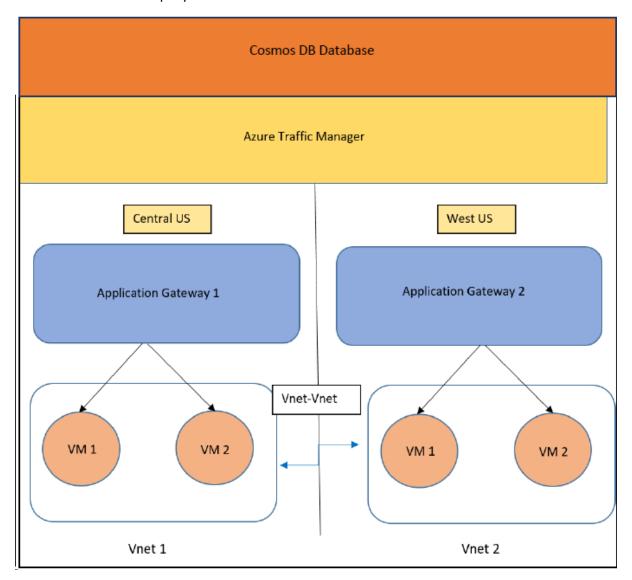
Microsoft Azure 305 Project

You work as an Azure Admin for XYZ Corp. You are assigned the task of implementing the below architecture for the company's website.



There are three web pages to be deployed:

- 1. The Home page is the default page(VM2)
- 2. The Upload page is where you can upload the files to your Azure Blob Storage.(VM1)
- 3. The Error page for 403 and 502 errors

Application Gateway has to be configured in the following manner:

- 1. Example.com should be pointed to the Home Page.
- 2. Example.com/upload should be pointed to the Upload Page.

3. Application Gateway's error pages should be pointed to error.html, which should be hosted as a static website in Azure Containers. The error.html file is present in the github repository

The term 'Example' here refers to Traffic Manager's domain name.

The client wants you to deploy them in the Central US and the West US regions such that the traffic is distributed optimally between both regions.

Storage Account has to be configured in the following manner:

- 1. You need to host your error.html as a static website here, and then point application gateway's 403 and 502 errors to it
- 2. Create a container named upload, this will be used by your code to upload the files

You must also create a Cosmos DB account which will store a log of all the files that have been uploaded. Choose a primary key as required.

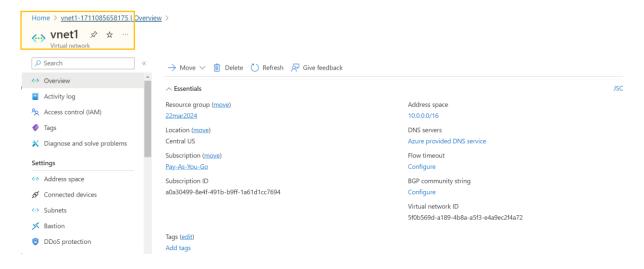
The account will be configured in either an SQL or Table API database format. The account must log in the Timestamp and ID for each of the file that is being uploaded.

Technical specifications for the deployments are as follows:

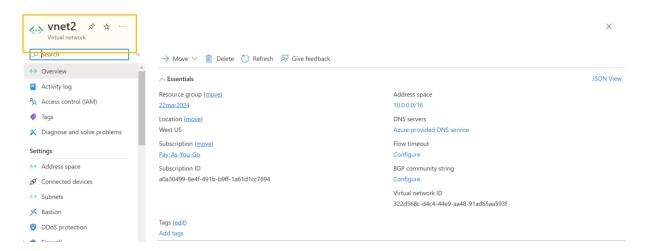
- 1. Deployments in both the regions should have VMs inside VNets.
- 2. Clone the github repo https://github.com/hshar94/azproject to all the VMs.
- On VM1, please run vm1.sh this will deploy the upload page, on VM2 please run VM2.sh, this will install the home page.
- 4. For running the scripts, please run the following command inside the github directory from the terminal. VM1: ./vm1.sh VM2: ./vm2.sh
- 5. After running the scripts, please edit config.py file on VM1, and enter the details related to your storage account, where the files will be uploaded
- 6. Once done, please run the following command sudo python3 app.py
- 7. Both the regions should be connected to each other using, Vnet-Vnet Peering
- 8. Finally, your Traffic Manager should be pointing to the application gateway of both the regions.

