CS 203 - Software Tools and Techniques for Al

Assignment - 8

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Github: https://github.com/HarshilShah1804/CS203 Assignment8

Docker Hub Links:

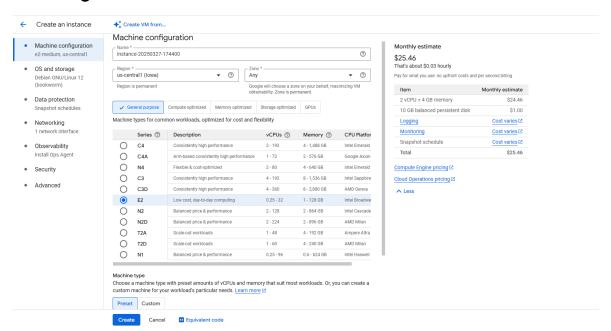
Fastapi:1 - https://hub.docker.com/repository/docker/harshilshah18042005/fastapi1
Fastapi:2 - https://hub.docker.com/repository/docker/harshilshah18042005/fastapi2
ElasticSearch - https://hub.docker.com/repository/docker/harshilshah18042005/fastapi2

Google Drive Links:

Fastapi:1 = <u>Fastapi:1</u> Fastapi:2 = <u>fastapi:2</u>

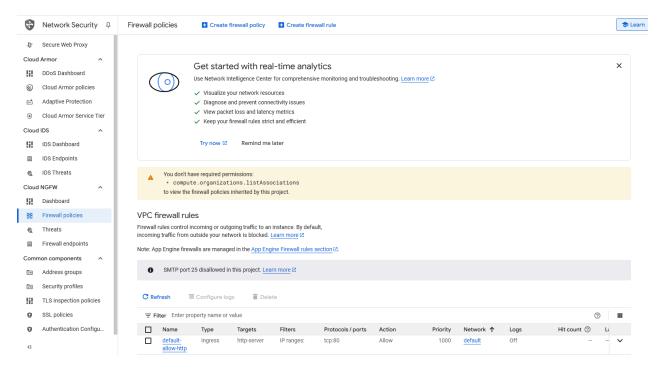
ElasticSearch = <u>elastic-search</u>

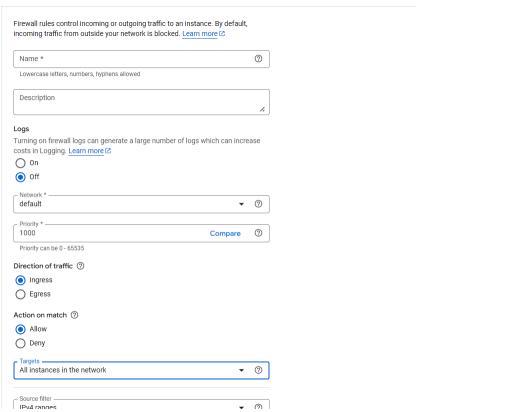
Creating Instance:



- Change the region to Montreal (as it has the lowest cost)
- In OS and storage, change the OS to Ubuntu and Version to 24.04 LTS x86_64, and storage size to 30 GB.
- In Networkings, allow the http and https traffic on the network
- In advanced, change Provisioning Model, to spot instead of Standard.

Creating Firewall Rule:





- Create a new firewall rule.
- Give any name and description. Keep the direction as ingress.
- In target types, apply to all instances.
- In the Source IPV4 ranges, give 0.0.0.0.
- Check the TCP protocol, and write 9567 in the port.

Install Docker:

- Go to link: https://download.docker.com/linux/ubuntu/dists/noble/pool/stable/amd64/
- Download the last instances of all using wget
- Run: sudo dpkg -i {package_name}

Make the frontend and backend:

 The codes for the index.html, app.py and Dockerfile are available on the GitHub link provided.

Now, the frontend and backend are connected and to run, go to: http://frontend-external-ip]/9567

Screenshots:

Frontend DockerFile:

```
g23110132@frontend-1:~/frontend$ cat Dockerfile

FROM python:3.9-slim

WORKDIR /app

COPY . .

RUN pip install --no-cache-dir requests fastapi[standard] uvicorn

CMD ["uvicorn", "app:app", "--host", "0.0.0.0", "--port", "9567"]
```

build:

Running docker container:

Backend Dockerfile:

```
FROM python:3.9-slim
WORKDIR /app
COPY . .

RUN pip install --no-cache-dir fastapi[standard] elasticsearch requests
CMD ["uvicorn", "main:app", "--host", "0.0.0.0", "--port", "9567"]
```

