Task 3 – Monitoring, Logging & Incident Response Runbook

Description:
This task focuses on implementing monitoring, logging, and incident response for a containerized application to ensure reliability and system observability. The objective is to detect failures early, visualize system health, and respond to incidents in a structured manner. Industry-standard monitoring tools were used to simulate real production-like scenarios.

Overview of the Task:
A FastAPI application was instrumented with Prometheus metrics and deployed using Docker Compose. Prometheus was configured to scrape metrics, while Grafana was used to visualize data and configure alerts. An incident response runbook was prepared and tested by simulating service failures and recovery.

Tools & Technologies Used:
- FastAPI
- Docker & Docker Compose
- Prometheus
- Grafana
- Linux shell commands

Monitoring & Logging Workflow:
1. Exposed application metrics using the /metrics endpoint.
2. Configured Prometheus to scrape application metrics.
3. Connected Prometheus as a data source in Grafana.
4. Created Grafana dashboards for request count and latency.
5. Configured alert rules to detect service downtime.
6. Collected application logs using Docker logging.
7. Simulated incidents and validated alert behavior.

Commands Used:
docker compose up --build
docker ps
docker compose stop app
docker compose start app
docker logs fastapi_app

Configuration Files:
- prometheus.yml
- docker-compose.yml
- Dockerfile
- application source code

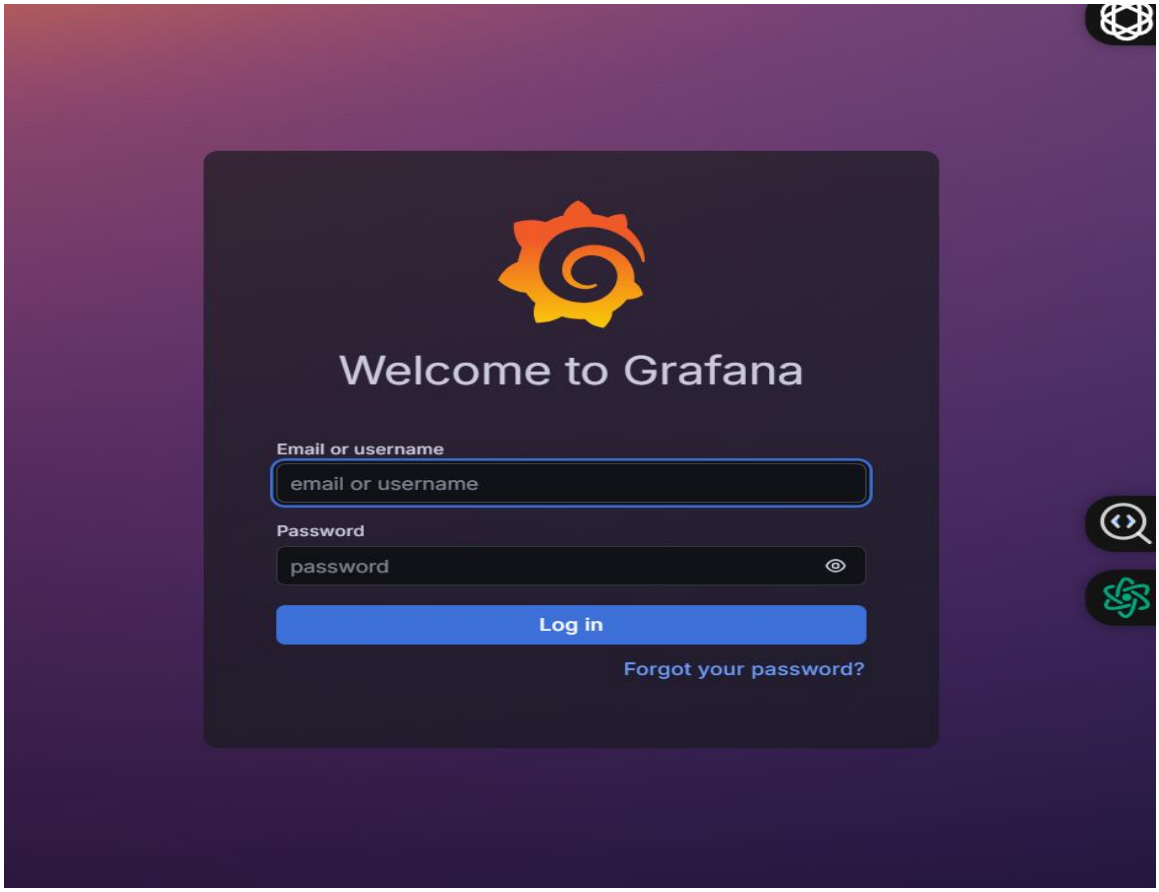
Incident Response Runbook:
Incident: FastAPI Service Down
Detection:
Alert changes to FIRING state in Grafana.

Mitigation:
Restart the affected service using Docker Compose.

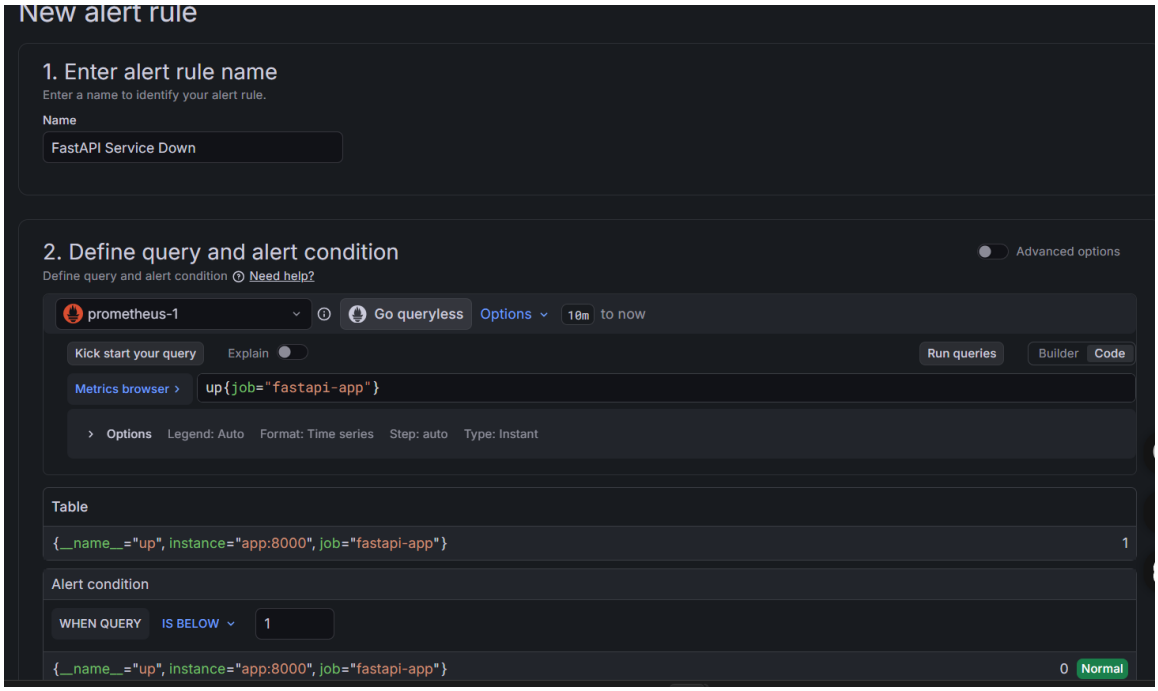
Verification:
Confirm alert returns to Normal state and metrics resume in Grafana dashboards.

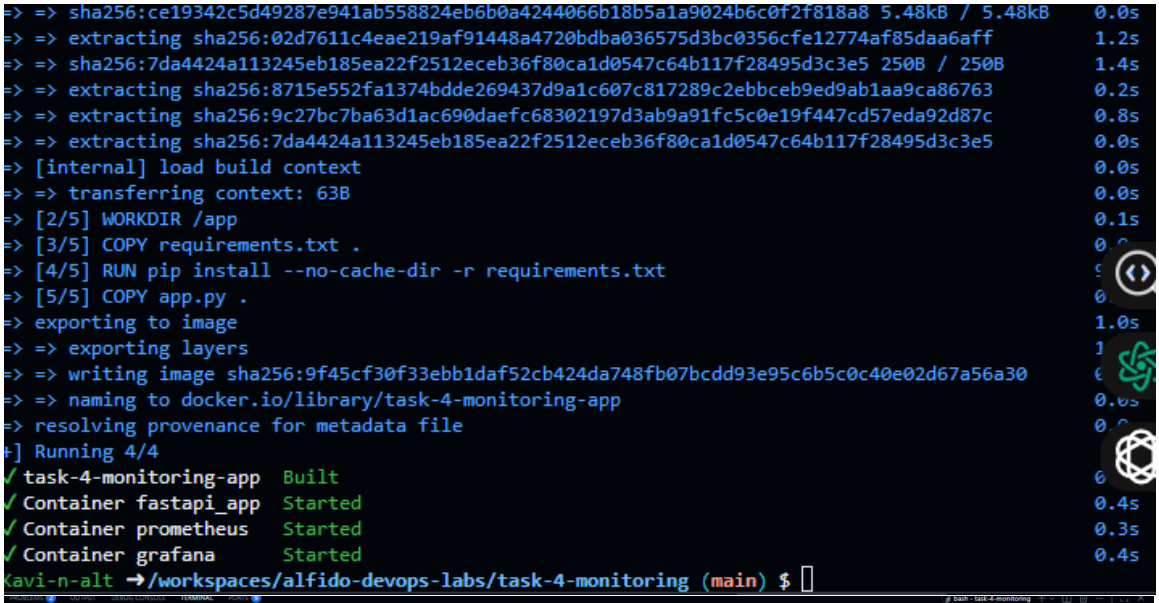
Outcome:
Monitoring dashboards, alerts, and logging were successfully implemented and tested. This task improved understanding of observability, alerting workflows, and incident response practices in DevOps environments.

