

CS203 Lab 8 Team 31 (Vansh Kumar 23110351) (Aditya Jain 23110016)

VM Instance Created

<input type="checkbox"/> Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input checked="" type="checkbox"/>	lab8-1	asia-south1-c			10.160.0.2 (nic0)	34.47.144.49 (nic0)	SSH ▾ ⋮

The codes in the screenshots below are the one which can be ran in the VM and the codes in the GitHub repository can be run locally

Github URL: <https://github.com/VanshOnGit/CS203--Assignment-8>

```
g23110351@lab8-1:~$ sudo apt update && sudo apt upgrade -y
Hit:1 http://asia-south1.gce.archive.ubuntu.com/ubuntu oracular InRelease
Hit:2 http://asia-south1.gce.archive.ubuntu.com/ubuntu oracular-updates InRelease
Hit:3 http://asia-south1.gce.archive.ubuntu.com/ubuntu oracular-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu oracular-security InRelease
Hit:5 https://packages.cloud.google.com/apt google-cloud-ops-agent-oracular-2 InRelease
1 package can be upgraded. Run 'apt list --upgradable' to see it.
Building dependency tree... 50%

g23110351@lab8-1:~$ sudo apt install -y docker-ce docker-ce-cli containerd.io
Installing:
  containerd.io  docker-ce  docker-ce-cli

Installing dependencies:
  docker-buildx-plugin  git  less  libgdbm6t64  libjansson4
  docker-ce-rootless-extras  git-man  liberror-perl  libip4tc2  libltdl7
  docker-compose-plugin  iptables  libgdbm-compat4t64  libip6tc2  libnetfilter-contrack

Suggested packages:
  cgroupfs-mount  git-daemon-run  git-doc  git-gui  gitweb  git-mediawiki  firewallld
  | cgroup-lite  | git-daemon-sysvinit  git-email  gitk  git-cvs  git-svn  gdbm-110n

Summary:
  Upgrading: 0, Installing: 28, Removing: 0, Not Upgrading: 1
  Download size: 135 MB
  Space needed: 521 MB / 27.4 GB available

Get:1 https://download.docker.com/linux/ubuntu oracular/stable amd64 containerd.io amd64 1.7.2
Get:2 https://download.docker.com/linux/ubuntu oracular/stable amd64 docker-buildx-plugin amd6
Get:3 http://asia-south1.gce.archive.ubuntu.com/ubuntu oracular/main amd64 perl-modules-5.38 a
```

```
g23110351@lab8-1:~$ docker --version
Docker version 28.0.2, build 0442a73
g23110351@lab8-1:~$
```

```

g23110351@lab8-1:~$ sudo apt install python3 python3-pip -y
python3 is already the newest version (3.12.6-0ubuntu1).
python3 set to manually installed.
Installing:
 python3-pip

Installing dependencies:
binutils binutils-common cpp-x86-64-linux-gnu gcc-14 gcc-14-x86-64-linux-gnu javascript-common libctf-nobfd0 libgprofng0 libmpc3
binutils-x86-64-linux-gnu dpkg-dev fakeroot gcc-x86-64-linux-gnu keyboxd libctf0 libbwasan0 libmpfr6
build-essential g++ gnupg gnupg-x86-64-linux-gnu libalgorithm-diff-perl libdpkg-perl libisl23 libpython3-dev
bzlib2 g++-14 gnupg-110n libalgorithm-diff-xs-perl libexpat1-dev libitm1 libpython3.12-dev
cpp g++-14-x86-64-linux-gnu gnupg-utilities libasan8 libfakeroot libjs-jquery libquadmath0
cpp-14 g++-x86-64-linux-gnu gpg-wks-client libbinutils libfile-fcntllock-perl libjs-sphinxdoc librsync1
cpp-14-x86-64-linux-gnu gcc gpgsm libcc1-0 libgcc-14-dev liblsan0 libstdc++-14-dev libtsan2

Suggested packages:
binutils-doc cpp-doc debconf gcc-14-doc automake bison gcc-14-multilib xloadimage | lighttpd libstdc++-14-doc
gprofng-gui gcc-14-locales g++-multilib gcc-multilib libtool gdb gdb-x86-64-linux-gnu gpg-wks-server | httpd make-doc
bzlib2-doc cpp-14-doc g++-14-multilib autoconf flex gcc-doc parcimonie apache2 bzip python3-setuptools

Summary:
Upgrading: 0, Installing: 64, Removing: 0, Not Upgrading: 1
Download size: 82.3 MB
Space needed: 296 MB / 26.9 GB available

Get:1 http://asia-south1.gce.archive.ubuntu.com/ubuntu oracular-updates/main amd64 binutils-common amd64 2.43.1-4ubuntu1.1 [244 kB]
Get:2 http://asia-south1.gce.archive.ubuntu.com/ubuntu oracular-updates/main amd64 libbwasan0 amd64 2.43.1-4ubuntu1.1 [15.2 kB]
Get:3 http://asia-south1.gce.archive.ubuntu.com/ubuntu oracular-updates/main amd64 libbinutils amd64 2.43.1-4ubuntu1.1 [580 kB]
Get:4 http://asia-south1.gce.archive.ubuntu.com/ubuntu oracular-updates/main amd64 libctf-nobfd0 amd64 2.43.1-4ubuntu1.1 [99.2 kB]
Get:5 http://asia-south1.gce.archive.ubuntu.com/ubuntu oracular-updates/main amd64 libctf0 amd64 2.43.1-4ubuntu1.1 [96.2 kB]
Get:6 http://asia-south1.gce.archive.ubuntu.com/ubuntu oracular-updates/main amd64 libgprofng0 amd64 2.43.1-4ubuntu1.1 [871 kB]
Get:7 http://asia-south1.gce.archive.ubuntu.com/ubuntu oracular-updates/main amd64 binutils-x86-64-linux-gnu amd64 2.43.1-4ubuntu1.1 [2507 kB]
$ [ 7 binutils-x86-64-linux-gnu 2056 B/2507 kB 0%]

```

Task 1

```

g23110351@lab8-1:~$ pip install fastapi uvicorn
Defaulting to user installation because normal site-packages is not writeable
Collecting fastapi
  Downloading fastapi-0.115.11-py3-none-any.whl (105 kB)
Collecting uvicorn
  Downloading uvicorn-0.34.0-py3-none-any.whl.metadata (10 kB)
Collecting starlette<0.47.0,>=0.40.0 (from fastapi)
  Downloading starlette-0.46.1-py3-none-any.whl (71 kB)
Collecting pydantic!=1.8,!=1.8.1,!=2.0.0,!=2.0.1 (from fastapi)
  Downloading pydantic-2.10.6-py3-none-any.whl.metadata (144 kB)
Requirement already satisfied: typing-extensions in /usr/local/lib/python3.12/dist-packages (from pydantic)
Requirement already satisfied: click>=7.0 in /usr/local/lib/python3.12/dist-packages (from uvicorn)
Collecting h11>=0.8 (from uvicorn)
  Downloading h11-0.14.0-py3-none-any.whl.metadata (8.1 kB)
Collecting annotated-types>=0.6.0 (from pydantic)
  Downloading annotated_types-0.7.0-py3-none-any.whl (11 kB)
Collecting pydantic-core==2.27.2 (from pydantic)

```

```

g23110351@lab8-1:~$ mkdir ~/lab08
g23110351@lab8-1:~$ cd ~/lab08
g23110351@lab8-1:~/lab08$

```

```

g23110351@lab8-1:~/lab08$ mkdir frontend && cd frontend
g23110351@lab8-1:~/lab08/frontend$

```

```

from fastapi import FastAPI
from fastapi.responses import HTMLResponse

app = FastAPI()

BACKEND_URL = "http://34.47.144.49:8000"

html_content = f"""
<!DOCTYPE html>
<html>
<head>
  <title>FastAPI Frontend</title>
  <script>
    async function search() {{
      let query = document.getElementById("query").value;
      if (!query) {{
        document.getElementById("output").innerText = "Please enter a search term.";
        return;
      }}
      try {{
        let response = await fetch(`${BACKEND_URL}/get?query=${{encodeURIComponent(query)}`);
        if (!response.ok) throw new Error("Failed to fetch data");

        let data = await response.json();
        document.getElementById("output").innerHTML = data.text ? `<p>${{data.text}}</p>` : data.message;
      }} catch (error) {{
        console.error("Error:", error);
        document.getElementById("output").innerText = "Error fetching data.";
      }}
    }}

    async function insert() {{
      try {{
        let response = await fetch(`${BACKEND_URL}/insert`, {{ method: "POST" }});
        if (!response.ok) throw new Error("Failed to insert data");

        let data = await response.json();
        document.getElementById("output").innerText = data.message;
      }} catch (error) {{
        console.error("Error:", error);
        document.getElementById("output").innerText = "Error inserting data.";
      }}
    }}
  </script>
</head>
<body>
  <h2>Search in Elasticsearch</h2>
  <input type="text" id="query" placeholder="Enter text">
  <button onclick="search()">Get</button>
  <button onclick="insert()">Insert</button>
  <div id="output"></div>
</body>
</html>
"""

@app.get("/", response_class=HTMLResponse)
def home():
    return html_content

```

Search in Elasticsearch

Enter text

Get

Insert

Task 2

```
g23110351@lab8-1:~/lab08$ ls
frontend
g23110351@lab8-1:~/lab08$ mkdir backend && cd backend
g23110351@lab8-1:~/lab08/backend$
```

```
g23110351@lab8-1:~/lab08/backend$ nano main.py
g23110351@lab8-1:~/lab08/backend$
```

```

BACKEND_URL = "http://10.10.10.100:8080"

html_content = """
<DOCTYPE html>
<html>
<head>
<title>{{url}} Frontend</title>
<script>
    async function search() {{
        let url = document.getElementById('query').value;
        if (query) {{
            document.getElementById('output').innerText = "Please enter a search term."
            return;
        }}
        try {{
            let response = await fetch(`${BACKEND_URL}/getQuery=${encodeURIComponent(query)}`);
            if (response.ok) throw new Error("Failed to fetch data");

            let data = await response.json();
            document.getElementById('output').innerHTML = `data: ${data} | ${JSON.stringify(data)} | ${data.message}`;
        }} catch (error) {{
            console.error("Error:", error);
            document.getElementById('output').innerText = "Error fetching data."
        }}
    }}

    async function insert() {{
        try {{
            let response = await fetch(`${BACKEND_URL}/insert`, {{ method: "POST" }});
            if (response.ok) throw new Error("Failed to insert data");

            let data = await response.json();
            document.getElementById('id').innerText = data.message;
        }} catch (error) {{
            console.error("Error:", error);
            document.getElementById('output').innerText = "Error inserting data."
        }}
    }}
</script>
</head>
<body>
<form>
    <input type="text" value="" id="query"/>
    <input type="button" value="Search" id="search"/>
    <input type="button" value="Insert" id="insert"/>
    <div id="output" style="margin-top: 10px; border: 1px solid #ccc; padding: 5px; min-height: 100px;">
```

```

TEST_CALLBACK_FUNC = "test_callback_callback_func"
INDEX_NAME = "Index"

def wait_for_elasticsearch():
    # as time
    for _ in range(10):
        es = Elasticsearch([host], [ELASTICSEARCH_PORT], request_timeout=10)
        if es.ping():
            print("Elasticsearch is ready")
            return es
        except Exception:
            print("Waiting for Elasticsearch...")
            time.sleep(1)
    raise Exception("Elasticsearch did not start in time")

es = wait_for_elasticsearch()

def create_index():
    if not es.indices.exists(index=INDEX_NAME):
        es.indices.create(
            index=INDEX_NAME,
            body={
                "mappings": {
                    "properties": {
                        "id": {"type": "keyword"},
                        "text": {"type": "text"}
                    }
                }
            }
        )

def on_event("startup"):
    create_index()

def get("/")
    return {}

def on_event("message")
    return {"message": "Backend is running with GMS!"}

def get("/{get}")
    def get_test_query(query: str):
        res = es.search(
            index=INDEX_NAME,
            body={"query": {"match": {"text": query}}},
            size=1
        )
    if not(INDEX_NAME):
        return {"message": "No relevant document found"}

```

[illegible]

```
g23110351@lab8-1:~/lab08/backend$ nano Dockerfile
g23110351@lab8-1:~/lab08/backend$
```

Frontend Dockerfile

```
FROM python:3.9

WORKDIR /app

COPY . /app

RUN pip install fastapi uvicorn

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

Backend Dockerfile

```
FROM python:3.9

WORKDIR /app

COPY . /app

RUN pip uninstall -y elasticsearch

RUN pip install "elasticsearch<8.0.0" fastapi uvicorn

CMD ["uvicorn", "main:app", "--host", "0.0.0.0", "--port", "8000"]
```

```
g23110351@lab8-1:~/lab08$ nano docker-compose.yml
g23110351@lab8-1:~/lab08$
```

```
services:
  elasticsearch:
    image: docker.elastic.co/elasticsearch/elasticsearch:7.10.1
    container_name: elasticsearch
    environment:
      - discovery.type=single-node
    ports:
      - "9200:9200"
    volumes:
      - elasticsearch-data:/usr/share/elasticsearch/data

  backend:
    build: ./backend
    container_name: backend
    depends_on:
      elasticsearch:
        condition: service_healthy
    restart: always
    ports:
      - "8000:8000"

  frontend:
    build: ./frontend
    ports:
      - "9567:9567"
    depends_on:
      - backend

volumes:
  elasticsearch-data:
```

```
g23110351@lab8-1:~/lab08$ docker compose up --build -d
WARN[0000] /home/g23110351/lab08/docker-compose.yml: the attribute 'version' is obsolete, it will be ignored, please remove it to avoid potential confusion
[+] Running 8/10
   ! elasticsearch [=====] 416.9MB / 438.7MB Pulling          9.9s
   ! e320e40c33f8 Extracting [=====] ] ...                  5.4s
   ✓ 05854002f9ce Download complete                          0.9s
   ✓ bbd0bc605f1c Download complete                          0.8s
   ✓ c007bcc2b672 Download complete                          4.6s
   ✓ ec0eb3aa67e9 Download complete                          1.7s
   ✓ d61875d70ca7 Download complete                          2.3s
   ✓ 06bd860c87c6 Download complete                          2.5s
   ✓ 5c275d95836d Download complete                          3.1s
   ✓ dcc04e1c3e42 Download complete                          3.4s
```

```
g23110351@lab8-1:~/lab08/backend$ docker compose up --build -d
WARN[0000] /home/g23110351/lab08/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 11.3s (10/10) FINISHED
=> [backend internal] load metadata for docker.io/library/python:3.9
=> => transferring Dockerfile: 197B
=> [backend internal] load metadata for docker.io/library/python:3.9
=> [backend internal] load .dockerignore
=> => transferring context: 2B
=> [backend 1/4] FROM docker.io/library/python:3.9@sha256:bc2e03bca83473050fc3b7c134c28ab22be73128ba1ce29517d9e8b7f3703b
=> [backend internal] load build context
=> => transferring context: 5.31kB
=> CACHED [backend 2/4] WORKDIR /app
=> [backend 3/4] COPY . /app
=> [backend 4/4] RUN pip install fastapi elasticsearch uvicorn
=> [backend] exporting to image
=> => exporting layers
=> => writing image sha256:c063814cc115949f5569bda61f0f44a943cc97e3e1640b16308eda0d1a7c0127
=> => naming to docker.io/library/lab08-backend
=> [backend] resolving provenance for metadata file
[+] Running 4/4
   ✓ backend      Build          0.0s
   ✓ Network lab08_default Created      0.1s
   ✓ Container elasticsearch Started      0.3s
   ✓ Container backend Started        0.4s
g23110351@lab8-1:~/lab08/backend$
```

Testing frontend

Insert

Search in Elasticsearch

Get

Insert

Documents inserted!

Get

Search in Elasticsearch

Get

Insert

During the early medieval period, Christianity, Islam, Judaism, and Zoroastrianism took root in India's coastal regions, while Muslim armies from Central Asia intermittently invaded the northern plains. The Delhi Sultanate integrated northern India into the broader Islamic world. In the south, the Vijayanagara Empire fostered a resilient Hindu culture. Sikhism emerged in Punjab, rejecting religious orthodoxy. The Mughal Empire, established in 1526, ushered in two centuries of relative peace and left behind a rich architectural heritage. The gradual expansion of British East India Company rule transformed India into a colonial economy while consolidating its territorial control. British Crown rule began in 1858, bringing slow political reforms, technological advancements, and modern education. A nationalist movement, driven by nonviolent resistance, played a decisive role in ending British rule in 1947. The British Indian Empire was then partitioned into two nations: India and Pakistan, resulting in mass migration and significant loss of life.

Search in Elasticsearch

Get

Insert

Modern humans arrived in the Indian subcontinent from Africa over 55,000 years ago. Their long period of isolation as hunter-gatherers contributed to high genetic diversity, second only to Africa. Settled life began in the western Indus River basin around 9,000 years ago, gradually evolving into the Indus Valley Civilization by the third millennium BCE. By 1200 BCE, an early form of Sanskrit, an Indo-European language, had spread into India from the northwest, influencing the emergence of Hinduism. The region's original Dravidian languages were gradually replaced in northern India. By 400 BCE, the caste system had emerged within Hinduism, while Buddhism and Jainism challenged hereditary social order. The Maurya and Gupta Empires brought early political unification and cultural advancements, but women's status declined, and untouchability became institutionalized. In South India, Dravidian kingdoms influenced Southeast Asia by exporting language scripts and religious traditions.

Search in Elasticsearch

Get

Insert

During the early medieval period, Christianity, Islam, Judaism, and Zoroastrianism took root in India's coastal regions, while Muslim armies from Central Asia intermittently invaded the northern plains. The Delhi Sultanate integrated northern India into the broader Islamic world. In the south, the Vijayanagara Empire fostered a resilient Hindu culture. Sikhism emerged in Punjab, rejecting religious orthodoxy. The Mughal Empire, established in 1526, ushered in two centuries of relative peace and left behind a rich architectural heritage. The gradual expansion of British East India Company rule transformed India into a colonial economy while consolidating its territorial control. British Crown rule began in 1858, bringing slow political reforms, technological advancements, and modern education. A nationalist movement, driven by nonviolent resistance, played a decisive role in ending British rule in 1947. The British Indian Empire was then partitioned into two nations: India and Pakistan, resulting in mass migration and significant loss of life.

Documentation

Uploading image created for all the 3 tasks in the docker hub (It should be public). Name the images as fastapi:1, fastapi:2, elastic search for task 1, task 2, and task 3, respectively.

```
>docker images
REPOSITORY          TAG          IMAGE ID          CREATED           SIZE
stt_assignment_8-backend   latest      52cb6979798a     9 minutes ago    1.5GB
stt_assignment_8-frontend latest      8550bd4c8586     14 hours ago    1.49GB
fastapi              1          75d6810ff8d5     8 days ago      222MB
jaegertracing/all-in-one 1.41       a4f4e5734320     2 years ago     94.8MB
jaegertracing/all-in-one 1.22       ca6b73330616     4 years ago     80.3MB
docker.elastic.co/elasticsearch/elasticsearch 7.10.1     5d8f1962907e     4 years ago     1.24GB
```

```
>docker tag stt_assignment_8-frontend vanshondocker/fastapi:1
>docker tag stt_assignment_8-backend vanshondocker/fastapi:2
>docker tag docker.elastic.co/elasticsearch/elasticsearch:7.10.1 vanshondocker/elasticsearch
```

```
>docker push vanshondocker/fastapi:1
The push refers to repository [docker.io/vanshondocker/fastapi]
```

```
>docker push vanshondocker/fastapi:2
The push refers to repository [docker.io/vanshondocker/fastapi]
```

```
>docker push vanshondocker/elasticsearch
Using default tag: latest
The push refers to repository [docker.io/vanshondocker/elasticsearch]
```

Provide a Link for the the uploaded images on docker hub.

Fastapi1: <https://hub.docker.com/repository/docker/vanshondocker/fastapi/tags/1/sha256-7534373ad5a111f5b8065aa50accada6751c74b4c26bc27804ff32cdd44e725b>

Fastapi2: <https://hub.docker.com/repository/docker/vanshondocker/fastapi/tags/2/sha256-1e162200a47cd48ae777e784dbf0de129339ef8ef6df0ea3006caef722389282>

Elastic: <https://hub.docker.com/repository/docker/vanshondocker/elasticsearch/tags/latest/sha256-2e84f1c41cb195231734df217d99b64424d13a522f43450bef243a1087166a6a>

GoogleDrive public link for “dockerfile” used to create images for all three tasks:

https://drive.google.com/drive/folders/1fS8zdagc4cThNqGRd3AcXpD_DZuUZHRI?usp=sharing

Screenshot of “netstat -antp | grep LISTEN” on Base Linux OS, where the container is running.

```
>netstat -antp | grep LISTEN
Netid      State      Recv-Q      Send-Q      Local Address:Port      Peer Address:Port
udp        UNCONN     0            0            127.0.0.11:36886        0.0.0.0:*
tcp        LISTEN     0            4096        127.0.0.11:36817        0.0.0.0:*
tcp        LISTEN     0            4096        *:9288                  *:*
```


Screenshot of "docker images"

```
>docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
stt_assignment_8-backend	latest	52cb6979798a	11 hours ago	1.5GB
vanshondocker/fastapi	2	52cb6979798a	11 hours ago	1.5GB
stt_assignment_8-frontend	latest	8550bd4c8586	26 hours ago	1.49GB
vanshondocker/fastapi	1	8550bd4c8586	26 hours ago	1.49GB
fastapi	1	75d6810ff8d5	9 days ago	222MB
jaegertracing/all-in-one	1.41	a4f4e5734320	2 years ago	94.8MB
jaegertracing/all-in-one	1.22	ca6b73330616	4 years ago	80.3MB
docker.elastic.co/elasticsearch/elasticsearch	7.10.1	5d8f1962907e	4 years ago	1.24GB
vanshondocker/elasticsearch	latest	5d8f1962907e	4 years ago	1.24GB

Screenshot when testing both get and insert query. Then stop and delete all three 3 containers and run it again, showing that the inserted query still exists. (It must been shown clearly before that the get query output is different compared to when it has been inserted later)

- Testing GET

```
>curl "http://localhost:8000/get?query=india"
{"id": "3", "text": "During the early medieval period, Christianity, Islam, Judaism, and Zoroastrianism took root in India's coastal regions, while Muslim armies from Central Asia intermittently invaded the northern plains. The Delhi Sultanate integrated northern India into the broader Islamic world. In the south, the Vijayanagara Empire fostered a resilient Hindu culture. Sikhism emerged in Punjab, rejecting religious orthodoxy. The Mughal Empire, established in 1526, ushered in two centuries of relative peace and left behind a rich architectural heritage. The gradual expansion of British East India Company rule transformed India into a colonial economy while consolidating its territorial control. British Crown rule began in 1858, bringing slow political reforms, technological advancements, and modern education. A nationalist movement, driven by nonviolent resistance, played a decisive role in ending British rule in 1947. The British Indian Empire was then partitioned into two nations: India and Pakistan, resulting in mass migration and significant loss of life."}
```

- Testing INSERT

```
>curl -X POST http://localhost:8000/insert
{"message": "Documents inserted!"}
```

- Testing GET after INSERT

```
>curl "http://localhost:8000/get?query=governed"
{"id": "4", "text": "Since becoming a federal republic in 1950, India has been governed through a democratic parliamentary system. It is a pluralistic, multilingual, and multi-ethnic society. Its population grew from 361 million in 1951 to over 1.4 billion in 2023. During this period, its nominal per capita income increased from $64 to $2,601, and its literacy rate rose from 16.6% to 74%. Once a largely impoverished country, India has transformed into a fast-growing economy and a major IT hub, with a growing middle class. Indian films and music have gained global influence. While the country has reduced poverty, economic inequality has risen. India is a nuclear-armed state with significant military expenditure and ongoing disputes over Kashmir with Pakistan and China. Socio-economic challenges include gender inequality, child malnutrition, and rising air pollution. India is one of the world's most biodiverse nations, with four biodiversity hotspots, and its wildlife has historically been protected by cultural and legal measures."}
```

- Stopping all Running Containers

```
>docker stop 56cbe7e1f549
56cbe7e1f549

>docker stop 7df2700d8d9e
7df2700d8d9e
```

- Removing all containers

```
>docker rm 3fc7ac9f56af
3fc7ac9f56af

>docker rm 56cbe7e1f549
56cbe7e1f549

>docker rm 7df2700d8d9e
7df2700d8d9e

>docker rm c6ac486b277e
c6ac486b277e
```

- All containers removed

```
>docker ps -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
--------------	-------	---------	---------	--------	-------	-------

- Starting everything again

```
>docker-compose up -d
[*] Running 3/3
✔Container elasticsearch           Healthy           16.5s
✔Container backend                 Started          16.7s
✔Container stt_assignment_8-frontend-1 Started          16.9s
```

- Checking if the inserted data still exists

curl "http://localhost:8080/get?que=governed" --id:"4","text":"Since becoming a federal republic in 1950, India has been governed through a democratic parliamentary system. It is a pluralist, multilingual, and multi-ethnic society. Its population grew from 361 million in 1951 to over 1.4 billion in 2023. During this period, its nominal per capita income increased from \$64 to \$2,681, and its literacy rate rose from 16.6% to 74%. Once a largely impoverished country, India has transformed into a fast-growing economy and a major IT hub, with a growing middle class. Indian films and music have gained global influence. While poverty and economic inequality have risen, India is a nuclear-armed state with significant military expenditure and ongoing disputes over Kashmir with Pakistan and China. Socio-economic challenges include gender inequality, child malnutrition, and rising air pollution. India is one of the world's most biodiverse nations, with four biodiversity hotspots, and its wildlife has historically been protected by cultural and legal measures."}]

Screenshot of “docker inspect” for all the 3 tasks, both container and images. (Give the whole output in the screenshot it is essential to verify whether the task was done properly or not)

```
>docker inspect backend
[
  {
    "Id": "0058a1f12e673016a74ba25c33804c680eea9d81eca2597e58e7902da713c6b9",
    "Created": "2025-03-27T14:37:17.53863693Z",
    "Path": "/uvicorn",
    "Args": [
      "main:app",
      "--host",
      "0.0.0.0",
      "--port",
      "8000"
    ],
    "State": {
      "Status": "running",
      "Running": true,
      "Paused": false,
      "Restarting": false,
      "OOMKilled": false,
      "Dead": false,
      "Pid": 21880,
      "ExitCode": 0,
      "Error": "",
      "StartedAt": "2025-03-27T14:37:33.919943603Z",
      "FinishedAt": "0001-01-01T00:00:00Z"
    },
    "Image": "sha256:52cb677979baac020fedb28aaa45cac14d96aa62276885305f8aa56b1b66ced",
    "ResolvedPath": "/var/lib/docker/containers/0058a1f12e673016a74ba25c33804c680eea9d81eca2597e58e7902da713c6b9/resolv.conf",
    "HostnamePath": "/var/lib/docker/containers/0058a1f12e673016a74ba25c33804c680eea9d81eca2597e58e7902da713c6b9/hostname",
    "HostsPath": "/var/lib/docker/containers/0058a1f12e673016a74ba25c33804c680eea9d81eca2597e58e7902da713c6b9/hosts",
    "LogPath": "/var/lib/docker/containers/0058a1f12e673016a74ba25c33804c680eea9d81eca2597e58e7902da713c6b9/json_log",
    "Name": "/backend",
    "RestartCount": 0,
    "Driver": "overlayfs",
    "Platform": "linux",
    "MountLabel": "",
    "ProcessLabel": "",
    "AppArmorProfile": "",
    "ExecIDs": null,
    "HostConfig": {
      "Binds": null,
      "ContainerIDFile": "",
      "LogConfig": {
        "Type": "json-file",
        "Config": {}
      }
    }
  }
]
```

[illegible]

```

>docker inspect stt_assignment_8-frontend-1
[
  {
    "Id": "6ab10feb24166c233b0e823c0ffcb627dd0e75100da08d68e40bc6aa0d6502a",
    "Created": "2025-03-27T14:37:17.638561552Z",
    "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": 21948,
      "ExitCode": 0,
      "Error": "",
      "StartedAt": "2025-03-27T14:37:34.269606865Z",
      "FinishedAt": "0001-01-01T00:00:00Z"
    },
    "Image": "sha256:8550bd4c85865d76eb355cb6dd5ab7affff1de569eb19bb82eb169b80aea43dd",
    "ResolvConfPath": "/var/lib/docker/containers/6ab10feb24166c233b0e823c0ffcb627dd0e75100da08d68e40bc6aa0d6502a/resolv.conf",
    "HostnamePath": "/var/lib/docker/containers/6ab10feb24166c233b0e823c0ffcb627dd0e75100da08d68e40bc6aa0d6502a/hostname",
    "HostsPath": "/var/lib/docker/containers/6ab10feb24166c233b0e823c0ffcb627dd0e75100da08d68e40bc6aa0d6502a/hosts",
    "LogPath": "/var/lib/docker/containers/6ab10feb24166c233b0e823c0ffcb627dd0e75100da08d68e40bc6aa0d6502a/6ab10feb24166c233b0e823c0ffcb627dd0e75100da08d68e40bc6aa0d6502a-json.log",
    "Name": "/stt_assignment_8-frontend-1",
    "RestartCount": 0,
    "Restart": "always",
    "Driver": "overlayfs",
    "Platform": "linux",
    "MountLabel": "",
    "ProcessLabel": "",
    "AppArmorProfile": "",
    "ExecIDs": null,
    "HostConfig": {
  }
}
]

```

Architecture Breakdown:

1. Frontend (FastAPI)

- Runs on port 9567.
- Sends API requests to the backend.
- Fetches and displays results in a web interface.

2. Backend (FastAPI)

- Runs on port 8000.
- Handles API requests from the frontend.
- Connects to Elasticsearch for data storage and retrieval.

3. Elasticsearch

- Runs on port 9200.
- Stores and indexes documents.
- Provides fast search capabilities for queries from the backend.

4. Docker & Containers

- Each service runs inside its own Docker container.
- Docker Compose manages dependencies and networking.