Virtual Networks Creation

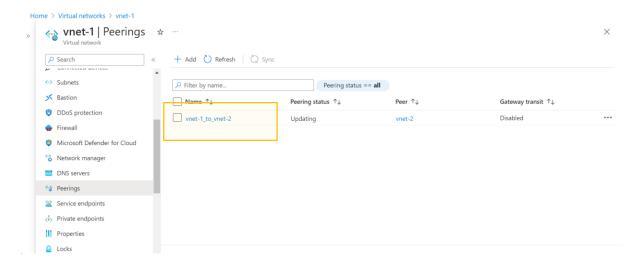
Vnet1 created in central us



Vnet2 created in west us

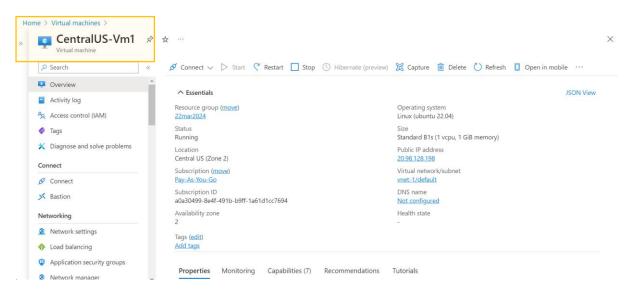


Peering made between vnet1 and vnet2

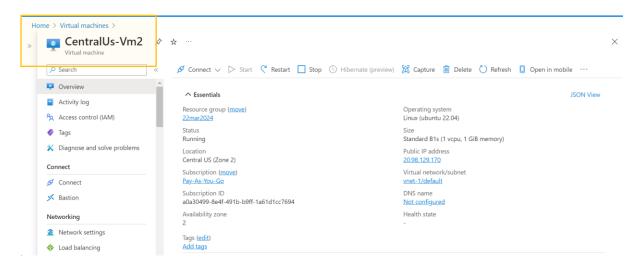


Virtual Machines creation

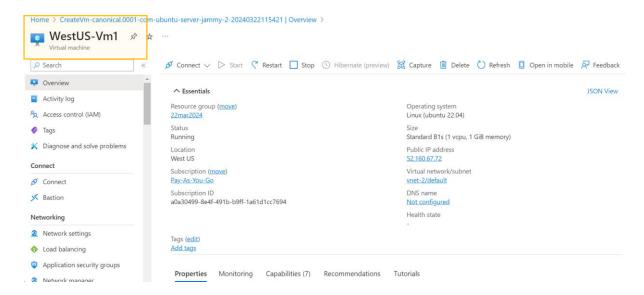
Vm1 created in centralUS



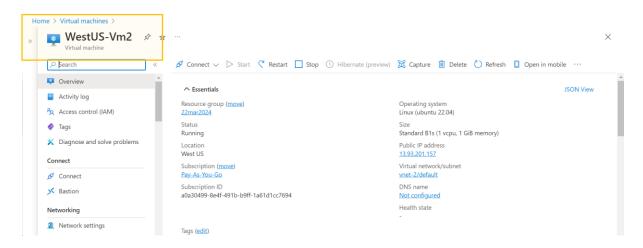
Vm2 created in centralUS



Vm1 created in WestUS



Vm2 created in WestUS



VM configuration to host homepage and upload page

Logged into VM1

```
| Joyin as: venkat | Venkat |
```

Shell script created to install git and clone git repo

```
venkat@CentralUS-Vm1: ~

sudo apt update
sudo apt install git
sudo yum install git
git clone https://github.com/hshar94/azproject
bash git.sh
```

Shell script executed

```
venkat@CentralUS-Vml:-$ vi git.sh
venkat@CentralUS-Vml:-$ vi git.sh
venkat@CentralUS-Vml:-$ vi git.sh
venkat@CentralUS-Vml:-$ bash git.sh
Get:1 http://azure.archive.ubuntu.com/ubuntu jammy InRelease [270 kB]
Get:2 http://azure.archive.ubuntu.com/ubuntu jammy-backports InRelease [119 kB]
Get:3 http://azure.archive.ubuntu.com/ubuntu jammy-backports InRelease [197 kB]
Hit:4 http://azure.archive.ubuntu.com/ubuntu jammy-backports InRelease
Get:5 http://azure.archive.ubuntu.com/ubuntu jammy-main amde4 Packages [1395 kB]
Get:6 http://azure.archive.ubuntu.com/ubuntu jammy/main amde4 Packages [1395 kB]
Get:7 http://azure.archive.ubuntu.com/ubuntu jammy/main amde4 c-n-f Metadata [30.3 kB]
Get:8 http://azure.archive.ubuntu.com/ubuntu jammy/restricted amde4 c-n-f Metadata [488 B]
Get:10 http://azure.archive.ubuntu.com/ubuntu jammy/restricted amde4 c-n-f Metadata [488 B]
Get:11 http://azure.archive.ubuntu.com/ubuntu jammy/restricted amde4 c-n-f Metadata [488 B]
Get:12 http://azure.archive.ubuntu.com/ubuntu jammy/universe amde4 Packages [14.1 kB]
Get:13 http://azure.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:14 http://azure.archive.ubuntu.com/ubuntu jammy/universe amde4 c-n-f Metadata [286 kB]
Get:15 http://azure.archive.ubuntu.com/ubuntu jammy/multiverse amde4 c-n-f Metadata [286 kB]
Get:16 http://azure.archive.ubuntu.com/ubuntu jammy/multiverse amde4 c-n-f Metadata [16 B]
Fetched 28.1 kB in 4s (6424 kB/s)

Beading package lists. Done
Building dependency tree... Done
Reading state information... Done
Building dependency tree... Done
Reading roady the meest version (1:2.34.1-1ubuntul.10).

git set to man
```

Listed the files in the repo cloned to VM1

And executed the VM1.sh shell script

```
venkat@CentralUS-Vml:~$ ls
azproject git.sh
venkat@CentralUS-Vml:~$ cd azproject
venkat@CentralUS-Vml:~$ cd azproject$ ls
README.md app.py config.py error.html index.html templates vml.sh vm2.sh
venkat@CentralUS-Vml:~{azproject$ bash vml.sh
Rules updated
Rules updated
Rules updated (v6)
Hit:1 http://azure.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://azure.archive.ubuntu.com/ubuntu jammy updates InRelease
Hit:3 http://azure.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://azure.archive.ubuntu.com/ubuntu jammy-backports InRelease
Reading package lists... Done
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Bython3 is already the newest version (3.10.6-1~22.04).
python3 set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 15 not upgraded.
```

```
- [azure-storage-blob] (https://pypi.org/project/azure-storage-blob): Blob storage client
- [azure-storage-file-share] (https://pypi.org/project/azure-storage-file-share): Storage file share client
- [azure-storage-file-datalake] (https://pypi.org/project/azure-storage-queue]
- [azure-storage-queue] (https://pypi.org/project/azure-storage-queue]: Queue storage client

[and of output]

note: This error originates from a subprocess, and is likely not a problem with pip.

error: metadata-generation-failed

* Encountered error while generating package metadata.
-> See above for output.

note: This is an issue with the package mentioned above, not pip.
hint: See above for details.

Defaulting to user installation because normal site-packages is not writeable
Collecting confignarser
Downloading confignarser-6.0.1-py3-none-any.wh1 (19 kB)
Installing collected packages: confignarser
Successfully installed confignarser-6.0.1

Defaulting to user installation because normal site-packages is not writeable
Collecting Hask
Downloading flask-3.0.2-py3-none-any.wh1 (10 kB)

Collecting Werkzeugy=3.0.0

Collecting Werkzeugy=3.0.1-py3-none-any.wh1 (10 kB)

Downloading werkzeugy=3.0.1-py3-none-any.wh1 (226 kB)

Downloading werkzeugy=3.0.1-py3-none-any.wh1 (276 kB)

Collecting blinker>=1.7-py3-none-any.wh1 (17 kB)

Collecting blinker>=1.6.2

Downloading blinker>=1.7.9-py3-none-any.wh1 (18 kB)

Collecting blinker>=1.6.2

Downloading istadangerous=2.1.2-py3-none-any.wh1 (18 kB)

Collecting blinker>=1.7.9-py3-none-any.wh1 (1
```

Then logged into the CentralUSVm2

```
Plogin as: venkat
Plogin as: v
```

Git is installed and git repo is cloned to vm

```
venkat@CentralUs-Vm2:~$ vi git.sh
venkat@CentralUs-Vm2:~$ cat git.sh
venkat@CentralUs-Vm2:~$ cat git.sh
sudo apt update
sudo apt install git
git clone https://github.com/hshar94/azproject

venkat@CentralUs-Vm2:~$ bash git.sh
Get:1 http://azure.archive.ubuntu.com/ubuntu jammy InRelease [270 kB]
Get:2 http://azure.archive.ubuntu.com/ubuntu jammy-pudates InRelease [119 kB]
Get:3 http://azure.archive.ubuntu.com/ubuntu jammy-backports InRelease [109 kB]
Hit:4 http://azure.archive.ubuntu.com/ubuntu jammy-backports InRelease
Get:34 http://azure.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.2 kB]
Get:35 http://azure.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [644 B]
Get:36 http://azure.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [116 B]
Fetched 20.1 MB in 5s (5910 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Building dependency tree... Done
Reading package lists... Done
Git is already the newest version (1:2.34.1-lubuntul.10).
git set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 15 not upgraded.
sudo: yum: command not found
Cloning into 'azproject: 100% (14/14), done.
remote: Counting objects: 100% (14/14), done.
remote: Counting o
```

