GROUP 28

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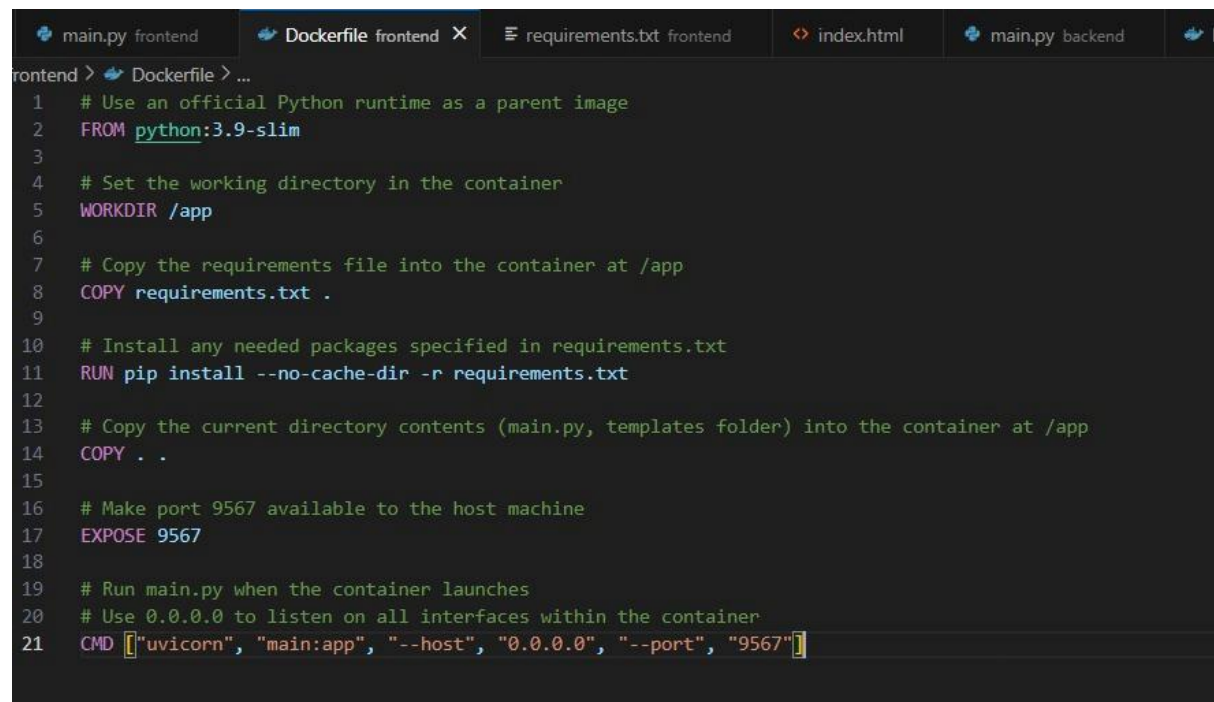
Github: Jain-Laksh/CS203-Lab-08

OneDrive: https://iitgnacin-my.sharepoint.com/:f:/g/personal/23110328_iitgn_ac_in/EjZbs6Q4egFEktaIv7TbeaQBeuRaCyzo9_aPy58BXbQyuQ?e=uEMvlq

Docker Hub: https://hub.docker.com/repository/docker/tanishy7777/fastapi/general

LAB-08 REPORT

1] Docker file code

FrontEnd

BackEnd

backend > Dockerfile > WORKDIR

```dockerfile
1   # Use an official Python runtime as a parent image
2   FROM python:3.9-slim
3
4   # Set the working directory in the container
5   WORKDIR /app
6
7   # Copy the requirements file into the container at /app
8   COPY requirements.txt .
9
10  # Install any needed packages specified in requirements.txt
11  RUN pip install --no-cache-dir -r requirements.txt
12
13  # Copy the current directory contents into the container at /app
14  COPY . .
15
16  # Make port 9567 available within the Docker network (but not necessarily to the host)
17  EXPOSE 9567
18
19  # Run main.py when the container launches
20  # Use 0.0.0.0 to listen on all interfaces within the container network
21  CMD ["uvicorn", "main:app", "--host", "0.0.0.0", "--port", "9567"]
```

Compose File

```yaml
docker-compose.yml
    ▷Run All Services
1   services:
      ▷ Run Service
2     elasticsearch:
3       image: docker.elastic.co/elasticsearch/elasticsearch:7.17.27
4       container_name: elasticsearch_cont
5       environment:
6         - discovery.type=single-node
7         - xpack.security.enabled=false
8         - ES_JAVA_OPTS=-Xms512m -Xmx512m
9
10      volumes:
11        - esdata:/usr/share/elasticsearch/data
12      networks:
13        - app-network
14      healthcheck:
15        test: ["CMD-SHELL", "curl -s -f http://localhost:9200/_cat/health >/dev/null || exit 1"]
16        interval: 10s
17        timeout: 5s
18        retries: 5
19        start_period: 30s
20
      ▷ Run Service
21    backend:
22      image: tanishy7777/fastapi:2
23      container_name: backend_cont
24      depends_on:
25        elasticsearch:
26          condition: service_healthy
27      networks:
28        - app-network
29      environment:
30        - ELASTICSEARCH_HOSTS=http://elasticsearch:9200
31
32
33
34  volumes:
35    esdata:
36
37  networks:
38    app-network:
39      driver: bridge
40
```

2] Building Command ,Running Command and Push Command


```
(venv) (base) PS D:\clg_stuff\STT assignments\STTAssignment8> docker-compose up --build -d
[+] Building 2.1s (19/19) FINISHED                                                                docker:desktop-linux
 => [backend internal] load build definition from Dockerfile                                                    0.0s
 => => transferring dockerfile: 738B                                                                            0.0s
 => [frontend internal] load metadata for docker.io/library/python:3.9-slim                                     1.6s
 => [backend internal] load .dockerignore                                                                       0.0s
 => => transferring context: 2B                                                                                 0.0s
 => [frontend 1/5] FROM docker.io/library/python:3.9-slim@sha256:e52ca5f579cc58fed41efcbb55a0ed5dccf6c7a156cba76acfb4ab42fc19dd00  0.0s
 => [backend internal] load build context                                                                       0.0s
 => => transferring context: 94B                                                                                0.0s
 => CACHED [frontend 2/5] WORKDIR /app                                                                           0.0s
 => CACHED [backend 3/5] COPY requirements.txt .                                                                 0.0s
 => CACHED [backend 4/5] RUN pip install --no-cache-dir -r requirements.txt                                      0.0s
 => CACHED [backend 5/5] COPY . .                                                                                0.0s
 => [backend] exporting to image                                                                                0.0s
 => => exporting layers                                                                                          0.0s
 => => writing image sha256:aae0cd8b5ec6e51b868a3d5eb677c183d5ff0a05b8c00ca7b964d02a9d4e8a46                     0.0s
 => => naming to docker.io/library/sttassignment8-backend                                                       0.0s
 => [backend] resolving provenance for metadata file                                                            0.0s
 => [frontend internal] load build definition from Dockerfile                                                   0.0s
 => => transferring dockerfile: 718B                                                                            0.0s
 => [frontend internal] load .dockerignore                                                                      0.0s
 => => transferring context: 2B                                                                                 0.0s
 => [frontend internal] load build context                                                                      0.0s
 => => transferring context: 246B                                                                               0.0s
 => CACHED [frontend 3/5] COPY requirements.txt .                                                                0.0s
 => CACHED [frontend 4/5] RUN pip install --no-cache-dir -r requirements.txt                                     0.0s
 => CACHED [frontend 5/5] COPY . .                                                                               0.0s
 => [frontend] exporting to image                                                                               0.0s
 => => exporting layers                                                                                          0.0s
 => => writing image sha256:d9c56601880e179e8ebcb31b23652465c7da78960652385d6458d439df957c86                    0.0s
 => => naming to docker.io/library/sttassignment8-frontend                                                      0.0s
 => [frontend] resolving provenance for metadata file                                                           0.0s
[+] Running 3/3
 ✓ Container elasticsearch_cont   Healthy                                                                        0.5s
 ✓ Container backend_cont         Running                                                                        0.0s
 ✓ Container frontend_cont        Running                                                                        0.0s
(venv) (base) PS D:\clg_stuff\STT assignments\STTAssignment8> docker exec backend_cont curl -X GET "elasticsearch:9200/wikipedia_india/_search?pretty&size=10"
```



```
e76c9d2eac0b
tanishyelgoe777@frontendvm:~$ docker run -d   --name frontend_cont_gcp   -p 9567:9567   -e BACKEND_URL="http://${
BACKEND_VM_INTERNAL_IP}:9567"   --restart always   $FRONTEND_IMAGE
ad1f959f3d1a5ffb4c84d9f8a6771f8ff1b1ac848dc1c3dce1e6f1596adae4b0
tanishyelgoe777@frontendvm:~$
```



```
✓ Network tanishyelgoe777_app-network  Removed
tanishyelgoe777@backendvm:~$ docker compose -f docker-compose-gcp.yml up -d --build
[+] Running 3/3
 ✓ Network tanishyelgoe777_app-network   Created                                   0.3s
 ✓ Container elasticsearch_cont          Healthy                                  43.7s
 ✓ Container backend_cont                Started                                  45.0s
tanishyelgoe777@backendvm:~$
```



```
repository name must be lowercase
(venv) (base) PS D:\clg_stuff\STT assignments\STTAssignment8> docker push tanishy7777/fastapi:1
The push refers to repository [docker.io/tanishy7777/fastapi]
af2ea3d26920: Pushed
2fb93163e432: Pushed
efc91753922b: Pushed
09956b80c1ec: Pushed
0796a33961ef: Mounted from library/python
04f6e4cfc28e: Mounted from library/python
140ec0aa8af0: Mounted from library/python
1287fbecdfcc: Mounted from library/python
1: digest: sha256:9bfdaa89a1259b025fbb581f2a4c9157e33367561f6e8d8156f7ba52695b5cdf size: 1992
(venv) (base) PS D:\clg_stuff\STT assignments\STTAssignment8> docker push tanishy7777/fastapi:2
The push refers to repository [docker.io/tanishy7777/fastapi]
c62184e68da7: Pushed
226ccaf0e6bf: Pushed
743410bc9f76: Pushed
09956b80c1ec: Layer already exists
0796a33961ef: Layer already exists
04f6e4cfc28e: Layer already exists
140ec0aa8af0: Layer already exists
1287fbecdfcc: Layer already exists
2: digest: sha256:96468f1b722a6f431229569d924c82f9e89f1242088595152830fd8a5b68da94 size: 1992
(venv) (base) PS D:\clg_stuff\STT assignments\STTAssignment8> docker ps
```

