

Prometheus and Grafana

Prometheus is an open-source system monitoring and alerting toolkit originally built at SoundCloud. It is now a standalone open source project . Prometheus joined the Cloud Native Computing Foundation in 2016 as the second hosted project, after Kubernetes.

Features,

1. a multi-dimensional data model with time series data identified by metric name and key/value pairs
2. PromQL, a flexible query language to leverage this dimensionality
3. no reliance on distributed storage; single server nodes are autonomous
4. time series collection happens via a pull model over HTTP
5. pushing time series is supported via an intermediary gateway
6. targets are discovered via service discovery or static configuration
7. multiple modes of graphing and dashboarding support

Prometheus Installation:

Username Creation:

```
sudo useradd \  
--system \  
--no-create-home \  
--shell /bin/false Prometheus
```

Commands:

```
wget  
https://github.com/prometheus/prometheus/releases/download/v2.47.1/prometheus-  
2.47.1.linux-amd64.tar.gz  
  
tar -xvf prometheus-2.47.1.linux-amd64.tar.gz  
  
sudo mkdir -p /data /etc/prometheus  
  
cd prometheus-2.47.1.linux-amd64/
```

```
sudo mv prometheus promtool /usr/local/bin/
```

```
sudo mv consoles/ console_libraries/ /etc/prometheus/
```

```
sudo mv prometheus.yml /etc/prometheus/prometheus.yml
```

```
sudo chown -R prometheus:prometheus /etc/prometheus/ /data/
```

```
cd
```

```
rm -rf prometheus-2.47.1.linux-amd64.tar.gz
```

```
prometheus --version
```

```
sudo vim /etc/systemd/system/prometheus.service
```

```
pcubuntu@PraneshPC: ~$ ls -l /usr/local/bin/prometheus
-rwxr-xr-x 1 pcubuntu pcubuntu 124158156 Oct  4 2023 /usr/local/bin/prometheus
pcubuntu@PraneshPC: ~$ sudo chown prometheus:prometheus /usr/local/bin/prometheus
pcubuntu@PraneshPC: ~$ sudo chown -R prometheus:prometheus /etc/prometheus /var/lib/prometheus /data
sudo chmod -R 775 /etc/prometheus /var/lib/prometheus /data
chown: cannot access '/var/lib/prometheus': No such file or directory
chmod: cannot access '/var/lib/prometheus': No such file or directory
pcubuntu@PraneshPC: ~$ sudo mkdir -p /var/lib/prometheus
sudo chown -R prometheus:prometheus /var/lib/prometheus
sudo chmod -R 775 /var/lib/prometheus
pcubuntu@PraneshPC: ~$ sudo mkdir -p /data
sudo chown -R prometheus:prometheus /data
sudo chmod -R 775 /data
pcubuntu@PraneshPC: ~$ sudo systemctl daemon-reload
sudo systemctl restart prometheus
sudo systemctl status prometheus
● prometheus.service - Prometheus
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-03-22 06:52:34 UTC; 8ms ago
     Main PID: 45993 (prometheus)
        Tasks: 6 (limit: 9369)
       Memory: 3.0M (0)
      CGroup: /system.slice/prometheus.service
              └─45993 /usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.yml --storage.tsdb.path=/data --web.console.templates=/
Mar 22 06:52:34 PraneshPC systemd[1]: Started prometheus.service - Prometheus.
pcubuntu@PraneshPC: ~$ sudo systemctl enable prometheus
sudo systemctl start prometheus
sudo systemctl status prometheus
journalctl -u prometheus -f --no-pager
● prometheus.service - Prometheus
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-03-22 06:52:34 UTC; 51s ago
     Main PID: 45993 (prometheus)
        Tasks: 16 (limit: 9369)
       Memory: 24.9M (0)
      CGroup: /system.slice/prometheus.service
              └─45993 /usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.yml --storage.tsdb.path=/data --web.console.templates=/
```

```
pcubuntu@PraneshPC: ~$ wget https://github.com/prometheus/node_exporter/releases/download/v1.6.1/node_exporter-1.6.1.linux-amd64.tar.gz
tar -xvf node_exporter-1.6.1.linux-amd64.tar.gz
--2025-03-22 06:54:04-- https://github.com/prometheus/node_exporter/releases/download/v1.6.1/node_exporter-1.6.1.linux-amd64.tar.gz
Resolving github.com (github.com)... 20.207.73.82
Connecting to github.com (github.com)[20.207.73.82]:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/5509b569-5c34-471e-8598-c05c0733bb7f?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=releaseassetproduction%2F20250322%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20250322T065407Z&X-Amz-Expires=300&X-Amz-Signature=e0e2b206b56ec27c7ded46ef17c214aaa09ae69f3d4de6289a86456d703f032c&X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dnode_exporter-1.6.1.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream [following]
--2025-03-22 06:54:05-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/5509b569-5c34-471e-8598-c05c0733bb7f?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=releaseassetproduction%2F20250322%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20250322T065407Z&X-Amz-Expires=300&X-Amz-Signature=e0e2b206b56ec27c7ded46ef17c214aaa09ae69f3d4de6289a86456d703f032c&X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dnode_exporter-1.6.1.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.108.133, 185.199.111.133, 185.199.110.133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)|185.199.108.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 10368103 (9.9M) [application/octet-stream]
Saving to: 'node_exporter-1.6.1.linux-amd64.tar.gz'

node_exporter-1.6.1.linux-amd64.tar 100%[=====] 9.89M 2.99MB/s in 3.3s

2025-03-22 06:54:10 (2.99 MB/s) - 'node_exporter-1.6.1.linux-amd64.tar.gz' saved [10368103/10368103]

node_exporter-1.6.1.linux-amd64/
node_exporter-1.6.1.linux-amd64/NOTICE
node_exporter-1.6.1.linux-amd64/node_exporter
node_exporter-1.6.1.linux-amd64/LICENSE
pcubuntu@PraneshPC: ~$ sudo mv \
node_exporter-1.6.1.linux-amd64/node_exporter \
/usr/local/bin/
pcubuntu@PraneshPC: ~$ rm -rf node_exporter*
pcubuntu@PraneshPC: ~$ node_exporter --version
node_exporter, version 1.6.1 (branch: HEAD, revision: 4a1b77600c1873a8233f3ff55afcedbb63b8d84)
 build user: root@0586879db11e5
 build date: 20230717-12:10:52
 go version: go1.20.6
 platform: linux/amd64
 tags: netgo osusergo static_build
pcubuntu@PraneshPC: ~$ sudo vim /etc/systemd/system/node_exporter.service
```