Then VM2.sh shell script is executed

```
wenkate(s):-S is approject git.wh
approject git.wh
wenkate(s):-S cd approject
wenkate(s):-Asproject sit.
Wenkate(s):-Asproject is
wenkate(s):-Asproject is
wenkate(s):-Asproject bash wm2.sh
wenkate(s):-Asproject bash wm2.sh
with http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:2 http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:3 http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:3 http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:4 http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:4 http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:5 http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:4 http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:5 http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:5 http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:5 http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:6 http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:6 http://asuse.archive.ubuntu.com/ubuntu jammy-updates Inmelease
Hit:6 http://asuse.archive.ubuntu.com/ubuntu jammy-updates
Hit:8 http://asustuntu.com/ubuntu jammy-updates
Hit:8 http://asustuntu.com/ubuntu jammy-updates
Hit:8 http://asustuntu.com/ubuntu jammy-updates
Hit:8 http://asustuntu.com/ubuntu jammy-updates
Hit:8 http://asustuntu.com/ubuntu.com/ubuntu-jammy-updates
Hit:8 http://asustuntu.com/
```

Accessed CentralUSVm2 on the web portal



Next, logged into the WestUSVm1

```
login as: venkat
venkat@S2.160.67.72's password:
Welcome to Ubuntu 22.04.4 LTS (GNU/Linux 6.5.0-1016-azure

* Documentation: https://help.ubuntu.com

* Management: https://landscape.canonical.com

* Support: https://ubuntu.com/pro

System information as of Fri Mar 22 07:13:26 UTC 2024

System load: 0.0 Processes: 108
Usage of /: 5.1% of 28.89GB Users logged in: 0
Memory usage: 35% IPv4 address for eth0: 10.0.1.4
Swap usage: 0%

* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s just raised the bar for easy, resilient and secure K8s cluster deployment.

https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.
```

Git is installed and git repo is cloned to vm

```
venkat@WestUS-Vml:~$ ls
venkat@WestUS-Vml:~$ vi git.sh
venkat@WestUS-Vml:~$ cat git.sh
sudo apt update
sudo apt install git
sudo yum install git
git clone https://github.com/hshar94/azproject.

venkat@WestUS-Vml:~$ bash git.sh
Reading package lists... Done
E: Could not get lock /var/lib/apt/lists/lock. It is held by process 2910 (apt-get)
N: Be aware that removing the lock file is not a solution and may break your system.
E: Unable to lock directory /var/lib/apt/lists/
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
git is already the newest version (1:2.34.1-lubuntul.10).
git set to manually installed.
O upgraded, O newly installed, O to remove and 9 not upgraded.

gudet your accommend not found.
```

Then Vm1.sh shellscript is executed

```
venkat@WestUS-Vml:~$ ls
azproject git.sh
venkat@WestUS-Vml:~{azproject$ ls
venkat@WestUS-Vml:~{azproject$ ls
README.md app.py config.py error.html index.html templates vml.sh vm2.sh
venkat@WestUS-Vml:~{azproject$ bash vml.sh
Rules updated
Rules updated
Rules updated (V6)
Hit:1 http://azure.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://azure.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://azure.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://azure.archive.ubuntu.com/ubuntu jammy-security InRelease
Reading package lists... Done
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
python3 is already the newest version (3.10.6-1~22.04).
```

```
note: This error originates from a subprocess, and is likely not a problem with pip.

error: metadata-generation-failed

Encountered error while generating package metadata.

See above for output.

note: This is an issue with the package mentioned above, not pip. hint: See above for details.

Defaulting to user installation because normal site-packages is not writeable collecting confignarser above for details.

Defaulting collected packages: confignarser bownloading confignarser-6.0.1-py3-none-any.whl (19 kB)

Installing collected packages: confignarser successfully installed confignarser-6.0.1

Pefaulting to user installation because normal site-packages is not writeable collecting flask bownloading flask-3.0.2-py3-none-any.whl (101 kB)

Collecting flask-3.0.2-py3-none-any.whl (101 kB)

Collecting click>=8.1.3

Downloading click>=8.1.7-py3-none-any.whl (97 kB)

Collecting blinker>=1.6.2

Downloading blinker>=1.7.0-py3-none-any.whl (13 kB)

Collecting Jinja2>=3.1.2

Downloading blinker>=1.7.0-py3-none-any.whl (15 kB)

Collecting Jinja2>=3.1.2

Downloading werkzeuy>=3.0.0

Enguirement already satisfied: Markupafe>> 2.26.7/226.7 NB 18.7 NB/s eta 0:00:00

Requirement already satisfied: Markupafe>> 2.0 in /usr/lib/python3/dist-packages (from Jinja2>=3.1.2->flask) (2.0.1)

Collecting Markupāfe>=2.0

Downloading Markupāfe=2.1.5 ergālo-cpālo-manylinux 2_17 x86 64.manylinux2014_x86 64.whl (25 kB)

Installing collected packages: Markupāfe, itsdangerous, click, blinker, werkzeug, Jinja2, flask

WARNING: Nos confignates devaled in /lonee/verkard.local/bl
```

Then logged in to the WestUSVm2

```
login as: venkat
login
log
```

Git is installed and git repo is cloned to vm

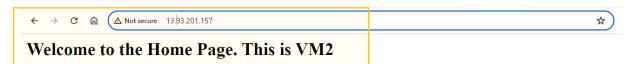
```
venkat@WestUS-Vm2:~$ vi git.sh
venkat@WestUS-Vm2:~$ cat git.sh
sudo apt update
sudo apt install git
sudo yum install git
git clone https://github.com/hshar94/azproject

venkat@WestUS-Vm2:~$ bash git.sh
Get:1 http://azure.archive.ubuntu.com/ubuntu jammy InRelease [270 kB]
Get:2 http://azure.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:3 http://azure.archive.ubuntu.com/ubuntu jammy-backports InRelease [109 kB]
Hit:4 http://azure.archive.ubuntu.com/ubuntu jammy-security InRelease
Get:5 http://azure.archive.ubuntu.com/ubuntu jammy-security InRelease
```

Then VM2.sh shell script is executed

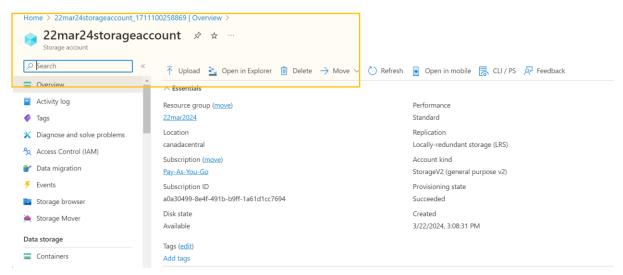
```
venkat@WestUS-Vm2:~$ ls
azproject git.sh
venkat@WestUS-Vm2:-$ cd azproject
venkat@WestUS-Wm2:-$ cd azproject$ ls
README.md app.py config.py error.html index.html templates vml.sh vm2.sh
venkat@WestUS-Vm2:-$ (azproject$ bash vm2.sh
#it:| http://azure.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://azure.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://azure.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://azure.archive.ubuntu.com/ubuntu jammy-security InRelease
Reading package lists... Done
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
```

Accessed CentralUSVm2 on the web portal

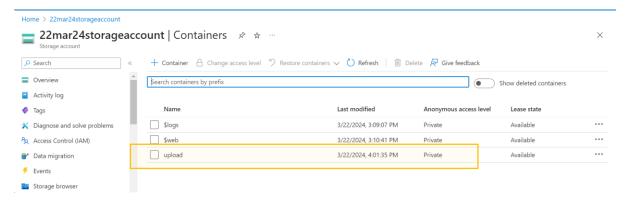


Storage Account Configuration

An storage account is created

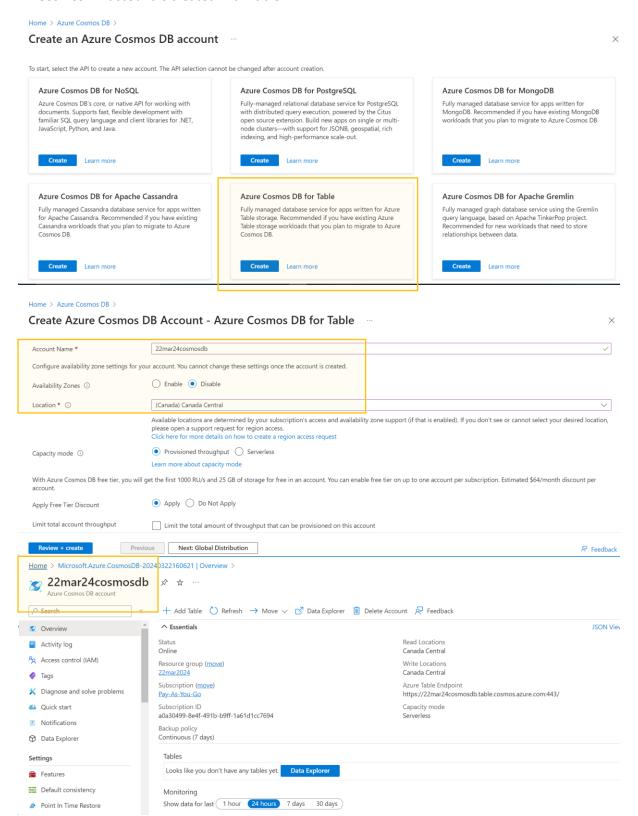


An container is created to store the files uploaded on upload page

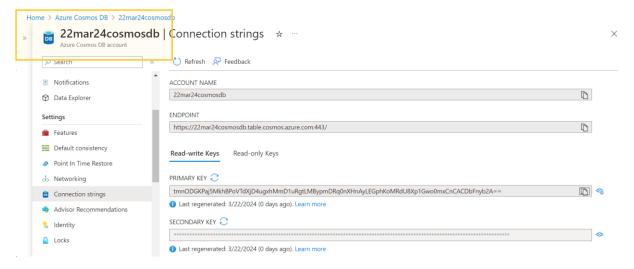


CosmosDB setup

An Cosmos DB account is created with Table API



Navigated to connection strings of cosmos DB and copied Endpoint and primary key



Updating config.py file in VM1 servers

Then navigated into the CentralUS vm1 and configured the config.py file with the storage account and cosmos DB account details so that the application can store files to SA and logs to Cosmos DB account

```
[DEFAULT]

# Account name
account = 22mar24storageaccount

# Azure Storage account access key
key = INgMykJilMIyjBZL+SRjdln/xvylhNS27KaRqtYUGp707hb4bWeUlvc8LFKbFLIjgGVTCZ5B/Whz+AStwW2xvQ==
# Container name
container = upload

# Cosmos DB configuration
cosmos_account_uri = https://22mar24cosmosdb.table.cosmos.azure.com:443/
cosmos_account_key = tmnODGKPaj5MkhBPoVTdXjD4ugxhMmDluRgtLMBypmDRq0nXHnAyLEGphK
cosmos_database_name = TablesDB
cosmos_container_name = logsTable
```

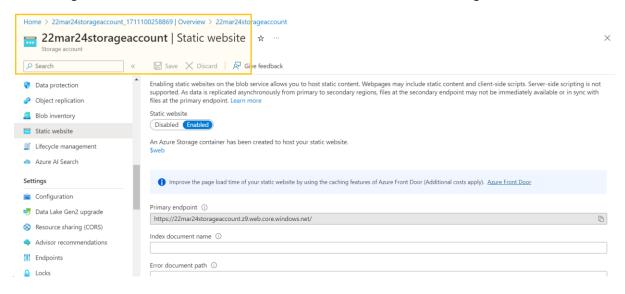
Then ran the command sudo python3 app.py

Similarly same steps repeated in the WestUS vm1 also

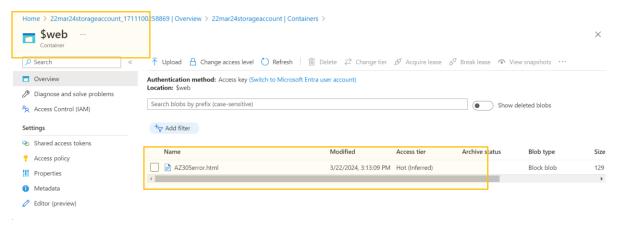
```
venkat@WestUS-Vml:~/azproject$ vi config.py
venkat@WestUS-Vml:~/azproject$ sudo python3 app.py
Traceback (most recent call last):
   File "app.py", line 6, in <module>
        from flask import Flask, request, redirect, url_for, render_template
ModuleNotFoundError: No module named 'flask'
venkat@WestUS-Vml:~/azproject$
```

Static Website Hosting

Then navigated to the SA and enabled static website which resulted in creating a container \$web



Navigated into the container \$web and stored the error.html file collected from github



Finally accessed the error page through the primary end point of static website

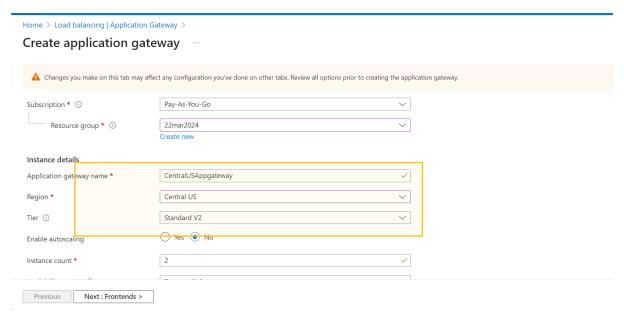


The requested content does not exist.