3] Port Allocation


```python
from fastapi import FastAPI, HTTPException, Request
# Import AsyncElasticsearch instead of Elasticsearch
from elasticsearch import AsyncElasticsearch, exceptions as es_exceptions
import time
import logging
import os

# ... (logging setup remains the same) ...
# --->>> ADD OR UNCOMMENT THESE LINES <<<---
# Configure logging format and level
logging.basicConfig(level=logging.INFO, format='%(asctime)s - %(name)s - %(levelname)s - %(message)s')
# Get the logger for the current module
logger = logging.getLogger(__name__)
# --->>> END OF LINES TO CHECK/ADD <<<

app = FastAPI()

ES_HOST = os.getenv("ELASTICSEARCH_HOSTS", "http://elasticsearch:9200")
INDEX_NAME = "wikipedia_india"

es_client = None # Will hold the AsyncElasticsearch client instance

@app.on_event("startup")
async def startup_event():
```

```python
# --- Backend Service Configuration ---
# The frontend needs to talk to the backend service over the Docker network
# Use the backend service name defined in docker-compose.yml
BACKEND_SERVICE_URL = os.getenv("BACKEND_URL", "http://1:9567") # Port 9567 is where backend listens internally

# --- Root Endpoint to Serve HTML ---
@app.get("/", response_class=HTMLResponse)
```

4] Screenshot of "netstat -antp | grep LISTEN"

4A] FrontEnd Output


```
tanishyelgoe777@frontendvm:~$ netstat -antp | grep LISTEN
(Not all processes could be identified, non-owned process info
 will not be shown, you would have to be root to see it all.)
tcp        0      0 0.0.0.0:20202          0.0.0.0:*          LISTEN      -
tcp        0      0 127.0.0.1:42983        0.0.0.0:*          LISTEN      -
tcp        0      0 0.0.0.0:22             0.0.0.0:*          LISTEN      -
tcp        0      0 127.0.0.53:53          0.0.0.0:*          LISTEN      -
tcp        0      0 0.0.0.0:9567           0.0.0.0:*          LISTEN      -
tcp6       0      0 :::20201               :::*              LISTEN      -
tcp6       0      0 :::22                  :::*              LISTEN      -
tcp6       0      0 :::9567                :::*              LISTEN      -
tanishyelgoe777@frontendvm:~$
```

4B] BackEnd Output


```
tanishyelgoe777@backendvm:~$ netstat -antp | grep LISTEN
(Not all processes could be identified, non-owned process info
 will not be shown, you would have to be root to see it all.)
tcp        0      0 0.0.0.0:9567           0.0.0.0:*          LISTEN      -
tcp        0      0 127.0.0.53:53          0.0.0.0:*          LISTEN      -
tcp        0      0 0.0.0.0:22             0.0.0.0:*          LISTEN      -
tcp        0      0 127.0.0.1:36057        0.0.0.0:*          LISTEN      -
tcp        0      0 0.0.0.0:20202          0.0.0.0:*          LISTEN      -
tcp6       0      0 :::9567                :::*              LISTEN      -
tcp6       0      0 :::22                  :::*              LISTEN      -
tcp6       0      0 :::20201               :::*              LISTEN      -
tanishyelgoe777@backendvm:~$
```

5] Docker Images

5A] FrontEnd

```
tanishyelgoe777@frontendvm:~$ docker ps
CONTAINER ID    IMAGE                          COMMAND             CREATED        STATUS        PORTS
                          NAMES
d1b167614f6a    tanishy7777/fastapi:1    "uvicorn main:app --…"   2 hours ago    Up 2 hours    0.0.0.0:9567->9567/tcp
, :::9567->9567/tcp    frontend_cont_gcp
tanishyelgoe777@frontendvm:~$
```

5B] BackEnd

```
tanishyelgoe777@backendvm:~$ docker ps
CONTAINER ID   IMAGE                                                    COMMAND              CREATED         STATUS                 PORTS                                         NAMES
c090cb79a00c   tanishy7777/fastapi:2                                    "uvicorn main:app --…"   12 minutes ago   Up 11 minutes          0.0.0.0:9567->9567/tcp, :::9567->9567/tcp   backend_con
t
be7ffaac01ff   docker.elastic.co/elasticsearch/elasticsearch:7.17.27   "/bin/tini -- /usr/l…"   12 minutes ago   Up 12 minutes (healthy)   9200/tcp, 9300/tcp                          elasticsear
ch_cont
```

6] Frontend and Working

6A] Documents before insertion

```
tanishyelgoe777@backendvm:~$ docker exec elasticsearch_cont curl -X GET "localhost:9200/wikipedia_india/_count?pretty"
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   114  100   114    0     0    950      0 --:--:-- --:--:-- --:--:--   942
{
  "count" : 4,
  "_shards" : {
    "total" : 1,
    "successful" : 1,
    "skipped" : 0,
    "failed" : 0
  }
}
```

6B] Get Query

6C] Insert Query

Search for Best Match

Enter Search Term:

democracy	Get Best Match

Search Result:

ID: para1
Score: 1.2893728
Text: India, officially the Republic of India (ISO: Bhārat Gaṇarājya), is a country in South Asia. It is the seventh-largest country by area; the most populous country as of June 2023; and from the time of its independence in 1947, the world's most populous democracy.

Insert Document

Enter Document Text:

Democracy allows citizens to have a voice in the decisions that shape their society. Democracy is the best, I love democracy. India is a democratic country.

Insert Document

Insert Result:

Insert status will be shown here...

Insert Document

Enter Document Text:

Insert Document

Insert Result:

Success: Document inserted successfully (ID: reeb2JUBcUkHyBozLcGW)

6D] Documents after insertion


```
tanishyelgoe777@backendvm:~$ docker exec elasticsearch_cont curl -X GET "localhost:9200/wikipedia_india/_count?pretty"
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   114  100   114    0     0    674      0 --:--:-- --:--:-- --:--:--   674
{
  "count" : 5,
  "_shards" : {
    "total" : 1,
    "successful" : 1,
    "skipped" : 0,
    "failed" : 0
  }
}
tanishyelgoe777@backendvm:~$
```

6E] Get Query Output After Insertion

Elasticsearch Simple Frontend

Search for Best Match

Enter Search Term:

democracy | Get Best Match |

Search Result:

ID: TbC22JUBxu57xl3rZ-Qe
Score: 1.5222484
Text: Democracy allows citizens to have a voice in the decisions that shape their society. Democracy is the best, I love democracy. India is a democratic country.

Insert Document

Enter Document Text:

| Insert Document |

6F] Stopping and Removing Docker Containers and Running it Again

FrontEnd


```
tanishyelgoe777@frontendvm:~$ docker ps
CONTAINER ID    IMAGE                COMMAND            CREATED        STATUS        PORTS
                          NAMES
e76c9d2eac0b    tanishy7777/fastapi:1   "uvicorn main:app --…"  4 minutes ago   Up 4 minutes   0.0.0.0:9567->9567
/tcp, :::9567->9567/tcp   frontend_cont_gcp
tanishyelgoe777@frontendvm:~$ ^C
tanishyelgoe777@frontendvm:~$ docker stop e76c9d2eac0b
e76c9d2eac0b
tanishyelgoe777@frontendvm:~$ docker rm e76c9d2eac0b
e76c9d2eac0b
tanishyelgoe777@frontendvm:~$
```



```
tanishyelgoe777@frontendvm:~$ docker run -d   --name frontend_cont_gcp   -p 9567:9567   -e BACKEND_URL="http://${
BACKEND_VM_INTERNAL_IP}:9567"   --restart always   $FRONTEND_IMAGE
ad1f959f3d1a5ffb4c84d9f8a6771f8ff1b1ac848dc1c3dce1e6f1596adae4b0
tanishyelgoe777@frontendvm:~$
```

BackEnd


```
tanishyelgoe777@backendvm:~$ docker compose down
[+] Running 3/3
 ✓ Container backend_cont           Removed
 ✓ Container elasticsearch_cont     Removed
 ✓ Network tanishyelgoe777_app-network  Removed
tanishyelgoe777@backendvm:~$
```



```
tanishyelgoe777@backendvm:~$ docker compose down
[+] Running 3/3
 ✓ Container backend_cont           Removed                               1.5s
 ✓ Container elasticsearch_cont     Removed                               1.3s
 ✓ Network tanishyelgoe777_app-network  Removed                           0.2s
tanishyelgoe777@backendvm:~$ docker compose up --build -d
[+] Running 3/3
 ✓ Network tanishyelgoe777_app-network  Created                          0.1s
 ✓ Container elasticsearch_cont     Healthy                              43.3s
 ✓ Container backend_cont           Started                              44.8s
tanishyelgoe777@backendvm:~$
```