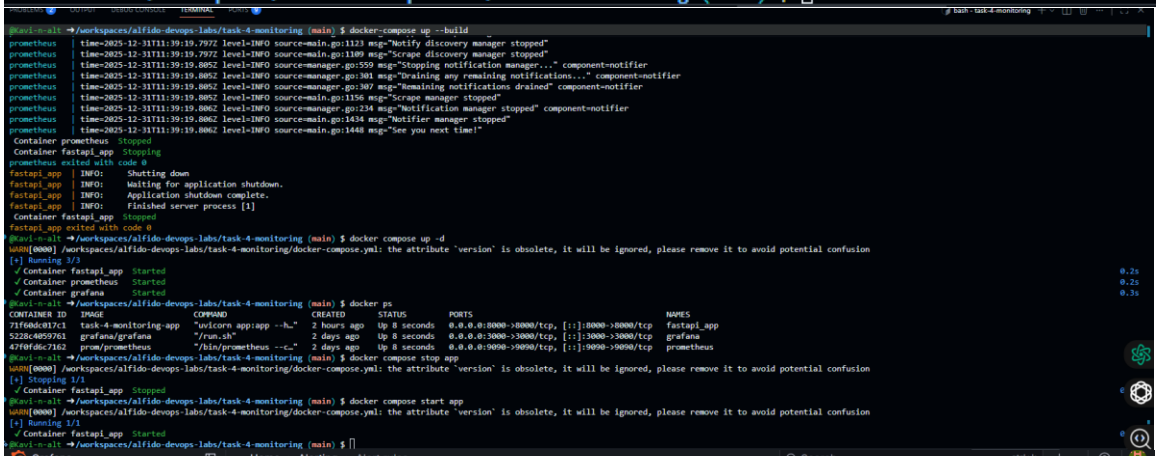
GitHub Repository:
https://github.com/Kavi-n-alt/alfido-devops-labs

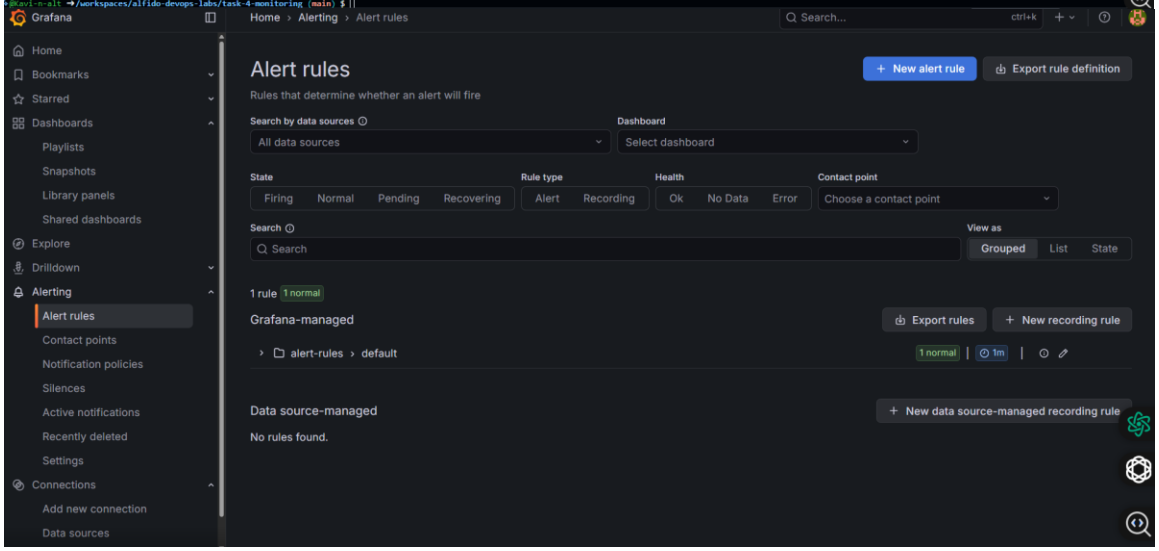

Welcome to Grafana
Email or username
email or username
Password
password
Log in
Forgot your password?

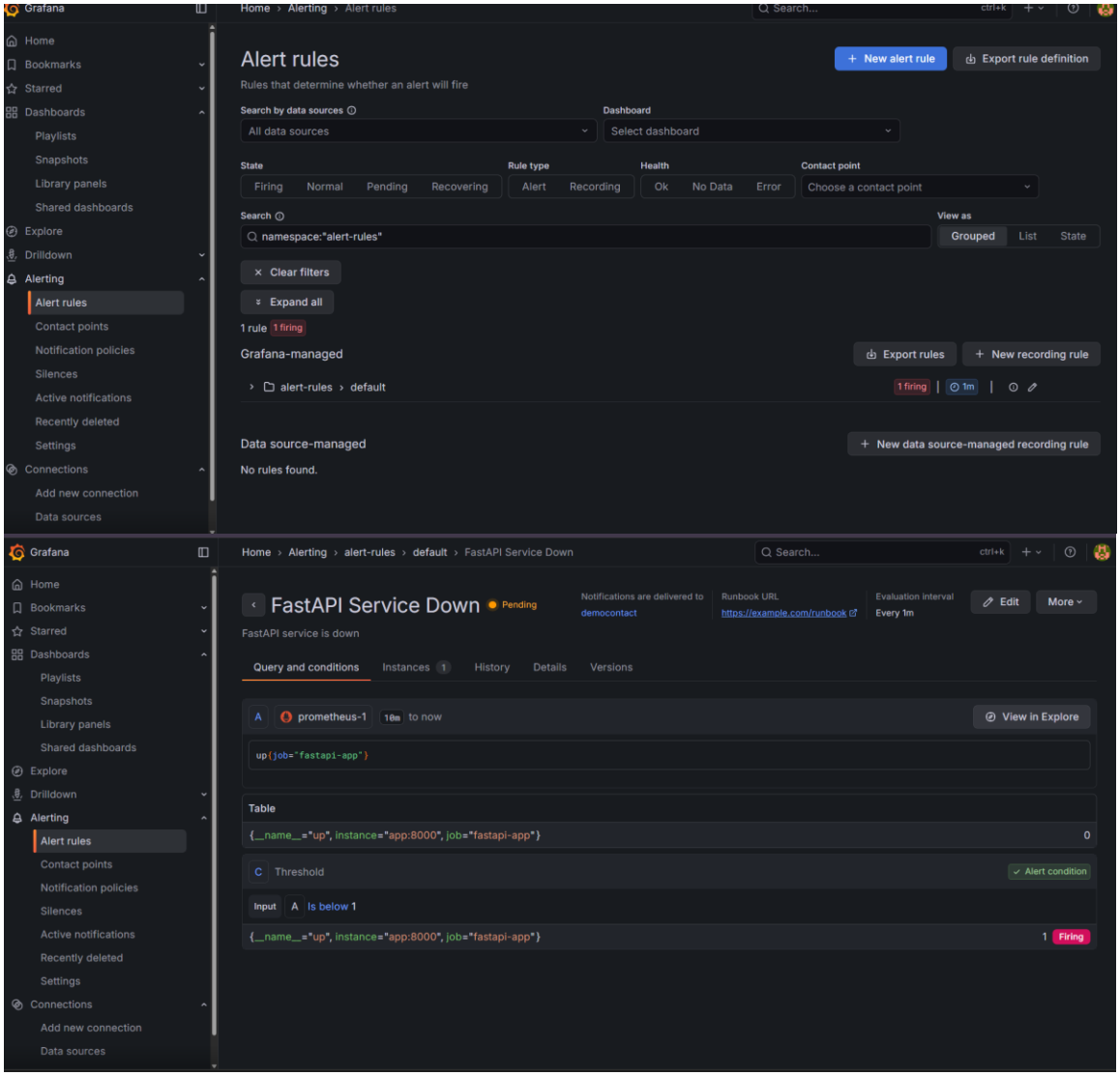
]


New alert rule
1. Enter alert rule name
Enter a name to identify your alert rule.
Name
FastAPI Service Down
2. Define query and alert condition
Define query and alert condition Need help?
Advanced options
prometheus-1
Go queryless
Options
10m
to now
Kick start your query
Explain
Run queries
Builder
Code
Metrics browser
up{job="fastapi-app"}
Options
Legend: Auto
Format: Time series
Step: auto
Type: Instant
Table
{__name__="up", instance="app:8000", job="fastapi-app"}
1
Alert condition
WHEN QUERY
IS BELOW
1
{__name__="up", instance="app:8000", job="fastapi-app"}
0
Normal

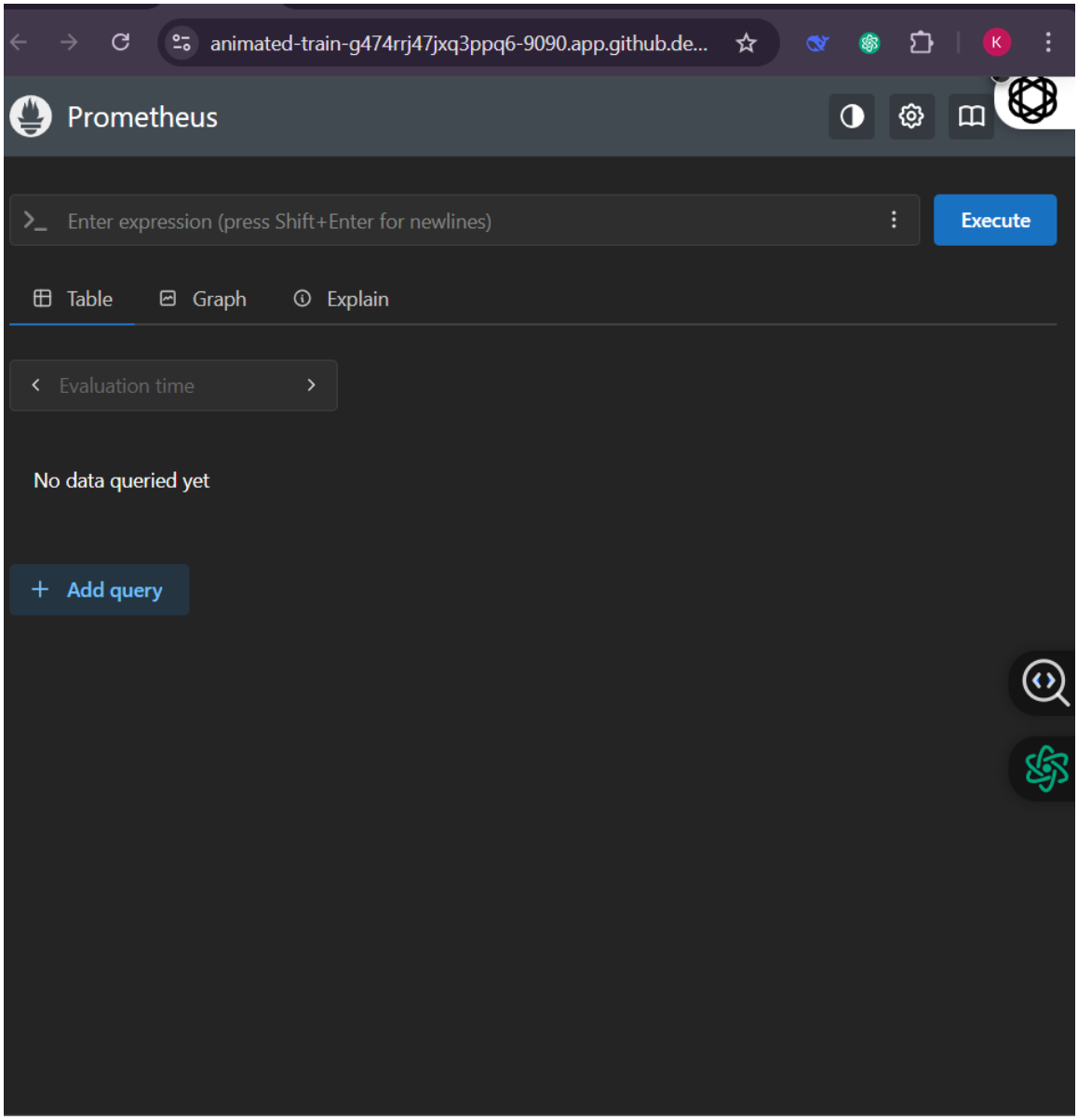

=> => sha256:ce19342c5d49287e941ab558824eb6b0a4244066b18b5a1a9024b6c0f2f818a8 5.48kB / 5.48kB 0.0s
=> => extracting sha256:02d7611c4eae219af91448a4720bdba036575d3bc0356cfe12774af85daa6aff 1.2s
=> => sha256:7da4424a113245eb185ea22f2512eceb36f80ca1d0547c64b117f28495d3c3e5 250B / 250B 1.4s
=> => extracting sha256:8715e552fa1374bdde269437d9a1c607c817289c2ebbceb9ed9ab1aa9ca86763 0.2s
=> => extracting sha256:9c27bc7ba63d1ac690daefc68302197d3ab9a91fc5c0e19f447cd57eda92d87c 0.8s
=> => extracting sha256:7da4424a113245eb185ea22f2512eceb36f80ca1d0547c64b117f28495d3c3e5 0.0s
=> [internal] load build context 0.0s
=> => transferring context: 63B 0.0s
=> [2/5] WORKDIR /app 0.1s
=> [3/5] COPY requirements.txt . 0.
=> [4/5] RUN pip install --no-cache-dir -r requirements.txt
=> [5/5] COPY app.py . 0.
=> exporting to image 1.0s
=> => exporting layers 1
=> => writing image sha256:9f45cf30f33ebb1daf52cb424da748fb07bcdd93e95c6b5c0c40e02d67a56a30
=> => naming to docker.io/library/task-4-monitoring-app 0.0s
=> resolving provenance for metadata file 0.
+] Running 4/4
✓ task-4-monitoring-app Built 0
✓ Container fastapi_app Started 0.4s
✓ Container prometheus Started 0.3s
✓ Container grafana Started 0.4s
Xavi-n-alt ➜ /workspaces/alfido-devops-labs/task-4-monitoring (main) $

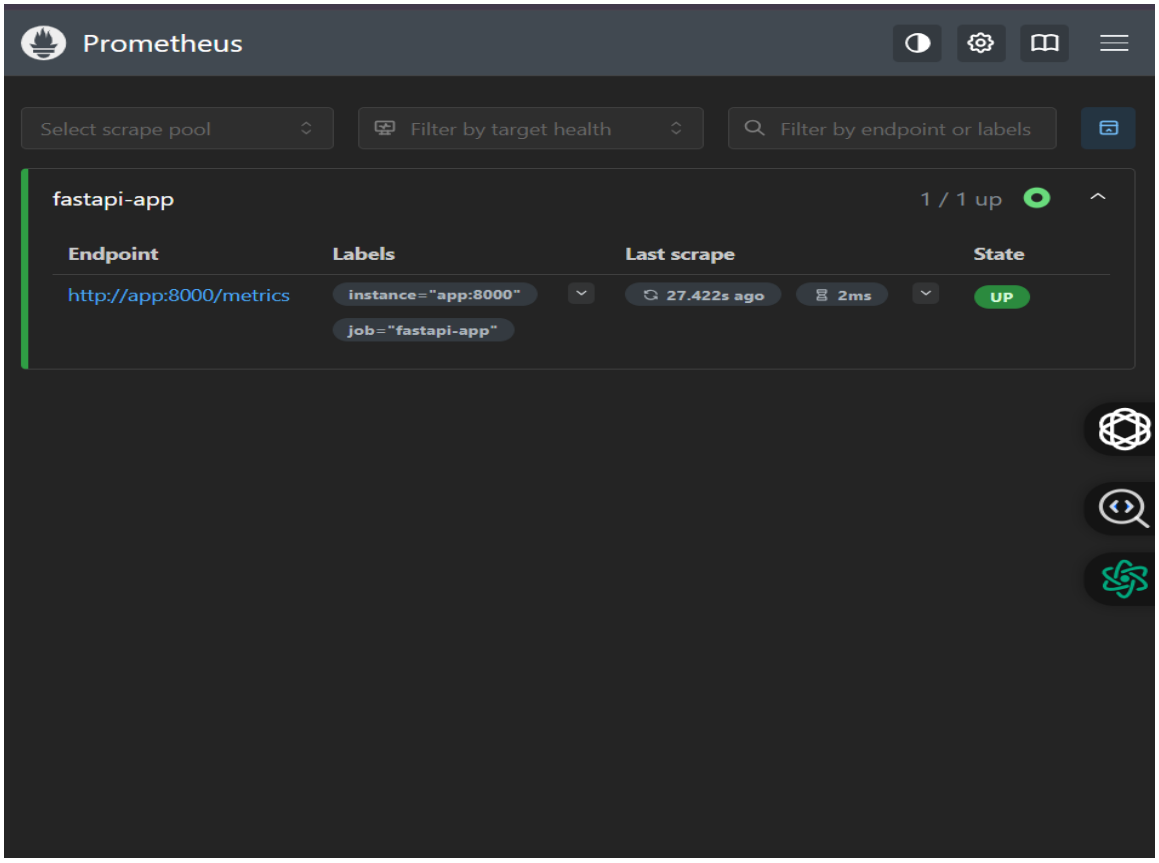

@Xavi-n-alt ➜/workspaces/alfido-devops-labs/task-4-monitoring (main) $ docker-compose up --build
prometheus | time=2025-12-31T11:39:19.797Z level=INFO source=main.go:1123 msg="Notify discovery manager stopped"
prometheus | time=2025-12-31T11:39:19.797Z level=INFO source=main.go:1109 msg="Scrape discovery manager stopped"
prometheus | time=2025-12-31T11:39:19.805Z level=INFO source=manager.go:559 msg="Stopping notification manager..." component=notifier
prometheus | time=2025-12-31T11:39:19.805Z level=INFO source=manager.go:301 msg="Draining any remaining notifications..." component=notifier
prometheus | time=2025-12-31T11:39:19.805Z level=INFO source=manager.go:307 msg="Remaining notifications drained" component=notifier
prometheus | time=2025-12-31T11:39:19.805Z level=INFO source=main.go:1156 msg="Scrape manager stopped"
prometheus | time=2025-12-31T11:39:19.806Z level=INFO source=manager.go:234 msg="Notification manager stopped" component=notifier
prometheus | time=2025-12-31T11:39:19.806Z level=INFO source=main.go:1434 msg="Notifier manager stopped"
prometheus | time=2025-12-31T11:39:19.806Z level=INFO source=main.go:1448 msg="See you next time!"
Container prometheus Stopped
Container fastapi_app Stopping
prometheus exited with code 0
fastapi_app | INFO: Shutting down
fastapi_app | INFO: Waiting for application shutdown.
fastapi_app | INFO: Application shutdown complete.
fastapi_app | INFO: Finished server process [1]
Container fastapi_app Stopped
fastapi_app exited with code 0
@Xavi-n-alt ➜/workspaces/alfido-devops-labs/task-4-monitoring (main) $ docker compose up -d
WARN[0000] /workspaces/alfido-devops-labs/task-4-monitoring/docker-compose.yml: the attribute `version` is obsolete, it will be ignored, please remove it to avoid potential confusion
[+] Running 3/3
✓ Container fastapi_app Started 0.2s
✓ Container prometheus Started 0.2s
✓ Container grafana Started 0.3s
@Xavi-n-alt ➜/workspaces/alfido-devops-labs/task-4-monitoring (main) $ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
71f60dc017c1 task-4-monitoring-app "uvicorn app:app --h…" 2 hours ago Up 8 seconds 0.0.0.0:8000->8000/tcp, [::]:8000->8000/tcp fastapi_app
5228c4059761 grafana/grafana "/run.sh" 2 days ago Up 8 seconds 0.0.0.0:3000->3000/tcp, [::]:3000->3000/tcp grafana
47f0fd6c7162 prom/prometheus "/bin/prometheus --c…" 2 days ago Up 8 seconds 0.0.0.0:9090->9090/tcp, [::]:9090->9090/tcp prometheus
@Xavi-n-alt ➜/workspaces/alfido-devops-labs/task-4-monitoring (main) $ docker compose stop app
WARN[0000] /workspaces/alfido-devops-labs/task-4-monitoring/docker-compose.yml: the attribute `version` is obsolete, it will be ignored, please remove it to avoid potential confusion
[+] Stopping 1/1
✓ Container fastapi_app Stopped
@Xavi-n-alt ➜/workspaces/alfido-devops-labs/task-4-monitoring (main) $ docker compose start app
WARN[0000] /workspaces/alfido-devops-labs/task-4-monitoring/docker-compose.yml: the attribute `version` is obsolete, it will be ignored, please remove it to avoid potential confusion
[+] Running 1/1
✓ Container fastapi_app Started
@Xavi-n-alt ➜/workspaces/alfido-devops-labs/task-4-monitoring (main) $

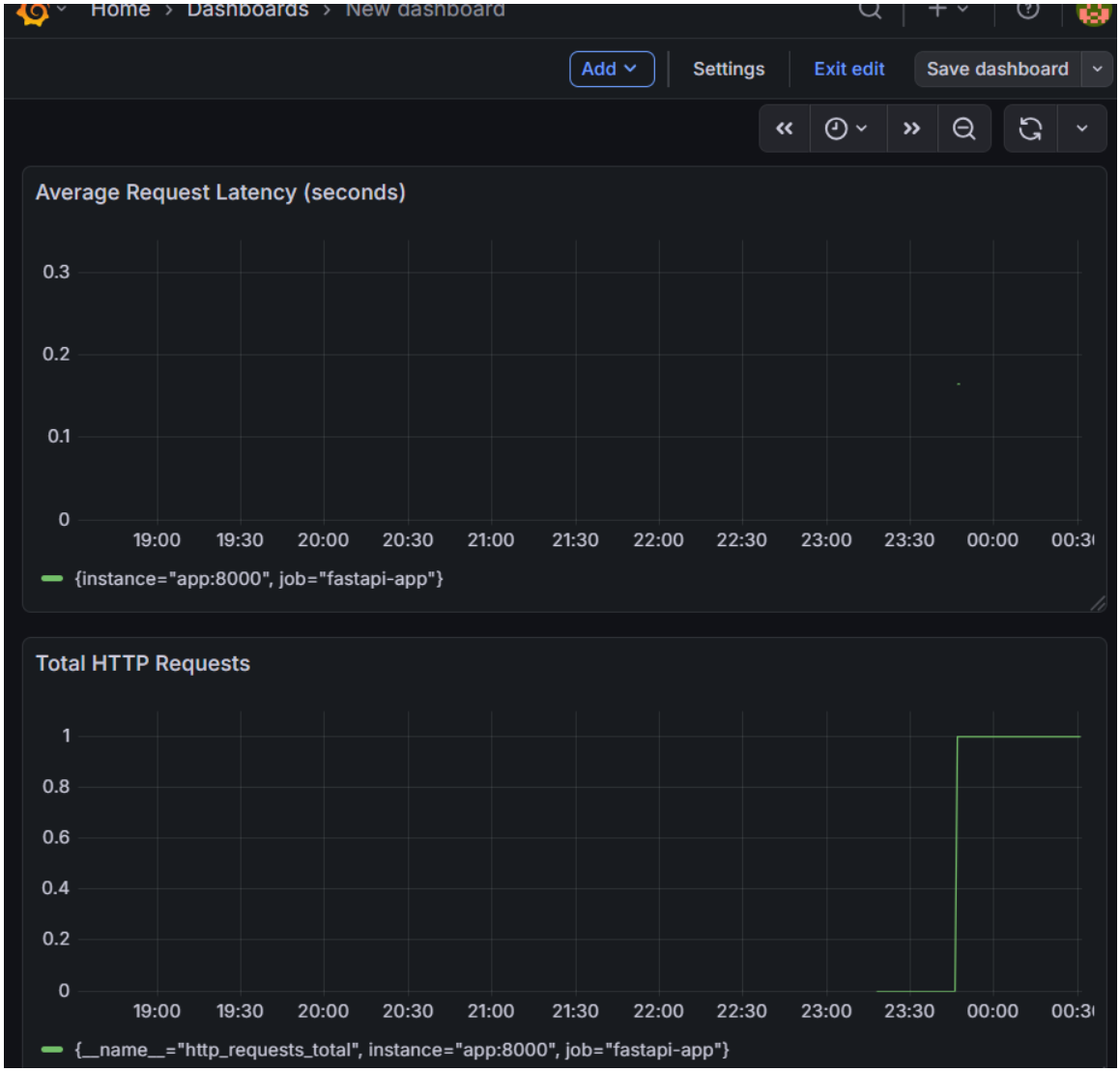

Grafana
Home › Alerting › Alert rules
Search... ctrl+k
Home
Bookmarks
Starred
Dashboards
Playlists
Snapshots
Library panels
Shared dashboards
Explore
Drilldown
Alerting
Alert rules
Contact points
Notification policies
Silences
Active notifications
Recently deleted
Settings
Connections
Add new connection
Data sources
Alert rules
Rules that determine whether an alert will fire
+ New alert rule
Export rule definition
Search by data sources
All data sources
Dashboard
Select dashboard
State
Firing Normal Pending Recovering
Rule type
Alert Recording
Health
Ok No Data Error
Contact point
Choose a contact point
Search
Search
View as
Grouped List State
1 rule 1 normal
Grafana-managed
Export rules
+ New recording rule
alert-rules › default
1 normal 1m
Data source-managed
+ New data source-managed recording rule
No rules found.

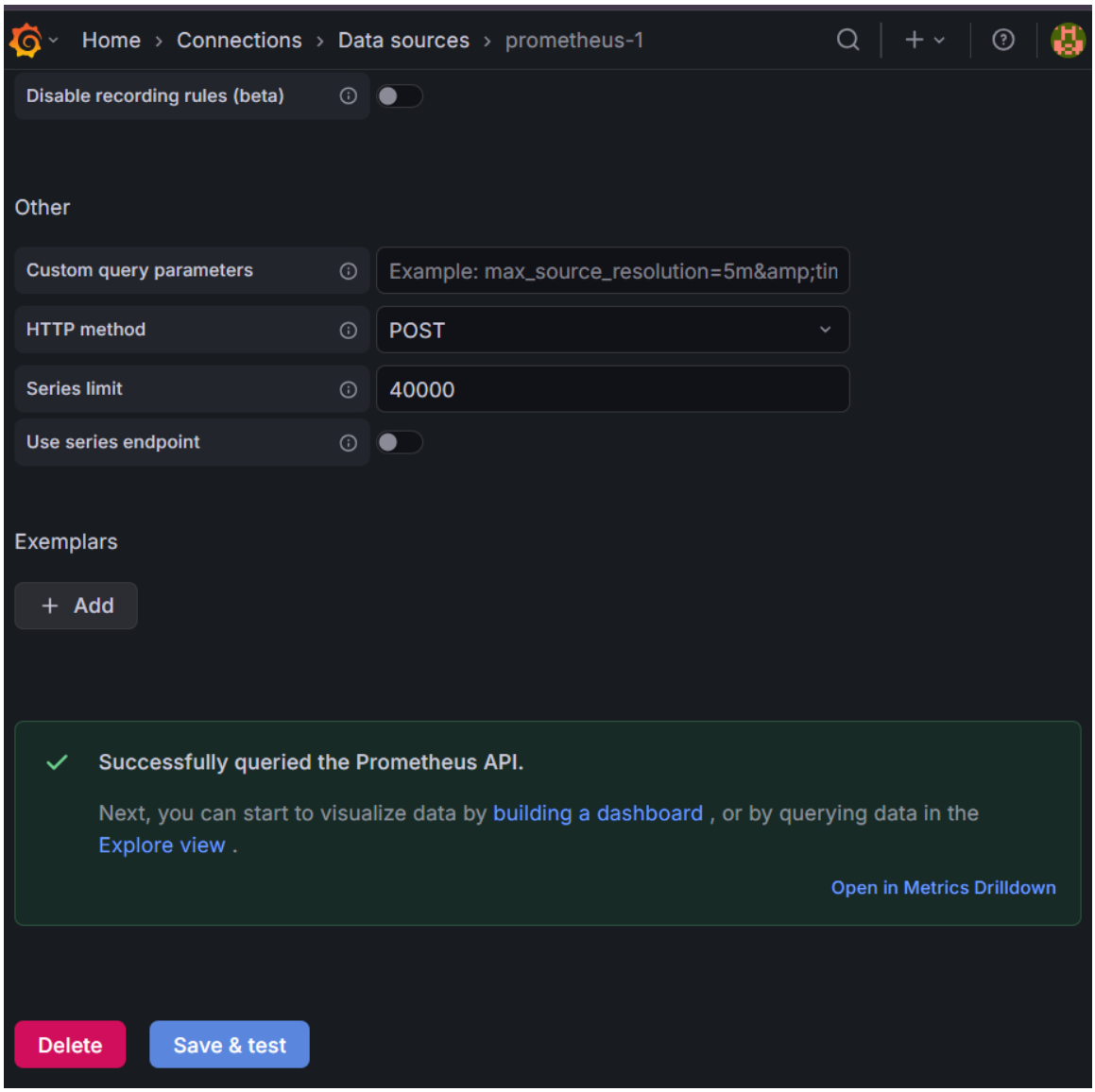

Grafana
Home › Alerting › Alert rules
Search...
ctrl+k
Home
Bookmarks
Starred
Dashboards
Playlists
Snapshots
Library panels
Shared dashboards
Explore
Drilldown
Alerting
Alert rules
Contact points
Notification policies
Silences
Active notifications
Recently deleted
Settings
Connections
Add new connection
Data sources
Alert rules
Rules that determine whether an alert will fire
New alert rule
Export rule definition
Search by data sources
All data sources
Dashboard
Select dashboard
State
Firing
Normal
Pending
Recovering
Rule type
Alert
Recording
Health
Ok
No Data
Error
Contact point
Choose a contact point
Search
namespace:"alert-rules"
View as
Grouped
List
State
Clear filters
Expand all
1 rule
1 firing
Grafana-managed
Export rules
New recording rule
alert-rules › default
1 firing
1m
Data source-managed
New data source-managed recording rule
No rules found.

Grafana
Home › Alerting › alert-rules › default › FastAPI Service Down
Search...
ctrl+k
Home
Bookmarks
Starred
Dashboards
Playlists
Snapshots
Library panels
Shared dashboards
Explore
Drilldown
Alerting
Alert rules
Contact points
Notification policies
Silences
Active notifications
Recently deleted
Settings
Connections
Add new connection
Data sources
FastAPI Service Down
Pending
Notifications are delivered to
democontact
Runbook URL
https://example.com/runbook
Evaluation interval
Every 1m
Edit
More
FastAPI service is down
Query and conditions
Instances 1
History
Details
Versions
A
prometheus-1
10m
to now
View in Explore
up{job="fastapi-app"}
Table
{__name__="up", instance="app:8000", job="fastapi-app"}
0
C
Threshold
Alert condition
Input
A
Is below 1
{__name__="up", instance="app:8000", job="fastapi-app"}
1
Firing


animated-train-g474rrj47jxq3ppq6-9090.app.github.de...
Prometheus
Enter expression (press Shift+Enter for newlines)
Execute
Table
Graph
Explain
Evaluation time
No data queried yet
Add query


Prometheus
Select scrape pool
Filter by target health
Filter by endpoint or labels
fastapi-app
1 / 1 up
Endpoint
Labels
Last scrape
State
http://app:8000/metrics
instance="app:8000"
job="fastapi-app"
27.422s ago
2ms
UP


Home › Dashboards › New dashboard
Add
Settings
Exit edit
Save dashboard
Average Request Latency (seconds)
0.3
0.2
0.1
0
19:00
19:30
20:00
20:30
21:00
21:30
22:00
22:30
23:00
23:30
00:00
{instance="app:8000", job="fastapi-app"}
Total HTTP Requests
1
0.8
0.6
0.4
0.2
0
19:00
19:30
20:00
20:30
21:00
21:30
22:00
22:30
23:00
23:30
00:00
{__name__="http_requests_total", instance="app:8000", job="fastapi-app"}


Home › Connections › Data sources › prometheus-1
Disable recording rules (beta)
Other
Custom query parameters
Example: max_source_resolution=5m&tin
HTTP method
POST
Series limit
40000
Use series endpoint
Exemplars
+ Add
Successfully queried the Prometheus API.
Next, you can start to visualize data by building a dashboard , or by querying data in the Explore view .
Open in Metrics Drilldown
Delete
Save & test