Prometheus.service:

[Unit]

Description=Prometheus

Wants=network-online.target

After=network-online.target

StartLimitIntervalSec=500

StartLimitBurst=5

[Service]

User=prometheus

Group=prometheus

Type=simple

Restart=on-failure

RestartSec=5s

ExecStart=/usr/local/bin/prometheus \

--config.file=/etc/prometheus/prometheus.yml \

--storage.tsdb.path=/data \

--web.console.templates=/etc/prometheus/consoles \

--web.console.libraries=/etc/prometheus/console_libraries \

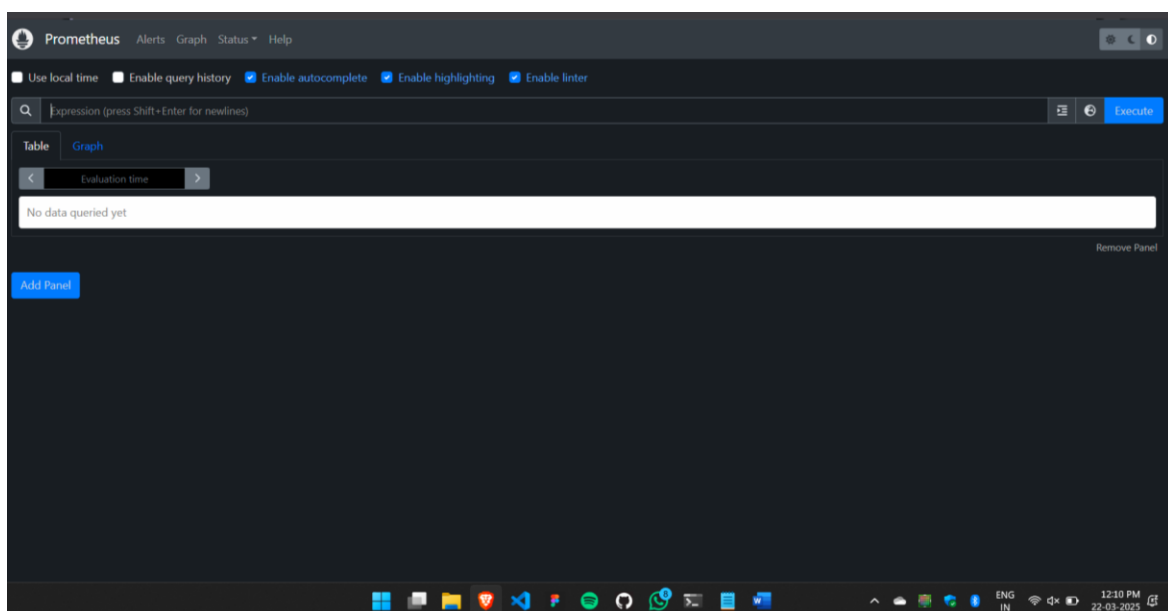
--web.listen-address=0.0.0.0:9090 \

--web.enable-lifecycle

[Install]

WantedBy=multi-user.target

```
pcubuntu@PraneshPC: ~  
prometheus-2.47.1.linux-amd64/consoles/node-overview.html  
prometheus-2.47.1.linux-amd64/promtool  
prometheus-2.47.1.linux-amd64/console_libraries/  
prometheus-2.47.1.linux-amd64/console_libraries/prom.lib  
prometheus-2.47.1.linux-amd64/console_libraries/menu.lib  
prometheus-2.47.1.linux-amd64/prometheus  
mv: cannot overwrite '/etc/prometheus/consoles': Directory not empty  
mv: cannot overwrite '/etc/prometheus/console_libraries': Directory not empty  
pcubuntu@PraneshPC: ~  
pcubuntu@PraneshPC: ~$ cd  
pcubuntu@PraneshPC: ~$ rm -rf prometheus-2.47.1.linux-amd64.tar.gz  
pcubuntu@PraneshPC: ~$ prometheus --version  
prometheus, version 2.47.1 (branch: HEAD, revision: c4d1a8beff37cc004f1dc4ab9d2e73193f51aaeb)  
  build user: root@4829330363be  
  build date: 20231004-10:31:16  
  go version: go1.21.1  
  platform: linux/amd64  
  tags: netgo,buildinassets,stringlabels  
pcubuntu@PraneshPC: ~$ sudo vim /etc/systemd/system/prometheus.service  
pcubuntu@PraneshPC: ~$ sudo systemctl enable prometheus  
sudo systemctl start prometheus  
sudo systemctl status prometheus  
journalctl -u prometheus -f --no-pager  
● prometheus.service - Prometheus  
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: enabled)  