6G] Documents after Re-running the Containers

```
tanishyelgoe777@backendvm:~$ docker exec elasticsearch_cont curl -X GET "localhost:9200/wikipedia_india/_count?pretty"
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   114  100   114    0     0    674      0 --:--:-- --:--:-- --:--:--   674
{
  "count" : 5,
  "_shards" : {
    "total" : 1,
    "successful" : 1,
    "skipped" : 0,
    "failed" : 0
  }
}
tanishyelgoe777@backendvm:~$
```

6H] Re-running the Get Command

7] Running of "docker inspect"

7A] FrontEnd Container

tanishyelgoe777@frontendvm:~$ docker inspect frontend_cont_gcp

```
[
    {
        "Id": "ad1f959f3d1a5ffb4c84d9f8a6771f8ff1b1ac848dc1c3dce1e6f1596adae4b0",
        "Created": "2025-03-27T17:48:07.569711624Z",
        "Path": "uvicorn",
        "Args": [
            "main:app",
            "--host",
            "0.0.0.0",
            "--port",
            "9567"
        ],
        "State": {
```

```
            "Status": "running",

            "Running": true,

            "Paused": false,

            "Restarting": false,

            "OOMKilled": false,

            "Dead": false,

            "Pid": 29646,

            "ExitCode": 0,

            "Error": "",

            "StartedAt": "2025-03-27T17:48:07.937717192Z",

            "FinishedAt": "0001-01-01T00:00:00Z"

        },

        "Image": "sha256:d9c56601880e179e8ebcb31b23652465c7da78960652385d6458d439df957c86",

        "ResolvConfPath":
"/var/lib/docker/containers/ad1f959f3d1a5ffb4c84d9f8a6771f8ff1b1ac848dc1c3dce1e6f1596adae4b0/res
olv.conf",

        "HostnamePath":
"/var/lib/docker/containers/ad1f959f3d1a5ffb4c84d9f8a6771f8ff1b1ac848dc1c3dce1e6f1596adae4b0/hos
tname",

        "HostsPath":
"/var/lib/docker/containers/ad1f959f3d1a5ffb4c84d9f8a6771f8ff1b1ac848dc1c3dce1e6f1596adae4b0/hos
ts",

        "LogPath":
"/var/lib/docker/containers/ad1f959f3d1a5ffb4c84d9f8a6771f8ff1b1ac848dc1c3dce1e6f1596adae4b0/ad1
f959f3d1a5ffb4c84d9f8a6771f8ff1b1ac848dc1c3dce1e6f1596adae4b0-json.log",

        "Name": "/frontend_cont_gcp",

        "RestartCount": 0,

        "Driver": "overlay2",

        "Platform": "linux",

        "MountLabel": "",

        "ProcessLabel": "",

        "AppArmorProfile": "docker-default",

        "ExecIDs": null,

        "HostConfig": {

            "Binds": null,

            "ContainerIDFile": "",

            "LogConfig": {

                "Type": "json-file",

                "Config": {}

            },

            "NetworkMode": "bridge",
```

```
"PortBindings": {
    "9567/tcp": [
        {
            "HostIp": "",
            "HostPort": "9567"
        }
    ]
},
"RestartPolicy": {
    "Name": "always",
    "MaximumRetryCount": 0
},
"AutoRemove": false,
"VolumeDriver": "",
"VolumesFrom": null,
"ConsoleSize": [
    39,
    113
],
"CapAdd": null,
"CapDrop": null,
"CgroupnsMode": "host",
"Dns": [],
"DnsOptions": [],
"DnsSearch": [],
"ExtraHosts": null,
"GroupAdd": null,
"IpcMode": "private",
"Cgroup": "",
"Links": null,
"OomScoreAdj": 0,
"PidMode": "",
"Privileged": false,
"PublishAllPorts": false,
"ReadonlyRootfs": false,
"SecurityOpt": null,
"UTSMode": "",
```

```json
        "UsernsMode": "",
        "ShmSize": 67108864,
        "Runtime": "runc",
        "Isolation": "",
        "CpuShares": 0,
        "Memory": 0,
        "NanoCpus": 0,
        "CgroupParent": "",
        "BlkioWeight": 0,
        "BlkioWeightDevice": [],
        "BlkioDeviceReadBps": [],
        "BlkioDeviceWriteBps": [],
        "BlkioDeviceReadIOps": [],
        "BlkioDeviceWriteIOps": [],
        "CpuPeriod": 0,
        "CpuQuota": 0,
        "CpuRealtimePeriod": 0,
        "CpuRealtimeRuntime": 0,
        "CpusetCpus": "",
        "CpusetMems": "",
        "Devices": [],
        "DeviceCgroupRules": null,
        "DeviceRequests": null,
        "MemoryReservation": 0,
        "MemorySwap": 0,
        "MemorySwappiness": null,
        "OomKillDisable": false,
        "PidsLimit": null,
        "Ulimits": [],
        "CpuCount": 0,
        "CpuPercent": 0,
        "IOMaximumIOps": 0,
        "IOMaximumBandwidth": 0,
        "MaskedPaths": [
            "/proc/asound",
            "/proc/acpi",
            "/proc/kcore",
```

```
                    "/proc/keys",

                    "/proc/latency_stats",

                    "/proc/timer_list",

                    "/proc/timer_stats",

                    "/proc/sched_debug",

                    "/proc/scsi",

                    "/sys/firmware",

                    "/sys/devices/virtual/powercap"
                ],

                "ReadonlyPaths": [

                    "/proc/bus",

                    "/proc/fs",

                    "/proc/irq",

                    "/proc/sys",

                    "/proc/sysrq-trigger"
                ]
            },

        "GraphDriver": {

            "Data": {

                "LowerDir":
"/var/lib/docker/overlay2/74d88f6d3c4d8d72a10711ca0db538c3a8ae110ccb41f487c0614a8cf9ae4ff8-
init/diff:/var/lib/docker/overlay2/321e0dbde0b542e0f7cae278e2e4e9ca58ac01f2feb45e955d7bd471aa55b
e49/diff:/var/lib/docker/overlay2/0727c94ffa11c8c310bea013e9cd6aa9299cbac6757b2516f2bbfabbd32be5
f7/diff:/var/lib/docker/overlay2/86a3f32d5714367a0da4a814e570e346a14524c29f4b0135456cb9c305eadea
4/diff:/var/lib/docker/overlay2/380280b7e72bdfc9efddfb18fe33a0e10e1e0f6ec116527114bd2ff6766f6e3a
/diff:/var/lib/docker/overlay2/6ff3e18d95314e3af697262443914b69785d816f3f969127b840971661b609fe/
diff:/var/lib/docker/overlay2/2f16d5980c6e14e730c425108973f02e0edab0aaa0961012cc4011dec0ad01c9/d
iff:/var/lib/docker/overlay2/24fb65930ff3e22a0ee81eb96958e69f2aee16190b9be0e83edfa8921290a90d/di
ff:/var/lib/docker/overlay2/c4bdeb6df308a0f226f40d8d379f20346967ef08d07c13b70ea6328bb5e0a133/dif
f",

                "MergedDir":
"/var/lib/docker/overlay2/74d88f6d3c4d8d72a10711ca0db538c3a8ae110ccb41f487c0614a8cf9ae4ff8/merge
d",

                "UpperDir":
"/var/lib/docker/overlay2/74d88f6d3c4d8d72a10711ca0db538c3a8ae110ccb41f487c0614a8cf9ae4ff8/diff"
,

                "WorkDir":
"/var/lib/docker/overlay2/74d88f6d3c4d8d72a10711ca0db538c3a8ae110ccb41f487c0614a8cf9ae4ff8/work"
            },

            "Name": "overlay2"
        },

        "Mounts": [],

        "Config": {

            "Hostname": "ad1f959f3d1a",
```

```json
        "Domainname": "",
        "User": "",
        "AttachStdin": false,
        "AttachStdout": false,
        "AttachStderr": false,
        "ExposedPorts": {
            "9567/tcp": {}
        },
        "Tty": false,
        "OpenStdin": false,
        "StdinOnce": false,
        "Env": [
            "BACKEND_URL=http://10.160.0.4:9567",

"PATH=/usr/local/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin",
            "LANG=C.UTF-8",
            "GPG_KEY=E3FF2839C048B25C084DEBE9B26995E310250568",
            "PYTHON_VERSION=3.9.21",
            "PYTHON_SHA256=3126f59592c9b0d798584755f2bf7b081fa1ca35ce7a6fea980108d752a05bb1"
        ],
        "Cmd": [
            "uvicorn",
            "main:app",
            "--host",
            "0.0.0.0",
            "--port",
            "9567"
        ],
        "Image": "tanishy7777/fastapi:1",
        "Volumes": null,
        "WorkingDir": "/app",
        "Entrypoint": null,
        "OnBuild": null,
        "Labels": {
            "com.docker.compose.project": "sttassignment8",
            "com.docker.compose.service": "frontend",
            "com.docker.compose.version": "2.30.3"
        }
```

```json
        },
        "NetworkSettings": {
            "Bridge": "",
            "SandboxID": "e23b023f8a6d22b67cffc5027bf0e91c140c9296c5b1772aa0d7e3fcc53f70f4",
            "SandboxKey": "/var/run/docker/netns/e23b023f8a6d",
            "Ports": {
                "9567/tcp": [
                    {
                        "HostIp": "0.0.0.0",
                        "HostPort": "9567"
                    },
                    {
                        "HostIp": "::",
                        "HostPort": "9567"
                    }
                ]
            },
            "HairpinMode": false,
            "LinkLocalIPv6Address": "",
            "LinkLocalIPv6PrefixLen": 0,
            "SecondaryIPAddresses": null,
            "SecondaryIPv6Addresses": null,
            "EndpointID": "cea7d2e4207bf468183c97b2fe107b6403c73262897f1993c3ceff833b630dbc",
            "Gateway": "172.17.0.1",
            "GlobalIPv6Address": "",
            "GlobalIPv6PrefixLen": 0,
            "IPAddress": "172.17.0.2",
            "IPPrefixLen": 16,
            "IPv6Gateway": "",
            "MacAddress": "02:42:ac:11:00:02",
            "Networks": {
                "bridge": {
                    "IPAMConfig": null,
                    "Links": null,
                    "Aliases": null,
                    "MacAddress": "02:42:ac:11:00:02",
                    "NetworkID": "232f03375004888a5c7d208a501633c970cde8a46e6d97e33052e7c02dd45488",
```

```
                        "EndpointID":
"cea7d2e4207bf468183c97b2fe107b6403c73262897f1993c3ceff833b630dbc",

                    "Gateway": "172.17.0.1",

                    "IPAddress": "172.17.0.2",

                    "IPPrefixLen": 16,

                    "IPv6Gateway": "",

                    "GlobalIPv6Address": "",

                    "GlobalIPv6PrefixLen": 0,

                    "DriverOpts": null,

                    "DNSNames": null

                }

            }

        }

    }

]
```

7B] BackEnd Container

tanishyelgoe777@backendvm:~$ docker inspect backend_cont

```
[

    {

        "Id": "e902946b2060427afedc13d7942ffa35e14e5f5b1ec82c4a26a651ef68b88968",

        "Created": "2025-03-27T17:47:06.823879045Z",

        "Path": "uvicorn",

        "Args": [

            "main:app",

            "--host",

            "0.0.0.0",

            "--port",

            "9567"

        ],

        "State": {

            "Status": "running",

            "Running": true,

            "Paused": false,

            "Restarting": false,

            "OOMKilled": false,

            "Dead": false,

            "Pid": 44894,
```

```
        "ExitCode": 0,

        "Error": "",

        "StartedAt": "2025-03-27T17:47:50.081376768Z",

        "FinishedAt": "0001-01-01T00:00:00Z"

    },

    "Image": "sha256:aae0cd8b5ec6e51b868a3d5eb677c183d5ff0a05b8c00ca7b964d02a9d4e8a46",

    "ResolvConfPath":
"/var/lib/docker/containers/e902946b2060427afedc13d7942ffa35e14e5f5b1ec82c4a26a651ef68b88968/res
olv.conf",

    "HostnamePath":
"/var/lib/docker/containers/e902946b2060427afedc13d7942ffa35e14e5f5b1ec82c4a26a651ef68b88968/hos
tname",

    "HostsPath":
"/var/lib/docker/containers/e902946b2060427afedc13d7942ffa35e14e5f5b1ec82c4a26a651ef68b88968/hos
ts",

    "LogPath":
"/var/lib/docker/containers/e902946b2060427afedc13d7942ffa35e14e5f5b1ec82c4a26a651ef68b88968/e90
2946b2060427afedc13d7942ffa35e14e5f5b1ec82c4a26a651ef68b88968-json.log",

    "Name": "/backend_cont",

    "RestartCount": 0,

    "Driver": "overlay2",

    "Platform": "linux",

    "MountLabel": "",

    "ProcessLabel": "",

    "AppArmorProfile": "docker-default",

    "ExecIDs": null,

    "HostConfig": {

        "Binds": null,

        "ContainerIDFile": "",

        "LogConfig": {

            "Type": "json-file",

            "Config": {}

        },

        "NetworkMode": "tanishyelgoe777_app-network",

        "PortBindings": {

            "9567/tcp": [

                {

                    "HostIp": "",

                    "HostPort": "9567"

                }

            ]
```

```json
        },
        "RestartPolicy": {
            "Name": "no",
            "MaximumRetryCount": 0
        },
        "AutoRemove": false,
        "VolumeDriver": "",
        "VolumesFrom": null,
        "ConsoleSize": [
            0,
            0
        ],
        "CapAdd": null,
        "CapDrop": null,
        "CgroupnsMode": "host",
        "Dns": null,
        "DnsOptions": null,
        "DnsSearch": null,
        "ExtraHosts": [],
        "GroupAdd": null,
        "IpcMode": "private",
        "Cgroup": "",
        "Links": null,
        "OomScoreAdj": 0,
        "PidMode": "",
        "Privileged": false,
        "PublishAllPorts": false,
        "ReadonlyRootfs": false,
        "SecurityOpt": null,
        "UTSMode": "",
        "UsernsMode": "",
        "ShmSize": 67108864,
        "Runtime": "runc",
        "Isolation": "",
        "CpuShares": 0,
        "Memory": 0,
        "NanoCpus": 0,
```

```json
        "CgroupParent": "",
        "BlkioWeight": 0,
        "BlkioWeightDevice": null,
        "BlkioDeviceReadBps": null,
        "BlkioDeviceWriteBps": null,
        "BlkioDeviceReadIOps": null,
        "BlkioDeviceWriteIOps": null,
        "CpuPeriod": 0,
        "CpuQuota": 0,
        "CpuRealtimePeriod": 0,
        "CpuRealtimeRuntime": 0,
        "CpusetCpus": "",
        "CpusetMems": "",
        "Devices": null,
        "DeviceCgroupRules": null,
        "DeviceRequests": null,
        "MemoryReservation": 0,
        "MemorySwap": 0,
        "MemorySwappiness": null,
        "OomKillDisable": false,
        "PidsLimit": null,
        "Ulimits": null,
        "CpuCount": 0,
        "CpuPercent": 0,
        "IOMaximumIOps": 0,
        "IOMaximumBandwidth": 0,
        "MaskedPaths": [
            "/proc/asound",
            "/proc/acpi",
            "/proc/kcore",
            "/proc/keys",
            "/proc/latency_stats",
            "/proc/timer_list",
            "/proc/timer_stats",
            "/proc/sched_debug",
            "/proc/scsi",
            "/sys/firmware",
```

```
                    "/sys/devices/virtual/powercap"
                ],
                "ReadonlyPaths": [
                    "/proc/bus",
                    "/proc/fs",
                    "/proc/irq",
                    "/proc/sys",
                    "/proc/sysrq-trigger"
                ]
            },
            "GraphDriver": {
                "Data": {
                    "LowerDir":
"/var/lib/docker/overlay2/6035206b903bfbffdda1b25bd20171ddf8997d98c959c81d1f9a2f2a330070fc-
init/diff:/var/lib/docker/overlay2/beb0a9790acf2c41d136a8c20241b15ff42581b615ade3d699edd86ab3ada
d6a/diff:/var/lib/docker/overlay2/da977ae23adebf9ab496f1d0386079a9a8a35cf4b123bc7edac4dcacf3adf7
ad/diff:/var/lib/docker/overlay2/1638f86fc96d04d9d2bebea528147ea7f65ba613510a5e3d0b47366ade2b279
4/diff:/var/lib/docker/overlay2/5d269e6cb3929bce721f259a5de7df5cb0fb2c11983c4b84b1b39e26d69ef0bf
/diff:/var/lib/docker/overlay2/5a4fa4409ae13ed346f2553df4cf0827af36d584f80e06a25c6f6d45a45a04fa/
diff:/var/lib/docker/overlay2/010aeda225c13927b1f4a35f3b36823c393ee0fcf253b53ec9af5185a5f4cc09/d
iff:/var/lib/docker/overlay2/a06edacdb189bbc56951c5c8b460070f955e8e0484f8e0c6ddc3b602d68c68ec/di
ff:/var/lib/docker/overlay2/fa8e31bbf857242fcd5856f0f681a1dd12148c2e12d6070a6a7e5cb87fa056f6/dif
f",

                    "MergedDir":
"/var/lib/docker/overlay2/6035206b903bfbffdda1b25bd20171ddf8997d98c959c81d1f9a2f2a330070fc/merge
d",

                    "UpperDir":
"/var/lib/docker/overlay2/6035206b903bfbffdda1b25bd20171ddf8997d98c959c81d1f9a2f2a330070fc/diff"
,

                    "WorkDir":
"/var/lib/docker/overlay2/6035206b903bfbffdda1b25bd20171ddf8997d98c959c81d1f9a2f2a330070fc/work"
                },
                "Name": "overlay2"
            },
            "Mounts": [],
            "Config": {
                "Hostname": "e902946b2060",
                "Domainname": "",
                "User": "",
                "AttachStdin": false,
                "AttachStdout": true,
                "AttachStderr": true,
                "ExposedPorts": {
                    "9567/tcp": {}
```

```
        },
        "Tty": false,
        "OpenStdin": false,
        "StdinOnce": false,
        "Env": [
            "ELASTICSEARCH_HOSTS=http://elasticsearch:9200",

"PATH=/usr/local/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin",
            "LANG=C.UTF-8",
            "GPG_KEY=E3FF2839C048B25C084DEBE9B26995E310250568",
            "PYTHON_VERSION=3.9.21",
            "PYTHON_SHA256=3126f59592c9b0d798584755f2bf7b081fa1ca35ce7a6fea980108d752a05bb1"
        ],
        "Cmd": [
            "uvicorn",
            "main:app",
            "--host",
            "0.0.0.0",
            "--port",
            "9567"
        ],
        "Image": "tanishy7777/fastapi:2",
        "Volumes": null,
        "WorkingDir": "/app",
        "Entrypoint": null,
        "OnBuild": null,
        "Labels": {
            "com.docker.compose.config-hash":
"db489ecb244b5875c754bb81c22309399637748b09318168ecfc2610688d0d46",
            "com.docker.compose.container-number": "1",
            "com.docker.compose.depends_on": "elasticsearch:service_healthy:false",
            "com.docker.compose.image":
"sha256:aae0cd8b5ec6e51b868a3d5eb677c183d5ff0a05b8c00ca7b964d02a9d4e8a46",
            "com.docker.compose.oneoff": "False",
            "com.docker.compose.project": "tanishyelgoe777",
            "com.docker.compose.project.config_files": "/home/tanishyelgoe777/docker-
compose-gcp.yml",
            "com.docker.compose.project.working_dir": "/home/tanishyelgoe777",
            "com.docker.compose.service": "backend",
```

```
            "com.docker.compose.version": "2.34.0"

        }

    },

    "NetworkSettings": {

        "Bridge": "",

        "SandboxID": "c4313b613a4ed2c00b2bc4756a72ac2ad57aea11eb1489e6f4733f1f1027069a",

        "SandboxKey": "/var/run/docker/netns/c4313b613a4e",

        "Ports": {

            "9567/tcp": [

                {

                    "HostIp": "0.0.0.0",

                    "HostPort": "9567"

                },

                {

                    "HostIp": "::",

                    "HostPort": "9567"

                }

            ]

        },

        "HairpinMode": false,

        "LinkLocalIPv6Address": "",

        "LinkLocalIPv6PrefixLen": 0,

        "SecondaryIPAddresses": null,

        "SecondaryIPv6Addresses": null,

        "EndpointID": "",

        "Gateway": "",

        "GlobalIPv6Address": "",

        "GlobalIPv6PrefixLen": 0,

        "IPAddress": "",

        "IPPrefixLen": 0,

        "IPv6Gateway": "",

        "MacAddress": "",

        "Networks": {

            "tanishyelgoe777_app-network": {

                "IPAMConfig": null,

                "Links": null,

                "Aliases": [
```

```
                    "backend_cont",

                    "backend"

                ],

                "MacAddress": "02:42:ac:19:00:03",

                "NetworkID":
"78abf6d3fa1ebb925809d94171d8f10a03d4e35bcf765aace85c948d1c08316d",

                "EndpointID":
"9037c00cd21ed4f5ad604fdff04dfbe53742db5bdc7f8841b4dd4a80d50940d6",

                "Gateway": "172.25.0.1",

                "IPAddress": "172.25.0.3",

                "IPPrefixLen": 16,

                "IPv6Gateway": "",

                "GlobalIPv6Address": "",

                "GlobalIPv6PrefixLen": 0,

                "DriverOpts": null,

                "DNSNames": [

                    "backend_cont",

                    "backend",

                    "e902946b2060"

                ]

            }

        }

    }

}

]

tanishyelgoe777@backendvm:~$
```