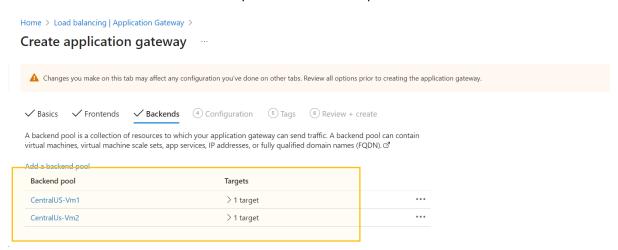
- HttpStatusCode: 404
- ErrorCode: WebContentNotFound
- RequestId: 28767179-c01e-0034-2c3d-7cf979000000
 TimeStamp: 2024-03-22T09:44:52.1421697Z

Application Geateways configuration

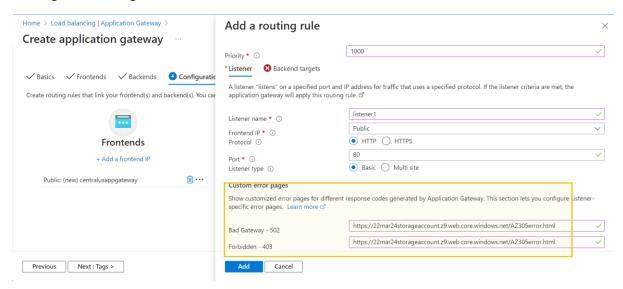
Then created an application gateway in CentralUS region



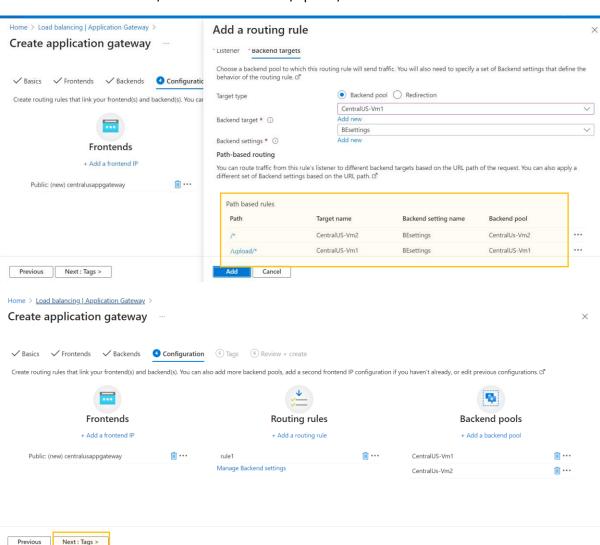
CentralUS vm1 and Central Us vm2 are provided as backend pools



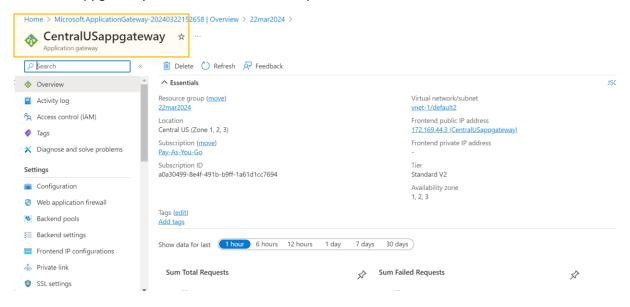
Routing rule is configured



Path based rules added as /* directs to VM2 and /upload/* directs to Vm1



CentralUS appgateway is created, IP address is copied



Centralusappgateway/ directs to the vm2 home page



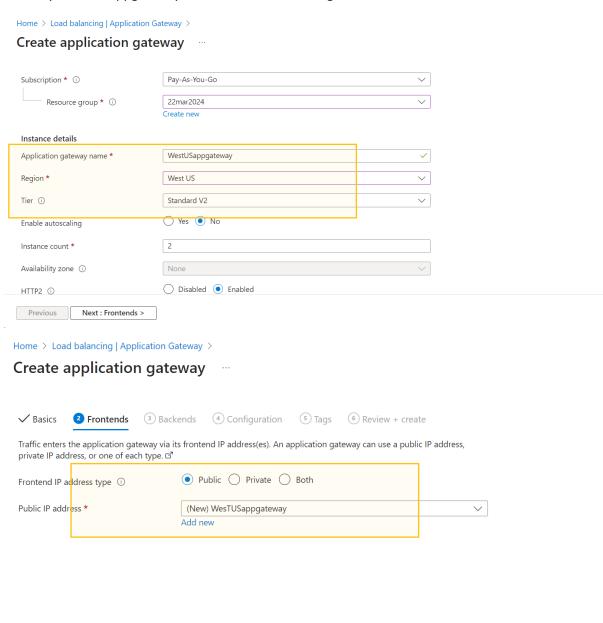
Centralusappgateway/upload/ directs to the VM1

