MindTrack

GitHub Link : https://github.com/Vennilavan12/Brain-Tasks-App.git

MindTrack

Overview

React application deployment to a production-ready state.

Brief description of the application, its purpose, and key features.

Example:

This project showcases deploying a React application from code to a production-ready, containerized application on Kubernetes (Amazon EKS) using a CI/CD pipeline with AWS CodeBuild, CodePipeline.

Architecture

- Application: React
- Containerization: Docker
- Orchestration: Kubernetes (EKS)
- Cloud Provider: AWS

Setup Instructions

Prerequisites

- Docker
- kubectl
- AWS CLI
- eksctl
- kubectl

Architecture Overview

- Application: React
- Containerization: Docker
- Orchestration: Kubernetes (Amazon EKS)
- Cloud Provider: AWS
- Monitoring & Observability: Prometheus and Grafana dashboards

Project Screenshots and Proof of Implementation

This section includes screenshots that provide visual proof of the successful implementation and execution of the project. The screenshots demonstrate key stages and components of the deployment, including:

- ❖ Source code repositories and project structure
- ❖ Successful Docker image build and push to AWS ECR
- ❖ AWS Code Build
- ❖ Amazon EKS cluster creation and running status
- ❖ Kubernetes deployments and services running successfully
- ❖ Application accessibility via the exposed application URL
- ❖ Prometheus metrics collection and Grafana dashboards displaying real-time cluster and application health

These screenshots collectively validate the end-to-end workflow, from source code to a production-ready, containerized application deployed on Kubernetes.

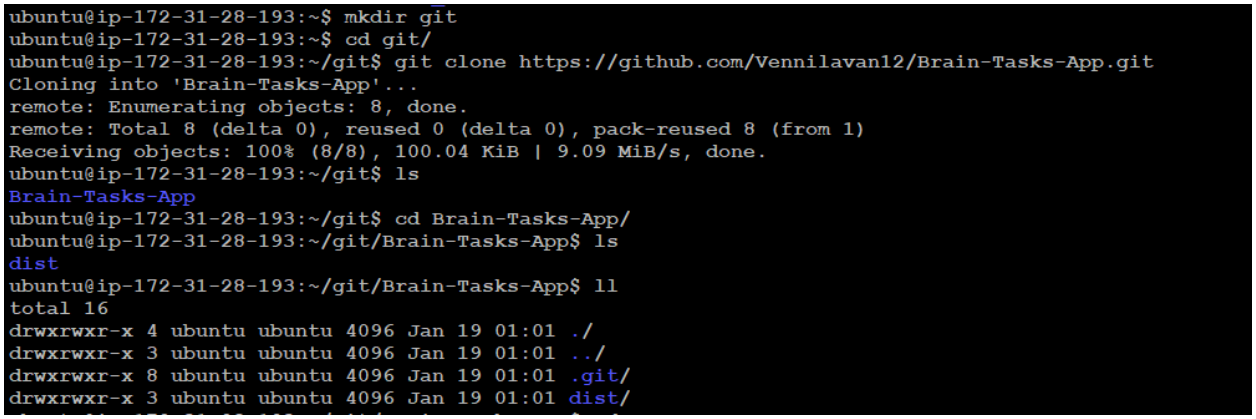
GIT URL : Project files

The full project setup and configuration artifacts are version-controlled and available in the Git repository.

URL :
https://github.com/udhayakumarethiraj1/enterprise/tree/5c7f33cfd9b02dc96c93ae28d093ef837f04a6a1/Project_1_Mind_Track

Application Deployment Git Repo Cloned to my repo (Brain-Tasks)

https://github.com/udhayakumarethiraj-git/Brain-Tasks.git



```
ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$ git remote -v
origin  git@github.com:udhayakumarethiraj-git/Brain-Tasks.git (fetch)
origin  git@github.com:udhayakumarethiraj-git/Brain-Tasks.git (push)
ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$ git push
fatal: The current branch main has no upstream branch.
To push the current branch and set the remote as upstream, use

    git push --set-upstream origin main

To have this happen automatically for branches without a tracking
upstream, see 'push.autoSetupRemote' in 'git help config'.

ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$ git push origin main
Enumerating objects: 8, done.
Counting objects: 100% (8/8), done.
Delta compression using up to 2 threads
Compressing objects: 100% (7/7), done.
Writing objects: 100% (8/8), 100.04 KiB | 502.00 KiB/s, done.
Total 8 (delta 0), reused 8 (delta 0), pack-reused 0
To github.com:udhayakumarethiraj-git/Brain-Tasks.git
 * [new branch]      main -> main
ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$ ll
total 16
drwxrwxr-x 4 ubuntu ubuntu 4096 Jan 19 01:01 ./
drwxrwxr-x 3 ubuntu ubuntu 4096 Jan 19 01:03 ../
drwxrwxr-x 8 ubuntu ubuntu 4096 Jan 19 01:18 .git/
drwxrwxr-x 3 ubuntu ubuntu 4096 Jan 19 01:01 dist/
ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$
```

Stage : Docker

Containerize the application by creating a Dockerfile, building the image, and testing the output.

Dockerfile

```
FROM nginx:alpine

# Remove default nginx static files
RUN rm -rf /usr/share/nginx/html/*

# Copy Vite build output to nginx
COPY dist /usr/share/nginx/html

# Replace default nginx config inline
RUN printf '%s\n' \
'server {' \
```

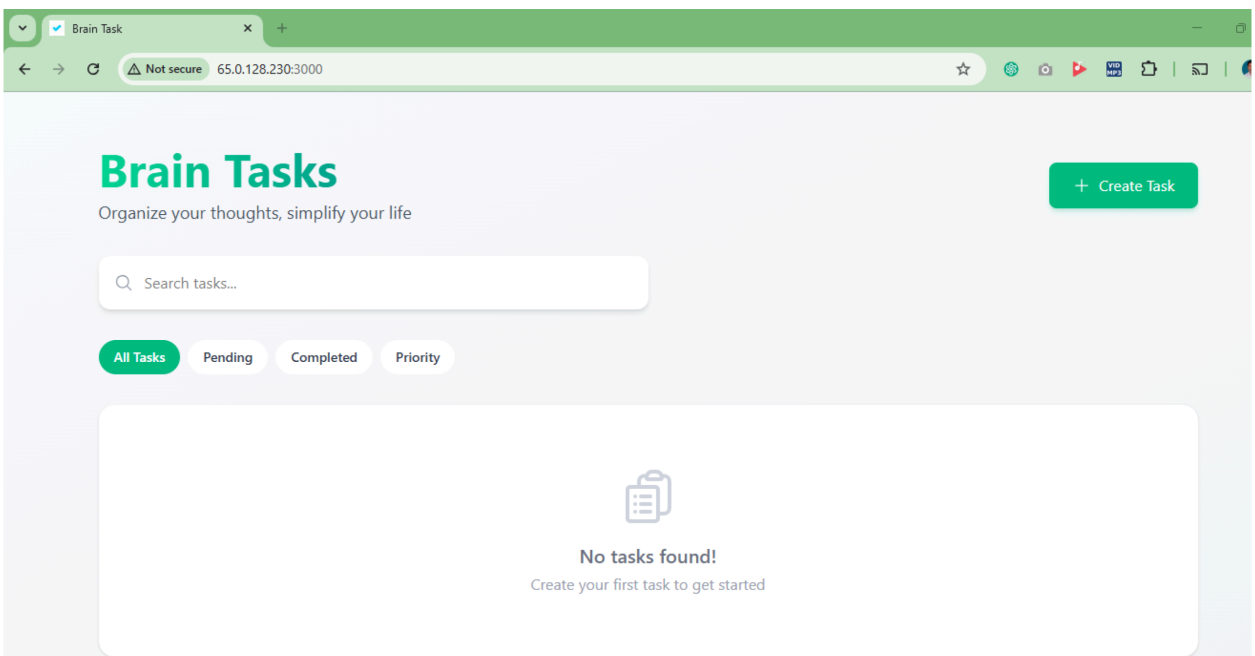
```
'   listen 3000;' \
'   listen [::]:3000;' \
'   server_name localhost;' \
'' \
'   location / {' \
'       root /usr/share/nginx/html;' \
'       index index.html;' \
'       try_files $uri $uri/ /index.html;' \
'   }' \
'}' \
> /etc/nginx/conf.d/default.conf

# Expose port 3000
EXPOSE 3000

# Run nginx
CMD ["nginx", "-g", "daemon off;"]
```

```
ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$ ls
Dockerfile  dist
ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$ more Dockerfile
FROM nginx:alpine

# Remove default nginx static files
RUN rm -rf /usr/share/nginx/html/*

# Copy Vite build output to nginx
COPY dist /usr/share/nginx/html

# Expose port 80
EXPOSE 80

CMD ["nginx", "-g", "daemon off;"]

ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$ sudo docker build -t brain-task .
```

```
ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$ sudo docker build -t brain-task .
[+] Building 6.1s (8/8) FINISHED                                                                 docker:default
 => [internal] load build definition from Dockerfile                                                        0.0s
 => => transferring dockerfile: 261B                                                                        0.0s
 => [internal] load metadata for docker.io/library/nginx:alpine                                             2.5s
 => [internal] load .dockerignore                                                                           0.0s
 => => transferring context: 2B                                                                             0.0s
 => [1/3] FROM docker.io/library/nginx:alpine@sha256:b0f7830b6bfaa1258f45d94c240ab668ced1b3651c8a222aefe6683447c7bf55  2.8s
 => => resolve docker.io/library/nginx:alpine@sha256:b0f7830b6bfaa1258f45d94c240ab668ced1b3651c8a222aefe6683447c7bf55  0.0s
 => => sha256:e096540205d5d1ab2c2647d716491020d81e3f167a33606665b193d75540857f 20.18MB / 20.18MB            0.9s
 => => sha256:0abf9e5672665202e79f26f23ef5dbd12558e2ea51ac32807922ab76fdb24ab0 1.40kB / 1.40kB              0.7s
 => => sha256:085c5e5aaa8eb4b957ecf253c74f16a6a5551231de3fb7c3ac74814a6bf17e06 1.21kB / 1.21kB              0.9s
 => => sha256:33f95a0f3229b49e777082e801b882b13fcc5b4e389410ce8eb066f4d58c71b9 403B / 403B                  0.9s
 => => sha256:da7c973d8b92a1555060972c8849a332c93bfe2608c11faeee2098c4cfbe8c3d 953B / 953B                  0.5s
 => => sha256:567f84da6fbd4287d40a5837485469435c40a81f9a94e98395b6385d3600643a 626B / 626B                  0.5s
 => => sha256:25f453064fd3e8a9754b6e51b86c637e13203cbfc748fcf73f3c8b2d10816ae3 1.86MB / 1.86MB              0.6s
 => => sha256:1074353eec0db2c1d81d5af2671e56e00cf5738486f5762609ea33d606f88612 3.86MB / 3.86MB              0.7s
 => => extracting sha256:1074353eec0db2c1d81d5af2671e56e00cf5738486f5762609ea33d606f88612                   0.1s
 => => extracting sha256:25f453064fd3e8a9754b6e51b86c637e13203cbfc748fcf73f3c8b2d10816ae3                   0.1s
 => => extracting sha256:567f84da6fbd4287d40a5837485469435c40a81f9a94e98395b6385d3600643a                   0.0s
 => => extracting sha256:da7c973d8b92a1555060972c8849a332c93bfe2608c11faeee2098c4cfbe8c3d                   0.0s
 => => extracting sha256:33f95a0f3229b49e777082e801b882b13fcc5b4e389410ce8eb066f4d58c71b9                   0.0s
 => => extracting sha256:085c5e5aaa8eb4b957ecf253c74f16a6a5551231de3fb7c3ac74814a6bf17e06                   0.0s
 => => extracting sha256:0abf9e5672665202e79f26f23ef5dbd12558e2ea51ac32807922ab76fdb24ab0                   0.0s
 => => extracting sha256:e096540205d5d1ab2c2647d716491020d81e3f167a33606665b193d75540857f                   0.5s
 => [internal] load build context                                                                           0.1s
 => => transferring context: 317.98kB                                                                       0.0s
 => [2/3] RUN rm -rf /usr/share/nginx/html/*                                                                0.4s
 => [3/3] COPY dist /usr/share/nginx/html                                                                   0.0s
 => exporting to image                                                                                      0.2s
 => => exporting layers                                                                                     0.1s
 => => exporting manifest sha256:324717c80d5644a59adfb2e298246526ab9044e59e71b6668f9a80c9a15a233e           0.0s
 => => exporting config sha256:2dcef4e15b5aa1d62707361885ebf0abd56173ce98abe2e4670d2a214009e907             0.0s
 => => exporting attestation manifest sha256:b9f58b1247bf1aae7e29ffe95a639d59bc8a395f27ea62703f340c4d8fe27801  0.0s
 => => exporting manifest list sha256:a4e360937599db2312e20549c98c60bc80c4919b59ca6e1c7843948903d26c5b       0.0s
 => => naming to docker.io/library/brain-task:latest                                                        0.0s
 => => unpacking to docker.io/library/brain-task:latest                                                     0.0s
```

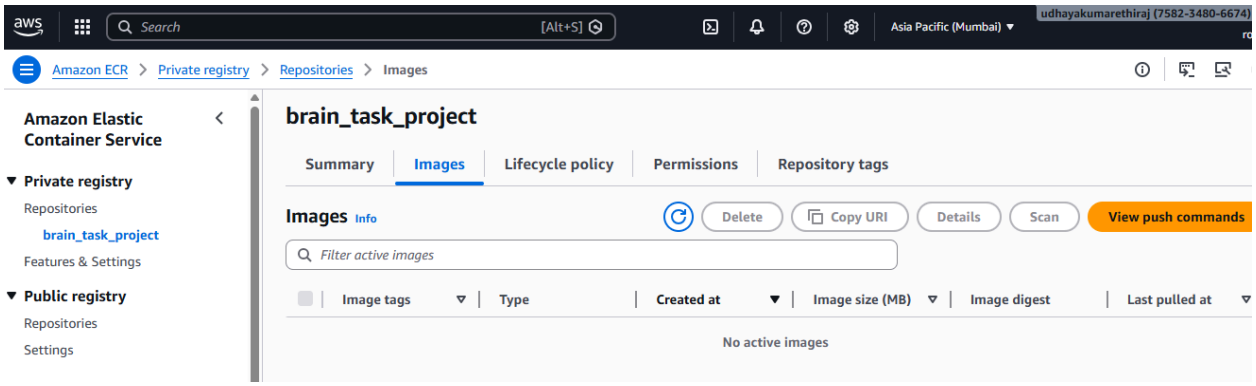
```
ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$ sudo docker run -d -p 3000:80 a4e360937599
9bcb2084e8218093ddbef838fe67ae17dc5d3c45288f5bde60b6158911a7f6cb
ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$ docker ps
permission denied while trying to connect to the docker API at unix:///var/run/docker.sock
ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$ sudo docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED          STATUS          PORTS                                     NAME
S
9bcb2084e821   a4e360937599   "/docker-entrypoint.…"   13 seconds ago   Up 13 seconds   0.0.0.0:3000->80/tcp, [::]:3000->80/tcp   elat
ed_pasteur
ubuntu@ip-172-31-28-193:~/git/Brain-Tasks$
```

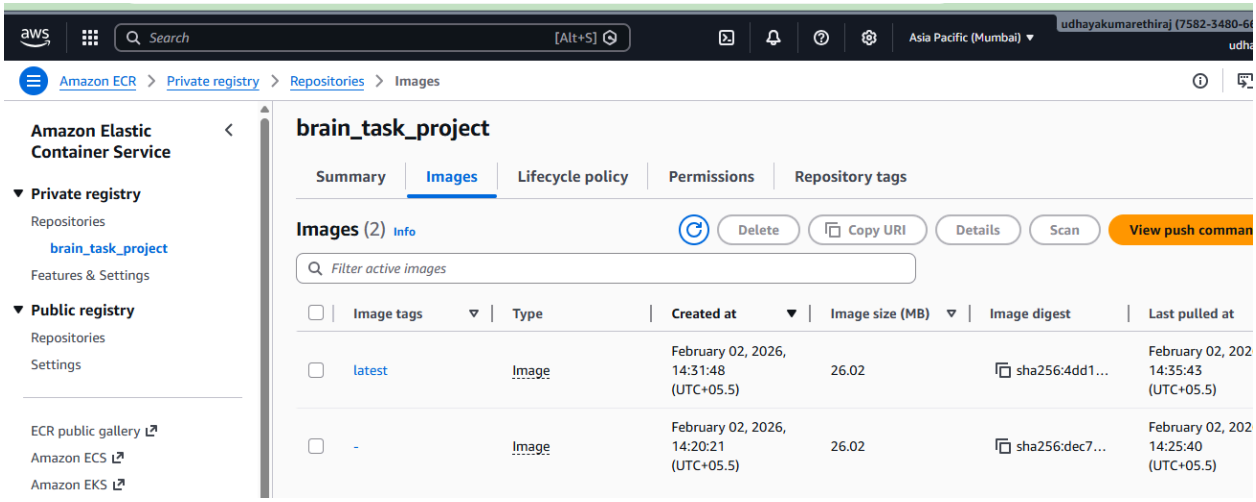
Output Test result



Stage : ECR Repo

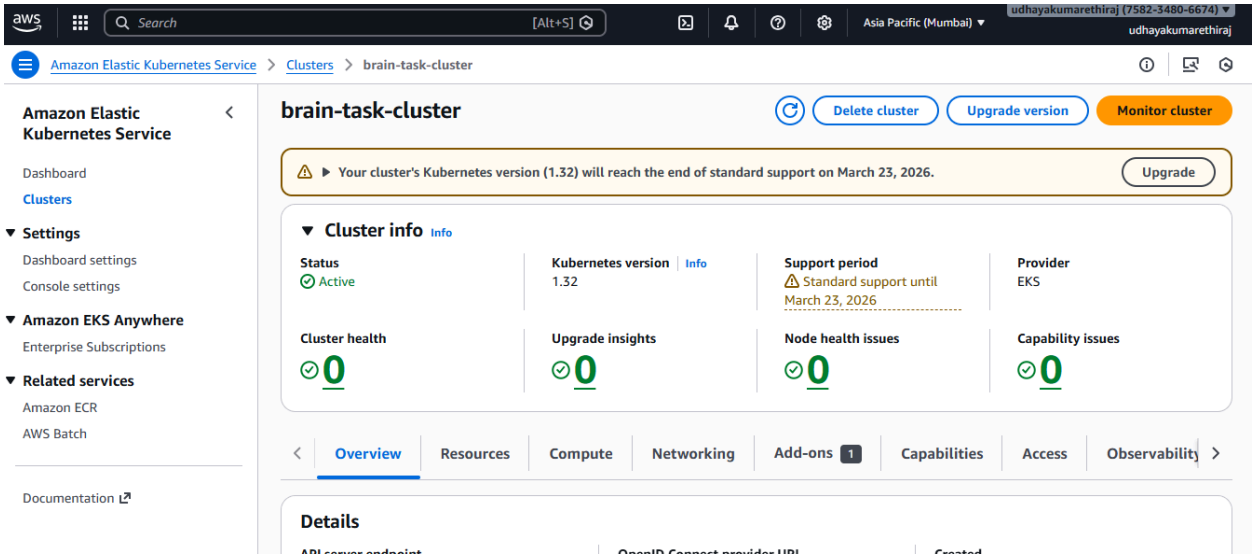
ECR Repository created.

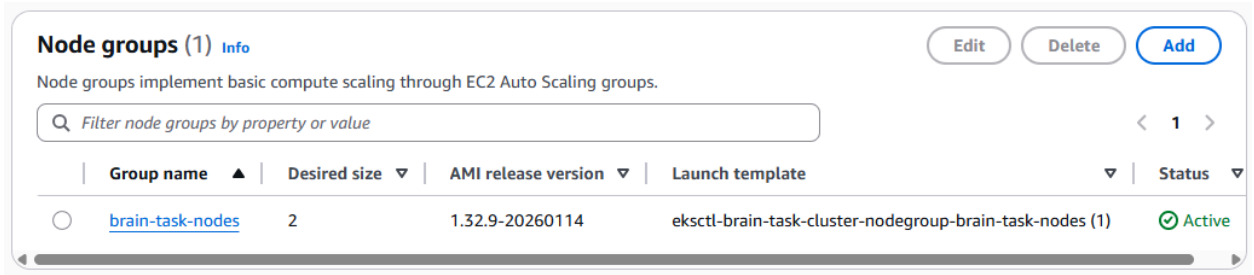




Stage : Kubernets

Kubernetes Cluster created with 2 nodes





Deployment.yml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: brain-task-app
spec:
  replicas: 2
  selector:
    matchLabels:
      app: brain-task-app
  template:
    metadata:
      labels:
        app: brain-task-app
    spec:
      containers:
        - name: brain-task-app
```

```
    image: 758234806674.dkr.ecr.ap-south-1.amazonaws.com/brain_task_project:latest
    ports:
      - containerPort: 3000
```

Serice.yml

```
apiVersion: v1
kind: Service
metadata:
  name: brain-task-service
spec:
  type: LoadBalancer
  selector:
    app: brain-task-app
  ports:
    - protocol: TCP
      port: 3000
      targetPort: 3000
```

Kubernets Cluster details

```
ubuntu@ip-172-31-28-193:~/projects/brain_task/Brain-Tasks$ eksctl get cluster
NAME                    REGION          EKSCTL CREATED
brain-task-cluster      ap-south-1      True
ubuntu@ip-172-31-28-193:~/projects/brain_task/Brain-Tasks$
```

Node Details

```
ubuntu@ip-172-31-28-193:~/projects/brain_task/Brain-Tasks$ kubectl get nodes
NAME                                          STATUS   ROLES    AGE   VERSION
ip-192-168-84-49.ap-south-1.compute.internal   Ready    <none>   9h    v1.32.9-eks-ecaa3a6
ip-192-168-9-56.ap-south-1.compute.internal    Ready    <none>   9h    v1.32.9-eks-ecaa3a6
ubuntu@ip-172-31-28-193:~/projects/brain_task/Brain-Tasks$
```

Pod details

```
ubuntu@ip-172-31-28-193:~/projects/brain_task/Brain-Tasks$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
brain-task-app-cb64cb69b-fdb4b   1/1     Running   0          4h59m
brain-task-app-cb64cb69b-g6rr7   1/1     Running   0          4h59m
ubuntu@ip-172-31-28-193:~/projects/brain_task/Brain-Tasks$ kubectl get pods -A
NAMESPACE     NAME                                                READY   STATUS    RESTARTS   AGE
default       brain-task-app-cb64cb69b-fdb4b                   1/1     Running   0          4h59m
default       brain-task-app-cb64cb69b-g6rr7                   1/1     Running   0          4h59m
kube-system   aws-node-6qvw7                                      2/2     Running   0          9h
kube-system   aws-node-xrr8f                                      2/2     Running   0          9h
kube-system   coredns-6799d65cb-98blh                             1/1     Running   0          9h
kube-system   coredns-6799d65cb-h8v28                             1/1     Running   0          9h
kube-system   kube-proxy-cvxvv                                    1/1     Running   0          9h
kube-system   kube-proxy-vr9zl                                    1/1     Running   0          9h
kube-system   metrics-server-6489f6d86b-pr4vr                      1/1     Running   0          9h
kube-system   metrics-server-6489f6d86b-qfqpk                      1/1     Running   0          9h
monitoring    kube-state-metrics-bdfdc4555-dfrf2                  1/1     Running   0          4h16m
monitoring    node-exporter-prometheus-node-exporter-j8n2g        1/1     Running   0          4h16m
monitoring    node-exporter-prometheus-node-exporter-s59jm        1/1     Running   0          4h16m
ubuntu@ip-172-31-28-193:~/projects/brain_task/Brain-Tasks$
```

Name space details

```
ubuntu@ip-172-31-28-193:~/projects/brain_task/Brain-Tasks$ kubectl get namespace
NAME              STATUS   AGE
default           Active   9h
kube-node-lease   Active   9h
kube-public       Active   9h
kube-system       Active   9h
monitoring        Active   4h37m
ubuntu@ip-172-31-28-193:~/projects/brain_task/Brain-Tasks$
```

Services details

```
ubuntu@ip-172-31-28-193:~/projects/brain_task/Brain-Tasks$ kubectl get svc -A
NAMESPACE     NAME                                      TYPE           CLUSTER-IP       EXTERNAL-IP
                        PORT(S)                  AGE
default       brain-task-service                        LoadBalancer   10.100.71.238    ae0a4e9f1c1ff4cdf83c8f4ecc4fbd18-1471213603.ap-
south-1.elb.amazonaws.com   3000:31704/TCP           9h
default       kubernetes                                ClusterIP      10.100.0.1       <none>
                        443/TCP                  9h
kube-system   eks-extension-metrics-api                 ClusterIP      10.100.28.22     <none>
                        443/TCP                  9h
kube-system   kube-dns                                  ClusterIP      10.100.0.10      <none>
                        53/UDP,53/TCP,9153/TCP   9h
kube-system   metrics-server                            ClusterIP      10.100.194.209   <none>
                        443/TCP                  9h
monitoring    kube-state-metrics                        ClusterIP      10.100.192.92    <none>
                        8080/TCP                 4h17m
monitoring    kube-state-metrics-lb                     LoadBalancer   10.100.203.56    ac55b318a2f1c4719839bf67a84589d7-132702156.ap-s
outh-1.elb.amazonaws.com    8080:32062/TCP           4h36m
monitoring    node-exporter-lb                          LoadBalancer   10.100.226.206   a9256f957d86340cca4526554991e02e-1184109852.ap-
south-1.elb.amazonaws.com   9100:30991/TCP           4h36m
monitoring    node-exporter-prometheus-node-exporter    ClusterIP      10.100.210.83    <none>
                        9100/TCP                 4h17m
ubuntu@ip-172-31-28-193:~/projects/brain_task/Brain-Tasks$
```

Application output :

http://ae0a4e9f1c1ff4cdf83c8f4ecc4fbd18-1471213603.ap-south-1.elb.amazonaws.com:3000/

Load balancer DNS

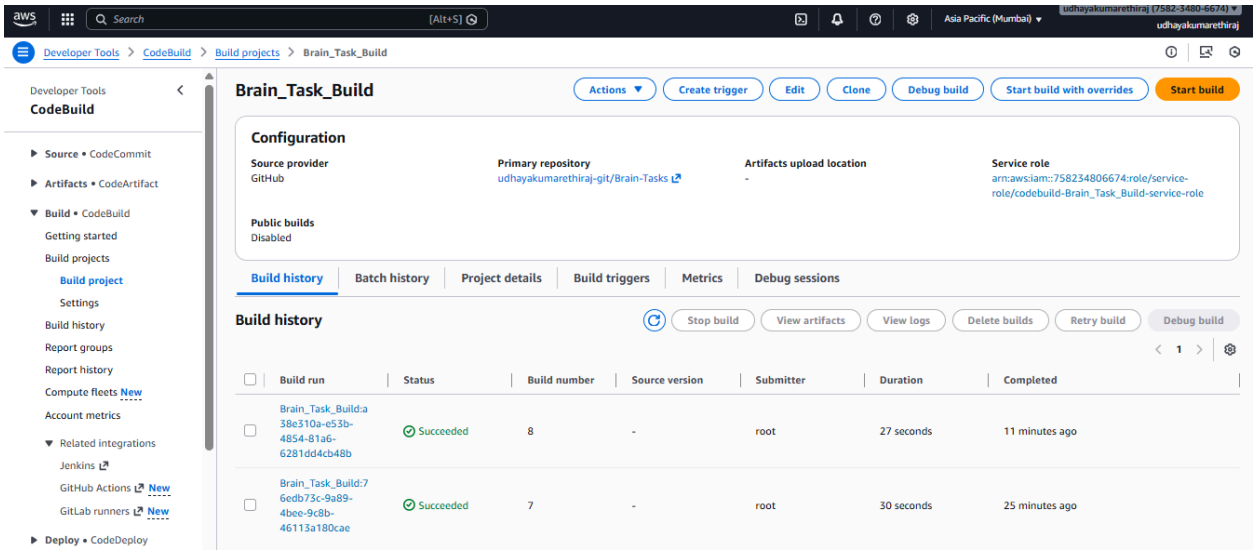
ae0a4e9f1c1ff4cdf83c8f4ecc4fbd18-1471213603.ap-south-1.elb.amazonaws.com

Stage : Code Build

buildspec.yml

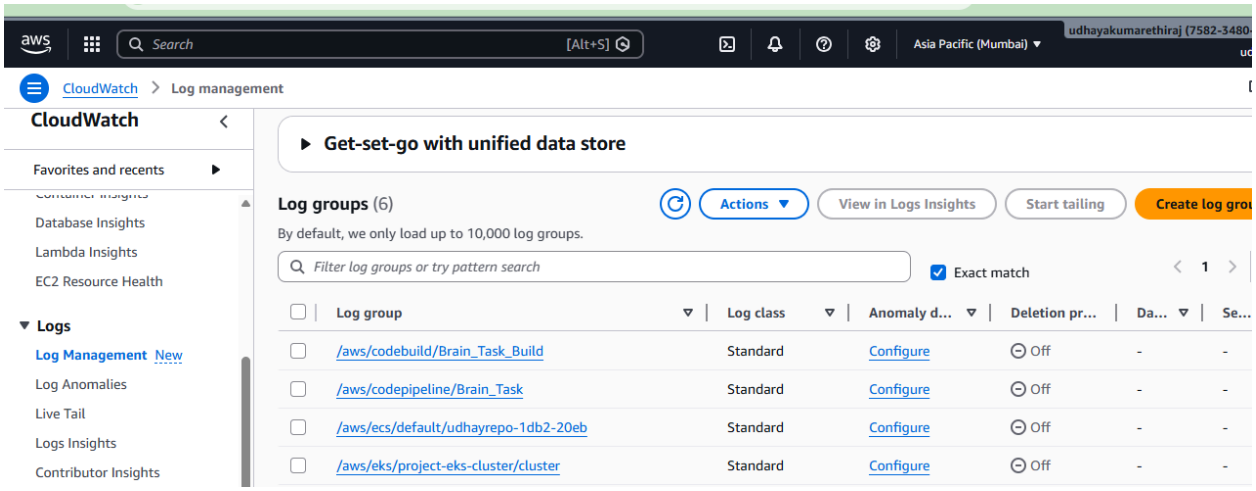
```
version: 0.2

phases:
  pre_build:
    commands:
      - echo "Logging in to Amazon ECR"
      - aws ecr get-login-password --region ap-south-1 | docker login --username AWS --password-stdin
758234806674.dkr.ecr.ap-south-1.amazonaws.com

  build:
    commands:
      - echo "Building Docker image"
      - docker build -t brain_task_project:latest .
      - docker tag brain_task_project:latest
758234806674.dkr.ecr.ap-south-1.amazonaws.com/brain_task_project:latest

  post_build:
```

commands:
- echo "Pushing Docker image"
- docker push 758234806674.dkr.ecr.ap-south-1.amazonaws.com/brain_task_project:latest

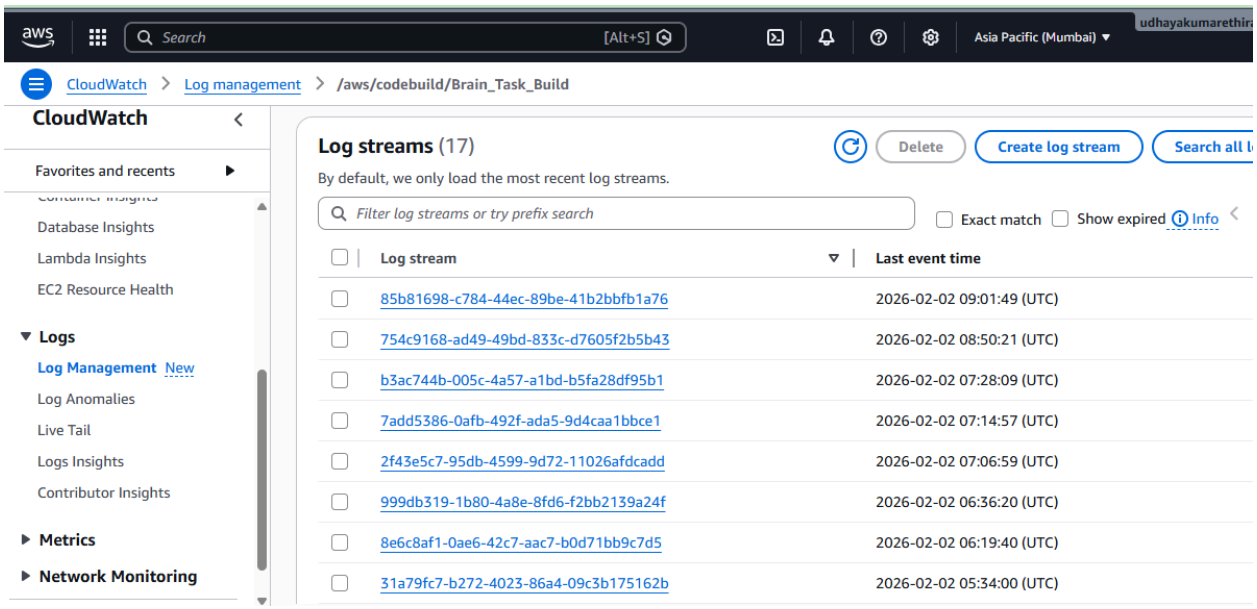


Stage : Monitoring

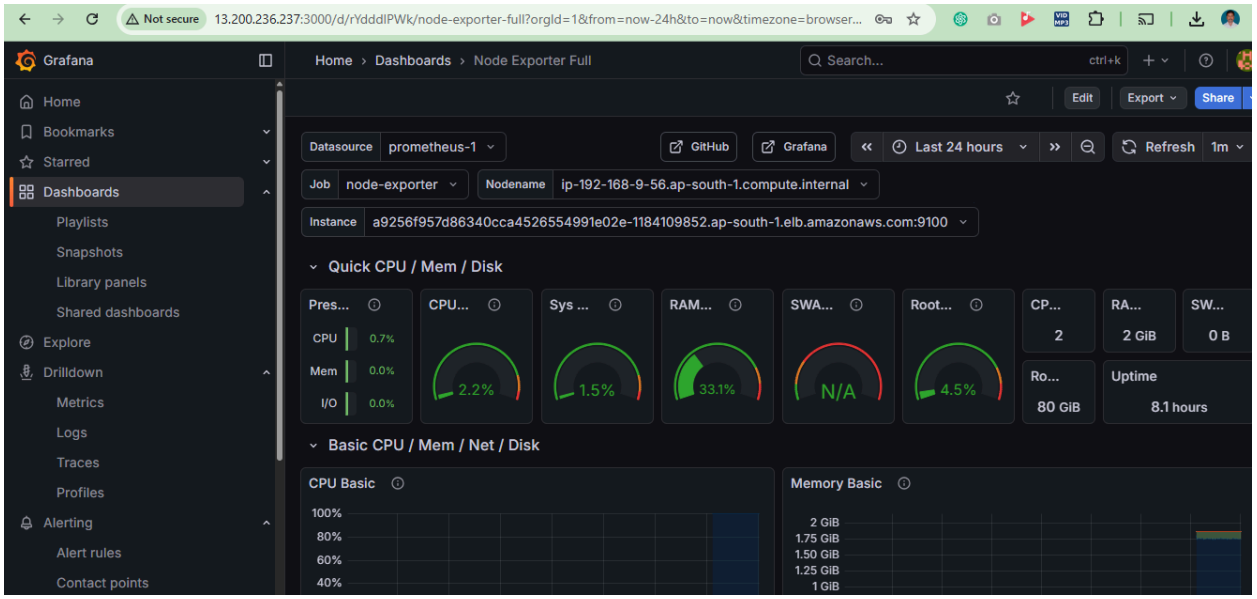
Cloudwatch Logs

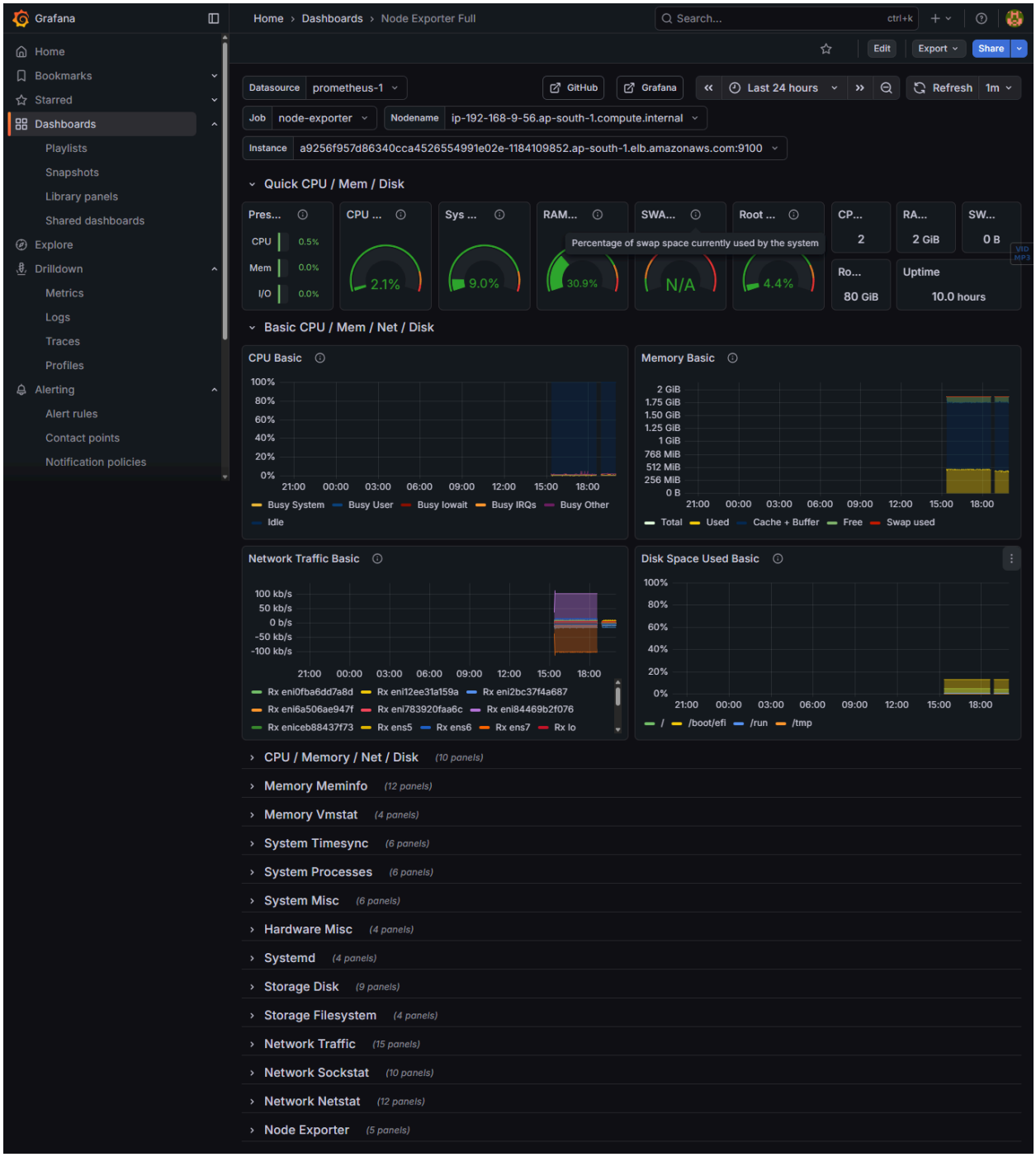


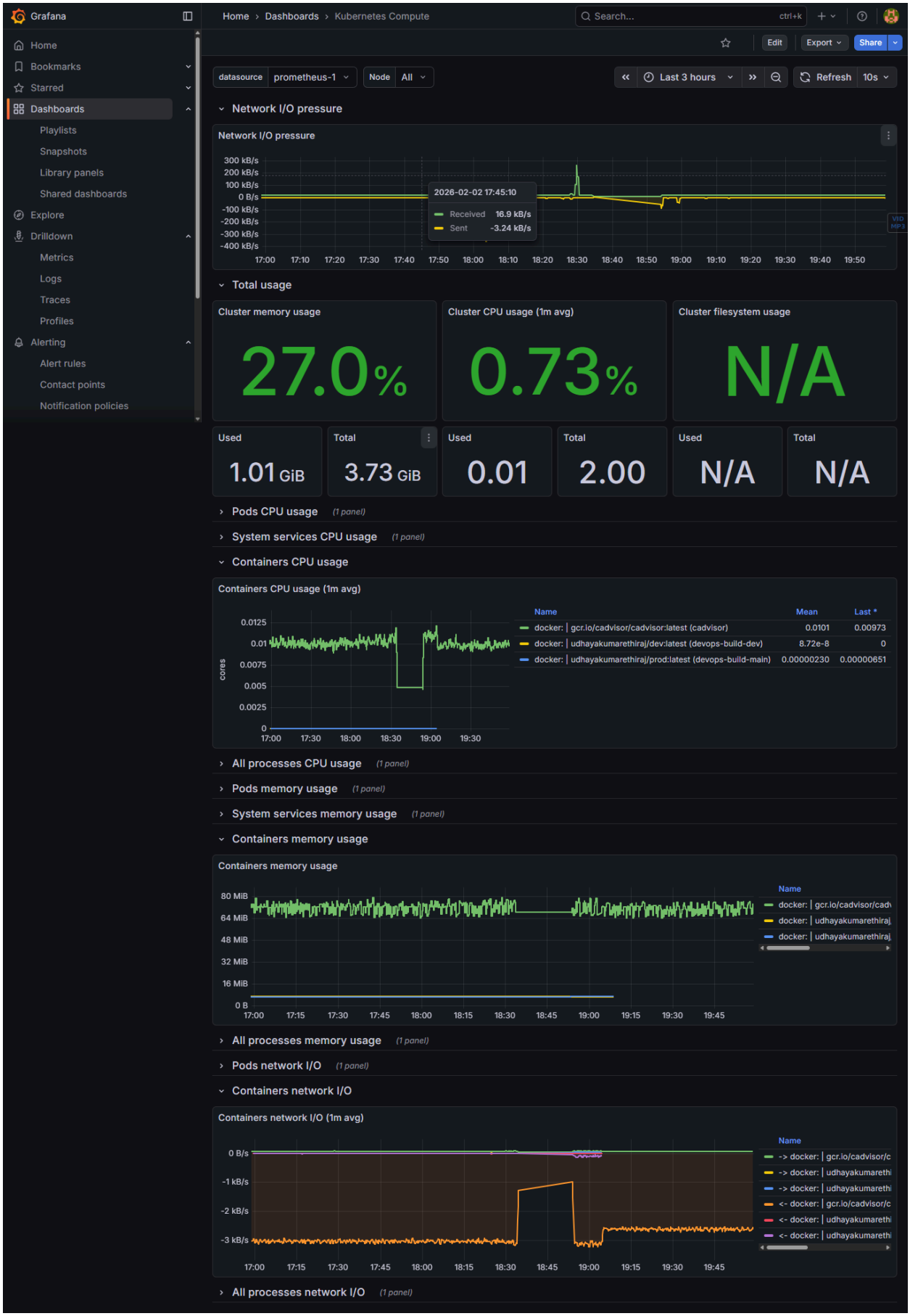
Cloudwatch Logs for Code Build



Grafana Monitoring




Grafana
Home
Bookmarks
Starred
Dashboards
Playlists
Snapshots
Library panels
Shared dashboards
Explore
Drilldown
Metrics
Logs
Traces
Profiles
Alerting
Alert rules
Contact points
Notification policies
Home › Dashboards › Node Exporter Full
Search...
ctrl+k
Edit
Export
Share
Datasource
prometheus-1
GitHub
Grafana
Last 24 hours
Refresh
1m
Job
node-exporter
Nodename
ip-192-168-9-56.ap-south-1.compute.internal
Instance
a9256f957d86340cca4526554991e02e-1184109852.ap-south-1.elb.amazonaws.com:9100
Quick CPU / Mem / Disk
Pres...
CPU
0.5%
Mem
0.0%
I/O
0.0%
CPU ...
2.1%
Sys ...
9.0%
RAM...
30.9%
SWA...
N/A
Percentage of swap space currently used by the system
Root ...
4.4%
CP...
2
RA...
2 GiB
SW...
0 B
Ro...
80 GiB
Uptime
10.0 hours
Basic CPU / Mem / Net / Disk
CPU Basic
100%
80%
60%
40%
20%
0%
21:00
00:00
03:00
06:00
09:00
12:00
15:00
18:00
Busy System
Busy User
Busy Iowait
Busy IRQs
Busy Other
Idle
Memory Basic
2 GiB
1.75 GiB
1.50 GiB
1.25 GiB
1 GiB
768 MiB
512 MiB
256 MiB
0 B
Total
Used
Cache + Buffer
Free
Swap used
Network Traffic Basic
100 kb/s
50 kb/s
0 b/s
-50 kb/s
-100 kb/s
Rx eni0fba6dd7a8d
Rx eni12ee31a159a
Rx eni2bc37f4a687
Rx eni6a506ae947f
Rx eni783920faa6c
Rx eni84469b2f076
Rx eniceb88437f73
Rx ens5
Rx ens6
Rx ens7
Rx lo
Disk Space Used Basic
/
/boot/efi
/run
/tmp
CPU / Memory / Net / Disk (10 panels)
Memory Meminfo (12 panels)
Memory Vmstat (4 panels)
System Timesync (6 panels)
System Processes (6 panels)
System Misc (6 panels)
Hardware Misc (4 panels)
Systemd (4 panels)
Storage Disk (9 panels)
Storage Filesystem (4 panels)
Network Traffic (15 panels)
Network Sockstat (10 panels)
Network Netstat (12 panels)
Node Exporter (5 panels)


Grafana
Home
Bookmarks
Starred
Dashboards
Playlists
Snapshots
Library panels
Shared dashboards
Explore
Drilldown
Metrics
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All
Last 3 hours
Refresh
10s
Network I/O pressure
Network I/O pressure
300 kB/s
200 kB/s
100 kB/s
0 B/s
-100 kB/s
-200 kB/s
-300 kB/s
-400 kB/s
2026-02-02 17:45:10
Received 16.9 kB/s
Sent -3.24 kB/s
17:00 17:10 17:20 17:30 17:40 17:50 18:00 18:10 18:20 18:30 18:40 18:50 19:00 19:10 19:20 19:30 19:40 19:50
Total usage
Cluster memory usage
27.0%
Cluster CPU usage (1m avg)
0.73%
Cluster filesystem usage
N/A
Used
1.01 GiB
Total
3.73 GiB
Used
0.01
Total
2.00
Used
N/A
Total
N/A
Pods CPU usage (1 panel)
System services CPU usage (1 panel)
Containers CPU usage
Containers CPU usage (1m avg)
cores
0.0125
0.01
0.0075
0.005
0.0025
0
17:00 17:30 18:00 18:30 19:00 19:30
Name
Mean
Last *
docker: | gcr.io/cadvisor/cadvisor:latest (cadvisor) 0.0101 0.00973
docker: | udhayakumarethiraj/dev:latest (devops-build-dev) 8.72e-8 0
docker: | udhayakumarethiraj/prod:latest (devops-build-main) 0.00000230 0.00000651
All processes CPU usage (1 panel)
Pods memory usage (1 panel)
System services memory usage (1 panel)
Containers memory usage
Containers memory usage
80 MiB
64 MiB
48 MiB
32 MiB
16 MiB
0 B
17:00 17:15 17:30 17:45 18:00 18:15 18:30 18:45 19:00 19:15 19:30 19:45
Name
docker: | gcr.io/cadvisor/cadv
docker: | udhayakumarethiraj
docker: | udhayakumarethiraj
All processes memory usage (1 panel)
Pods network I/O (1 panel)
Containers network I/O
Containers network I/O (1m avg)
0 B/s
-1 kB/s
-2 kB/s
-3 kB/s
17:00 17:15 17:30 17:45 18:00 18:15 18:30 18:45 19:00 19:15 19:30 19:45
Name
-> docker: | gcr.io/cadvisor/c
-> docker: | udhayakumarethi
-> docker: | udhayakumarethi
<- docker: | gcr.io/cadvisor/c
<- docker: | udhayakumarethi
<- docker: | udhayakumarethi
All processes network I/O (1 panel)


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Node
All
Last 3 hours
Refresh
10s
Network I/O pressure
Network I/O pressure
Total usage
Cluster memory usage
27.0%
Cluster CPU usage (1m avg)
0.73%
Cluster filesystem usage
N/A
Used
1.01 GiB
Total
3.73 GiB
Used
0.01
Total
2.00
Used
N/A
Total
N/A
Pods CPU usage
System services CPU usage
Containers CPU usage
Containers CPU usage (1m avg)
All processes CPU usage
All processes CPU usage (1m avg)
Pods memory usage
System services memory usage
Containers memory usage
Containers memory usage
All processes memory usage
All processes memory usage
Pods network I/O
Containers network I/O
Containers network I/O (1m avg)
All processes network I/O
All processes network I/O (1m avg)