7C] Elastic Search Container

tanishyelgoe777@backendvm:~$ ^C

tanishyelgoe777@backendvm:~$ docker inspect elasticsearch_cont

[

  {

    "Id": "56039dadcc6151fdbea08fadd3dabfd1906f1979749ec17ebc08ba6cfe313180",

    "Created": "2025-03-27T17:47:06.762711601Z",

    "Path": "/bin/tini",

"Args": [

   "--",

   "/usr/local/bin/docker-entrypoint.sh",

   "eswrapper"

],

"State": {

   "Status": "running",

   "Running": true,

   "Paused": false,

   "Restarting": false,

   "OOMKilled": false,

   "Dead": false,

   "Pid": 44489,

   "ExitCode": 0,

   "Error": "",

   "StartedAt": "2025-03-27T17:47:07.874330195Z",

   "FinishedAt": "0001-01-01T00:00:00Z",

   "Health": {

     "Status": "healthy",

     "FailingStreak": 0,

     "Log": [

       {

         "Start": "2025-03-27T17:52:43.128109732Z",

         "End": "2025-03-27T17:52:43.204088379Z",

         "ExitCode": 0,

         "Output": ""

       },

       {

```json
        "Start": "2025-03-27T17:52:53.204918601Z",

        "End": "2025-03-27T17:52:53.273233726Z",

        "ExitCode": 0,

        "Output": ""

      },

      {

        "Start": "2025-03-27T17:53:03.274065914Z",

        "End": "2025-03-27T17:53:03.378264429Z",

        "ExitCode": 0,

        "Output": ""

      },

      {

        "Start": "2025-03-27T17:53:13.379434907Z",

        "End": "2025-03-27T17:53:13.457976562Z",

        "ExitCode": 0,

        "Output": ""

      },

      {

        "Start": "2025-03-27T17:53:23.459676361Z",

        "End": "2025-03-27T17:53:23.55573477Z",

        "ExitCode": 0,

        "Output": ""

      }

    ]

  }

},

"Image":
"sha256:5d694fa81d1188eb1537b5676516dc874eec2eba0a213fb5c2d812274f6323d0",
```

"ResolvConfPath":
"/var/lib/docker/containers/56039dadcc6151fdbea08fadd3dabfd1906f1979749ec17ebc08b
a6cfe313180/resolv.conf",

"HostnamePath":
"/var/lib/docker/containers/56039dadcc6151fdbea08fadd3dabfd1906f1979749ec17ebc08b
a6cfe313180/hostname",

"HostsPath":
"/var/lib/docker/containers/56039dadcc6151fdbea08fadd3dabfd1906f1979749ec17ebc08b
a6cfe313180/hosts",

"LogPath":
"/var/lib/docker/containers/56039dadcc6151fdbea08fadd3dabfd1906f1979749ec17ebc08b
a6cfe313180/56039dadcc6151fdbea08fadd3dabfd1906f1979749ec17ebc08ba6cfe313180-
json.log",

"Name": "/elasticsearch_cont",

"RestartCount": 0,

"Driver": "overlay2",

"Platform": "linux",

"MountLabel": "",

"ProcessLabel": "",

"AppArmorProfile": "docker-default",

"ExecIDs": null,

"HostConfig": {

    "Binds": null,

    "ContainerIDFile": "",

    "LogConfig": {

        "Type": "json-file",

        "Config": {}

    },

    "NetworkMode": "tanishyelgoe777_app-network",

    "PortBindings": {},

    "RestartPolicy": {

```json
    "Name": "no",
    "MaximumRetryCount": 0
},
"AutoRemove": false,
"VolumeDriver": "",
"VolumesFrom": null,
"ConsoleSize": [
    0,
    0
],
"CapAdd": null,
"CapDrop": null,
"CgroupnsMode": "host",
"Dns": null,
"DnsOptions": null,
"DnsSearch": null,
"ExtraHosts": [],
"GroupAdd": null,
"IpcMode": "private",
"Cgroup": "",
"Links": null,
"OomScoreAdj": 0,
"PidMode": "",
"Privileged": false,
"PublishAllPorts": false,
"ReadonlyRootfs": false,
"SecurityOpt": null,
"UTSMode": "",
```

"UsernsMode": "",

"ShmSize": 67108864,

"Runtime": "runc",

"Isolation": "",

"CpuShares": 0,

"Memory": 0,

"NanoCpus": 0,

"CgroupParent": "",

"BlkioWeight": 0,

"BlkioWeightDevice": null,

"BlkioDeviceReadBps": null,

"BlkioDeviceWriteBps": null,

"BlkioDeviceReadIOps": null,

"BlkioDeviceWriteIOps": null,

"CpuPeriod": 0,

"CpuQuota": 0,

"CpuRealtimePeriod": 0,

"CpuRealtimeRuntime": 0,

"CpusetCpus": "",

"CpusetMems": "",

"Devices": null,

"DeviceCgroupRules": null,

"DeviceRequests": null,

"MemoryReservation": 0,

"MemorySwap": 0,

"MemorySwappiness": null,

"OomKillDisable": false,

"PidsLimit": null,

"Ulimits": null,

"CpuCount": 0,

"CpuPercent": 0,

"IOMaximumIOps": 0,

"IOMaximumBandwidth": 0,

"Mounts": [

  {

    "Type": "volume",

    "Source": "tanishyelgoe777_esdata",

    "Target": "/usr/share/elasticsearch/data",

    "VolumeOptions": {}

  }

],

"MaskedPaths": [

  "/proc/asound",

  "/proc/acpi",

  "/proc/kcore",

  "/proc/keys",

  "/proc/latency_stats",

  "/proc/timer_list",

  "/proc/timer_stats",

  "/proc/sched_debug",

  "/proc/scsi",

  "/sys/firmware",

  "/sys/devices/virtual/powercap"

