

NAME:ARPITA PAKKI

SIC:21BCED16

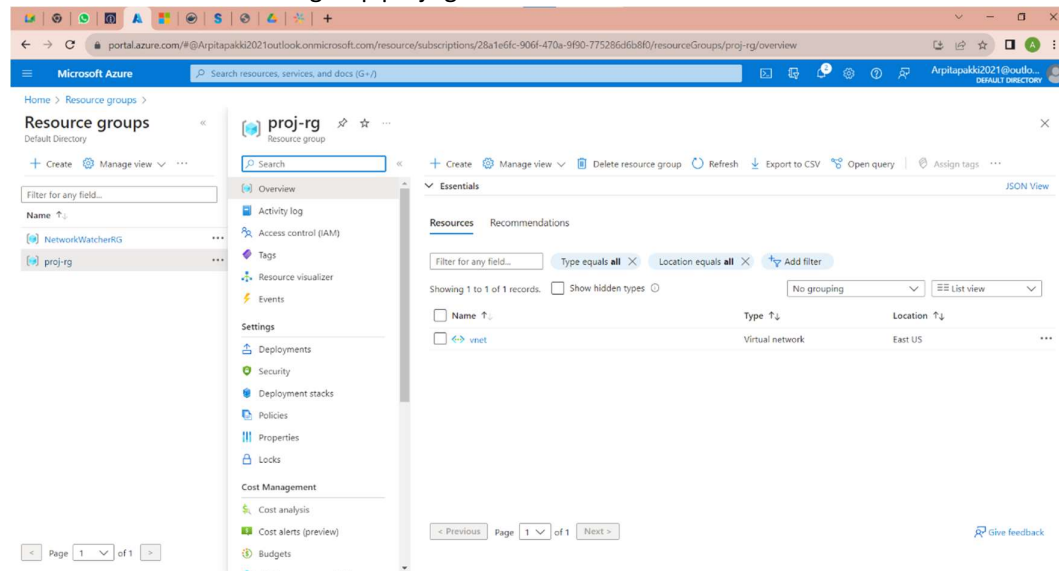
BRANCH:CEN

AZURE PROJECT

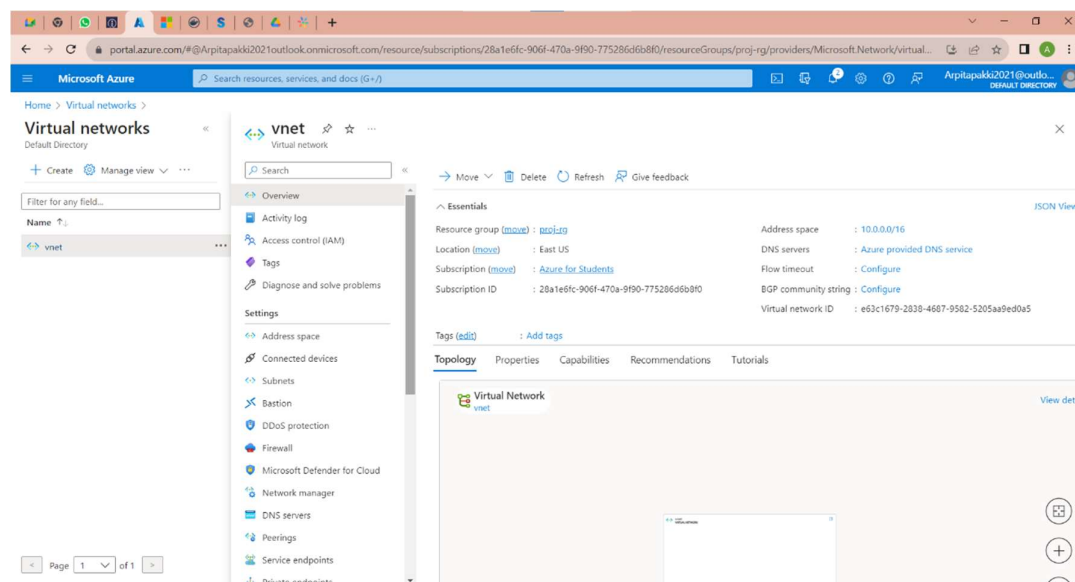
TASK: Create two virtual machines(where sample websites are configured) and then made connection with database and then create tables ,then we needed to create another virtual machine where mysql is configured,the two virtual machines created must be load balancing and auto scaled and then domain mapping should be done and ssl certificate generation is (optional).

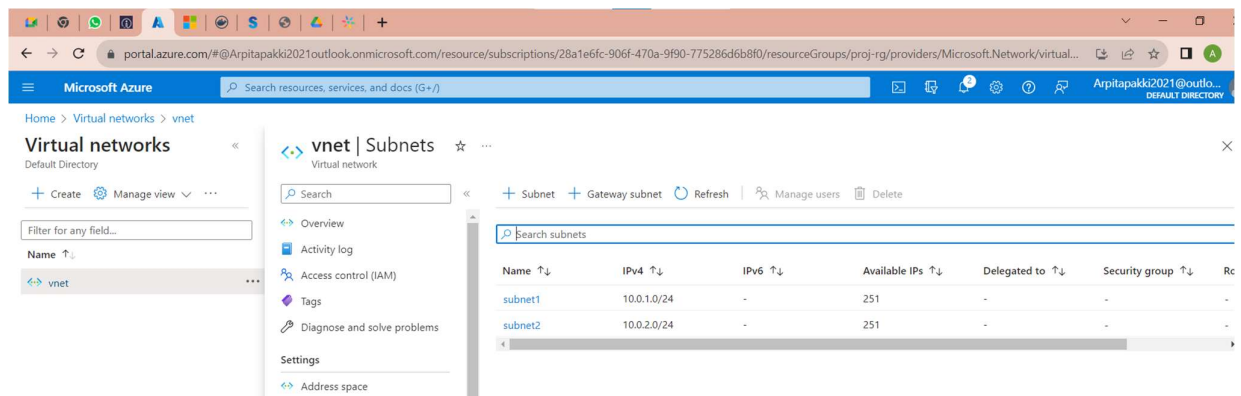
SOLUTION(STEPS):

1-I first created a resource group proj-rg.

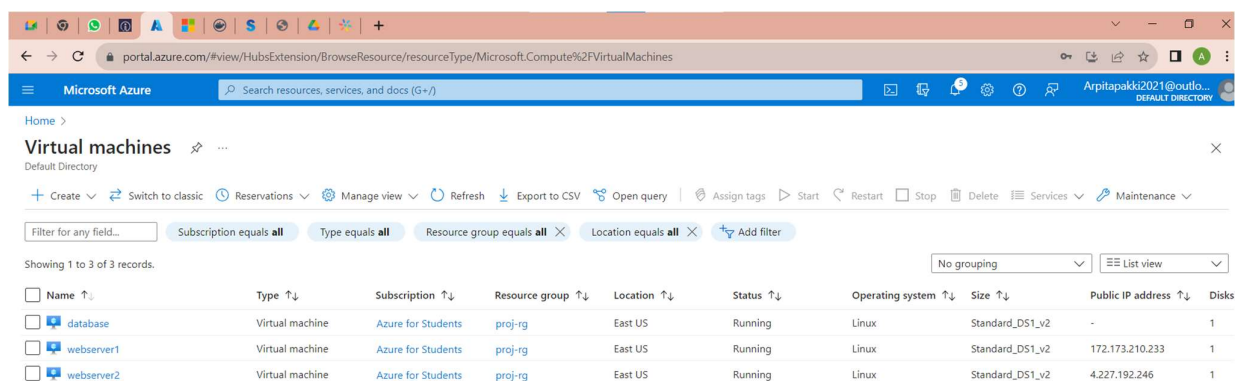


2-Then I created a virtual network named vnet and added subnets to it i.e subnet1 and subnet2

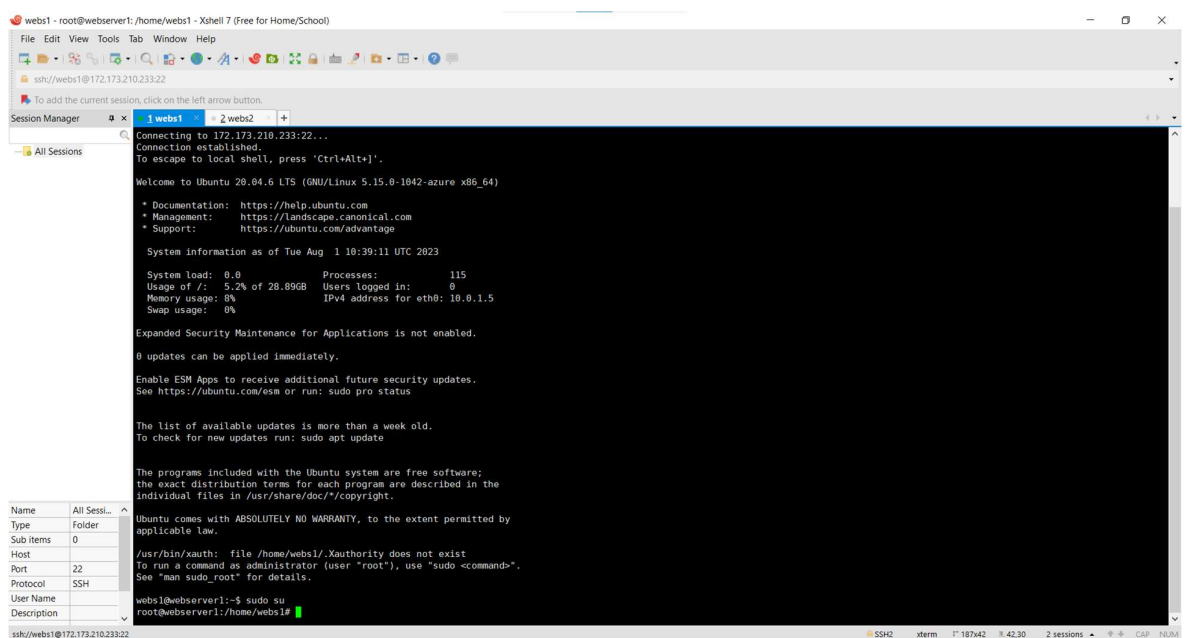




3-Created three virtual machines of linux where created and the the public-ip for database vm was none and other vms that where webserver1 and webserver2 were provided with the public ip address.



4-Go to xshell where we created connection for both servers through ssh key then made sudo su .



```
webs2 - root@webserver2: ~ - Xshell 7 (Free for Home/School)
File Edit View Tools Tab Window Help
ssh://webs2@4.227.192.246:22
To add the current session, click on the left arrow button.
Session Manager
All Sessions
1 webs1
2 webs2
Connection established.
To escape to local shell, press 'Ctrl+Alt+J'.
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1042-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

System information as of Tue Aug 1 10:43:47 UTC 2023

System load: 0.08      Processes:            184
Usage of /:  5.2% of 28.89GB Users logged in:      0
Memory usage: 9%      IPv4 address for eth0: 10.0.1.6
Swap usage:  0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

/usr/bin/xdm: file /home/webs2/.Xauthority does not exist
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

webs2@webserver2:~$ sudo su
root@webserver2:/home/webs2# cd
root@webserver2:~#
```

Cd etc, then also made both the webserver connected with database server .

```
webs1 - root@database: ~ - Xshell 7 (Free for Home/School)
File Edit View Tools Tab Window Help
ssh://webs1@172.173.210.233:22
To add the current session, click on the left arrow button.
Session Manager
All Sessions
1 webs1
2 webs2
ECDSA key fingerprint is SHA256:JA7EP+8vz8zjPu80v3S40AE1GbV+0MjFurd/bzk9IE.
Are you sure you want to continue connecting (yes/no/[fingerprint])? y
Please type 'yes', 'no' or the fingerprint: yes
Warning: Permanently added '10.0.1.4' (ECDSA) to the list of known hosts.
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1042-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

System information as of Tue Aug 1 10:49:42 UTC 2023

System load: 0.0      Processes:            115
Usage of /:  5.2% of 28.89GB Users logged in:      0
Memory usage: 9%      IPv4 address for eth0: 10.0.1.4
Swap usage:  0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

azureuser@database:~$ sudo su
root@database:/home/azureuser# cd
root@database:~#
```

5-Here installed mysql server on the database which has already been connected with the webserver

[illegible]

6-I created user name and password for the mysql so that when ever i want to login to mysql interface we can directly login through following commands directly.

The image shows a Kali Linux desktop environment. In the background, a web browser window is open, displaying a terminal session with the command `ssh://webs1@172.173.210.233:22`. The terminal window in the foreground is running a MySQL monitor session. The user is logged in as root, and the database is mysql. The user enters the password and is prompted for the MySQL monitor commands. The user enters 'exit' and the session ends. The terminal also shows a list of sessions in the bottom left corner.

Terminal Output:

```
mysql> exit
Bye
root@database:~# mysql -u root -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 13
Server version: 8.0.33-0ubuntu0.20.04.4 (Ubuntu)

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Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> exit
Bye
root@database:~# mysql -u root -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 14
Server version: 8.0.33-0ubuntu0.20.04.4 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
```

Session Manager:

Name	All Sessi...
Type	Folder
Sub-items	0
Host	22
Port	22
Protocol	SSH
User Name	
Description	

Terminal Output (Bottom Left):

```
ssh://webs1@172.173.210.233:22
```

Then we created tables using sql queries shown below:

Webs1:

```
mysql> CREATE TABLE employees (
  id INT(4) UNSIGNED ZEROFILL AUTO_INCREMENT PRIMARY KEY,
  first_name VARCHAR(50),
  last_name VARCHAR(50),
  email VARCHAR(100));
Query OK, 0 rows affected (0.07 sec)

mysql> SHOW TABLES;
+-----+
| Tables_in_mydb |
+-----+
| employees       |
+-----+
1 row in set (0.00 sec)

mysql> DESCRIBE employees;
+-----+
| Field      | Type                | Null | Key | Default | Extra |
+-----+
| id         | int(4) unsigned     | NO   | PRI | NULL    | auto_increment |
| first_name | varchar(50)         | YES  |     | NULL    |               |
| last_name  | varchar(50)         | YES  |     | NULL    |               |
| email      | varchar(100)        | YES  |     | NULL    |               |
+-----+
4 rows in set (0.01 sec)

mysql> INSERT INTO employees (first_name, last_name, email)
-> VALUES ('John', 'Doe', 'john.doe@example.com');
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO employees (first_name, last_name, email)
-> VALUES ('Jane', 'Smith', 'jane.smith@example.com');
Query OK, 1 row affected (0.01 sec)

mysql> SELECT * FROM employees;
+-----+
| id | first_name | last_name | email |
+-----+
| 1  | John      | Doe      | john.doe@example.com |
| 2  | Jane      | Smith    | jane.smith@example.com |
+-----+
2 rows in set (0.00 sec)

mysql>
```

Webs2:

```
mysql> CREATE TABLE employees (
  id INT(4) UNSIGNED ZEROFILL AUTO_INCREMENT PRIMARY KEY,
  first_name VARCHAR(50),
  last_name VARCHAR(50),
  email VARCHAR(100));
Query OK, 0 rows affected (0.07 sec)

mysql> SHOW TABLES;
+-----+
| Tables_in_mydb |
+-----+
| employees       |
+-----+
1 row in set (0.00 sec)

mysql> DESCRIBE employees;
+-----+
| Field      | Type                | Null | Key | Default | Extra |
+-----+
| id         | int(4) unsigned     | NO   | PRI | NULL    | auto_increment |
| first_name | varchar(50)         | YES  |     | NULL    |               |
| last_name  | varchar(50)         | YES  |     | NULL    |               |
| email      | varchar(100)        | YES  |     | NULL    |               |
+-----+
4 rows in set (0.01 sec)

mysql> INSERT INTO employees (first_name, last_name, email)
-> VALUES ('John', 'Doe', 'john.doe@example.com');
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO employees (first_name, last_name, email)
-> VALUES ('Jane', 'Smith', 'jane.smith@example.com');
Query OK, 1 row affected (0.01 sec)

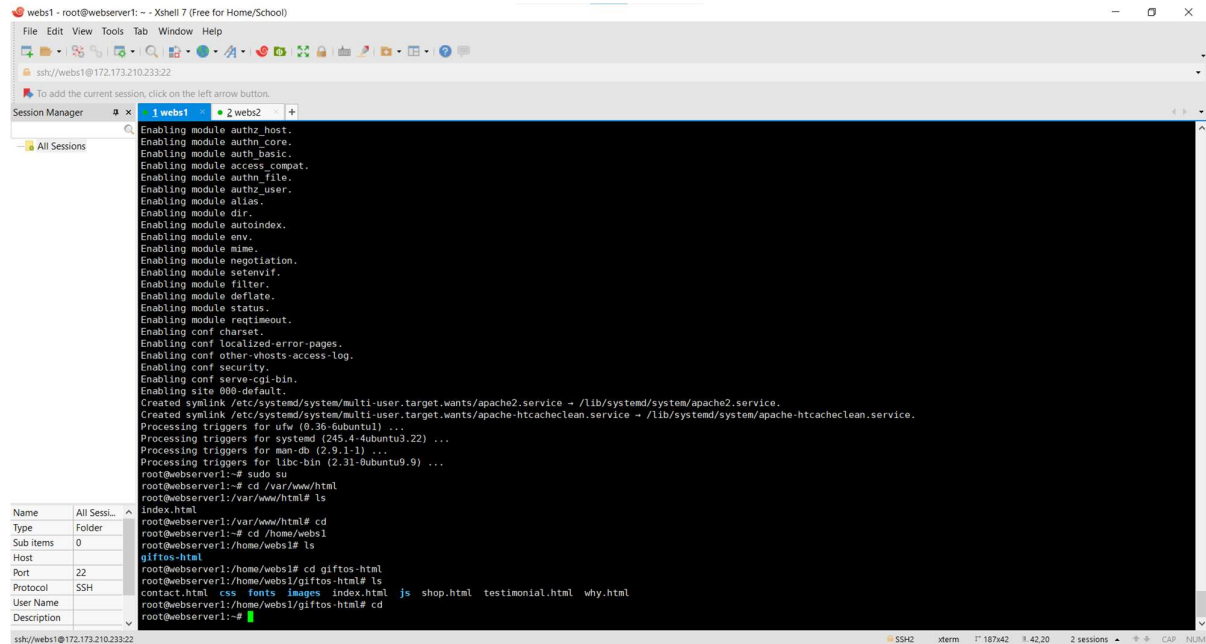
mysql> SELECT * FROM employees;
+-----+
| id | first_name | last_name | email |
+-----+
| 1  | John      | Doe      | john.doe@example.com |
| 2  | Jane      | Smith    | jane.smith@example.com |
+-----+
2 rows in set (0.00 sec)

mysql> SELECT * FROM employees;
+-----+
| id | first_name | last_name | email |
+-----+
| 1  | John      | Doe      | john.doe@example.com |
| 2  | Jane      | Smith    | jane.smith@example.com |
+-----+
2 rows in set (0.00 sec)

mysql>
```

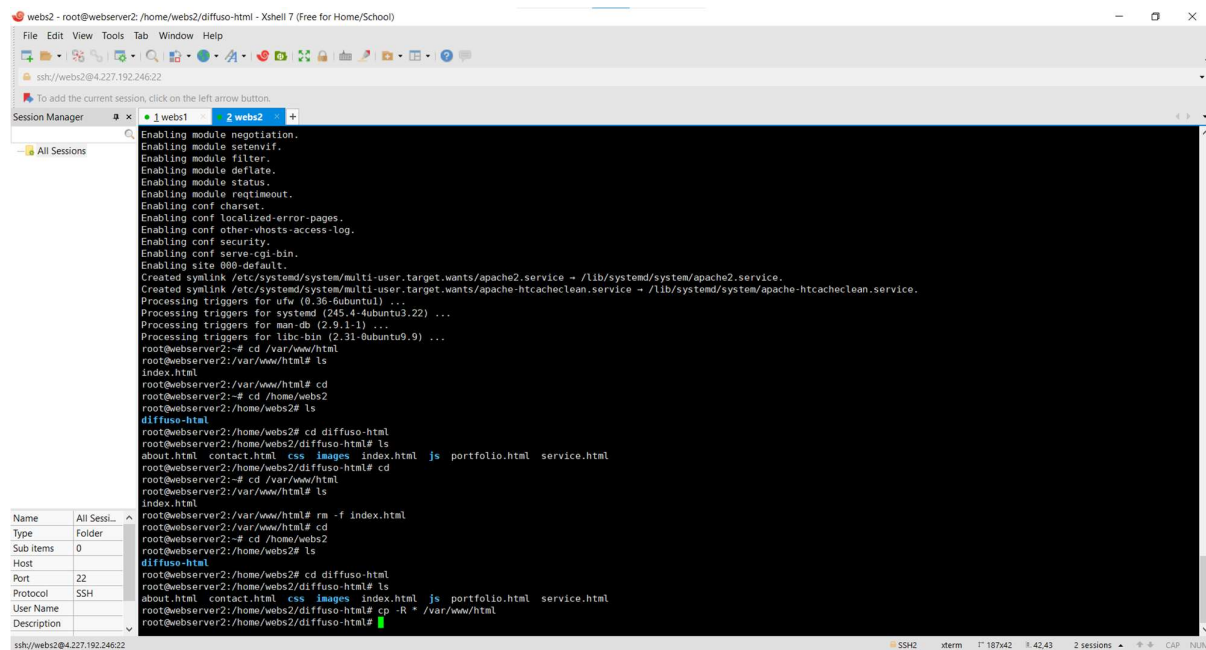
7:exited from database and configured both webs1 and webs2 with the help of winscp and configured html based template by installing apache2 we can configure web server on linux platform.

## Webs1:



```
webs1 - root@webs1: ~ - Xshell 7 (Free for Home/School)
File Edit View Tools Tab Window Help
ssh://webs1@172.173.210.233:22
To add the current session, click on the left arrow button.
Session Manager
1 webs1 2 webs2
All Sessions
Name: All Sessi...
Type: Folder
Sub Items: 0
Host:
Port: 22
Protocol: SSH
User Name:
Description:
root@webs1:~# apt-get install apache2
Enabling module authz_host.
Enabling module authn_core.
Enabling module auth_basic.
Enabling module access_compat.
Enabling module authn_file.
Enabling module authz_user.
Enabling module alias.
Enabling module dir.
Enabling module autoindex.
Enabling module env.
Enabling module mime.
Enabling module negotiation.
Enabling module setenvif.
Enabling module filter.
Enabling module deflate.
Enabling module status.
Enabling module ssl.
Enabling conf charset.
Enabling conf localized-error-pages.
Enabling conf other-vhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service - /lib/systemd/system/apache2.service.
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.service - /lib/systemd/system/apache-htcacheclean.service.
Processing triggers for ufw (0.36-0ubuntu1) ...
Processing triggers for systemd (245.4-4ubuntu3.22) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.9) ...
root@webs1:~# sudo su
root@webs1:/var/www/html# ls
index.html
root@webs1:/var/www/html# cd
root@webs1:/home/webs1# cd /home/webs1
root@webs1:/home/webs1# ls
giftos.html
root@webs1:/home/webs1# cd giftos.html
root@webs1:/home/webs1/giftos.html# ls
contact.html css fonts images index.html js shop.html testimonial.html why.html
root@webs1:/home/webs1/giftos.html# cd
root@webs1:/#
```

## 2:webs2:

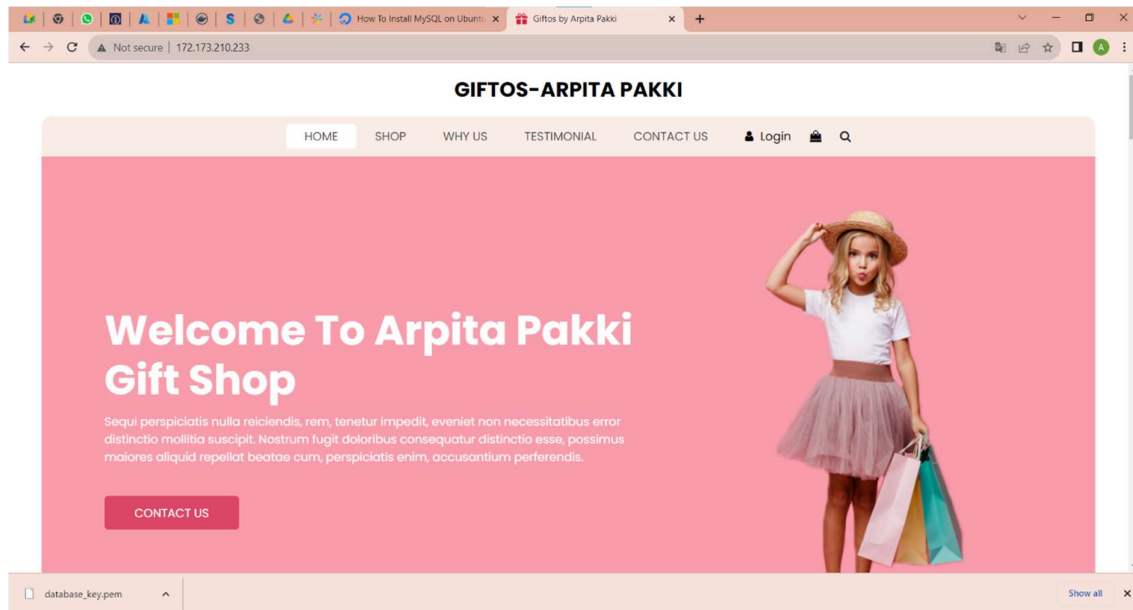


```
webs2 - root@webs2:/home/webs2/diffuso.html - Xshell 7 (Free for Home/School)
File Edit View Tools Tab Window Help
ssh://webs2@4.227.192.246:22
To add the current session, click on the left arrow button.
Session Manager
1 webs1 2 webs2
All Sessions
Name: All Sessi...
Type: Folder
Sub Items: 0
Host:
Port: 22
Protocol: SSH
User Name:
Description:
root@webs2:/home/webs2/diffuso.html# apt-get install apache2
Enabling module negotiation.
Enabling module setenvif.
Enabling module filter.
Enabling module deflate.
Enabling module status.
Enabling module ssl.
Enabling module reqtimeout.
Enabling conf charset.
Enabling conf localized-error-pages.
Enabling conf other-vhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service - /lib/systemd/system/apache2.service.
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.service - /lib/systemd/system/apache-htcacheclean.service.
Processing triggers for ufw (0.36-0ubuntu1) ...
Processing triggers for systemd (245.4-4ubuntu3.22) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.9) ...
root@webs2:/home/webs2/diffuso.html# cd /var/www/html
root@webs2:/var/www/html# ls
index.html
root@webs2:/var/www/html# cd
root@webs2:/home/webs2# cd /home/webs2
root@webs2:/home/webs2# ls
diffuso.html
root@webs2:/home/webs2# cd diffuso.html
root@webs2:/home/webs2/diffuso.html# ls
about.html contact.html css images index.html js portfolio.html service.html
root@webs2:/home/webs2/diffuso.html# cd
root@webs2:/home/webs2# cd /var/www/html
root@webs2:/var/www/html# ls
index.html
root@webs2:/var/www/html# rm -f index.html
root@webs2:/var/www/html# cd
root@webs2:/home/webs2# cd /home/webs2
root@webs2:/home/webs2# ls
diffuso.html
root@webs2:/home/webs2# cd diffuso.html
root@webs2:/home/webs2/diffuso.html# ls
about.html contact.html css images index.html js portfolio.html service.html
root@webs2:/home/webs2/diffuso.html# cp -R * /var/www/html
root@webs2:/home/webs2/diffuso.html#
```

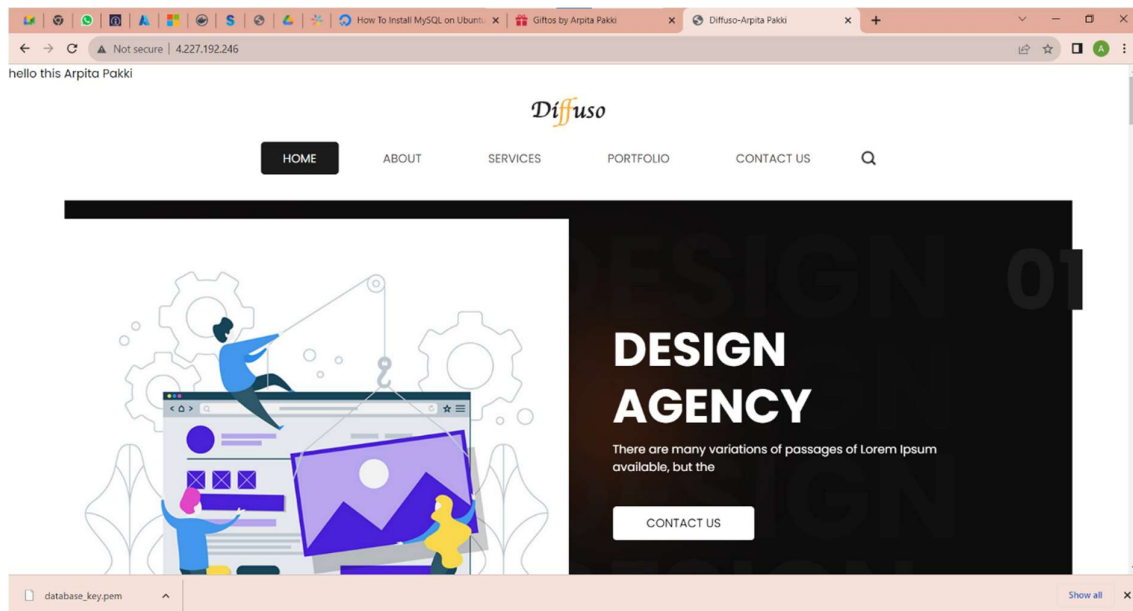


8-When I hit both the ips like when we hit public-ip of webserver1 I can see a website loaded and then again now when we hit the public ip of webserver 2 I can see the a diff website configured on it is visible.

Webserver1:

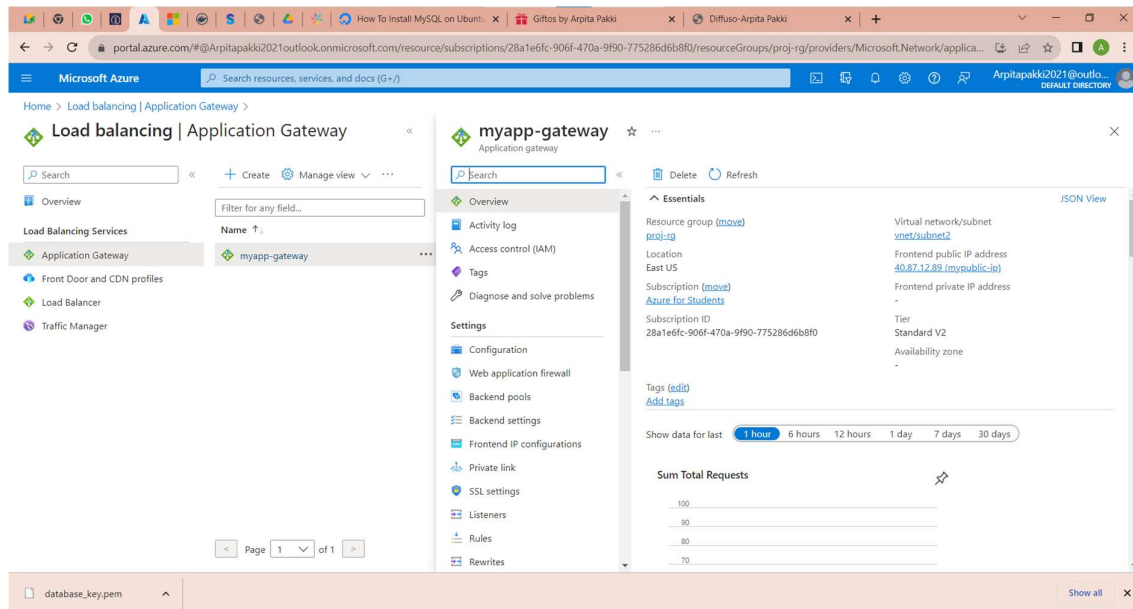


Webserver2:

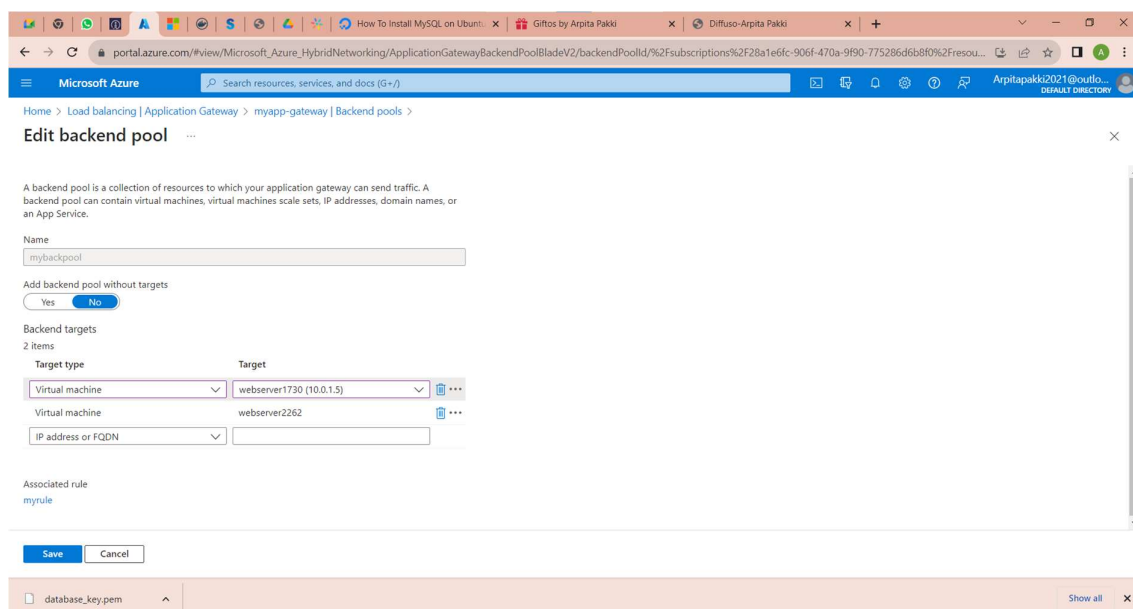


9-Now to load balance and auto scale the virtual machine webserver I use Application gateway.so I created an application gateway and added frontend-ips,backend pools and routing rules to it and after deployment we backend pools by associating the ips of web server vms with the application gateway or the load balancer.

### Application Gateway:

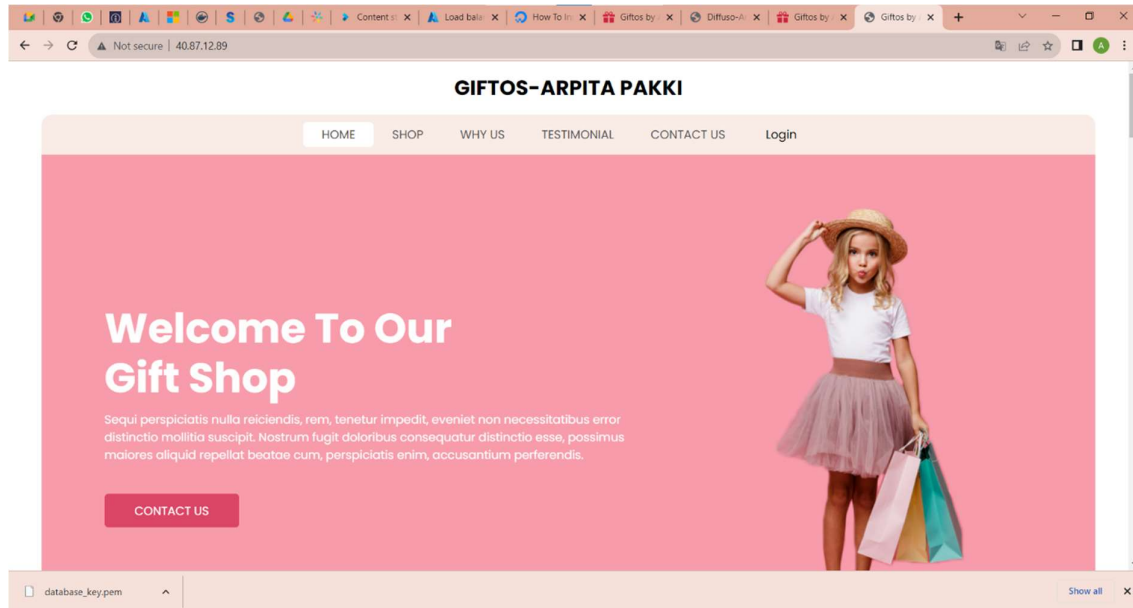


### Adding Backendpool:

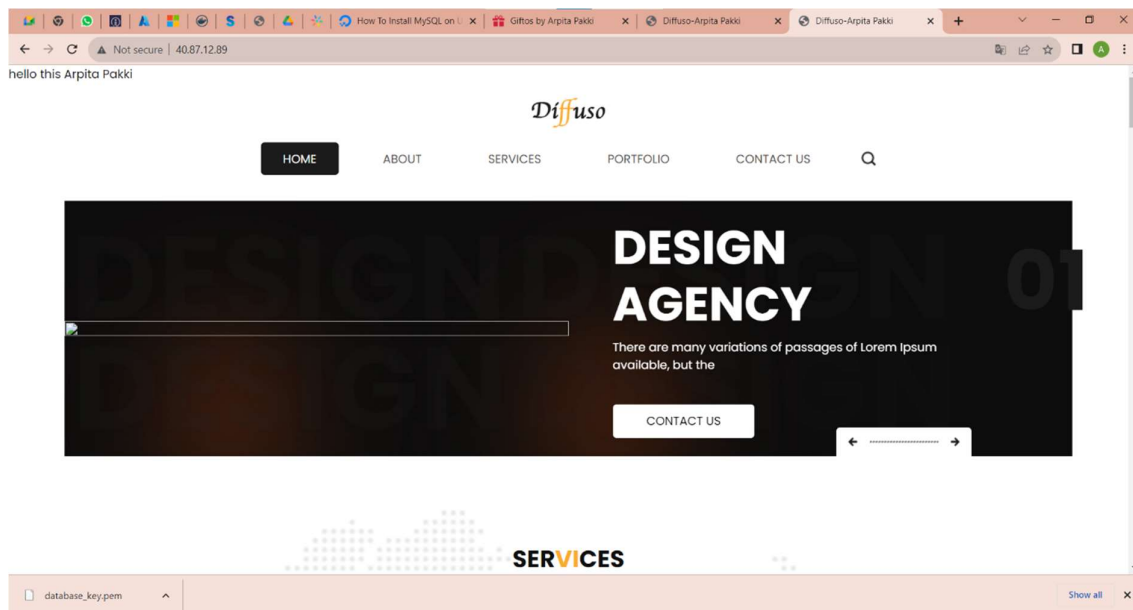




10-when we hit the public ip of application gateway(load balancer) we can see both websites configuring and displayed the websites are load balanced. Public ip of Application gateway is 40.87.12.89.



Webserver2:



11-Then I created a DNS zones with same username as the domain name that purchased from hostinger .After that I copied all the nameservers on the azure and web hostinger to my profile

where nameservers are available and then I clicked change nameservers and added all name servers from azure portal to hostinger domain.

DNS ZONE:

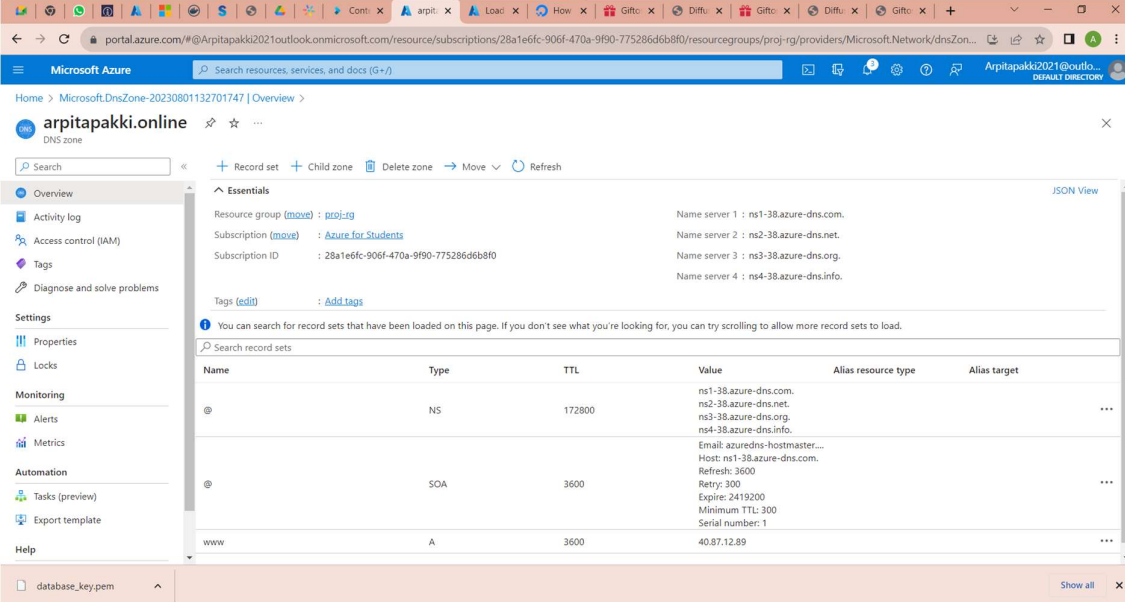
The screenshot shows the Microsoft Azure portal interface for a DNS zone named 'arpitapakki.online'. The left sidebar contains navigation options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings, Properties, Locks, Monitoring, Alerts, Metrics, Automation, Tasks (preview), Export template, and Help. The main content area displays the 'Essentials' section with details about the resource group (proj-rg), subscription (Azure for Students), and subscription ID (28a1e6fc-906f-470a-9f90-775286d6b8f0). It also lists the four name servers: ns1-38.azure-dns.com, ns2-38.azure-dns.net, ns3-38.azure-dns.org, and ns4-38.azure-dns.info. Below this, a table shows the DNS records for the zone, including NS and SOA records. The NS record has a TTL of 172800 and lists the four name servers. The SOA record has a TTL of 3600 and includes details like the host, email, refresh interval, retry interval, expire time, minimum TTL, and serial number.

Name	Type	TTL	Value	Alias resource type	Alias target
@	NS	172800	ns1-38.azure-dns.com. ns2-38.azure-dns.net. ns3-38.azure-dns.org. ns4-38.azure-dns.info.		...
@	SOA	3600	Email: azuredns-hostmaster... Host: ns1-38.azure-dns.com. Refresh: 3600 Retry: 300 Expire: 2419200 Minimum TTL: 300 Serial number: 1		...

HOSTINGER DOMAIN:

The screenshot shows the Hostinger domain management interface for the domain 'arpitapakki.online'. The top navigation bar includes links for Home, Hosting, Emails, Domains, VPS, Billing, and a PRO Panel. The left sidebar has options for Back to domains, Domain Overview, DNS / Nameservers, and Domain Ownership. The main content area is titled 'Nameservers' and explains that nameservers handle internet requests for the domain. It lists the four name servers: ns1-38.azure-dns.com, ns2-38.azure-dns.net, ns3-38.azure-dns.org, and ns4-38.azure-dns.info. Below this list is a 'Change Nameservers' button. The section also includes a 'Manage DNS records' subsection with a warning message: 'Your domain is not pointing to Hostinger. To manage DNS records, change your nameservers to Hostinger's'.

12-Then in the overview of DNS zones there is a option to add record set I clicked on it and then added a record set with www as record name([www.arpitapakki.online](http://www.arpitapakki.online)) and below it provided ip address as the ip of the Application gateway that we created and saved.

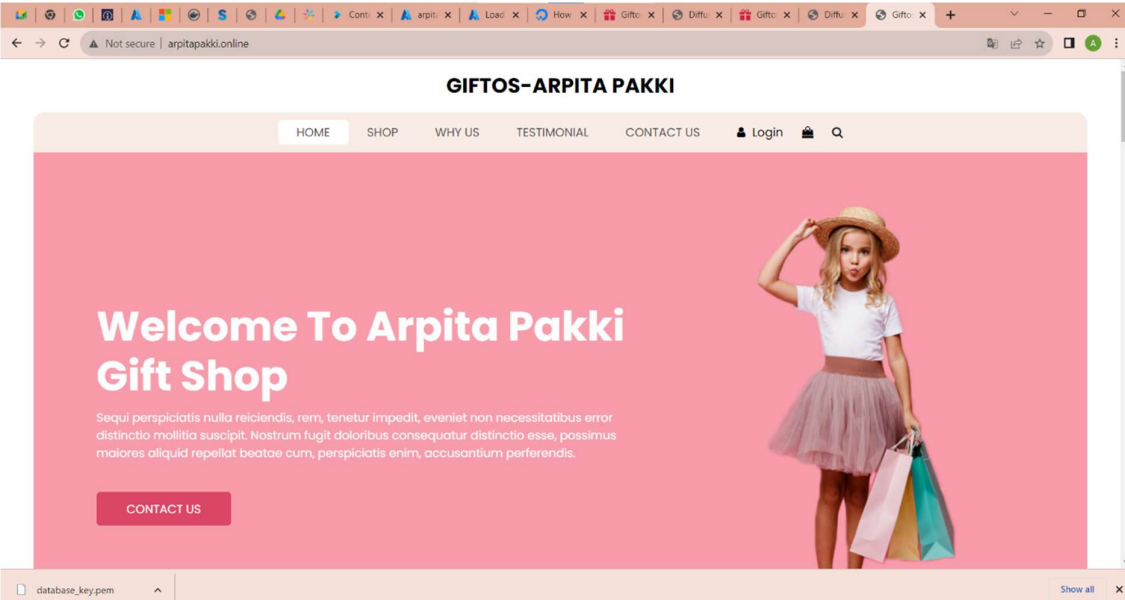


The screenshot shows the Microsoft Azure portal interface for a DNS zone named **arpitapakki.online**. The left sidebar contains navigation options like Overview, Activity log, Access control (IAM), Tags, and Settings. The main content area displays the 'Record sets' table with the following data:

Name	Type	TTL	Value	Alias resource type	Alias target
@	NS	172800	ns1-38.azure-dns.com, ns2-38.azure-dns.net, ns3-38.azure-dns.org, ns4-38.azure-dns.info		...
@	SOA	3600	Email: azuredns-hostmaster..., Host: ns1-38.azure-dns.com, Refresh: 3600, Retry: 300, Expire: 2419200, Minimum TTL: 300, Serial number: 1		...
www	A	3600	40.87.12.89		...

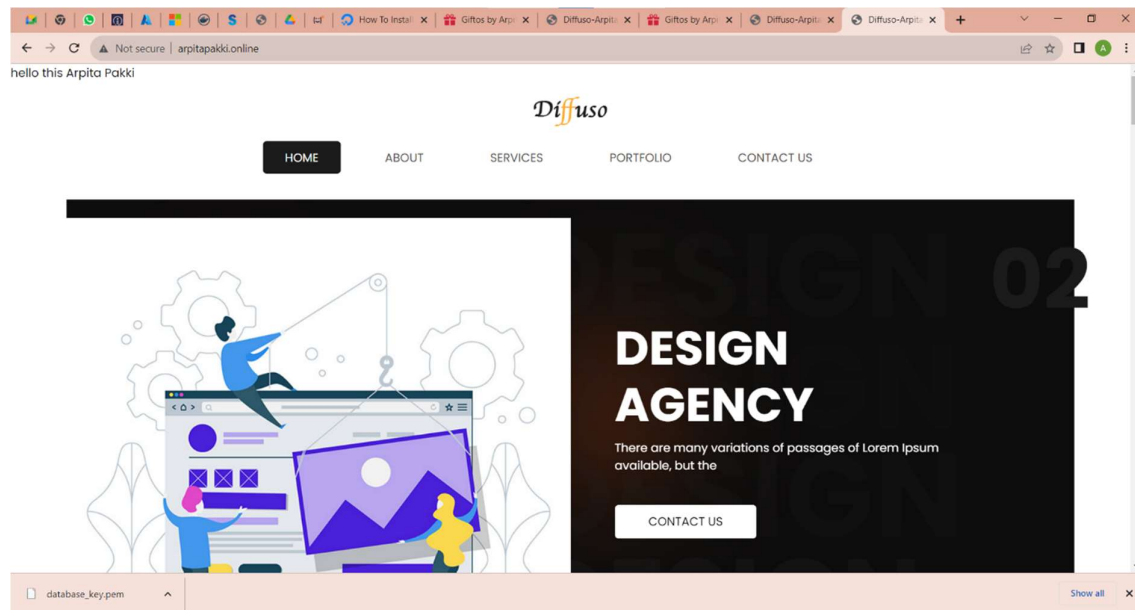
13-When we click on the above link [www.arpitapakki.online](http://www.arpitapakki.online) we can see our both the websites means these websites have been mapped.