   Active: active (running) since Sat 2025-03-22 06:52:34 UTC; 1h 1min ago  
   Main PID: 45993 (prometheus)  
     Tasks: 19 (limit: 9369)  
    Memory: 34.2M (-)  
   CGroup: /system.slice/prometheus.service  
           └─45993 /usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.yml --storage.tsdb.path=/data --web.console.templates=/etc/prometheus/consoles --web.console.libraries=/etc/prometheus/console_libraries  
Mar 22 06:52:34 PraneshPC prometheus[45993]: ts=2025-03-22T06:52:34.693Z caller=head.go:681 level=info component=tsdb msg="On-disk memory mapped successfully"  
Mar 22 06:52:34 PraneshPC prometheus[45993]: ts=2025-03-22T06:52:34.693Z caller=head.go:689 level=info component=tsdb msg="Replaying WAL, this may take a while"  
Mar 22 06:52:34 PraneshPC prometheus[45993]: ts=2025-03-22T06:52:34.695Z caller=head.go:760 level=info component=tsdb msg="WAL segment loaded"  
Mar 22 06:52:34 PraneshPC prometheus[45993]: ts=2025-03-22T06:52:34.695Z caller=head.go:797 level=info component=tsdb msg="WAL replay completed"  
Mar 22 06:52:34 PraneshPC prometheus[45993]: ts=2025-03-22T06:52:34.696Z caller=main.go:1045 level=info fs_type=EXT4_SUPER_MAGIC  
Mar 22 06:52:34 PraneshPC prometheus[45993]: ts=2025-03-22T06:52:34.696Z caller=main.go:1048 level=info msg="TSDB started"  
Mar 22 06:52:34 PraneshPC prometheus[45993]: ts=2025-03-22T06:52:34.696Z caller=main.go:1229 level=info msg="Loading configuration file" filename=/etc/prometheus/prometheus.yml  
Mar 22 06:52:34 PraneshPC prometheus[45993]: ts=2025-03-22T06:52:34.696Z caller=main.go:1266 level=info msg="Completed loading of configuration" filename=/etc/prometheus/prometheus.yml  
Mar 22 06:52:34 PraneshPC prometheus[45993]: ts=2025-03-22T06:52:34.696Z caller=main.go:1089 level=info msg="Server is ready to receive web requests"
```



Node Exporter:

Commands for installation:

```
sudo mv \  
node_exporter-1.6.1.linux-amd64/node_exporter \  
/usr/local/bin/  
rm -rf node_exporter*
```

Node exporter file:

[Unit]

Description=Node Exporter

Wants=network-online.target

After=network-online.target

StartLimitIntervalSec=500

StartLimitBurst=5

[Service]

User=node_exporter

Group=node_exporter

Type=simple

Restart=on-failure

RestartSec=5s

ExecStart=/usr/local/bin/node_exporter \
--collector.logind

[Install]

WantedBy=multi-user.target

Service check : sudo systemctl enable node_exporter

sudo systemctl start node_exporter

sudo systemctl status node_exporter

journalctl -u node_exporter -f --no-pager

```
# my global config
global:
  scrape_interval: 15s # Set the scrape interval to every 15 seconds. Default is every 1 minute.
  evaluation_interval: 15s # Evaluate rules every 15 seconds. The default is every 1 minute.
  # scrape_timeout is set to the global default (10s).

# Alertmanager configuration
alerting:
  alertmanagers:
    - static_configs:
        - targets:
            # - alertmanager:9093

# Load rules once and periodically evaluate them according to the global 'evaluation_interval'.
rule_files:
  # - "first_rules.yml"
  # - "second_rules.yml"

# A scrape configuration containing exactly one endpoint to scrape:
# Here it's Prometheus itself.
scrape_configs:
  # The job name is added as a label 'job=job_name' to any timeseries scraped from this config.
  - job_name: "prometheus"

    # metrics_path defaults to '/metrics'
    # scheme defaults to 'http'.

    static_configs:
      - targets: ["localhost:9090"]

  - job_name: "node_export"
    static_configs:
      - targets: ["localhost:9100"]

  - job_name: "jenkins"
    metrics_path: '/prometheus'
    static_configs:
      - targets: ["localhost:8080"]

...
...
...

"/etc/prometheus/prometheus.yml" 38L, 1132B
```

Reload Prometheus: `curl -X POST http://localhost:9090/-/reload`

Prometheus Alerts Graph Status Help

Targets

All scrape pools: All Unhealthy Collapse All Filter by endpoint or labels

jenkins (0/1 up) [Show logs](#)

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:8080/prometheus	Down	instance="localhost:8080" job="jenkins"	32.331s ago	6.208ms	server returned HTTP status 403 Forbidden

node_export (1/1 up) [Show logs](#)

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:9100/metrics	Up	instance="localhost:9100" job="node_export"	24.854s ago	38.140ms	

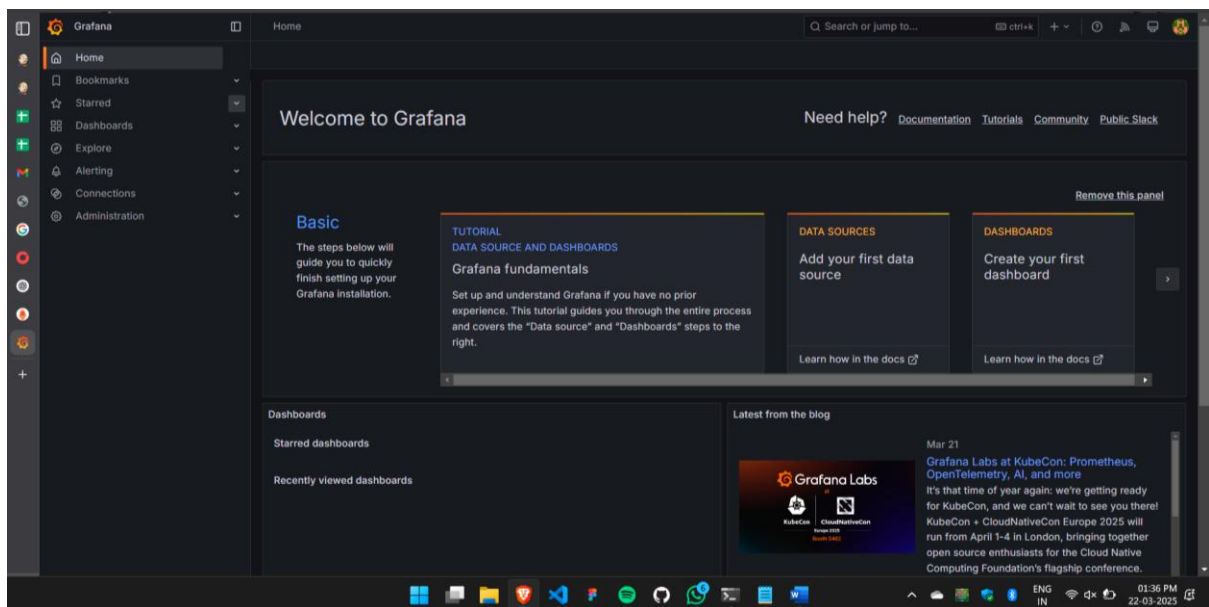
prometheus (1/1 up) [Show logs](#)

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:9090/metrics	Up	instance="localhost:9090" job="prometheus"	20.766s ago	5.218ms	