],

"ReadonlyPaths": [

  "/proc/bus",

```
        "/proc/fs",

        "/proc/irq",

        "/proc/sys",

        "/proc/sysrq-trigger"

    ]

},

"GraphDriver": {

    "Data": {

        "LowerDir":
"/var/lib/docker/overlay2/7408c9228a3270630f4b98f1cec98613a18c62df9bb5bb2e47193d
3d94f2b8f1-
init/diff:/var/lib/docker/overlay2/992ff44eae14cacba6698043b3eede7763eded2560c86bc5
ed59ef205048a4a6/diff:/var/lib/docker/overlay2/14c9bf1708f0ddac0ff27226a8fc5c754119f
eaceba41d6681b5d0ab3fadb82b/diff:/var/lib/docker/overlay2/36c12607a51d4c79fe87b0d7
cadfce9fa49a8bfd0e4fbc28c98d9f24c6b43e9d/diff:/var/lib/docker/overlay2/99058a3b7f645
c501721e380ae5a22bfb75a6a0d23ad1d6936f56e4f87d6b6bf/diff:/var/lib/docker/overlay2/
49b63c46c8b70c1bd476bf774c45bd9bfb11cb25db03bde50e8c3c8024a3984f/diff:/var/lib/d
ocker/overlay2/053d075961cfc925c74906c8fa4cd8bee76cad62b951c1e029745268c4543e1
a/diff:/var/lib/docker/overlay2/660069678b8f94e2efe32ad3b78918578d34f065fed0dc402e
e18e03fee024f7/diff:/var/lib/docker/overlay2/2f76796217df9f5d643aa92d181503cd8860d2
1b7ccba5d823e88da401b473d9/diff:/var/lib/docker/overlay2/29b4958a5b6759ea7f2fe120
9f4b8e5c3a66efaa5e2cf61440ba7ce3b45adc78/diff:/var/lib/docker/overlay2/c3265fd263b5
6bb525f538001730f819bdb086212404251f02fe4b10405f838c/diff",

        "MergedDir":
"/var/lib/docker/overlay2/7408c9228a3270630f4b98f1cec98613a18c62df9bb5bb2e47193d
3d94f2b8f1/merged",

        "UpperDir":
"/var/lib/docker/overlay2/7408c9228a3270630f4b98f1cec98613a18c62df9bb5bb2e47193d
3d94f2b8f1/diff",

        "WorkDir":
"/var/lib/docker/overlay2/7408c9228a3270630f4b98f1cec98613a18c62df9bb5bb2e47193d
3d94f2b8f1/work"

    },

    "Name": "overlay2"
```

```
    },
    "Mounts": [
        {
            "Type": "volume",
            "Name": "tanishyelgoe777_esdata",
            "Source": "/var/lib/docker/volumes/tanishyelgoe777_esdata/_data",
            "Destination": "/usr/share/elasticsearch/data",
            "Driver": "local",
            "Mode": "z",
            "RW": true,
            "Propagation": ""
        }
    ],
    "Config": {
        "Hostname": "56039dadcc61",
        "Domainname": "",
        "User": "",
        "AttachStdin": false,
        "AttachStdout": true,
        "AttachStderr": true,
        "ExposedPorts": {
            "9200/tcp": {},
            "9300/tcp": {}
        },
        "Tty": false,
        "OpenStdin": false,
        "StdinOnce": false,
        "Env": [
```

                "discovery.type=single-node",

                "xpack.security.enabled=false",

                "ES_JAVA_OPTS=-Xms512m -Xmx512m",

"PATH=/usr/share/elasticsearch/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/b
in",

                "ELASTIC_CONTAINER=true"

            ],

            "Cmd": [

                "eswrapper"

            ],

            "Healthcheck": {

                "Test": [

                    "CMD-SHELL",

                    "curl -s -f http://localhost:9200/_cat/health >/dev/null || exit 1"

                ],

                "Interval": 10000000000,

                "Timeout": 5000000000,

                "StartPeriod": 30000000000,

                "Retries": 5

            },

            "Image": "docker.elastic.co/elasticsearch/elasticsearch:7.17.27",

            "Volumes": null,

            "WorkingDir": "/usr/share/elasticsearch",

            "Entrypoint": [

                "/bin/tini",

                "--",

                "/usr/local/bin/docker-entrypoint.sh"

            ],

"OnBuild": null,

"Labels": {

"com.docker.compose.config-hash": "ef4a2645465ad3e4373121c956ec7ec7d3880f66de1e611bacf91fe2faf85403",

"com.docker.compose.container-number": "1",

"com.docker.compose.depends_on": "",

"com.docker.compose.image": "sha256:5d694fa81d1188eb1537b5676516dc874eec2eba0a213fb5c2d812274f6323d0",

"com.docker.compose.oneoff": "False",

"com.docker.compose.project": "tanishyelgoe777",

"com.docker.compose.project.config_files": "/home/tanishyelgoe777/docker-compose-gcp.yml",

"com.docker.compose.project.working_dir": "/home/tanishyelgoe777",

"com.docker.compose.service": "elasticsearch",

"com.docker.compose.version": "2.34.0",

"org.label-schema.build-date": "2025-01-09T14:09:01.578835424Z",

"org.label-schema.license": "Elastic-License-2.0",

"org.label-schema.name": "Elasticsearch",

"org.label-schema.schema-version": "1.0",

"org.label-schema.url": "https://www.elastic.co/products/elasticsearch",

"org.label-schema.usage": "https://www.elastic.co/guide/en/elasticsearch/reference/index.html",

"org.label-schema.vcs-ref": "0f88dde84795b30ca0d2c0c4796643ec5938aeb5",

"org.label-schema.vcs-url": "https://github.com/elastic/elasticsearch",

"org.label-schema.vendor": "Elastic",

"org.label-schema.version": "7.17.27",

"org.opencontainers.image.created": "2025-01-09T14:09:01.578835424Z",

"org.opencontainers.image.documentation": "https://www.elastic.co/guide/en/elasticsearch/reference/index.html",

            "org.opencontainers.image.licenses": "Elastic-License-2.0",

            "org.opencontainers.image.ref.name": "ubuntu",

            "org.opencontainers.image.revision":
"0f88dde84795b30ca0d2c0c4796643ec5938aeb5",

            "org.opencontainers.image.source": "https://github.com/elastic/elasticsearch",

            "org.opencontainers.image.title": "Elasticsearch",

            "org.opencontainers.image.url": "https://www.elastic.co/products/elasticsearch",

            "org.opencontainers.image.vendor": "Elastic",

            "org.opencontainers.image.version": "7.17.27"

        }

    },
    "NetworkSettings": {

        "Bridge": "",

        "SandboxID":
"e13a7b040f11015f17f286e00f5a73d9293b17fec2712e4461643e05af45d027",

        "SandboxKey": "/var/run/docker/netns/e13a7b040f11",

        "Ports": {

            "9200/tcp": null,

            "9300/tcp": null

        },

        "HairpinMode": false,

        "LinkLocalIPv6Address": "",

        "LinkLocalIPv6PrefixLen": 0,

        "SecondaryIPAddresses": null,

        "SecondaryIPv6Addresses": null,

        "EndpointID": "",

        "Gateway": "",

        "GlobalIPv6Address": "",

        "GlobalIPv6PrefixLen": 0,

```json
            "IPAddress": "",

            "IPPrefixLen": 0,

            "IPv6Gateway": "",

            "MacAddress": "",

            "Networks": {

                "tanishyelgoe777_app-network": {

                    "IPAMConfig": null,

                    "Links": null,

                    "Aliases": [

                        "elasticsearch_cont",

                        "elasticsearch"

                    ],

                    "MacAddress": "02:42:ac:19:00:02",

                    "NetworkID":
"78abf6d3fa1ebb925809d94171d8f10a03d4e35bcf765aace85c948d1c08316d",

                    "EndpointID":
"67f404735842a56dd18ee80b229777a133f7057446d18d5666c23c163f802f1c",

                    "Gateway": "172.25.0.1",

                    "IPAddress": "172.25.0.2",

                    "IPPrefixLen": 16,

                    "IPv6Gateway": "",

                    "GlobalIPv6Address": "",

                    "GlobalIPv6PrefixLen": 0,

                    "DriverOpts": null,

                    "DNSNames": [

                        "elasticsearch_cont",

                        "elasticsearch",

                        "56039dadcc61"

                    ]
```

```
        }

      }

    }

  }
]
```

tanishyelgoe777@backendvm:~$

7D] FrontEnd Image

tanishyelgoe777@frontendvm:~$ docker inspect d9c56601880e

```
[

  {

    "Id":
"sha256:d9c56601880e179e8ebcb31b23652465c7da78960652385d6458d439df957c86",

    "RepoTags": [

      "tanishy7777/fastapi:1"

    ],

    "RepoDigests": [

"tanishy7777/fastapi@sha256:9bfdaa89a1259b025fbb581f2a4c9157e33367561f6e8d8156f
7ba52695b5cdf"

    ],

    "Parent": "",

    "Comment": "buildkit.dockerfile.v0",

    "Created": "2025-03-27T12:52:41.327096482Z",

    "DockerVersion": "",

    "Author": "",

    "Config": {

      "Hostname": "",

      "Domainname": "",

      "User": "",
```

"AttachStdin": false,

"AttachStdout": false,

"AttachStderr": false,

"ExposedPorts": {

    "9567/tcp": {}

},

"Tty": false,

"OpenStdin": false,

"StdinOnce": false,

"Env": [

    "PATH=/usr/local/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin",

    "LANG=C.UTF-8",

    "GPG_KEY=E3FF2839C048B25C084DEBE9B26995E310250568",

    "PYTHON_VERSION=3.9.21",

"PYTHON_SHA256=3126f59592c9b0d798584755f2bf7b081fa1ca35ce7a6fea980108d752a05bb1"

],

"Cmd": [

    "uvicorn",

    "main:app",

    "--host",

    "0.0.0.0",

    "--port",

    "9567"

],

"ArgsEscaped": true,

"Image": "",

"Volumes": null,

      "WorkingDir": "/app",

      "Entrypoint": null,

      "OnBuild": null,

      "Labels": {

         "com.docker.compose.project": "sttassignment8",

         "com.docker.compose.service": "frontend",

         "com.docker.compose.version": "2.30.3"

      }

   },

   "Architecture": "amd64",

   "Os": "linux",

   "Size": 167694056,

   "GraphDriver": {

      "Data": {

         "LowerDir":
"/var/lib/docker/overlay2/0727c94ffa11c8c310bea013e9cd6aa9299cbac6757b2516f2bbfab
bd32be5f7/diff:/var/lib/docker/overlay2/86a3f32d5714367a0da4a814e570e346a14524c29f
4b0135456cb9c305eadea4/diff:/var/lib/docker/overlay2/380280b7e72bdfc9efddfb18fe33a0
e10e1e0f6ec116527114bd2ff6766f6e3a/diff:/var/lib/docker/overlay2/6ff3e18d95314e3af69
7262443914b69785d816f3f969127b840971661b609fe/diff:/var/lib/docker/overlay2/2f16d5
980c6e14e730c425108973f02e0edab0aaa0961012cc4011dec0ad01c9/diff:/var/lib/docker/
overlay2/24fb65930ff3e22a0ee81eb96958e69f2aee16190b9be0e83edfa8921290a90d/diff:/
var/lib/docker/overlay2/c4bdeb6df308a0f226f40d8d379f20346967ef08d07c13b70ea6328b
b5e0a133/diff",