Docker-compose.yml:

```
g23110295@instance-20250327-170909:~/backend$ cat docker-compose.yml
version: '3'
services:
 elasticsearch:
    image: docker.elastic.co/elasticsearch/elasticsearch:8.10.2
    container_name: elasticsearch
    environment:
      - discovery.type=single-node
      - xpack.security.enabled=false
    ports:
- "9200:9200"
    networks:

    mynetwork

    healthcheck:
      test: ["CMD-SHELL", "curl -f http://localhost:9200/_cluster/health || exit 1"]
      interval: 3s
      retries: 10
  fastapi:
   build:
    container name: fastapi2
    depends_on:
      elasticsearch:
       condition: service_healthy
    environment:
       - ES HOST=http://elasticsearch:9200
    networks:

    mynetwork

    ports:
- "9567:9567"
networks:
 mynetwork:
    driver: bridge
```

Running docker-compose.yml:

```
g23110295@instance-20250327-170909:~/backend$ sudo docker compose up -d --build WARN[0000] /home/g23110295/backend/docker-compose.yml: the attribute `version` is obsolete, it will be ignored, please remove it to avoid potential confusion
 Compose can now delegate builds to bake for better performance.
To do so, set COMPOSE_BAKE=true.
[+] Building 17.6s (11/11) FINISHED
                      ferring dockerfile: 221B
                                                                                                                                                                                    docker:default
      [fastapi] exporting to image

>> exporting layers

>> writing image sha256:3a79328de7cfe80313a14355adf09de648a7f36cee79346867328274alb4ffaa

>> naming to docker.io/library/backend-fastapi
[fastapi] resolving provenance for metadata file

Running 4/4
 ✓ Network backend_mynetwork Created
✓ Container elasticsearch Healthy
✓ Container fastapi2
✓ Container fastapi2 Started
g23110295@instance-20250327-170909:~/backend$ sudo docker ps
CONTAINER ID IMAGE
                                                                                                                                  COMMAND
                                                                                                                                                                                 CREATED
       STATUS
                                                            PORTS
                                                                                                                                                                       NAMES
2f9db3d6f3e6 backend-fastapi
                                                                                                                                  "uvicorn main:app --..." About a minute ag
"uvicorn main:app --..." About a minute ag o Up 56 seconds 0.0.0.0:9567->9567/tcp, [::]:9567->9567/tcp fastapi2 9dc6861d8e04 docker.elastic.co/elasticsearch/elasticsearch:8.10.2 "/bin/tini -- /usr/l..." About a minute ag o Up About a minute (healthy) 0.0.0.0:9200->9200/tcp, [::]:9200->9200/tcp, 9300/tcp elasticsearch g23110295@instance-20250327-170909:~/backend$
```

netstat -antp | grep LISTEN:

```
`[[Ag23110132@frontend-1:~/frontend$ netstat -antp | grep LISTEN
(No info could be read for "-p": geteuid()=1001 but you should be root.)
              0 0.0.0.0:20202
0 0.0.0.0:9567
                                    0.0.0.0:*
tcp
         0
                                            0.0.0.0:*
tcp
          0
          0
                 0 127.0.0.54:53
                                            0.0.0.0:*
tcp
          0
                 0 127.0.0.53:53
                                            0.0.0.0:*
tcp
tcp6
           0
                 0 :::20201
                                            :::*
tcp6
           0
                 0 :::9567
                                            :::*
tcp6
           0
                0 :::22
                                            :::*
```

Website screenshot for insert:

Elasticsearch Interface

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Temp txt		
	1.	
Insert		
		Query

Output:

```
{
"result": "created",
"id": "26b8352f-1da4-4d66-aff1-e972610e44e6"
}
```

Website screenshot for get:

Elasticsearch Interface

Shah Harshil Hardik - 23110132

Shah Tirth - 23110295

	h	
Insert		
txt		Query

Output:

```
{
"hits": [
{
"_index": "documents",
"_id": "26b8352f-1da4-4d66-aff1-e972610e44e6",
"_score": 2.583037,
"_source": {
"id": "26b8352f-1da4-4d66-aff1-e972610e44e6",
"text": "Temp txt"
}
}
]
}
```