Webserver1:



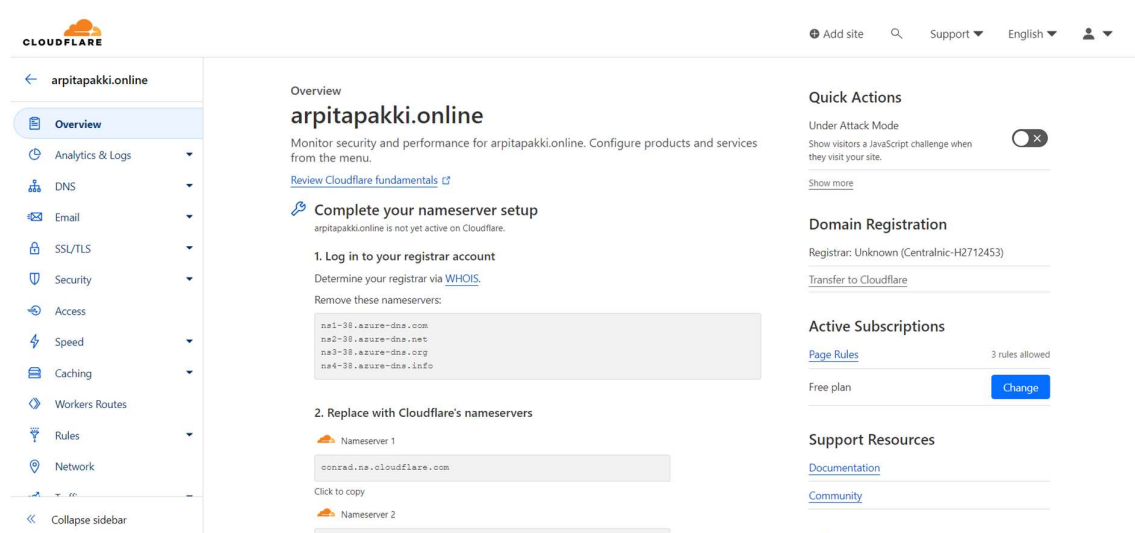
The screenshot shows the website **arpitapakki.online**. The page has a pink background and features a woman in a white shirt and pink skirt holding shopping bags. The text "Welcome To Arpita Pakki Gift Shop" is prominently displayed, along with a "CONTACT US" button. The navigation bar includes links for HOME, SHOP, WHY US, TESTIMONIAL, and CONTACT US, as well as a Login button and a search icon.

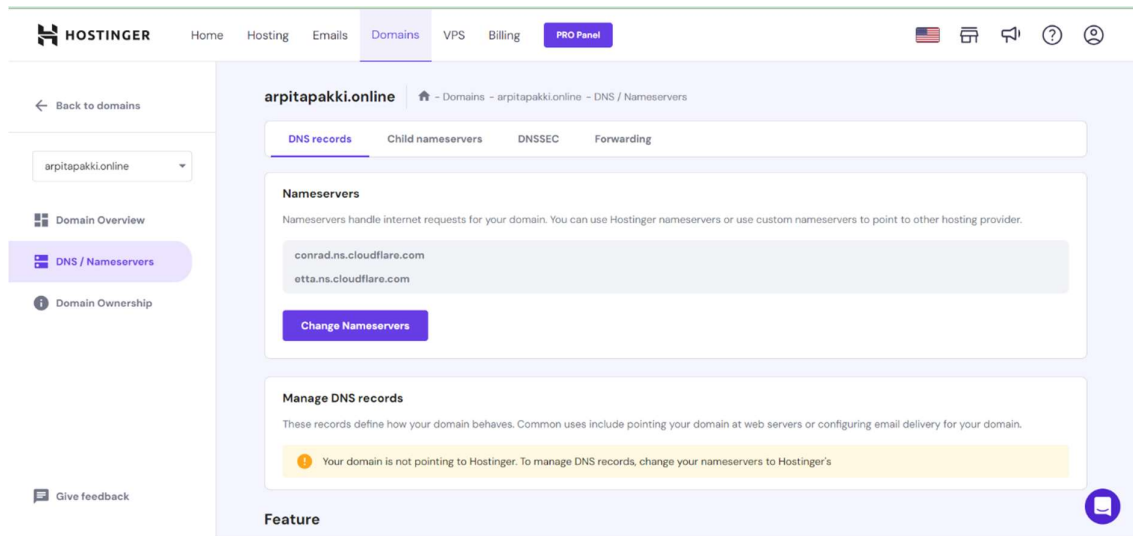
## Webserver2:



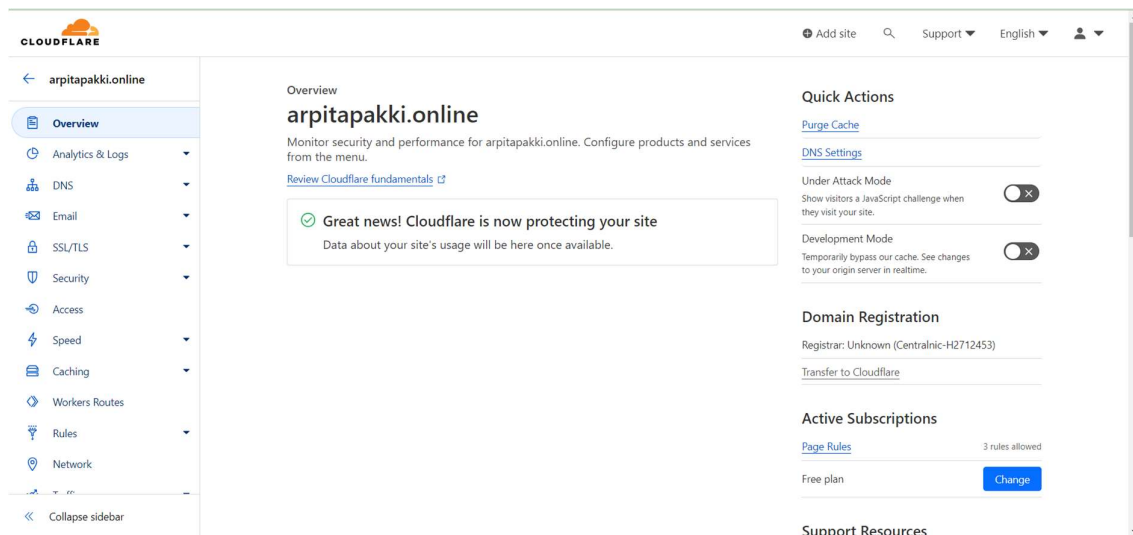
### \*SSL CERTIFICATE GENERATION:

First created a account in cloudflare and gave the hostinger domain name in cloudflare account and then removed the old name servers and then copied the name server provided by cloudflare into our hostinger domain and saved and then after few hours cloudflare started protecting our websites.



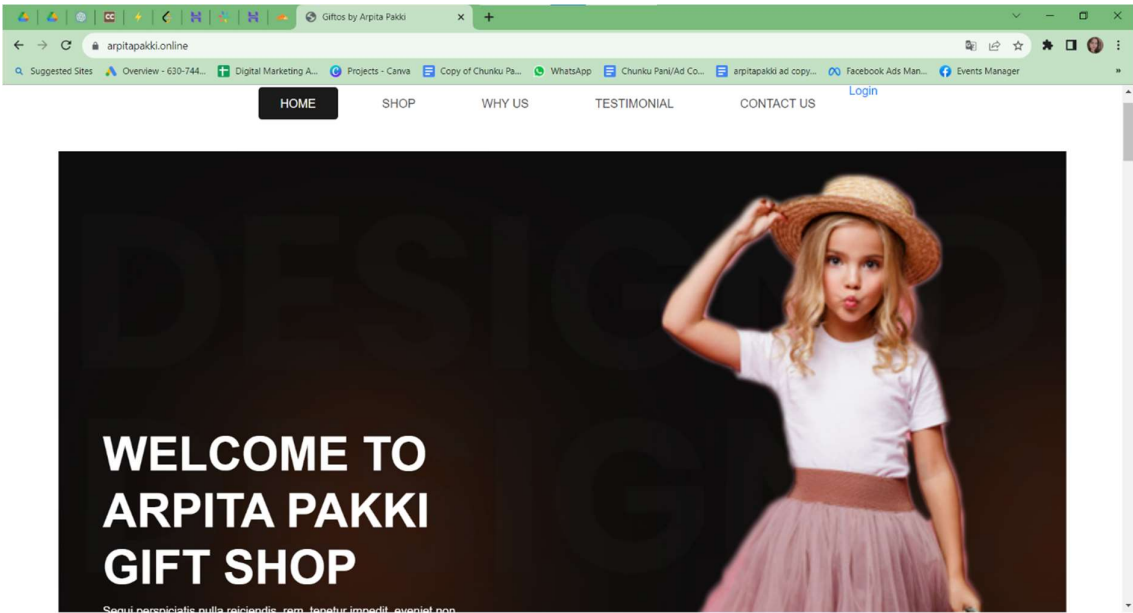


Cloudflare protecting our websites.

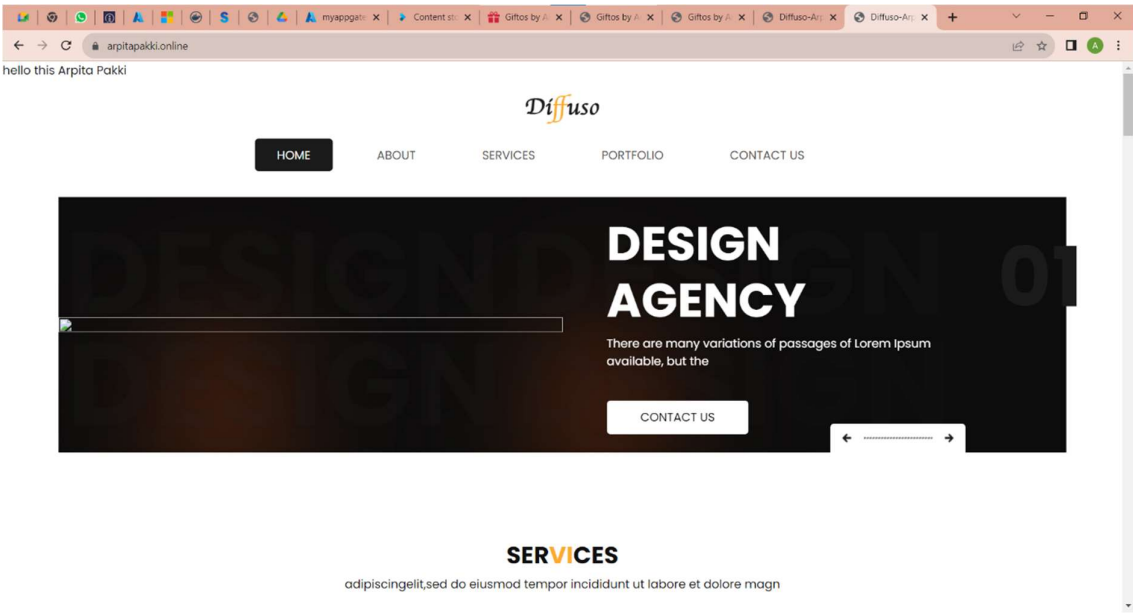


Now the websites are secured and appear with a lock symbol.

Webs1:



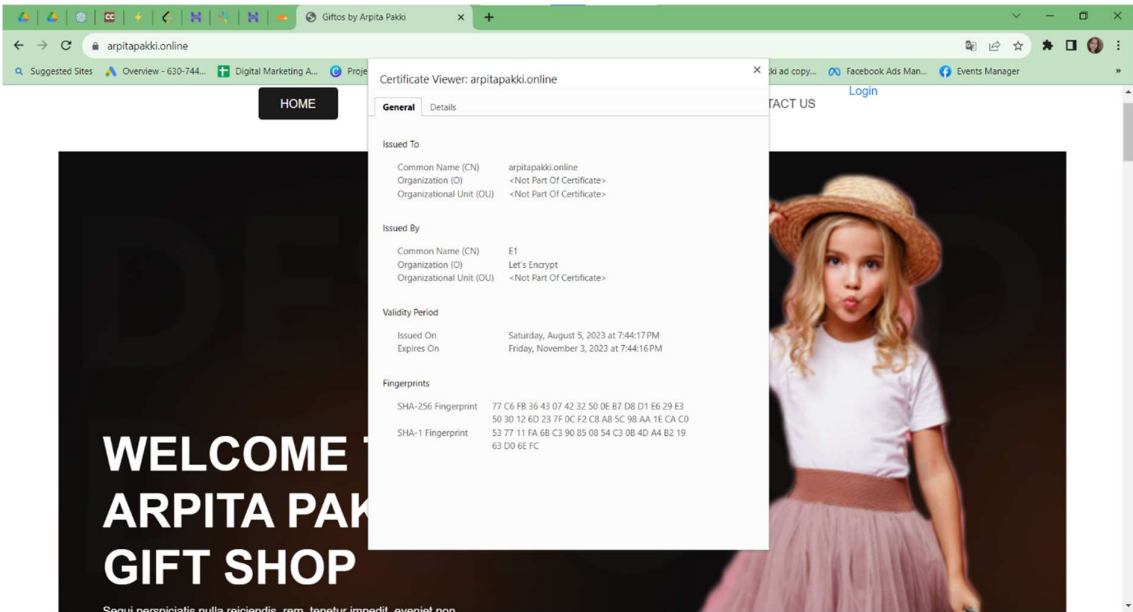
Webs2:



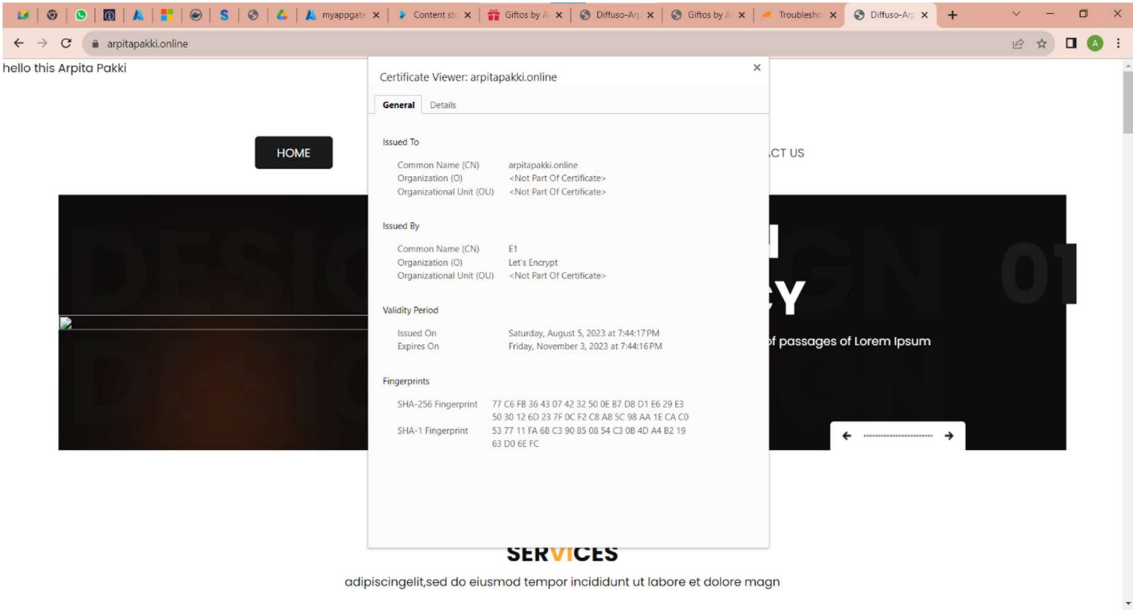


Websites with SSL certificates:

Webs1:



Webs2:



ThankYou!