         "MergedDir":
"/var/lib/docker/overlay2/321e0dbde0b542e0f7cae278e2e4e9ca58ac01f2feb45e955d7bd4
71aa55be49/merged",

         "UpperDir":
"/var/lib/docker/overlay2/321e0dbde0b542e0f7cae278e2e4e9ca58ac01f2feb45e955d7bd4
71aa55be49/diff",

         "WorkDir":
"/var/lib/docker/overlay2/321e0dbde0b542e0f7cae278e2e4e9ca58ac01f2feb45e955d7bd4
71aa55be49/work"

```
        },
        "Name": "overlay2"
    },
    "RootFS": {
        "Type": "layers",
        "Layers": [

"sha256:1287fbecdfcce6ee8cf2436e5b9e9d86a4648db2d91080377d499737f1b307f3",

"sha256:140ec0aa8af03880fb53bce492a8630996d0f734c6cc329dc2d1e8ca1256dea9",

"sha256:04f6e4cfc28e74355ff17edb23937c7c385a8435406994499ee3f657745a2f1a",

"sha256:0796a33961efbdc069b7e0ba8533463c67e639c1134253f0e29ed70f04b74b2c",

"sha256:09956b80c1ec09ef3deda225729074816f5a4f84127ce668439c38dcd62f34ee",

"sha256:efc91753922bef1315f4ea3880e17b4fef0b281aa0786e6f3969915af45e68d2",

"sha256:2fb93163e4327b842bdbc71e7fd917f0529d33d032edbc8fdc5e557431ac10fa",

"sha256:af2ea3d2692082c0e604127b698d93bec5f8b9e40aaa9842aa90d2575c7b29c6"
        ]
    },
    "Metadata": {
        "LastTagTime": "0001-01-01T00:00:00Z"
    }
  }
]
```

7E] BackEnd Image

```
tanishyelgoe777@backendvm:~$ docker inspect aae0cd8b5ec6
```

```
[
    {
        "Id": "sha256:aae0cd8b5ec6e51b868a3d5eb677c183d5ff0a05b8c00ca7b964d02a9d4e8a46",
        "RepoTags": [
            "tanishy7777/fastapi:2"
        ],
        "RepoDigests": [

"tanishy7777/fastapi@sha256:96468f1b722a6f431229569d924c82f9e89f1242088595152830fd8a5b68da94"
        ],
        "Parent": "",
        "Comment": "buildkit.dockerfile.v0",
        "Created": "2025-03-27T13:20:40.252975503Z",
        "DockerVersion": "",
        "Author": "",
        "Config": {
            "Hostname": "",
            "Domainname": "",
            "User": "",
            "AttachStdin": false,
            "AttachStdout": false,
            "AttachStderr": false,
            "ExposedPorts": {
                "9567/tcp": {}
            },
            "Tty": false,
            "OpenStdin": false,
            "StdinOnce": false,
            "Env": [

"PATH=/usr/local/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin",
                "LANG=C.UTF-8",
                "GPG_KEY=E3FF2839C048B25C084DEBE9B26995E310250568",
                "PYTHON_VERSION=3.9.21",
                "PYTHON_SHA256=3126f59592c9b0d798584755f2bf7b081fa1ca35ce7a6fea980108d752a05bb1"
            ],
            "Cmd": [
                "uvicorn",
```

```
                    "main:app",

                    "--host",

                    "0.0.0.0",

                    "--port",

                    "9567"

                ],

                "ArgsEscaped": true,

                "Image": "",

                "Volumes": null,

                "WorkingDir": "/app",

                "Entrypoint": null,

                "OnBuild": null,

                "Labels": {

                    "com.docker.compose.project": "sttassignment8",

                    "com.docker.compose.service": "backend",

                    "com.docker.compose.version": "2.30.3"

                }

            },

            "Architecture": "amd64",

            "Os": "linux",

            "Size": 184454557,

            "GraphDriver": {

                "Data": {

                    "LowerDir":
"/var/lib/docker/overlay2/da977ae23adebf9ab496f1d0386079a9a8a35cf4b123bc7edac4dcacf3adf7ad/diff:
/var/lib/docker/overlay2/1638f86fc96d04d9d2bebea528147ea7f65ba613510a5e3d0b47366ade2b2794/diff:/
var/lib/docker/overlay2/5d269e6cb3929bce721f259a5de7df5cb0fb2c11983c4b84b1b39e26d69ef0bf/diff:/v
ar/lib/docker/overlay2/5a4fa4409ae13ed346f2553df4cf0827af36d584f80e06a25c6f6d45a45a04fa/diff:/va
r/lib/docker/overlay2/010aeda225c13927b1f4a35f3b36823c393ee0fcf253b53ec9af5185a5f4cc09/diff:/var
/lib/docker/overlay2/a06edacdb189bbc56951c5c8b460070f955e8e0484f8e0c6ddc3b602d68c68ec/diff:/var/
lib/docker/overlay2/fa8e31bbf857242fcd5856f0f681a1dd12148c2e12d6070a6a7e5cb87fa056f6/diff",

                    "MergedDir":
"/var/lib/docker/overlay2/beb0a9790acf2c41d136a8c20241b15ff42581b615ade3d699edd86ab3adad6a/merge
d",

                    "UpperDir":
"/var/lib/docker/overlay2/beb0a9790acf2c41d136a8c20241b15ff42581b615ade3d699edd86ab3adad6a/diff"
,

                    "WorkDir":
"/var/lib/docker/overlay2/beb0a9790acf2c41d136a8c20241b15ff42581b615ade3d699edd86ab3adad6a/work"

                },

                "Name": "overlay2"

            },
```

```
        "RootFS": {

            "Type": "layers",

            "Layers": [

                "sha256:1287fbecdfcce6ee8cf2436e5b9e9d86a4648db2d91080377d499737f1b307f3",

                "sha256:140ec0aa8af03880fb53bce492a8630996d0f734c6cc329dc2d1e8ca1256dea9",

                "sha256:04f6e4cfc28e74355ff17edb23937c7c385a8435406994499ee3f657745a2f1a",

                "sha256:0796a33961efbdc069b7e0ba8533463c67e639c1134253f0e29ed70f04b74b2c",

                "sha256:09956b80c1ec09ef3deda225729074816f5a4f84127ce668439c38dcd62f34ee",

                "sha256:743410bc9f762dccf63d63444474d8aafc6b5928028ea5f422188096fab0c81a4",

                "sha256:226ccaf0e6bf43ef85ff31c1b3d24c6824d72700c615e02f53d2646c439666a8",

                "sha256:c62184e68da7a4c1b11da8fe839c975c29c00b90e5b6a394a7ad1125faa38f7a"

            ]

        },

        "Metadata": {

            "LastTagTime": "0001-01-01T00:00:00Z"

        }

    }

]
```

7F] ElasticSearch Image

```
tanishyelgoe777@backendvm:~$ docker inspect 5d694fa81d11

[

    {

        "Id": "sha256:5d694fa81d1188eb1537b5676516dc874eec2eba0a213fb5c2d812274f6323d0",

        "RepoTags": [

            "docker.elastic.co/elasticsearch/elasticsearch:7.17.27"

        ],

        "RepoDigests": [

"docker.elastic.co/elasticsearch/elasticsearch@sha256:e3db87aef5d115408b36e3d5bbd309629100597462
910d6b5efec70fcfead22a"

        ],

        "Parent": "",

        "Comment": "buildkit.dockerfile.v0",

        "Created": "2025-01-09T14:15:17.365964648Z",

        "DockerVersion": "",

        "Author": "",

        "Config": {

            "Hostname": "",
```

```
"Domainname": "",
"User": "",
"AttachStdin": false,
"AttachStdout": false,
"AttachStderr": false,
"ExposedPorts": {
    "9200/tcp": {},
    "9300/tcp": {}
},
"Tty": false,
"OpenStdin": false,
"StdinOnce": false,
"Env": [

"PATH=/usr/share/elasticsearch/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
,
        "ELASTIC_CONTAINER=true"
],
"Cmd": [
    "eswrapper"
],
"ArgsEscaped": true,
"Image": "",
"Volumes": null,
"WorkingDir": "/usr/share/elasticsearch",
"Entrypoint": [
    "/bin/tini",
    "--",
    "/usr/local/bin/docker-entrypoint.sh"
],
"OnBuild": null,
"Labels": {
    "org.label-schema.build-date": "2025-01-09T14:09:01.578835424Z",
    "org.label-schema.license": "Elastic-License-2.0",
    "org.label-schema.name": "Elasticsearch",
    "org.label-schema.schema-version": "1.0",
    "org.label-schema.url": "https://www.elastic.co/products/elasticsearch",
```

```
                "org.label-schema.usage":
"https://www.elastic.co/guide/en/elasticsearch/reference/index.html",

                "org.label-schema.vcs-ref": "0f88dde84795b30ca0d2c0c4796643ec5938aeb5",

                "org.label-schema.vcs-url": "https://github.com/elastic/elasticsearch",

                "org.label-schema.vendor": "Elastic",

                "org.label-schema.version": "7.17.27",

                "org.opencontainers.image.created": "2025-01-09T14:09:01.578835424Z",

                "org.opencontainers.image.documentation":
"https://www.elastic.co/guide/en/elasticsearch/reference/index.html",

                "org.opencontainers.image.licenses": "Elastic-License-2.0",

                "org.opencontainers.image.ref.name": "ubuntu",

                "org.opencontainers.image.revision": "0f88dde84795b30ca0d2c0c4796643ec5938aeb5",

                "org.opencontainers.image.source": "https://github.com/elastic/elasticsearch",

                "org.opencontainers.image.title": "Elasticsearch",

                "org.opencontainers.image.url": "https://www.elastic.co/products/elasticsearch",

                "org.opencontainers.image.vendor": "Elastic",

                "org.opencontainers.image.version": "7.17.27"

            }
        },
        "Architecture": "amd64",
        "Os": "linux",
        "Size": 634087166,
        "GraphDriver": {
            "Data": {
                "LowerDir":
"/var/lib/docker/overlay2/14c9bf1708f0ddac0ff27226a8fc5c754119feaceba41d6681b5d0ab3fadb82b/diff:
/var/lib/docker/overlay2/36c12607a51d4c79fe87b0d7cadfce9fa49a8bfd0e4fbc28c98d9f24c6b43e9d/diff:/
var/lib/docker/overlay2/99058a3b7f645c501721e380ae5a22bfb75a6a0d23ad1d6936f56e4f87d6b6bf/diff:/v
ar/lib/docker/overlay2/49b63c46c8b70c1bd476bf774c45bd9bfb11cb25db03bde50e8c3c8024a3984f/diff:/va
r/lib/docker/overlay2/053d075961cfc925c74906c8fa4cd8bee76cad62b951c1e029745268c4543e1a/diff:/var
/lib/docker/overlay2/660069678b8f94e2efe32ad3b78918578d34f065fed0dc402ee18e03fee024f7/diff:/var/
lib/docker/overlay2/2f76796217df9f5d643aa92d181503cd8860d21b7ccba5d823e88da401b473d9/diff:/var/l
ib/docker/overlay2/29b4958a5b6759ea7f2fe1209f4b8e5c3a66efaa5e2cf61440ba7ce3b45adc78/diff:/var/li
b/docker/overlay2/c3265fd263b56bb525f538001730f819bdb086212404251f02fe4b10405f838c/diff",

                "MergedDir":
"/var/lib/docker/overlay2/992ff44eae14cacba6698043b3eede7763eded2560c86bc5ed59ef205048a4a6/merge
d",

                "UpperDir":
"/var/lib/docker/overlay2/992ff44eae14cacba6698043b3eede7763eded2560c86bc5ed59ef205048a4a6/diff"
,

                "WorkDir":
"/var/lib/docker/overlay2/992ff44eae14cacba6698043b3eede7763eded2560c86bc5ed59ef205048a4a6/work"

            },
            "Name": "overlay2"
```

```
        },
        "RootFS": {
            "Type": "layers",
            "Layers": [
                "sha256:fffe76c64ef2dee2d80a8bb3ad13d65d596d04a45510b1956a976a69215dae92",
                "sha256:31ca1434762aac97acc3176c64064a05283f45879c15203aacdda8c83918b4dc",
                "sha256:296cb615ba85360f76f7085299a6e67ec9fddee6dea8b63e861264b79bd090c2",
                "sha256:5f70bf18a086007016e948b04aed3b82103a36bea41755b6cddfaf10ace3c6ef",
                "sha256:270d30146daca9b1488457425153bbe685d969ced818790321b1f072a1c1090e",
                "sha256:5d3cf9ce41f1e3e544ed9264887a69fed51ffb305acccf1035249f49dff42faf",
                "sha256:cdf69d2f465d7cb3caf86c3f21cc9de8bdc46172881e8f0442fcd40042fdfc7d",
                "sha256:59d8da6549cd19dcb3deb3f5699b62759ded9839a9e679b24f6515ffa00cf7cf",
                "sha256:8869b00bf655e6ccd37b3c82844355d02fd6f54b5f101b1fd666a87c5787b7a2",
                "sha256:6ef00360d951588e6002e4b6b8be77da3e9c1cb2b22b29ed17cc835b830f4f3e"
            ]
        },
        "Metadata": {
            "LastTagTime": "0001-01-01T00:00:00Z"
        }
    }
]
```

8] VM Creation

← Create an instance   ⁺⁺ Create VM from...

- Machine configuration
  e2-custom-2-2048, asia-south1-a

- OS and storage
  Debian GNU/Linux 12 (bookworm)

- Data protection
  Snapshot schedules

- Networking
  1 network interface

- Observability
  Install Ops Agent

- Security

- Advanced

Operating system and stor

Name	fronten
Type	New ba
Size	10 GB
Snapshot schedule ⓘ	default-
License type ⓘ	Free
Image	🚫 Deb

Change

Additional disks

＋ Add new disk   ＋ Attach existi

Container ⓘ
Deploy a container image to this VM instance

Deploy container

Select an image or snapshot to create a boot disk; or attach an existing disk. Can't find what you're looking for? Explore hundreds of VM solutions in Marketplace ↗

Public images   Custom images   Snapshots   Archive Snapshots   Existing Disks

Operating system
Ubuntu ▼

Version *
Ubuntu 20.04 LTS ▼
x86/64, amd64 focal image built on 2025-03-13

Boot disk type *
Standard persistent disk ▼

Compare disk types

Size (GB) *
30

Provision between 10 and 65536 GB

⌄ Show advanced configuration

Select   Cancel

← Create an instance   ⁺⁺ Create VM from....

- Machine configuration
  e2-custom-2-2048, asia-south1-a

- OS and storage
  Ubuntu 20.04 LTS

- Data protection
  No backups

- Networking
  1 network interface

- Observability
  Install Ops Agent

- Security

- Advanced

Data protection

Protect your data against failures and errors. Learn more ↗

Back up your data

You can automate recurring backups through a backup plan or snapshot schedule. Learn more ↗

○ **Backup plan**
Back up the full VM. These immutable backups are secured by backup vault against accidental or malicious deletion. Managed by Backup and DR Service, a separate service from Compute Engine with independent certifications and accreditation. Learn more ↗

○ **Snapshot schedules**
Back up disks only. This provides foundational protection at a lower cost. Learn more ↗

⦿ **No backups**
Neither VM nor disks will be backed up. If data is deleted or corrupted for any reason, you won't be able to recover it.

Continuously replicate data for disaster protection

Cross-zone synchronous replication

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9] Architectural Diagram
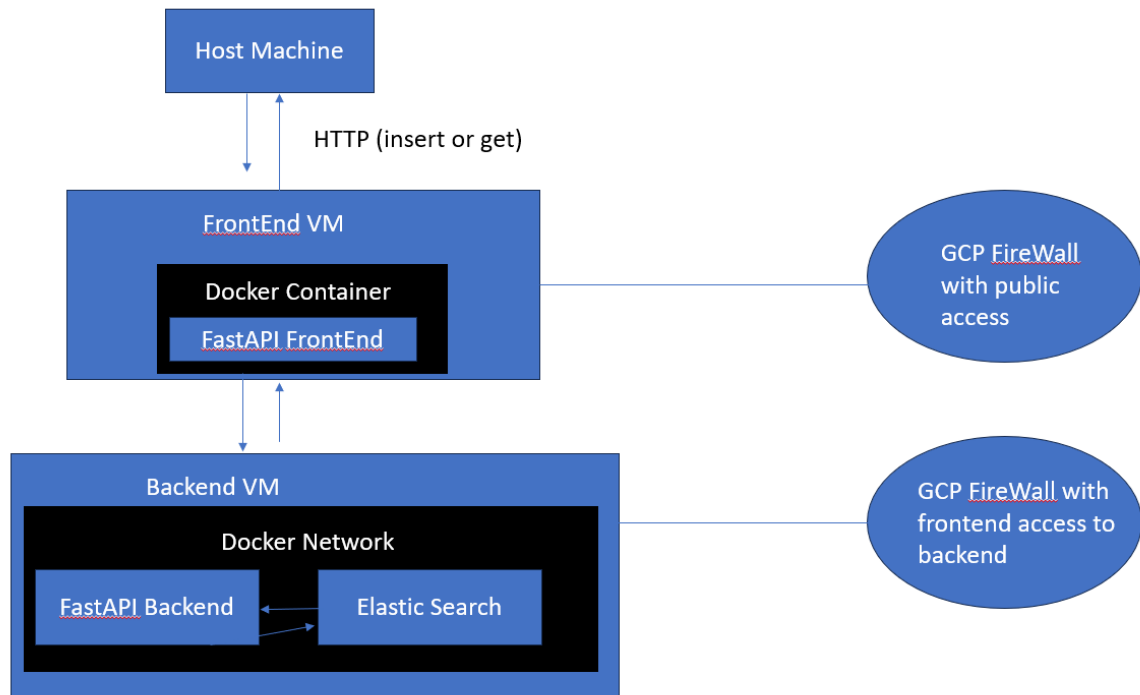
10] Optimization

1**. Use a Minimal Base Image**

Instead of using a heavyweight image like python:3.12, you might have chosen:

dockerfile

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FROM python:3.12-slim

This reduces image size by removing unnecessary tools

2. **Use --no-cache-dir for pip install**

dockerfile

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RUN pip install --no-cache-dir -r requirements.txt

Prevents unnecessary cache buildup.

3. **Use Docker Build Caching Properly**

Placed COPY requirements.txt . before COPY . . to leverage caching:

dockerfile

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COPY requirements.txt .

RUN pip install --no-cache-dir -r requirements.txt

COPY . .

This ensures dependencies are installed only when they change.