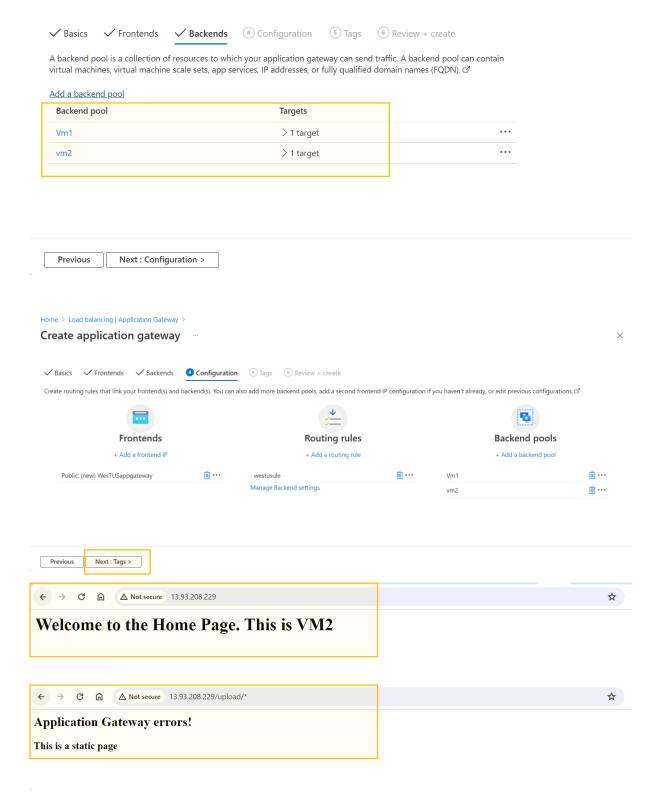


Similarly another appgateway is created for WestUS region

Previous

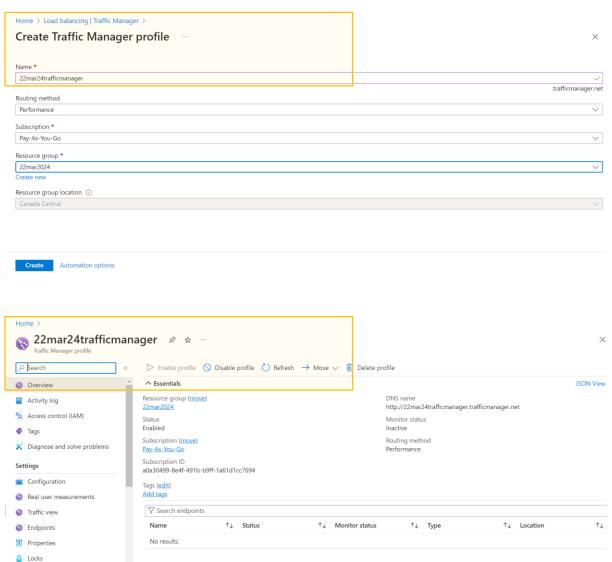
Next : Backends >



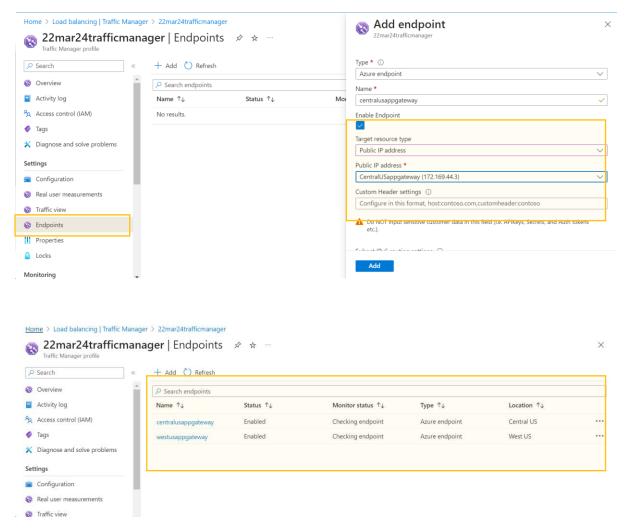


Traffic Manager Configuration

 Then an traffic manager is created to balance the traffic to both the CentralUS and WestUS regions



• Added application gateways as end points of traffic manager



Accessing vm through the traffic manager