Docker Hub push:

```
g23110132@frontend-1:~/frontend$ dockerhub login -u harshilshah18042005
dockerhub: command not found
g23110132@frontend-1:~/frontend$ docker login -u harshilshah18042005
i Info \rightarrow A Personal Access Token (PAT) can be used instead.
         To create a PAT, visit <a href="https://app.docker.com/settings">https://app.docker.com/settings</a>
Password:
Login Succeeded
g23110132@frontend-1:~/frontend$ docker images
                                TAG
                                           IMAGE ID
                                                           CREATED
                                                                                SIZE
harshilshah18042005/fastapi1
                                                         About an hour ago
                               latest
                                           14a68de9a277
                                                                                181MB
                                latest
                                           14a68de9a277 About an hour ago
g23110132@frontend-1:~/frontend$ ^C
g23110132@frontend-1:~/frontend$ docker push harshilshah18042005/fastapi1:latest
The push refers to repository [docker.io/harshilshah18042005/fastapi1]
a164a0b6242a: Pushed
0158c05328b9: Pushed
3ae44366cb26: Pushed
0796a33961ef: Mounted from library/python
04f6e4cfc28e: Mounted from library/python
140ec0aa8af0: Mounted from library/python
1287fbecdfcc: Mounted from library/python
latest: digest: sha256:d918c74feae48fd8acf9114cb57256604c8e250fea132b5b61<u>ae6a95cea75908 size: 1785</u>
```

```
g23110132@instance-20250327-170909:~$ sudo docker images
REPOSITORY
                                                           IMAGE ID
                                                                          CREATED
                                                                                           SIZE
                                                 TAG
tirthshah2504/cs203
                                                 latest
                                                           5329a51915c8
                                                                           2 hours ago
                                                                                           309MB
tirthshah2504/cs203final
                                                           5329a51915c8
                                                                          2 hours ago
                                                                                           309MB
                                                 latest
harshilshah18042005/fastapi2
                                                 latest
                                                           5329a51915c8
                                                                           2 hours ago
                                                                                           309MB
g23110295-fastapi
                                                 latest
                                                           5329a51915c8
                                                                          2 hours ago
                                                                                           309MB
                                                           bb20157f1390
                                                 8.10.2
docker.elastic.co/elasticsearch/elasticsearch
                                                                          18 months ago
                                                                                           1.34GB
harshilshah18042005/elasticsearch
                                                 8.10.2
                                                           bb20157f1390
                                                                           18 months ago
                                                                                           1.34GB
```

```
g23110132@frontend-1:~$ sudo docker images
REPOSITORY
                                TAG
                                          IMAGE ID
                                                          CREATED
                                                                        SIZE
harshilshah18042005/fastapi1
                                          14a68de9a277
                                latest
                                                          2 hours ago
                                                                        181MB
                                          14a68de9a277
                                                          2 hours ago
                                                                        181MR
fastapi
                                latest
```

Screenshot for VM logs (insert):

INFO: 10.162.0.7:34430 - "GET /insert/India%20has%20been%20a%20federal%20republic%20since%201950%2C%20governe d%20through%20ak20democratic%20parliamentary%20system. %20IT%20is%20a%20pluralistic%20%20multilingual%20and%20multi-ethnic%20society.%20India%27s%20population%20grew%20from%20361%20million%20Ip51%20to%20over%201.4%20billion%20Inf%20Ip51%20E%20population%20grew%20from%20361%20million%20Ip51%20to%20over%201.4%20billion%20Inf%20Ip51%20E%20India%20Inf%20Ip51%20E%20Its%20India%2

Screenshot for VM logs (get)"

```
txt
```

INFO: 10.162.0.7:59642 - "GET /get/txt HTTP/1.1" 200 OK

Docker inspect (frontend):

```
Run 'docker --help' for more information
q23110132@frontend-1:~/frontend$ docker inspect e2777cd12fce
            "Id": "e2777cd12fce8c1e84f2e4bf75ceb59571e1c9160c3841b69a022847e997840b",
             "Created": "2025-03-27T19:53:43.563554098Z",
             "Path": "uvicorn",
             "Args": [
                   "app:app",
"--host",
"0.0.0.0",
                   "--port",
            ],
"State": {
                   "Status": "running",
                  "Running": true,
"Paused": false,
                   "Restarting": false, "OOMKilled": false,
                   "Dead": false,
                   "Pid": 15027,
                   "ExitCode": 0,
"Error": "",
"StartedAt": "2025-03-27T19:53:43.6502329112",
"FinishedAt": "0001-01-01T00:00:002"
             },
"Image": "sha256:14a68de9a277a587ab38a76e13f0c777d91b6c245b3031e31d18ec47c4b279fa",
            "ResolvConfPath": "/var/lib/docker/containers/e2777cd12fce8c1e84f2e4bf75ceb59571e1c9160c3841b69a022847e997840b/reso
"HostnamePath": "/var/lib/docker/containers/e2777cd12fce8c1e84f2e4bf75ceb59571e1c9160c3841b69a022847e997840b/hostna
            "HostsPath": "/var/lib/docker/containers/e2777cd12fce8c1e84f2e4bf75ceb59571e1c9160c3841b69a022847e997840b/hosts",
"LogPath": "/var/lib/docker/containers/e2777cd12fce8c1e84f2e4bf75ceb59571e1c9160c3841b69a022847e997840b/e2777cd12fc
```

Architectural Diagram:

