

## Team23

### Assignment 8

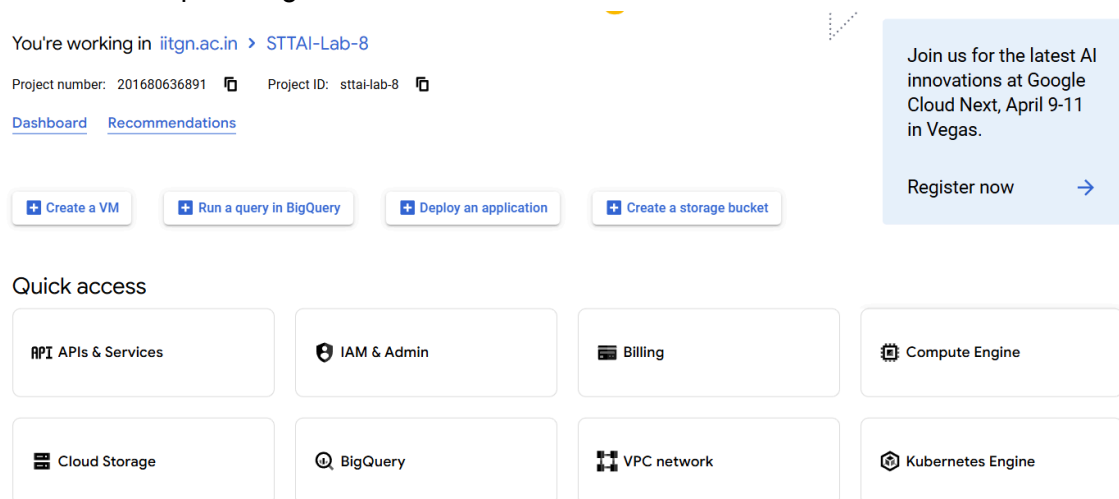
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**Github :** [https://github.com/samarth2015/CS203\\_Lab\\_8](https://github.com/samarth2015/CS203_Lab_8)

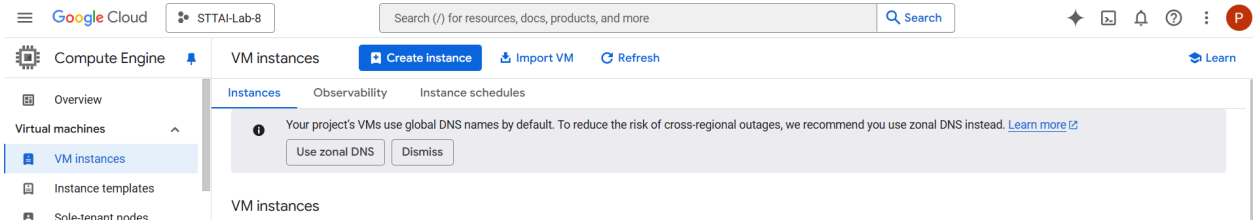
In this assignment we had to make 2 VMs, one on which our frontend will run and the second on which our backend will run, which comprises of Fastapi backend and elasticsearch. From the frontend the user will give get and insert query to the fastapi backend which will forward it to elasticsearch. From Get query we will get all the paragraphs which have a word similar to the word given in Get query and Insert query will store the the new paragraphs in the elasticsearch. The backend can't be accessed directly by frontend. Even after deleting the container we will be able to get the data inserted into elasticsearch before deleting, this is done by using docker volumes.

## VM Creation:

1. First Go to Compute Engine in the Console



2. Click on VM Instances and then click create Instance



3. In Machine Configuration click the region with low CO2 emission as it costs less and the give a name to your instance and then select a zone based on the region you have selected.

- Machine configuration
  - e2-medium, us-central1-a
- OS and storage
  - Debian GNU/Linux 12 (bookworm)
- Data protection
  - Snapshot schedules
- Networking
  - 1 network interface
- Observability
  - Install Ops Agent
- Security
- Advanced

### Machine configuration

Name \* frontend2

Region \* us-central1 (Iowa) Zone \* us-central1-a

Region is permanent Zone is permanent

☒ General purpose ☐ Compute optimized ☐ Memory optimized ☐ Storage optimized ☐ GPUs

Machine types for common workloads, optimized for cost and flexibility

Series	Description	vCPUs	Memory	CPU Platform
<input type="radio"/> C4	Consistently high performance	2 - 192	4 - 1,488 GB	Intel Emerald
<input type="radio"/> C4A	Arm-based consistently high performance	1 - 72	2 - 576 GB	Google Axion
<input type="radio"/> N4	Flexible & cost-optimized	2 - 80	4 - 640 GB	Intel Emerald
<input type="radio"/> C3	Consistently high performance	4 - 192	8 - 1,536 GB	Intel Sapphire
<input type="radio"/> C3D	Consistently high performance	4 - 360	8 - 2,880 GB	AMD Genoa
<input checked="" type="radio"/> E2	Low cost, day-to-day computing	0.25 - 32	1 - 128 GB	Intel Broadwell
<input type="radio"/> N2	Balanced price & performance	2 - 128	2 - 864 GB	Intel Cascade

### Monthly estimate

**\$25.46**  
That's about \$0.03 hourly

Pay for what you use: no upfront costs and per second billing

Item	Monthly estimate
2 vCPU + 4 GB memory	\$24.46
10 GB balanced persistent disk	\$1.00
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
<b>Total</b>	<b>\$25.46</b>

[Compute Engine pricing](#)  
[Cloud Operations pricing](#)

[Less](#)

4. Also select 2 cores and 3 GB Ram

**Cores**

2

32

2 vCPU  
(1 core)

☐ Shared core

**Memory**

1

16

3 GB

[Advanced configurations](#)

5. In OS and Storage, select Ubuntu as the OS and size as 30 GB.

- Machine configuration  
e2-medium, us-central1-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 storage

Name	frontend2
Type	New balanced persistent disk
Size	10 GB
Snapshot schedule	default-schedule-1
License type	Free
Image	Debian GNU/Linux 12 (bookworm)

[Change](#)

### Additional disks

[+ Add new disk](#)
[+ Attach existing disk](#)
[+ Add local SSD disk](#)

### Container

Deploy a container image to this VM instance

**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 \*  
Balanced persistent disk

[Compare disk types](#)

Size (GB) \*  
30  
Provision between 10 and 65536 GB

[Show advanced configuration](#)

## 6. In Networking select Allow HTTP Traffic and Allow HTTPS Traffic.

- Machine configuration  
e2-medium, us-central1-a
- OS and storage  
Ubuntu 20.04 LTS
- Data protection  
Snapshot schedules
- Networking**  
2 firewall rules, 1 network interface
- Observability  
Install Ops Agent
- Security
- Advanced

### Networking

#### Firewall

Add tags and firewall rules to allow specific network traffic from the Internet

☒ Allow HTTP traffic  
☒ Allow HTTPS traffic  
☐ Allow Load Balancer Health Checks

Network tags

Hostname

Set a custom hostname for this instance or leave it default. Choice is permanent

IP forwarding

☐ Enable

**Monthly estimate**

**\$27.46**  
That's about \$0.04 hourly  
Pay for what you use: no upfront costs and per second billing

Item	Monthly estimate
2 vCPU + 4 GB memory	\$24.46
30 GB balanced persistent disk	\$3.00
Logging	<a href="#">Cost varies</a>
Monitoring	<a href="#">Cost varies</a>
Snapshot schedule	<a href="#">Cost varies</a>
<b>Total</b>	<b>\$27.46</b>

[Compute Engine pricing](#)  
[Cloud Operations pricing](#)  
[Less](#)

## 7. In Advanced from VM Termination select Spot, as it will reduce your cost drastically.

- Machine configuration  
e2-medium, us-central1-a
- OS and storage  
Ubuntu 20.04 LTS
- Data protection  
Snapshot schedules
- Networking  
2 firewall rules, 1 network interface
- Observability  
Install Ops Agent
- Security
- Advanced**  
Spot

### Provisioning model

VM provisioning model  
Spot  
Determines how long your VMs will run. Choice is permanent

☐ Set a time limit for the VM  
☐ Gracefully shut down the VM

On VM termination  
Stop  
Choose what happens to your VM when it's preempted or reaches its time limit

On host maintenance  
Terminate VM instance  
When Compute Engine performs periodic infrastructure maintenance it can migrate your VM instances to other hardware without downtime

Host error timeout  
Unspecified (default)  
When the VM becomes unresponsive, it will terminate after this amount of time

Automatic restart  
Off  
Compute Engine can automatically restart VM instances if they are terminated for non-user-initiated reasons (maintenance event, hardware failure, software failure and so on)

**Monthly estimate**

**\$12.78**  
That's about \$0.02 hourly  
Pay for what you use: no upfront costs and per second billing

Item	Monthly estimate
2 vCPU + 4 GB memory	\$9.78
30 GB balanced persistent disk	\$3.00
Logging	<a href="#">Cost varies</a>
Monitoring	<a href="#">Cost varies</a>
Snapshot schedule	<a href="#">Cost varies</a>
<b>Total</b>	<b>\$12.78</b>

[Compute Engine pricing](#)  
[Cloud Operations pricing](#)  
[Less](#)

## 8. Click on create below. Thus we made the frontend VM instance, backend VM instance can be made in similar way.

## Building FastAPI1 (frontend)

```
root@frontend:~# docker build -t fastapi1 .
[+] Building 20.4s (9/9) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 224B
=> [internal] load metadata for docker.io/library/python:3.9-slim
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [1/4] FROM docker.io/library/python:3.9-slim@sha256:e52ca5f579cc58fed41efcbb55a0ed5dccf6c7a156cba76acfb4ab42fc19dd00
=> => resolve docker.io/library/python:3.9-slim@sha256:e52ca5f579cc58fed41efcbb55a0ed5dccf6c7a156cba76acfb4ab42fc19dd00
=> => sha256:e52ca5f579cc58fed41efcbb55a0ed5dccf6c7a156cba76acfb4ab42fc19dd00 10.41kB / 10.41kB
=> => sha256:246e088f8d9bae1efc1d3f0ab4a800616403520b3aec810f30e27cd9d69e0b4 1.75kB / 1.75kB
=> => sha256:bea3dea871787412b8fa17205b317e46dd3f37bdfb1952d6022290726219b9bc 5.28kB / 5.28kB
=> => sha256:6e909acdb790c5a1989d9cfc795fda5a246ad6664bb27b5c688e2b734b2c5fad 28.20MB / 28.20MB
=> => sha256:cec49b84de9df5777ee48546b2fd933b7ae87ec6746f4aa181d6893175331a21 3.51MB / 3.51MB
=> => sha256:dalcbe0d584f421af08256ce9d3d64b361a433126b700d76ac42c23da4259346 14.93MB / 14.93MB
=> => sha256:9a95d1744747ce9c4e854b9f5822065468265f57a58dae4d8fcec30f1e60216f 249B / 249B
=> => extracting sha256:6e909acdb790c5a1989d9cfc795fda5a246ad6664bb27b5c688e2b734b2c5fad
=> => extracting sha256:cec49b84de9df5777ee48546b2fd933b7ae87ec6746f4aa181d6893175331a21
=> => extracting sha256:dalcbe0d584f421af08256ce9d3d64b361a433126b700d76ac42c23da4259346
=> => extracting sha256:9a95d1744747ce9c4e854b9f5822065468265f57a58dae4d8fcec30f1e60216f
=> [internal] load build context
=> => transferring context: 1.62MB
=> [2/4] WORKDIR /app
=> [3/4] COPY . .
=> [4/4] RUN pip install --no-cache-dir requests fastapi[standard] uvicorn gunicorn
=> exporting to image
=> => exporting layers
=> => writing image sha256:c61da5bd0f8bd7455994221cdd105c4e275ad3505b8c5190b54ca1c17845dc40
=> => naming to docker.io/library/fastapi1
root@frontend:~#
```

```
root@frontend:~# docker images
REPOSITORY      TAG          IMAGE ID      CREATED        SIZE
fastapi1        latest      c61da5bd0f8b  29 seconds ago 183MB
```

```
root@frontend:~# docker run -d --name fastapi1 -p 9567:9567 fastapi1
62b39095d3b13d40a83c45f821016be368096fffd4e329199b47684c7658b51d9
```

## Backend docker-compose output

```
root@backend:~# docker compose -f 'docker-compose.yml' up -d --build
WARN[0000] /root/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 16.8s (10/10) FINISHED
=> [fastapi internal] load build definition from Dockerfile
=> => transferring dockerfile: 221B
=> [fastapi internal] load metadata for docker.io/library/python:3.9-slim
=> [fastapi internal] load .dockerignore
=> => transferring context: 2B
=> [fastapi 1/4] FROM docker.io/library/python:3.9-slim@sha256:e52ca5f579cc58fed41efcbb55a0ed5dccf6c7a156cba76acfb4ab42fc19dd00
=> [fastapi internal] load build context
=> => transferring context: 32.87kB
=> CACHED [fastapi 2/4] WORKDIR /app
=> [fastapi 3/4] COPY
=> [fastapi 4/4] RUN pip install --no-cache-dir fastapi[standard] elasticsearch requests
=> [fastapi] exporting to image
=> => exporting layers
=> => writing image sha256:e7d3bc9a5ed8a770890c8528ad0416b08cbd0579c118e97706beaad427f9fad2
=> => naming to docker.io/library/root-fastapi
=> [fastapi] resolving provenance for metadata file
[*] Running 3/3
✓ fastapi Built 0.0s
✓ Container elasticsearch Healthy 0.6s
✓ Container fastapi2 Started 0.9s
```

```
root@backend:~# docker images
REPOSITORY      TAG          IMAGE ID      CREATED        SIZE
root-fastapi    latest      e7d3bc9a5ed8  About a minute ago 196MB
```

## Uploading images to docker

```
root@frontend:~# docker tag fastapi1 praneeljoshi/myapp:latest
root@frontend:~# docker push praneeljoshi/myapp:latest
The push refers to repository [docker.io/praneeljoshi/myapp]
ce108be826a4: Pushed
478bd558c081: Pushed
6a028eb62d21: Pushed
0796a33961ef: Mounted from library/python
04f6e4cfc28e: Mounted from library/python
140ec0aa8af0: Mounted from library/python
1287fbecdfcc: Mounted from library/python
latest: digest: sha256:d5a5f693b8bf129b8b37ab6b36e6f0b3f0321115fc7f302b13aad4199216c52 size: 1788
root@frontend:~#
```

```
root@backend:~# docker tag bb20157f1390 samarthsonawane/elasticsearch:latest
root@backend:~# docker push samarthsonawane/elasticsearch:latest
The push refers to repository [docker.io/samarthsonawane/elasticsearch]
95f4bf0a4d9b: Pushed
2f5957218729: Pushed
5ed32b623b37: Pushed
2be7e20ae15d: Pushed
2a4d04e1b235: Pushed
ba3c6b8238d8: Pushed
5f70bf18a086: Mounted from tiangolo/uvicorn-gunicorn-fastapi
27b69f979d28: Pushed
d3fc620609ac: Pushed
954c82bdeb5f: Pushed
latest: digest: sha256:7aae8ab0a532acddfd9781476e0233c0a304cddce87264ce2e7f881c70ffdd42 size: 2410
root@backend:~#
```

```
root@backend:~# docker tag root-fastapi samarthsonawane/fastapi2:latest
root@backend:~# docker push samarthsonawane/fastapi2:latest
The push refers to repository [docker.io/samarthsonawane/fastapi2]
257ece61f328: Pushed
60e9b014868b: Pushed
21e554d9f6af: Pushed
0796a33961ef: Mounted from library/python
04f6e4cfc28e: Mounted from library/python
140ec0aa8af0: Mounted from library/python
1287fbecdfcc: Mounted from library/python
latest: digest: sha256:f86e3141aacb15217998022188be200b2961e398e92f0c46be819f96315e0966 size: 1788
root@backend:~#
```

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.

1. <https://hub.docker.com/repository/docker/samarthsonawane/elasticsearch/general>
2. <https://hub.docker.com/repository/docker/samarthsonawane/fastapi2/general>
3. <https://hub.docker.com/repository/docker/praneeljoshi/fastapi1/general>

## Public link for “dockerfile” used to create images for all three tasks

1. [https://github.com/samarth2015/CS203\\_Lab\\_8/blob/main/frontend/Dockerfile](https://github.com/samarth2015/CS203_Lab_8/blob/main/frontend/Dockerfile)
2. [https://github.com/samarth2015/CS203\\_Lab\\_8/blob/main/backend/Dockerfile](https://github.com/samarth2015/CS203_Lab_8/blob/main/backend/Dockerfile)

### Docker file code

#### Frontend

```
GNU nano 4.8
FROM python:3.9-slim
WORKDIR /app
COPY . .
RUN pip install --no-cache-dir requests fastapi[standard] uvicorn gunicorn
CMD ["uvicorn", "main:app", "--host", "0.0.0.0", "--port", "9567"]
```

#### Backend

```
GNU nano 4.8
FROM python:3.9-slim
WORKDIR /app
COPY . .
RUN pip install --no-cache-dir fastapi[standard] elasticsearch requests
CMD ["uvicorn", "main:app", "--host", "0.0.0.0", "--port", "9567"]
```

**Screenshot of what has been done to make FastAPI and ElasticSearch run on specific ports.**

Command used to run fastapi on given port (9567)

```
root@frontend:~# docker run -d --name fastapi1 -p 9567:9567 fastapi1
62b39095d3b13d40a83c45f821016be368096ffd4e329199b47684c7658b51d9
```

In the backend part, ports were mentioned in the docker-compose.yml file.

We ran both fastapi2 and elasticsearch on the same port i.e. 9567 using the nginx.conf.

```

GNU nano 4.8
events {}

http {
    server {
        listen 80;

        location /api/ {
            proxy_pass http://fastapi:9567/;
        }

        location /es/ {
            proxy_pass http://elasticsearch:9200/;
        }
    }
}

```

## netstat command ss

### FrontEnd

```

root@frontend:~# netstat -antp | grep LISTEN
tcp        0      0 0.0.0.0:20202        0.0.0.0:*            LISTEN      915/fluent-bit
tcp        0      0 0.0.0.0:9567         0.0.0.0:*            LISTEN      8443/docker-proxy
tcp        0      0 127.0.0.53:53       0.0.0.0:*            LISTEN      454/systemd-resolve
tcp        0      0 0.0.0.0:22         0.0.0.0:*            LISTEN      835/sshd: /usr/sbin
tcp6       0      0 :::20201            :::*                  LISTEN      889/otelopscol
tcp6       0      0 :::9567             :::*                  LISTEN      8449/docker-proxy
tcp6       0      0 :::22               :::*                  LISTEN      835/sshd: /usr/sbin

```

### Backend

```

root@backend:~# netstat -antp | grep LISTEN
tcp        0      0 0.0.0.0:20202        0.0.0.0:*            LISTEN      913/fluent-bit
tcp        0      0 0.0.0.0:9567         0.0.0.0:*            LISTEN      38453/docker-proxy
tcp        0      0 0.0.0.0:9200         0.0.0.0:*            LISTEN      37992/docker-proxy
tcp        0      0 127.0.0.53:53       0.0.0.0:*            LISTEN      457/systemd-resolve
tcp        0      0 0.0.0.0:22         0.0.0.0:*            LISTEN      833/sshd: /usr/sbin
tcp6       0      0 :::20201            :::*                  LISTEN      900/otelopscol
tcp6       0      0 :::9567             :::*                  LISTEN      38458/docker-proxy
tcp6       0      0 :::9200             :::*                  LISTEN      37998/docker-proxy
tcp6       0      0 :::22               :::*                  LISTEN      833/sshd: /usr/sbin
root@backend:~#

```

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)

## For Containers

### Frontend

```
root@frontend:~# docker inspect fastapi1
[
  {
    "Id": "5b468615c9e611602a2d1e3e48dcd5ff8354a20bd8f8d66cffd35867fec607a9",
    "Created": "2025-03-27T14:27:35.593822669Z",
    "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": 8417,
      "ExitCode": 0,
      "Error": "",
      "StartedAt": "2025-03-27T14:27:35.704018948Z",
      "FinishedAt": "0001-01-01T00:00:00Z"
    },
    "Image": "sha256:f3d960a0b27e62704dd563bca80ea96475c94ca0c942159a1f1d86582bb422a3",
    "ResolvConfPath": "/var/lib/docker/containers/5b468615c9e611602a2d1e3e48dcd5ff8354a20bd8f8d66cffd35867fec607a9/resolv.conf",
    "HostnamePath": "/var/lib/docker/containers/5b468615c9e611602a2d1e3e48dcd5ff8354a20bd8f8d66cffd35867fec607a9/hostname",
    "HostsPath": "/var/lib/docker/containers/5b468615c9e611602a2d1e3e48dcd5ff8354a20bd8f8d66cffd35867fec607a9/hosts",
    "LogPath": "/var/lib/docker/containers/5b468615c9e611602a2d1e3e48dcd5ff8354a20bd8f8d66cffd35867fec607a9/5b468615c9e611602a2d1e3e48dcd5ff8354a20bd8f8d66cffd35867fec607a9-json.log",
    "Name": "/fastapi1",
    "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": "no",
        "MaximumRetryCount": 0
      }
    }
  }
]
```



```
},
"AutoRemove": false,
"VolumeDriver": "",
"VolumesFrom": null,
"ConsoleSize": [
    46,
    194
],
"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": "",
"UsersnsMode": "",
"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/interrupts",
      "/proc/kmsg",
      "/proc/keys",
      "/proc/latency_stats",
      "/proc/timer_list",
      "/proc/timer_stats",
      "/proc/sockstat",
      "/proc/scsi",
      "/sys/timerstat",
      "/sys/devices/virtual/powercap"
    ],
    "ReadOnlyPaths": [
      "/proc/bus",
      "/proc/fs",
      "/proc/irq",
      "/proc/sys",
      "/proc/sysrq-trigger"
    ]
  },
  "graphDriver": {
    "Data": {
      "ID": "3b468615c9e61160a2d13c7f6d45f83542b0d8f1d6c7fd33867fc607a8",
      "OverlayDir": "/var/lib/docker/overlay2/fe347dd0b3c17ed6a95d001c243b194daa8f34458688c7e2b03ff324d66520-init/diff;/var/lib/docker/overlay2/yyfmlj8kb7cpat73attel8e01/diff;/var/lib/docker/overlay2/dwvzhmadmf444kmul3w6gmpp/diff;/var/lib/docker/overlay2/bk9tab2p0iwlwpc8dyag9grt/diff;/var/lib/docker/overlay2/92bd48f6f381996b8bbe7fd9d83bd19f7103a9a9aad2a225b8866422b050/diff;/var/lib/docker/overlay2/4446db947c47416772899443c48da12afda129056992600c343e01a7ed0a6/diff;/var/lib/docker/overlay2/ea33b842c86271ce3f427901b7f59224d8b8db17de907809966c7c3d3dd/diff;/var/lib/docker/overlay2/f136c8f68c3b73ce37d453d4d0c7461dc61e10f92c0990b73ede3c7f36a80/diff",
      "MergeDir": "/var/lib/docker/overlay2/fe347dd0b3c17ed6a95d001c243b194daa8f34458688c7e2b03ff324d66520/merged",
      "UpperDir": "/var/lib/docker/overlay2/fe347dd0b3c17ed6a95d001c243b194daa8f34458688c7e2b03ff324d66520/diff",
      "WorkDir": "/var/lib/docker/overlay2/fe347dd0b3c17ed6a95d001c243b194daa8f34458688c7e2b03ff324d66520/work"
    },
    "Name": "overlay2"
  },
  "Mounts": [],
  "Config": {
    "Hostname": "3b468615c9e6",
    "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=4730C048B25C084DEB889626995E310250568",
      "PYTHON_VERSION=3.9.21",
      "PYTHON_SHA256=3126f39592c9b0d798584755f2b47b081falc35ce7a6fee980108d752a05bb1"
    ]
  },
  "Cmd": [
    "uvicorn",

```

```

    "Cmd": [
      "uvicorn",
      "main:app",
      "--host",
      "0.0.0.0",
      "--port",
      "9567"
    ],
    "Image": "fastapi",
    "Volumes": null,
    "WorkingDir": "/app",
    "Entrypoint": null,
    "OnBuild": null,
    "Labels": {}
  },
  "NetworkSettings": {
    "Bridge": "",
    "SandboxID": "c86253203b8cffff1f2ce910081a9cb77df6110152c5c1ab92befcc914d828387",
    "SandboxKey": "/var/run/docker/netns/c86253203b8c",
    "Ports": {
      "9567/tcp": [
        {
          "HostIp": "0.0.0.0",
          "HostPort": "9567"
        },
        {
          "HostIp": ":",
          "HostPort": "9567"
        }
      ]
    },
    "HairpinMode": false,
    "LinkLocalIPv6Address": "",
    "LinkLocalIPv6PrefixLen": 0,
    "SecondaryIPAddresses": null,
    "SecondaryIPv6Addresses": null,
    "EndpointID": "1d820a5bdb5484ad548f7ad19f42d1da4be27993f013eb3d3dc13c9e4ff6afe4",
    "Gateway": "172.17.0.1",
    "GlobalIPv6Address": "",
    "GlobalIPv6PrefixLen": 0,
    "IPAddress": "172.17.0.2",
    "IPPrefixLen": 16,
    "IPv6Gateway": "",
    "MacAddress": "ca:6b:c9:ad:e5:1e",
    "Networks": {
      "bridge": {
        "IPAMConfig": null,
        "Links": null,
        "Aliases": null,
        "MacAddress": "ca:6b:c9:ad:e5:1e",
        "DriverOpts": null,
        "GwPriority": 0,
        "NetworkID": "c2ec747c0343ff620685e192199016001ae13f2864f6af7663dfa9ec9f09fffc5",
        "EndpointID": "1d820a5bdb5484ad548f7ad19f42d1da4be27993f013eb3d3dc13c9e4ff6afe4",
        "Gateway": "172.17.0.1",
        "IPAddress": "172.17.0.2",
        "IPPrefixLen": 16,
        "IPv6Gateway": "",

```

## Backend ElasticSearch

```
root@backendl-0:~# docker inspect elasticsearch
[
  {
    "Id": "eccd6ea524f5ed7b8e4e9a9642f6c6f88f568294c4b29ba348ed27a567baadd",
    "Created": "2025-03-27T14:24:49.992231252Z",
    "Path": "/bin/tini",
    "Args": [
      "-t",
      "/usr/local/bin/docker-entrypoint.sh",
      "eswrapper"
    ],
    "State": {
      "Status": "running",
      "Running": true,
      "Paused": false,
      "Restarting": false,
      "OOMKilled": false,
      "Dead": false,
      "Pid": 37960,
      "ExitCode": 0,
      "Error": "",
      "StartTime": "2025-03-27T14:24:50.217981782Z",
      "FinishedAt": "0001-01-01T00:00:00Z",
      "Health": {
        "Status": "healthy",
        "FailingStreak": 0,
        "Log": [
          {
            "Start": "2025-03-27T14:33:15.113844184Z",
            "End": "2025-03-27T14:33:15.182598252Z",
            "ExitCode": 0,
            "Output": " % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current\n                               Dload  Upload  Total  Spent  Left  Speed\nv\nr 0 0 0 0 0 0 0 0 0\nodes\\\";1,\"active_primary_shards\\\":1,\"active_shards\\\":1,\"relocating_shards\\\":0,\"initializing_shards\\\":0,\"unassigned_shards\\\":1,\"delayed_unassigned_shards\\\":0,\"number_of_pending_tasks\\\":0,\"number_of_in_flight_fetch\\\":0,\"task_max_wa\niting_in_queue_millis\\\":0,\"active_shards_percent_as_number\\\":50.0)\"",
          },
          {
            "Start": "2025-03-27T14:33:18.183558275Z",
            "End": "2025-03-27T14:33:18.256269374Z",
            "ExitCode": 0,
            "Output": " % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current\n                               Dload  Upload  Total  Spent  Left  Speed\nv\nr 0 0 0 0 0 0 0 0 0\nodes\\\";1,\"active_primary_shards\\\":1,\"active_shards\\\":1,\"relocating_shards\\\":0,\"initializing_shards\\\":0,\"unassigned_shards\\\":1,\"delayed_unassigned_shards\\\":0,\"number_of_pending_tasks\\\":0,\"number_of_in_flight_fetch\\\":0,\"task_max_wa\niting_in_queue_millis\\\":0,\"active_shards_percent_as_number\\\":50.0)\"",
          },
          {
            "Start": "2025-03-27T14:33:21.257228389Z",
            "End": "2025-03-27T14:33:21.324732567Z",
            "ExitCode": 0,
            "Output": " % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current\n                               Dload  Upload  Total  Spent  Left  Speed\nv\nr 0 0 0 0 0 0 0 0 0\nodes\\\";1,\"active_primary_shards\\\":1,\"active_shards\\\":1,\"relocating_shards\\\":0,\"initializing_shards\\\":0,\"unassigned_shards\\\":1,\"delayed_unassigned_shards\\\":0,\"number_of_pending_tasks\\\":0,\"number_of_in_flight_fetch\\\":0,\"task_max_wa\niting_in_queue_millis\\\":0,\"active_shards_percent_as_number\\\":50.0)\"",
          },
          {
            "Start": "2025-03-27T14:33:24.325945191Z",
            "End": "2025-03-27T14:33:24.38188139Z",
            "ExitCode": 0,
            "Output": " % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current\n                               Dload  Upload  Total  Spent  Left  Speed\nv\nr 0 0 0 0 0 0 0 0 0\nodes\\\";1,\"active_primary_shards\\\":1,\"active_shards\\\":1,\"relocating_shards\\\":0,\"initializing_shards\\\":0,\"unassigned_shards\\\":1,\"delayed_unassigned_shards\\\":0,\"number_of_pending_tasks\\\":0,\"number_of_in_flight_fetch\\\":0,\"task_max_wa\niting_in_queue_millis\\\":0,\"active_shards_percent_as_number\\\":50.0)\"",
          },
          {
            "Start": "2025-03-27T14:33:27.382694455Z",
            "End": "2025-03-27T14:33:27.45414344Z",
            "ExitCode": 0,
            "Output": " % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current\n                               Dload  Upload  Total  Spent  Left  Speed\nv\nr 0 0 0 0 0 0 0 0 0\nodes\\\";1,\"active_primary_shards\\\":1,\"active_shards\\\":1,\"relocating_shards\\\":0,\"initializing_shards\\\":0,\"unassigned_shards\\\":1,\"delayed_unassigned_shards\\\":0,\"number_of_pending_tasks\\\":0,\"number_of_in_flight_fetch\\\":0,\"task_max_wa\niting_in_queue_millis\\\":0,\"active_shards_percent_as_number\\\":50.0)\"",
          }
        ]
      },
      "Image": "sha256:b28157f1390eb7c638973436bf1fc7ca995186b445aac3638de8839d112cb",
      "ResolvConfPath": "/var/lib/docker/containers/eccd6ea524f5ed7b8e4e9a9642f6c6f88f568294c4b29ba348ed27a567baadd/resolv.conf",
      "HostnamePath": "/var/lib/docker/containers/eccd6ea524f5ed7b8e4e9a9642f6c6f88f568294c4b29ba348ed27a567baadd/hostname",
      "HostsPath": "/var/lib/docker/containers/eccd6ea524f5ed7b8e4e9a9642f6c6f88f568294c4b29ba348ed27a567baadd/hosts",
      "LogPath": "/var/lib/docker/containers/eccd6ea524f5ed7b8e4e9a9642f6c6f88f568294c4b29ba348ed27a567baadd/cccd6ea524f5ed7b8e4e9a9642f6c6f88f568294c4b29ba348ed27a567baadd-json.log",
      "Name": "/elasticsearch",
      "RestartCount": 0,
      "Driver": "overlay2",
      "Platform": "linux",
      "MountLabel": "",
      "ProcessLabel": "",
      "AppArmorProfile": "docker-default",
      "ExecIDs": null,
      "HostConfig": {
        "Binds": null,
        "ContainerIDFile": "",
        "LogConfig": {
          "Type": "json-file",
          "Config": {}
        },
        "NetworkMode": "root_mynetwork",
        "PortBindings": {
          "9200/tcp": []
        }
      }
    }
  }
]
```

```

    {
      "HostIp": "",
      "HostPort": "9200"
    }
  ],
  "RestartPolicy": {
    "Name": "no",
    "MaximumRetryCount": 0
  },
  "AutoRemove": false,
  "VolumeDriver": "",
  "VolumesFrom": null,
  "ConsoleSize": [
    0,
    0
  ],
  "CapAdd": null,
  "CapDrop": null,
  "CgroupnsMode": "host",
  "Oms": null,
  "OmsOptions": null,
  "OmsSearch": null,
  "ExtraHosts": [],
  "GroupAdd": null,
  "IpcMode": "private",
  "Cgroup": "",
  "Links": null,
  "OomScoreAdj": 0,
  "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,
  "PidLimit": null,
  "Ulimits": null,
  "CpuCount": 0,
  "CpuPercent": 0,
  "IOMaximumIops": 0,
  "IOMaximumBandwidth": 0,
  "MaskedPaths": [
    "/proc/asound",
    "/proc/acpi",
    "/proc/cpuinfo",
    "/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/i9g",
    "/proc/sys",
    "/proc/sysrq-trigger"
  ],
  "GraphDriver": {
    "Data": {
      "ID": "ecdc6ea524f5ed7b0e4e99642f6c6f08ff568294c4b290a340ed27a567ba6dd",
      "LowerDir": [
        "/var/lib/docker/overlay2/6080b0c11b22ed61478a23f1c0441b31bd291c3dxc609667400c39976226-init/diff:/var/lib/docker/overlay2/60dc94999fcd3d373baaf8f00c2422bb3ff6431fea8d555bd4dc4fbb624001/diff:/var/lib/docker/overlay2/63c058509e1f8414581c1ab2f8e646d6fcc260562e3885c766dbf46a976c65f/diff:/var/lib/docker/overlay2/23002444a293b9b5bdc77ba7f9d38fb0c8841a6045ab087433b763a2ef791/diff:/var/lib/docker/overlay2/8b1abc7e7f7a3e7757e3059881e9cc80538f09c6d5ff199d93c611b7815f7e/diff:/var/lib/docker/overlay2/bbdc43c68d7928ff148b6124d96c60a98a94098308a3752ee6b3233abc83d70e/diff:/var/lib/docker/overlay2/186fb40f38a1b51acbd1af9b42458b7b81dbfc2ff0961f7fb8803986887eac16/diff:/var/lib/docker/overlay2/0531886cae87ab69c36591077c6ceda4a4e7aa2d6d376fcc429feeb2470482c/diff:/var/lib/docker/overlay2/438c2890f438b38bd693bf762364fc69e4b530e189afb7a070d4cbedb3887/diff:/var/lib/docker/overlay2/c5ad7c1e67e82b51791d6e4df179be89ff5f26ecb9b9fed0b21924fb258de30/diff:/var/lib/docker/overlay2/27d3b9814c4fe7b97883ca7c18d7aeb027909002a702f4f5fa31b20b302266/diff"
      ]
    }
  }
}

```

```

    "MergedDir": "/var/lib/docker/overlay2/688ba8cc11b22dced614f8a23f1cd441b31bd291c3dac689667400c39976226/merged",
    "UpperDir": "/var/lib/docker/overlay2/688ba8cc11b22dced614f8a23f1cd441b31bd291c3dac689667400c39976226/diff",
    "WorkDir": "/var/lib/docker/overlay2/688ba8cc11b22dced614f8a23f1cd441b31bd291c3dac689667400c39976226/work"
  },
  "Name": "overlay2"
},
"Mounts": [],
"Config": {
  "Hostname": "ecd66ea524f5",
  "Domainname": "",
  "User": "1000:0",
  "AttachStdin": false,
  "AttachStdout": true,
  "AttachStderr": true,
  "ExposedPorts": {
    "9200/tcp": {},
    "9300/tcp": {}
  },
  "Ty": false,
  "OpenStdin": false,
  "StdinOnce": false,
  "Env": [
    "discovery.type=single-node",
    "xpack.security.enabled=false",
    "PATH=/usr/share/elasticsearch/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/sbin:/bin",
    "ELASTIC_CONTAINER=true"
  ],
  "Cmd": [
    "eswrapper"
  ],
  "Healthcheck": {
    "Test": [
      "CMD-SHELL",
      "curl -f http://localhost:9200/_cluster/health || exit 1"
    ],
    "Interval": "3000000000",
    "Retries": 10
  },
  "Image": "docker.elastic.co/elasticsearch/elasticsearch:8.10.2",
  "Volumes": null,
  "WorkingDir": "/usr/share/elasticsearch",
  "Entrypoint": [
    "/bin/tini",
    "...",
    "/usr/local/bin/docker-entrypoint.sh"
  ],
  "OnBuild": null,
  "Labels": {
    "com.docker.compose.config-hash": "af84aa262e615637fdbff1dc77ba7dca7c5b87feef6e334ed2e6cd459193",

```

```

    "com.docker.compose.container-number": "1",
    "com.docker.compose.depends_on": "",
    "com.docker.compose.image": "sha256:1b20157f1390e5b7c638973436fbc17ea995106b445aac3638de839d112ec",
    "com.docker.compose.oneoff": "false",
    "com.docker.compose.project": "root",
    "com.docker.compose.project.config_files": "/root/docker-compose.yml",
    "com.docker.compose.project.working_dir": "/root",
    "com.docker.compose.service": "elasticsearch",
    "com.docker.compose.version": "2.34.0",
    "org.label-schema.build-date": "2023-09-19T08:16:24.564900370Z",
    "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": "6d20d8ce62365be9b1ca96427de4622e970e9e",
    "org.label-schema.vcs-url": "https://github.com/elastic/elasticsearch",
    "org.label-schema.vendor": "Elastic",
    "org.label-schema.version": "8.10.2",
    "org.opencontainers.image.created": "2023-09-19T08:16:24.564900370Z",
    "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": "6d20d8ce62365be9b1ca96427de4622e970e9e",
    "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": "8.10.2"
  }
},
"NetworkSettings": {
  "Bridge": "",
  "SandBoxID": "19c478c849e47385d64e326e49c43f913c9c2ff19999b5de17acefe849a3d841",
  "SandBoxKey": "/var/run/docker/netns/19c478c849e4",
  "Ports": {
    "9200/tcp": [
      {
        "HostIp": "0.0.0.0",
        "HostPort": "9200"
      },
      {
        "HostIp": ":::",
        "HostPort": "9200"
      }
    ],
    "9300/tcp": null
  },
  "HairpinMode": false,

```

```
root@backend:~#
```

## Fastapi2

\*Rest

```

    "Name": "no",
    "MaximumRetryCount": 0
  },
  "AutoRemove": false,
  "VolumeDriver": "",
  "VolumesFrom": null,
  "ConsoleSize": [
    0,
    0
  ],
  "CapAdd": null,
  "CapDrop": null,
  "CgroupsMode": "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": "",
  "UsersMode": "",
  "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,
  "MaskedPaths": [
    "/proc/asound",
    "/proc/acpi",
    "/proc/interrupts",
    "/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/fts",
    "/proc/i9g",
    "/proc/sys",
    "/proc/sysrq-trigger"
  ]
},
"GraphDriver": {
  "Data": {
    "ID": "c54fab9becff8238eefdc50809f18f67df9899775812dd5c63dbb3822b93",
    "LowerDir": "/var/lib/docker/overlay2/93caf2bdbc6dcf14e96f8f4b768b163999b278c8968cbfd66257b927ceee9a1-init/diff:/var/lib/docker/overlay2/2gqrm1bhvut1ze74n960lyr0/diff:/var/lib/docker/overlay2/gu0ley2abuj5thg28eozaxcb/d1ff:/var/lib/docker/overlay2/f2vphszm6a8h25e087mdloz3/diff:/var/lib/docker/overlay2/9a3b1130cb6f729ff3183fc5feade331e919f724ab824cf8bdc284db378acfe/diff:/var/lib/docker/overlay2/69835e1f8d7cbc825913eec5282c1859c447d5688047865d3d291c3d4d18f5d/diff:/var/lib/docker/overlay2/843697fc1b42f88ccb2cab765e6998dcfb6c4f70ad6af6ccc79e143ec3148765/diff:/var/lib/docker/overlay2/913f8e7b9412c3bbd2b3cdf85a1e45e56806823b9c9b78851575f973f9e385b/diff",
    "MergedDir": "/var/lib/docker/overlay2/93caf2bdbc6dcf14e96f8f4b768b163999b278c8968cbfd66257b927ceee9a1/merged",
    "UpperDir": "/var/lib/docker/overlay2/93caf2bdbc6dcf14e96f8f4b768b163999b278c8968cbfd66257b927ceee9a1/diff",
    "WorkDir": "/var/lib/docker/overlay2/93caf2bdbc6dcf14e96f8f4b768b163999b278c8968cbfd66257b927ceee9a1/work"
  },
  "Name": "overlay2"
},
"Mounts": [],
"Config": {
  "Hostname": "c54fab9bece",

```





## For Images Frontend

```
root@frontend:~# docker inspect f3d960a0b27e
[
  {
    "Id": "sha256:f3d960a0b27e62704dd563bca80ea96475c94ca0c942159a1f1d86582bb422a3",
    "RepoTags": [
      "fastapi:latest"
    ],
    "RepoDigests": [],
    "Parent": "",
    "Comment": "Buildkit.dockerfile.v0",
    "Created": "2025-03-27T14:27:24.995604758Z",
    "DockerVersion": "",
    "Author": "",
    "Config": {
      "Hostname": "",
      "Domainname": "",
      "User": "",
      "AttachStdin": false,
      "AttachStdout": false,
      "AttachStderr": false,
      "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=33F93380C04825C084DEBE9B26999E310250568",
        "PYTHON_SHA256=3126f9592c9b0d798584755f2bf7b081fa1ca35ce7a6fea980108d752a05bb1"
      ],
      "Cmd": [
        "uvicorn",
        "main:app",
        "--host",
        "0.0.0.0",
        "--port",
        "9567"
      ],
      "ArgsEscaped": true,
      "Image": "",
      "Volume": null,
      "WorkingDir": "/app",
      "Entrypoint": null,
      "OnBuild": null,
      "Labels": null
    },
    "Architecture": "amd64",
    "Os": "linux",
    "Size": 183481361,
    "GraphDriver": {
      "Data": [
        {
          "LowerDir": "/var/lib/docker/overlay2/dmvszhmadf444km3lewgm3p/diff:/var/lib/docker/overlay2/bk9tab2p0v1wlpce8dyacp8rt/diff:/var/lib/docker/overlay2/929d248f6f381996b8bbe7fd0d83bd19f7103a5a89a4d2a225bf88f6422b050/diff:/var/lib/docker/overlay2/4446db947c47416772899443c48da12afda29056992680c3343e01ad76e80a6/diff:/var/lib/docker/overlay2/6a835b84a2c862741ee3f4277901b7759224d9b8db17de907809966c7f38d3d/diff:/var/lib/docker/overlay2/2f36c8f68c3b73cee57d4505d440e7461dc61e40f92c0990b95e4c6ff56800/diff",
          "UpperDir": "/var/lib/docker/overlay2/yfmlj8kb7rpat73attel8e01/merged",
          "WorkDir": "/var/lib/docker/overlay2/yfmlj8kb7rpat73attel8e01/diff",
          "WorkDir": "/var/lib/docker/overlay2/yfmlj8kb7rpat73attel8e01/work"
        }
      ]
    },
    "Name": "overlay2"
  },
  {
    "RootFS": {
      "Type": "layers",
      "Layers": [
        "sha256:1287fbecdfcfe6ee8cf2436e5b9e9d86a4648db2d91080377d499737f1b307f3",
        "sha256:140ec0aa8af03880fb53bce492a8630996d0f734c6cc329dc2d1e8ca1256dea9",
        "sha256:04f6e4cfc28e74355ff17edb23937c7c385a8435406994499ee3f657745a2f1a",
        "sha256:0796a33961efbdc069b7e0ba8533463c67e639c1134253f0e29ed70f04b74b2c",
        "sha256:6a028eb62d21bcaa8c4e8b15afbabe095c99a0b1ff83da9813c4f7cc795c4252",
        "sha256:3d06cef4602bc0fcl9c8fb894c37ad003506846223620c76cdfb42f6f9561e1",
        "sha256:e4a5de6dcabc8016d954ed0e8320306c9258e88a92069678413d139ccd6bd1acf"
      ]
    },
    "Metadata": {
      "LastTagTime": "2025-03-27T14:27:25.516836724Z"
    }
  }
]
```

# Backend

## Elastic Search

```
root@backend:~# docker inspect bb20157f1390
[
  {
    "Id": "sha256:bb20157f1390e5b7c638973436fbc1f7ea995106b445aac3630de0839d112ecb",
    "RepoTags": [
      "docker.elastic.co/elasticsearch/elasticsearch:8.10.2",
      "samarthsonawane/elasticsearch:latest"
    ],
    "RepoDigests": [
      "docker.elastic.co/elasticsearch/elasticsearch@sha256:d118fc05cfa714a4577731384ec8b08fe7e78c203a6949b0851e0f6ebe54b0af",
      "samarthsonawane/elasticsearch@sha256:7aa8abba532acd9f9781476e0233c0a304cdce87264ce2e77881c70f7dd42"
    ],
    "Parent": "",
    "Comment": "buildkit.dockerfile.v0",
    "Created": "2023-09-19T08:23:13.553811426Z",
    "DockerVersion": "",
    "Author": "",
    "Config": {
      "Hostname": "",
      "Domainname": "",
      "User": "1000:0",
      "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",
        "-s",
        "/usr/local/bin/docker-entrypoint.sh"
      ],
      "OnBuild": null,
      "Labels": {}
    }
  }
]
```

```

    "org.label-schema.build-date": "2023-09-19T08:16:24.564900370Z",
    "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": "6d20d08ce62365be9b1aca96427de4622e970e9e",
    "org.label-schema.vcs-url": "https://github.com/elastic/elasticsearch",
    "org.label-schema.vendor": "Elastic",
    "org.label-schema.version": "8.10.2",
    "org.opencontainers.image.created": "2023-09-19T08:16:24.564900370Z",
    "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": "6d20d08ce62365be9b1aca96427de4622e970e9e",
    "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": "8.10.2"
  },
  "Architecture": "amd64",
  "Os": "linux",
  "Size": 134128025,
  "GraphDriver": {
    "Data": {
      "lowerDir": "/var/lib/docker/overlay2/63c850e9b1f8d4145861cab27be646dfcc260562e3885ce766db46a976c65f/diff:/var/lib/docker/overlay2/23062444a293b19b5bdc77ba7f9d38fbc88a41a6045ad08743bf03a2ef791/diff:/var/lib/docker/overlay2/8b1abc7e7f7a3e757a38590b1decc8b380c65f199a93c6f11078157fe/diff:/var/lib/docker/overlay2/b08d41c0d87920f1f1806124d96c0a99a940830ba3752ee6b0233b0c83070e/diff:/var/lib/docker/overlay2/186fba0f38a151c6bdf19b42458b7b1d0fc2f4e961f08893868587feac16/diff:/var/lib/docker/overlay2/0531580ca87ab69c36591077c6cdadaa8c7aa206d576fcc429feeb2470482c/diff:/var/lib/docker/overlay2/438c2890f438b38cfbd6593bf762364fc69a0530e1893f6/a070d4cbeddb3887/diff:/var/lib/docker/overlay2/c5ad7c1e07e82bb179d6e4df17be089f5f26ec930b9fedb21924fb2580c30/diff:/var/lib/docker/overlay2/27d3b9814c4fe7097883ca7fc18a7aeb0279c9002a782f4f5f8a31b20b5b2266/diff",
      "mergedDir": "/var/lib/docker/overlay2/60dccc94999fcd3d3738aaf8f0062422bd03ff031feab0555b04dc4fbb624001/merged",
      "upperDir": "/var/lib/docker/overlay2/60dccc94999fcd3d3738aaf8f0062422bd03ff031feab0555b04dc4fbb624001/diff",
      "workDir": "/var/lib/docker/overlay2/60dccc94999fcd3d3738aaf8f0062422bd03ff031feab0555b04dc4fbb624001/work"
    },
    "Name": "overlay2"
  },
  "RootFS": {
    "Type": "layers",
    "Layers": [
      "sha256:954c82bdeb5fcc80094317528fa3fcbh1026aeff64f872527d35ec0b4343b84d",
      "sha256:d3fc620609ac2a4129616530b223fa57ffa7a8a6c4e00de26686ba61ee0c996",
      "sha256:27b69f979d2809d9f4d91790f6b271eea5370ef918a20e15d988a675692306a",
      "sha256:5f70bf18a0600701ce9480a4ac9b02f18330ea417520c0d0rfl80c366f",
      "sha256:b03c6a82350b0b007c0421334c7708a14c811c1ef13887c020a02076750810",
      "sha256:2a4d04e1b235ba668029ead12c96f063347496969030f14b3a06417b59ece",
      "sha256:2be7e20ae15d23ebae1b4f3c0232e280978802c93fcc596c9a5b2e5dbdfdc58",
      "sha256:5e03262b397efc37fd0cc824c409f0eecc015b79712e9310db0ed102217e",
      "sha256:2f59572187208642191799de081412756baec10ceda7125ae014f42525221e8c"
    ]
  }
}
```

```
      "org.label-schema.version": "8.10.2",
      "org.opencontainers.image.created": "2023-09-19T08:16:24.564900370Z",
      "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": "6d20dd8ce62365be9b1ac96427de4622e970e9e",
      "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": "8.10.2"
    }
  },
  "Architecture": "amd64",
  "Os": "linux",
  "Size": 1341208925,
  "GraphDriver": {
    "Data": {
      "LowerDir": "/var/lib/docker/overlay2/763c859b1f8d4145861cab2fbc646dfcc268562c385ce76d6b46a976c65f/diff:/var/lib/docker/overlay2/23002444a293b19650dc77ba7f9d38fbc88a41a6845abd007433bfb3a2ef791/diff:/var/lib/docker/overlay2/0b1abc7e7f7a3c7757e3059801e9cc80538f9c6d5f119493c6f11878157e/diff:/var/lib/docker/overlay2/b8dc43c8d7928ff148b6124d96c68a9a9400308a3752ee6b3233abc83d70e/diff:/var/lib/docker/overlay2/186fb40f38a1b51acbd1a199642458b7b81dbfc2f06961fb880398688f7eac16/diff:/var/lib/docker/overlay2/05318dce87ab69c36591077c6cdadaaa4e7aa2d6d376fcc429feeb2470482c/diff:/var/lib/docker/overlay2/438c2890f438b38cfbd693bf762364fc69e4b530e189afb7a070d4cbeddb3887/diff:/var/lib/docker/overlay2/c5ad7c1e7e7b2b1791d6e4d179be89f15726ecb93b9fedbb21924fb258de3b/diff:/var/lib/docker/overlay2/27d3b9814c4f679b7883ca7fc18a7aeb0279b9002a70274f5f8a31b20b5b2266/diff",
      "MergedDir": "/var/lib/docker/overlay2/60dccc94999fcd3d3730aaf8f0062422b0b3ff31fea8d555bd4dc4fb0624001/merged",
      "UpperDir": "/var/lib/docker/overlay2/60dccc94999fcd3d3730aaf8f0062422b0b3ff31fea8d555bd4dc4fb0624001/merged",
      "WorkDir": "/var/lib/docker/overlay2/60dccc94999fcd3d3730aaf8f0062422b0b3ff31fea8d555bd4dc4fb0624001/work"
    }
  },
  "Name": "overlay2"
},
"RootFS": {
  "Type": "layers",
  "Layers": [
    "sha256:954c82bdeb5fccc80094317528fa3fcb1026aeff64f872527d35ec9b4343b84d",
    "sha256:d3fcc20609ac2a4129616536b223fa57ffa7a86c4e00de26e86ba61ee0c990",
    "sha256:278d9f979d200b09f4d91708fb2f1ee5370e4918a2be15d98a6756923b6a",
    "sha256:5770bf13a00608781e948d84aed382183a36bea4175b6cddfa1dacc3cef",
    "sha256:ba3c6b823d08b5087c9421334cf78601dc811c1ef13887fa200c0207a750810",
    "sha256:2a404b1b235af608029eadc12c96f063347496969030f14b3a08417b59ece",
    "sha256:2bc7e2b0e15d230ee1b4f3a8232c28b077882c03fccdf96c9ab2a50b0f0c58",
    "sha256:5ed32b623b37f0c37f01d0c824c497f64ecc015a79712a931d0b0d1702117f",
    "sha256:2f595718729864219f17a9dea01412756baec10ceda7125ae614fd255221e8c",
    "sha256:95f4bf04d9ba8f169288e44c21485d49afc5ad1f769e7968d0ead4ebf7f83287"
  ]
},
"Metadata": {
  "LastTagTime": "2025-03-27T14:00:07.11690302Z"
}
}
}
root@backend:~#
```

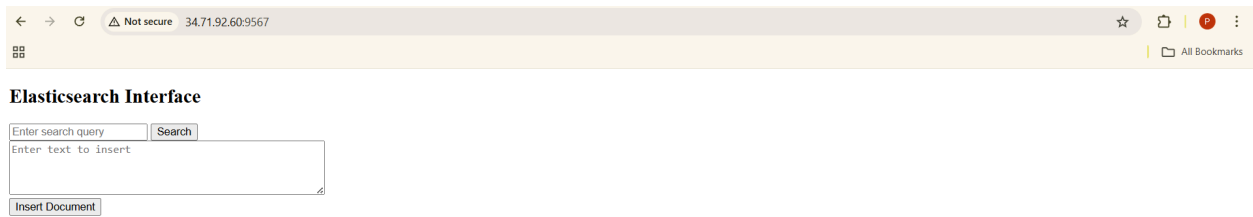
## Fastapi2

```
root@backend:~# docker inspect 010ebfcc333d
[
  {
    "Id": "sha256:010ebfcc333d2ea22773761cf070fa162f90bd5acfa32bc3770c1e6277770ff",
    "RepoTags": [
      "root-fastapi:latest",
      "samarthsonawane/fastapi2:latest"
    ],
    "RepoDigests": [
      "samarthsonawane/fastapi20sha256:33b85790ba93bc93b57197516c3b5bead6225b48bd31e635f25fc4114eedff4"
    ],
    "Parent": "",
    "Comment": "buildkit dockerfile v0",
    "Created": "2025-03-27T14:24:49.222304407Z",
    "DockerVersion": "",
    "Author": "",
    "Config": {
      "Hostname": "",
      "Domainname": "",
      "User": "",
      "AttachStdin": false,
      "AttachStdout": false,
      "AttachStderr": false,
      "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=E3FF2839C048825C884DEBE9B26995E310250568",
        "PYTHON_VERSION=3.9.21",
        "PYTHON_SHA256=3126f5952c9b0d798504755f2b7b081fa1ca35ce7a6fea980108d752a85bb1"
      ],
      "Cmd": [
        "uvicorn",
        "main:app",
        "--host",
        "0.0.0.0",
        "--port",
        "9507"
      ],
      "ArgsEscaped": true,
      "Image": "",
      "Volumes": null,
      "WorkingDir": "/app",
      "Entrypoint": null,
      "OnBuilder": null,
      "Labels": {
        "com.docker.compose.project": "root",

```

```
    "-host",
    "0.0.0.0",
    "-port",
    "9567"
  ],
  "ArgsEscaped": true,
  "Image": "",
  "Volumes": null,
  "WorkingDir": "/app",
  "Entrypoint": null,
  "OnBuild": null,
  "Labels": {
    "com.docker.compose.project": "root",
    "com.docker.compose.service": "fastapi",
    "com.docker.compose.version": "2.34.0"
  }
},
"Architecture": "amd64",
"Os": "linux",
"Size": 195585775,
"GraphDriver": {
  "Data": {
    "LowerDir": "/var/lib/docker/overlay2/gu8ley2abu5thga8eozacxb8/diff:/var/lib/docker/overlay2/f2ppghzma6a8h25e087mdlor3/diff:/var/lib/docker/overlay2/9a3b1138cb6f729ff2183fc5freade231e919f7244ab24cf8bdc284db378acfe/diff:/v
ar/lib/docker/overlay2/69835e1f8df7c825913ec5282c1859c447d5680847865d3d291c304d18f5d/diff:/var/lib/docker/overlay2/049097f1cb42f88cb2cab765e6998dcfb6c4f70ad6af6ccc79e143ec3148765/diff:/var/lib/docker/overlay2/913f9e7b9412c3bbd2b3cdf85
ale45e56586823b9c9b78851575f93f9e385b/diff",
    "MergedDir": "/var/lib/docker/overlay2/2gornl1bhvutize74n0681yz0/merged",
    "UpperDir": "/var/lib/docker/overlay2/2gornl1bhvutize74n0681yz0/diff",
    "WorkDir": "/var/lib/docker/overlay2/2gornl1bhvutize74n0681yz0/work"
  },
  "Name": "overlay2"
},
"RootFS": {
  "Type": "layers",
  "Layers": [
    "sha256:1287fbcdcfccedeecf2435e5b9e9d86a4648db2091080377d499737f1b307f3",
    "sha256:140ec0a8af03880fb53bce492a8630996d8f734c6cc329dc2d1e8ca1256dea9",
    "sha256:04f6e4cf28e74355ff17e6b23937c7c385a8435406994499ee3f657745a2f1a",
    "sha256:0796d33961efuk860b7e0ba833463c07e439c1134253f0e29ed70f00b74b2e",
    "sha256:21e5549f6a7b49565cc585e5795f09a833a9ddb4b5badfb1757a614b589ae83d",
    "sha256:5c2187175d566b7a3385850e4626bc35f8188bc103drfb597d4f6ce1b347e6c6c",
    "sha256:dda8f0a3fc7f85dd4cc0b0044cfcf8b79a28e8f69528775d51ab443e15a220"
  ]
},
"Metadata": {
  "LastTagTime": "2025-03-27T14:28:03.371289256Z"
}
}
root@backend:~#
```

Frontend page



**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)**

**Making Docker Volume so that the data inserted by user isn't deleted.**

```
root@backend:~# docker compose down
[+] Running 4/4
   Container nginx           Removed      0.3s
   Container fastapi2        Removed      0.4s
   Container elasticsearch   Removed      2.9s
   Network root_mynetwork    Removed      0.1s
root@backend:~# docker compose -f 'docker-compose.yml' up -d --build
Compose can now delegate builds to bake for better performance.
To do so, set COMPOSE_BAKE=true.
[+] Building 17.3s (10/10) FINISHED
=> [fastapi internal] load build definition from Dockerfile
=> => transferring Dockerfile: 2210
=> [fastapi internal] load metadata for docker.io/library/python:3.9-slim
=> [fastapi internal] load dockerignore
=> => transferring context: 20
=> [fastapi 1/4] FROM docker.io/library/python:3.9-slim@sha256:e52ca5f579cc58fed41efcbb55a8ed5dccc75c7a156cba76acfd4ab42fc19a000
=> [fastapi internal] load build context
=> => transferring context: 33.90kB
=> CACHED [fastapi 2/4] WORKDIR /app
=> [fastapi 3/4] COPY
=> [fastapi 4/4] RUN pip install --no-cache-dir fastapi[standard] elasticsearch requests
=> [fastapi internal] exporting to image
=> => exporting layers
=> => writing image sha256:86a18d8782065d84d8d321818ac5e127779d21f30c5bee03b702d4081e83e2d
=> => naming to docker.io/library/root-fastapi
=> [fastapi] resolving provenance for metadata file
[+] Running 3/5
   fastapi                  Built           0.8s
   Network root_mynetwork    Created           0.1s
   Container elasticsearch   Healthy          25.9s
   Container fastapi2        Started          26.1s
   Container nginx           Started          26.4s
root@backend:~# curl -X GET "http://localhost:9200/documents/_search/pretty"
{
  "took" : 157,
  "timed_out" : false,
  "_shards" : {
    "total" : 1,
    "successful" : 1,
    "skipped" : 0,
    "failed" : 0
  },
  "hits" : {
    "total" : {
      "value" : 4,
      "relation" : "eq"
    },
    "max_score" : 1.0,
    "hits" : [
      {
        "_index" : "documents",
        "_id" : "1",
        "_score" : 1.0,
        "_source" : {
          "id" : "1",
          "text" : "India, officially the Republic of India, is a country in South Asia. It is the seventh-largest country by area; the most populous country from June 2023 onwards; and since its independence in 1947, the world's most populous democracy. Bounded by the Indian Ocean on the south, the Arabian Sea on the southwest, and the Bay of Bengal on the southeast, it shares land borders with Pakistan to the west; China, Nepal, and Bhutan to the north; and Bangladesh and Myanmar to the east. In the Indian Ocean, India is near Sri Lanka and the Maldives; its Andaman and Nicobar Islands share a maritime border with Thailand, Myanmar, and Indonesia."
        }
      },
      {
        "_index" : "documents",
        "_id" : "2",
        "_score" : 1.0,
        "_source" : {
          "id" : "2",
          "text" : "Modern humans arrived on the Indian subcontinent from Africa no later than 55,000 years ago. Their long occupation, predominantly in isolation as hunter-gatherers, has made the region highly diverse, second only to Africa in human genetic diversity. Settled life emerged on the subcontinent in the western margins of the Indus river basin 9,000 years ago, evolving gradually into the Indus Valley civilisation of the third millennium BCE. By 1200 BCE, an archaic form of Sanskrit, an Indo-European language, had diffused into India from the northwest. Its hymns recorded the dawning of Hinduism in India. India's pre-existing Dravidian languages were supplanted in the northern regions. By 400 BCE, caste had emerged within Hinduism, and Buddhism and Jainism had arisen, proclaiming social orders unlinked to heredity. Early political consolidations gave rise to the loose-knit Maurya and Gupta Empires. Widespread creativity suffused this era, but the status of women declined, and untouchability became an organized belief. In South India, the Middle kingdoms exported Dravidian language scripts and religious cultures to the Kingdoms of Southeast Asia."
        }
      },
      {
        "_index" : "documents",
        "_id" : "3",
        "_score" : 1.0,
        "_source" : {
          "id" : "3",
          "text" : "In the early medieval era, Christianity, Islam, Judaism, and Zoroastrianism became established on India's southern and western coasts. Muslim armies from Central Asia intermittently overran India's northern plains. The resulting Delhi Sultanate drew northern India into the cosmopolitan networks of medieval Islam. In south India, the Vijayanagara Empire created a long-lasting composite Hindu culture. In the Punjab, Sikhism emerged, rejecting institution alized religion. The Mughal Empire, in 1526, ushered in two centuries of relative peace, leaving a legacy of luminous architecture. Gradually expanding rule of the British East India Company turned India into a colonial economy but consolidated its sovereignty. British Crown rule began in 1858. The rights promised to Indians were granted slowly, but technological changes were introduced, and modern ideas of education and public life took root. A pioneering and influential nationalist movement, noted for nonviolent resistance, became the major factor in ending British rule. In 1947, the British Indian Empire was partitioned into two independent dominions, a Hindu-majority dominion of India and a Muslim-majority dominion of Pakistan. A large-scale loss of life and an unprecedented migration accompanied the partition."
        }
      },
      {
        "_index" : "documents",
        "_id" : "4",
        "_score" : 1.0,
        "_source" : {
          "id" : "4",
          "text" : "India has been a federal republic since 1950, governed through a democratic parliamentary system. It is a pluralistic, multilingual and multi-ethnic society. India's population grew from 361 million in 1951 to over 1.4
```

```

    },
    "max_score" : 1.0,
    "hits" : [
      {
        "_index" : "documents",
        "_id" : "1",
        "_score" : 1.0,
        "_source" : {
          "id" : "1",
          "text" : "India, officially the Republic of India, is a country in South Asia. It is the seventh-largest country by area; the most populous country from June 2023 onwards; and since its independence in 1947, the world's most populous democracy. Bounded by the Indian Ocean on the south, the Arabian Sea on the southwest, and the Bay of Bengal on the southeast, it shares land borders with Pakistan to the west; China, Nepal, and Bhutan to the north; and Bangladesh and Myanmar to the east. In the Indian Ocean, India is near Sri Lanka and the Maldives; its Andaman and Nicobar Islands share a maritime border with Thailand, Myanmar, and Indonesia."
        }
      },
      {
        "_index" : "documents",
        "_id" : "2",
        "_score" : 1.0,
        "_source" : {
          "id" : "2",
          "text" : "Modern humans arrived on the Indian subcontinent from Africa no later than 55,000 years ago. Their long occupation, predominantly in isolation as hunter-gatherers, has made the region highly diverse, second only to Africa in human genetic diversity. Settled life emerged on the subcontinent in the western margins of the Indus river basin 9,000 years ago, evolving gradually into the Indus Valley civilisation of the third millennium BCE. By 1200 BCE, an archaic form of Sanskrit, an Indo-European language, had diffused into India from the northwest. Its hymns recorded the dawning of Hinduism in India. India's pre-existing Dravidian languages were supplanted in the northern regions. By 400 BCE, caste had emerged within Hinduism, and Buddhism and Jainism had arisen, proclaiming social orders unlinked to heredity. Early political consolidations gave rise to the loose-knit Maurya and Gupta Empires. Widespread creativity suffused this era, but the status of women declined, and untouchability became an organized belief. In South India, the Middle kingdoms exported Dravidian language scripts and religious cultures to the Kingdoms of Southeast Asia."
        }
      },
      {
        "_index" : "documents",
        "_id" : "3",
        "_score" : 1.0,
        "_source" : {
          "id" : "3",
          "text" : "In the early medieval era, Christianity, Islam, Judaism, and Zoroastrianism became established on India's southern and western coasts. Muslim armies from Central Asia intermittently overran India's northern plains. The resulting Delhi Sultanate drew northern India into the cosmopolitan networks of medieval Islam. In south India, the Vijayanagara Empire created a long-lasting composite Hindu culture. In the Punjab, Sikhism emerged, rejecting institution alized religion. The Mughal Empire, in 1526, ushered in two centuries of relative peace, leaving a legacy of luminous architecture. Gradually expanding rule of the British East India Company turned India into a colonial economy but consolidated its sovereignty. British Crown rule began in 1858. The rights promised to Indians were granted slowly, but technological changes were introduced, and modern ideas of education and public life took root. A pioneering and influential nationalist movement, noted for nonviolent resistance, became the major factor in ending British rule. In 1947, the British Indian Empire was partitioned into two independent dominions, a Hindu-majority dominion of India and a Muslim-majority dominion of Pakistan. A large-scale loss of life and an unprecedented migration accompanied the partition."
        }
      },
      {
        "_index" : "documents",
        "_id" : "4",
        "_score" : 1.0,
        "_source" : {
          "id" : "4",
          "text" : "India has been a federal republic since 1950, governed through a democratic parliamentary system. It is a pluralistic, multilingual and multi-ethnic society. India's population grew from 361 million in 1951 to over 1.4
```

```

root@frontend:~# docker stop fastapil
fastapil
root@frontend:~# docker rm fasatapil
Error response from daemon: No such container: fasatapil
root@frontend:~# docker rm fastapil
fastapil
root@frontend:~#

```

Deleting all 3 containers

Get Query inserted before deleting of all 3 containers.

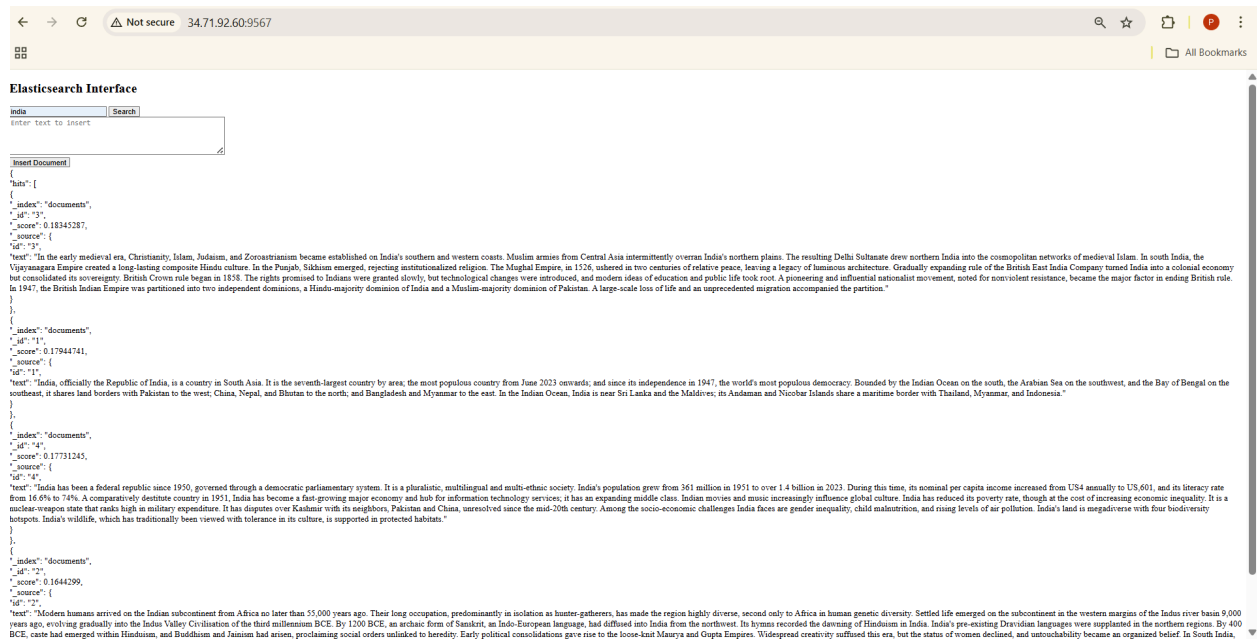
The screenshot shows a web browser window with the address bar displaying '34.71.92.60:9567'. The page title is 'Elasticsearch Interface'. Below the title, there is a search bar with the text 'india' and a 'Search' button. Below the search bar, there is a section titled 'Insert Document' with a text area containing a JSON document structure. The document contains three entries, each with an 'id', 'index', 'score', and 'source' field. The first entry has id '3', the second has id '1', and the third has id '4'. Each entry's 'source' field contains a paragraph of text about India's history and demographics.

```

{
  "hits": [
    {
      "_index": "documents",
      "_id": "3",
      "_score": 0.18345287,
      "_source": {
        "id": "3",
        "text": "In the early medieval era, Christianity, Islam, Judaism, and Zoroastrianism became established on India's southern and western coasts. Muslim armies from Central Asia intermittently overran India's northern plains. The resulting Delhi Sultanate drew northern India into the cosmopolitan networks of medieval Islam. In south India, the Vijayanagara Empire created a long-lasting composite Hindu culture. In the Punjab, Sikhism emerged, rejecting institutionalized religion. The Mughal Empire, in 1526, ushered in two centuries of relative peace, leaving a legacy of luminous architecture. Gradually expanding rule of the British East India Company turned India into a colonial economy but consolidated its sovereignty. British Crown rule began in 1858. The rights promised to Indians were granted slowly, but technological changes were introduced, and modern ideas of education and public life took root. A pioneering and influential nationalist movement, noted for non-violent resistance, became the major factor in ending British rule. In 1947, the British Indian Empire was partitioned into two independent dominions, a Hindu-majority dominion of India and a Muslim-majority dominion of Pakistan. A large-scale loss of life and an unprecedented migration accompanied the partition."
      }
    },
    {
      "_index": "documents",
      "_id": "1",
      "_score": 0.17944741,
      "_source": {
        "id": "1",
        "text": "India, officially the Republic of India, is a country in South Asia. It is the seventh-largest country by area; the most populous country from June 2023 onwards; and since its independence in 1947, the world's most populous democracy. Bounded by the Indian Ocean on the south, the Arabian Sea on the southwest, and the Bay of Bengal on the southeast, it shares land borders with Pakistan to the west; China, Nepal, and Bhutan to the north; and Bangladesh and Myanmar to the east. In the Indian Ocean, India is near Sri Lanka and the Maldives; its Andaman and Nicobar Islands share a maritime border with Thailand, Myanmar, and Indonesia."
      }
    },
    {
      "_index": "documents",
      "_id": "4",
      "_score": 0.17731245,
      "_source": {
        "id": "4",
        "text": "India has been a federal republic since 1950, governed through a democratic parliamentary system. It is a pluralistic, multilingual and multi-ethnic society. India's population grew from 361 million in 1951 to over 1.4 billion in 2023. During this time, its nominal per capita income increased from US$4 annually to US$601, and its literacy rate from 16.6% to 74%. A comparatively destitute country in 1951, India has become a fast-growing major economy and hub for information technology services; it has an expanding middle class. Indian movies and music increasingly influence global culture. India has reduced its poverty rate, though at the cost of increasing economic inequality. It is a nuclear-weapon state that ranks high in military expenditure. It has disputes over Kashmir with its neighbors, Pakistan and China, unresolved since the mid-20th century. Among the socio-economic challenges India faces are gender inequality, child malnutrition, and rising levels of air pollution. India's land is megadiverse with four biodiversity hotspots. India's wildlife, which has traditionally been viewed with tolerance in its culture, is supported in protected habitats."
      }
    }
  ]
}

```

## Get Query after rebuilding the containers after deleting it.



← → ↺ ⚠ Not secure 34.71.92.60:9567 🔍 ☆ 📌 | 📌 All Bookmarks

### Elasticsearch Interface

india

Enter text to insert

```
{
  "hits": [
    {
      "_index": "documents",
      "_id": "3",
      "_score": 0.18343287,
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        "id": "3",
        "text": "In the early medieval era, Christianity, Islam, Judaism, and Zoroastrianism became established on India's southern and western coasts. Muslim armies from Central Asia intermittently overran India's northern plains. The resulting Delhi Sultanate drew northern India into the cosmopolitan networks of medieval Islam. In south India, the Vijayanagara Empire created a long-lasting composite Hindu culture. In the Punjab, Sikhism emerged, rejecting institutionalized religion. The Mughal Empire, in 1526, ushered in two centuries of relative peace, leaving a legacy of luminous architecture. Gradually expanding rule of the British East India Company turned India into a colonial economy but consolidated its sovereignty. British Crown rule began in 1858. The rights promised to Indians were granted slowly, but technological changes were introduced, and modern ideas of education and public life took root. A pioneering and influential nationalist movement, noted for nonviolent resistance, became the major factor in ending British rule. In 1947, the British Indian Empire was partitioned into two independent dominions, a Hindu-majority dominion of India and a Muslim-majority dominion of Pakistan. A large-scale loss of life and an unprecedented migration accompanied the partition."
      }
    },
    {
      "_index": "documents",
      "_id": "1",
      "_score": 0.17944741,
      "_source": {
        "id": "1",
        "text": "India, officially the Republic of India, is a country in South Asia. It is the seventh-largest country by area, the most populous country from June 2023 onwards, and since its independence in 1947, the world's most populous democracy. Bounded by the Indian Ocean on the south, the Arabian Sea on the southwest, and the Bay of Bengal on the southeast, it shares land borders with Pakistan to the west; China, Nepal, and Bhutan to the north; and Bangladesh and Myanmar to the east. In the Indian Ocean, India is near Sri Lanka and the Maldives; its Andaman and Nicobar Islands share a maritime border with Thailand, Myanmar, and Indonesia."
      }
    },
    {
      "_index": "documents",
      "_id": "4",
      "_score": 0.17731245,
      "_source": {
        "id": "4",
        "text": "India has been a federal republic since 1950, governed through a democratic parliamentary system. It is a pluralistic, multilingual and multi-ethnic society. India's population grew from 361 million in 1951 to over 1.4 billion in 2023. During this time, its nominal per capita income increased from US$4 annually to US$601, and its literacy rate from 16.6% to 74%. A comparatively destitute country in 1951, India has become a fast-growing major economy and hub for information technology services; it has an expanding middle class. Indian movies and music increasingly influence global culture. India has reduced its poverty rate, though at the cost of increasing economic inequality. It is a nuclear-weapon state that ranks high in military expenditure. It has disputes over Kashmir with its neighbors, Pakistan and China, unresolved since the mid-20th century. Among the socio-economic challenges India faces are gender inequality, child malnutrition, and rising levels of air pollution. India's land is megadiverse with four biodiversity hotspots. India's wildlife, which has traditionally been viewed with tolerance in its culture, is supported in protected habitats."
      }
    },
    {
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```

## Insert Query before deleting of containers



← → ↺ ⚠ Not secure 34.71.92.60:9567 🔍 ☆ 📌 | 📌 All Bookmarks

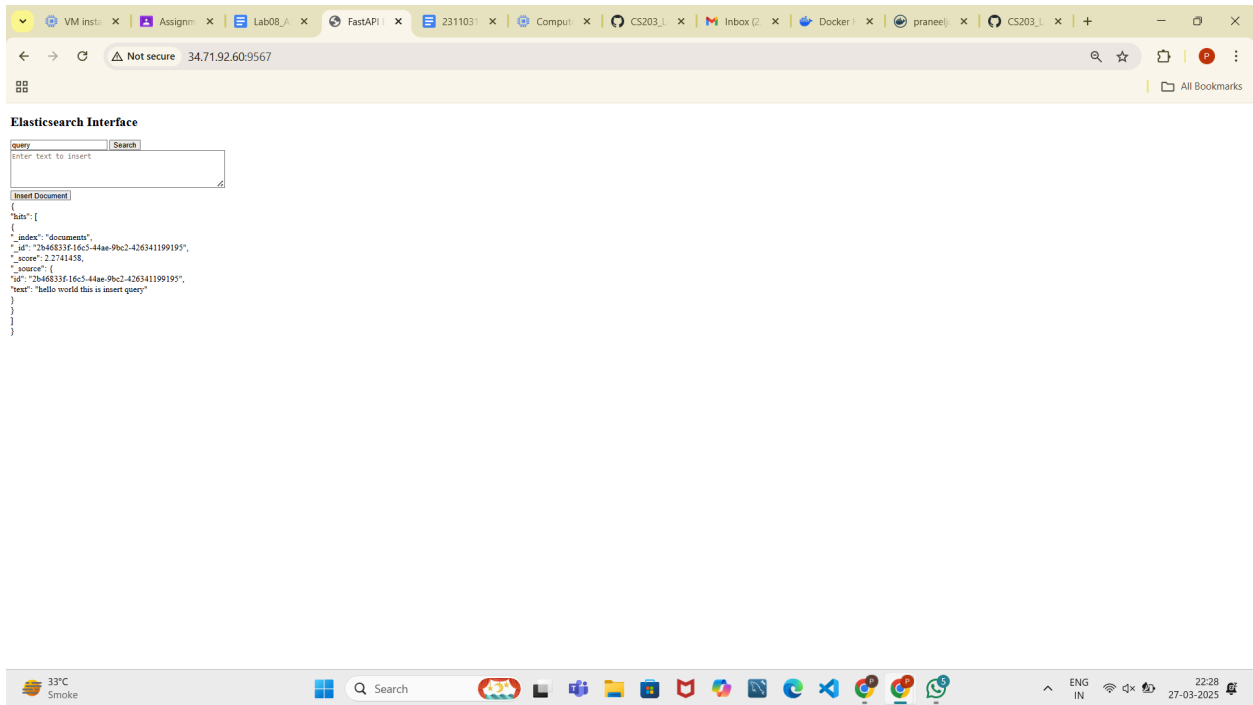
### Elasticsearch Interface

hello world this is insert query

Enter search query

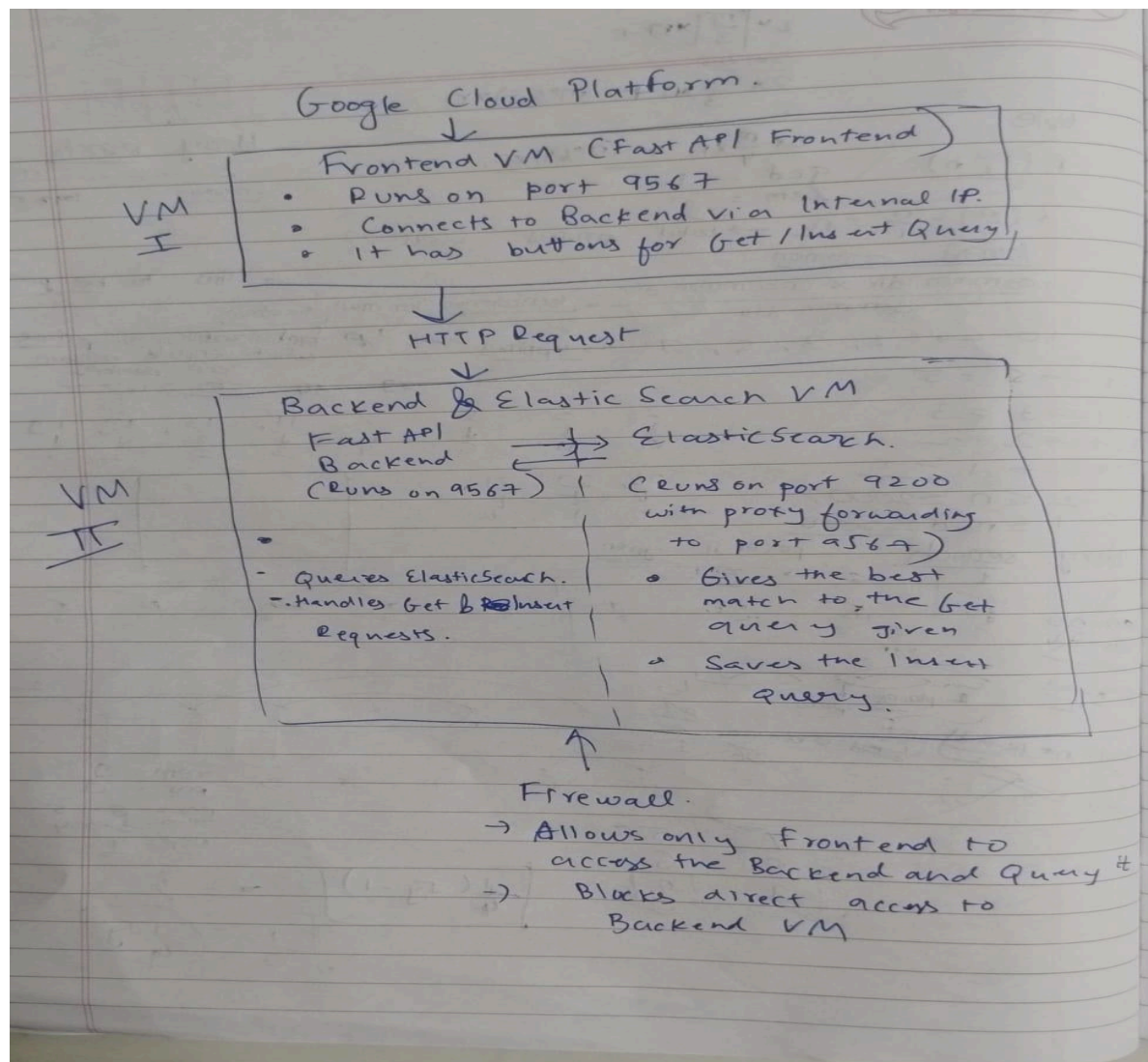
```
{
  "result": "created",
  "_id": "2b46833f-16c5-44ae-9bc2-426341199195"
}
```

### Query Inserted still exists after deleting of containers





## Detailed architectural diagram.



## Optimization:

1. For reducing the size of images and running the containers faster we have changed the python version from python3.9 - slim.
2. Also we have used fastapi[standard]

These all steps reduced the size of images a lot and have helped in making the container load fast.