Lab 12.1 Create the lb_test.conf configuration file

Use the credentials: root/training when accessing the server's command line.

1. Backup default.conf

   ```
   mv /etc//nginx/conf.d/default.conf /etc/nginx/conf.d/default.conf.bak
   ```

2. Create lb_test.conf

   ```
   vim /etc/nginx/conf.d/lb_test.conf
   ```

3. Add the server block below to lb_test.conf

   ```
   server {
       listen 80 default_server;
       root /usr/share/nginx/html;
       server_name localhost;
       access_log /var/log/nginx/lb.access.log combined;
       error_log /var/log/nginx/lb.error.log notice;

       location / {

       }
   }
   ```

4. Save lb_test.conf
5. Reload nginx
6. curl localhost

Lab 12.2 Set up backend servers for load balancing

1. In /etc/nginx/conf.d, create backends.conf.

   ```
   vim /etc/nginx/conf.d/backends.conf
   ```

2. Define three server context with root directive pointing to /data/backend 1, backend2 and backend 3, with listen directives on ports 8081, 8082, and 8083, respectively:

   ```
   server {
       listen 8081;
       root /data/backend1;
   }

   server {
       listen 8082;
       root /data/backend2;
   }

   server {
       listen 8083;
   ```

```
        root /data/backend3;
}
```

3. Save and exit backends.conf
4. Create directories for your backend content

```
mkdir -p /data/backend1/
mkdir -p /data/backend2/
mkdir -p /data/backend3/
```

5. Create content for your backends. Create index.html

```
vim /data/backend1/index.html
```

6. Enter the text "this is backend 1"
7. Save and exit index.html
8. Repeat the process above to create index files for backend2 and backend3 respectively.
9. Save and reload NGINX. Test each back end:

```
curl localhost:8081
curl localhost:8082
curl localhost:8083
```

Lab 12.3 Define a server pool

1. Open lb_test.conf

```
vim /etc/nginx/conf.d/lb_test.conf
```

2. Create an upstream context in the http context as follows:

```
upstream myServers {
    server 127.0.0.1:8081;
    server 127.0.0.1:8082;
    server 127.0.0.1:8083;
}
```

3. Update the location context with a proxy_pass directive that references the upstream you just created, as follows:

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

4. Save and reload NGINX.
5. Curl localhost a few times. It should rotate through the backends.

Lab 12.4 Server Weight

1. Open lb_test.conf

   ```
   vim /etc/nginx/conf.d/lb_test.conf
   ```

2. In the upstream myServers, add weight parameters to your server directives as follows:

   ```
   upstream myServers {
       server 127.0.0.1:8081 weight=1;
       server 127.0.0.1:8082 weight=2;
       server 127.0.0.1:8083 weight=4;
   }
   ```

3. Save and exit lb_test.conf
4. Reload nginx
5. Curl localhost a few times. How has the weight parameter changed the load balancing?

Lab 12.5 max_fails and fail_timeout

1. Open lb_test.conf

   ```
   vim /etc/nginx/conf.d/lb_test.conf
   ```

2. In the upsteam myServers, add max_fails and fail_timeout parameters to your upstream servers, as follows:

   ```
   upstream myServers {
       server 127.0.0.1:8081 weight=1 max_fails=5 fail_timeout=90s;
       server 127.0.0.1:8082 weight=2 max_fails=5 fail_timeout=90s;
       server 127.0.0.1:8083 weight=4 max_fails=5 fail_timeout=90s;
   }
   ```

3. Save and exit lb_test.conf
4. Reload nginx
5. curl localhost

Lab 12.6 Specify a maximum number of connections to your backends

1. Open lb_test.conf

   ```
   vim /etc/nginx/conf.d/lb_test.conf
   ```

2. In the upstream myServers, add the max_conns parameter to each upstream server, as follows:

   ```
   upstream myServers {
       server 127.0.0.1:8081 weight=1 max_fails=5 fail_timeout=90s
   max_conns=100;
       server 127.0.0.1:8082 weight=2 max_fails=5 fail_timeout=90s
   max_conns=200;
   ```

```
    server 127.0.0.1:8083 weight=4 max_fails=5 fail_timeout=90s;
max_conns=400;
}
```

3. Save and exit lb_test.conf
4. Reload nginx
5. curl localhost

Lab 12.7 Set up a queue for your upstream

1. Open lb_test.conf

```
vim /etc/nginx/conf.d/lb_test.conf
```

2. In the upstream backend, add the following directives:

```
queue 100 timeout=70;
```

3. Save and exit lb_test.conf
4. Reload nginx
5. curl localhost

Lab 12.8 Change the load balancing method to Random

1. Open lb_test.conf
2. In upstream backend, add the following directive:

```
random two least_time=header;
```

3. Save and exit lb_test.conf
4. Reload nginx
5. curl localhost

Each lab uses a fresh environment so remember to shut down the environment when done.