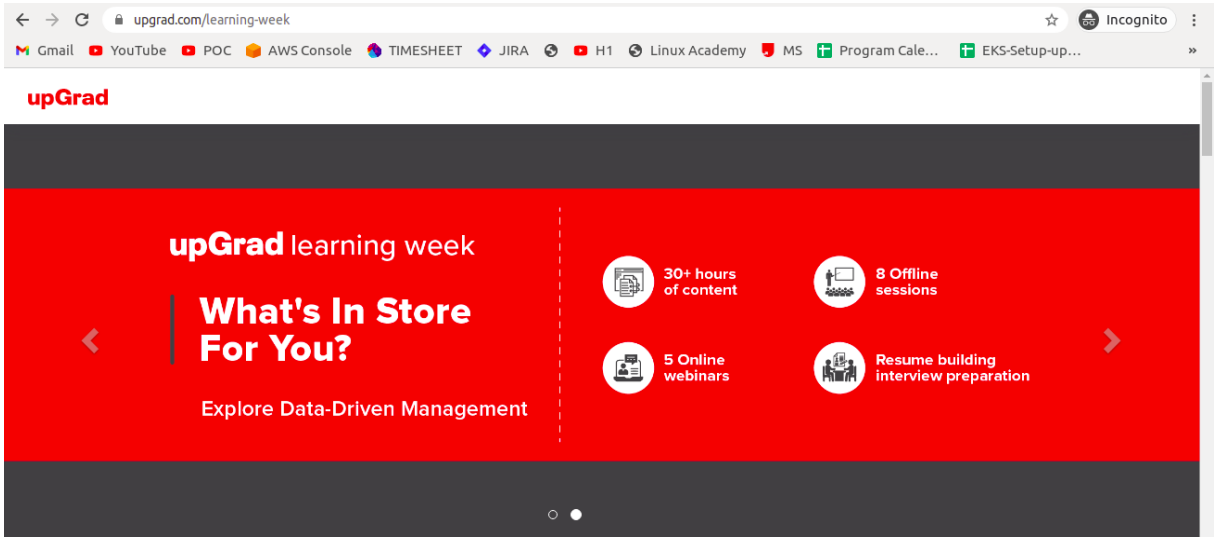
```
upstream backend {
   server upgrad.com;
   server facebook.com;
}

server {
       listen 80;
       listen [::]:80;

       server_name upgradloadbalancing.com;

   location / {
       proxy_pass http://backend;
   }
}
```

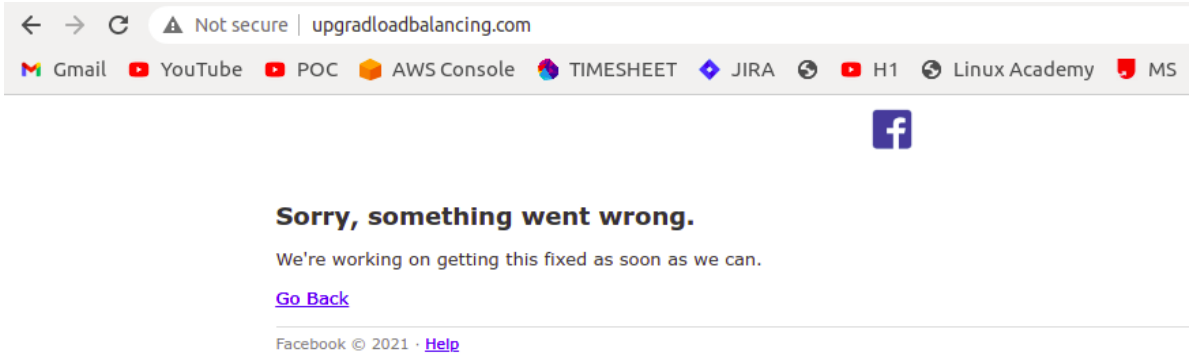
```
upstream backend {
   least_conn;   #try changing the type here
```

```
upstream backend {
   server facebook.com weight=5;
```

```
upstream backend {
   server upgrad.com down;
```

upGrad


upgrad.com/learning-week
Incognito
Gmail
YouTube
POC
AWS Console
TIMESHEET
JIRA
H1
Linux Academy
MS
Program Cale...
EKS-Setup-up...
upGrad
upGrad learning week
What's In Store For You?
Explore Data-Driven Management
30+ hours of content
8 Offline sessions
5 Online webinars
Resume building interview preparation


Not secure
upgradloadbalancing.com
Gmail
YouTube
POC
AWS Console
TIMESHEET
JIRA
H1
Linux Academy
MS
Sorry, something went wrong.
We're working on getting this fixed as soon as we can.
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Load Balancing in an AWS Environment

In the module on 'AWS Services', you learnt the steps in creating load balancers in AWS. This document contains a summary of the steps needed to set up a load balancer in AWS.