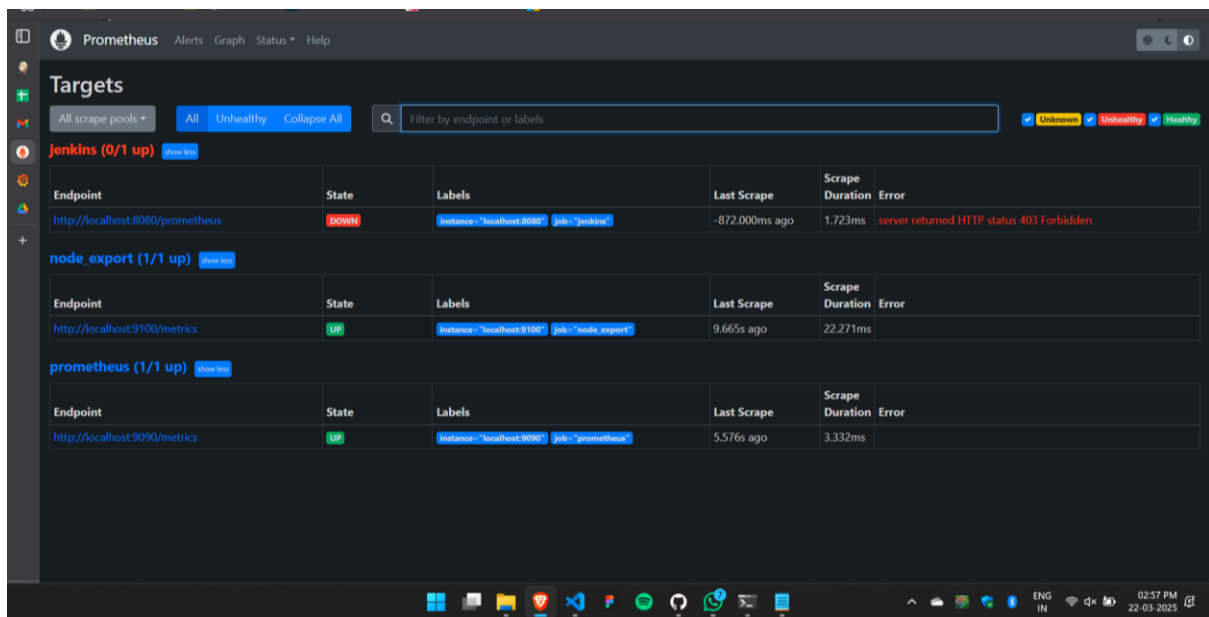
Grafana:

```
sudo apt-get install -y apt-transport-https software-properties-common  
wget -q -O - https://packages.grafana.com/gpg.key | sudo apt-key add -  
echo "deb https://packages.grafana.com/oss/deb stable main" | sudo tee -a  
/etc/apt/sources.list.d/grafana.list  
  
sudo apt-get update  
  
sudo apt-get -y install grafana  
  
sudo systemctl enable grafana-server  
  
sudo systemctl start grafana-server  
  
sudo systemctl status grafana-server
```

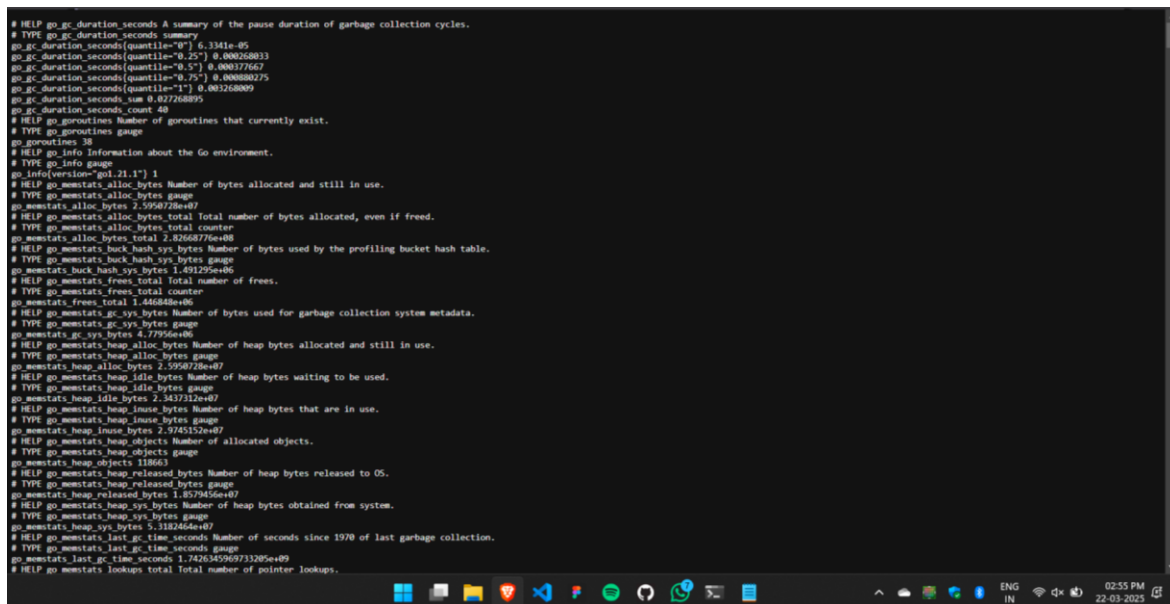
Grafana UI:



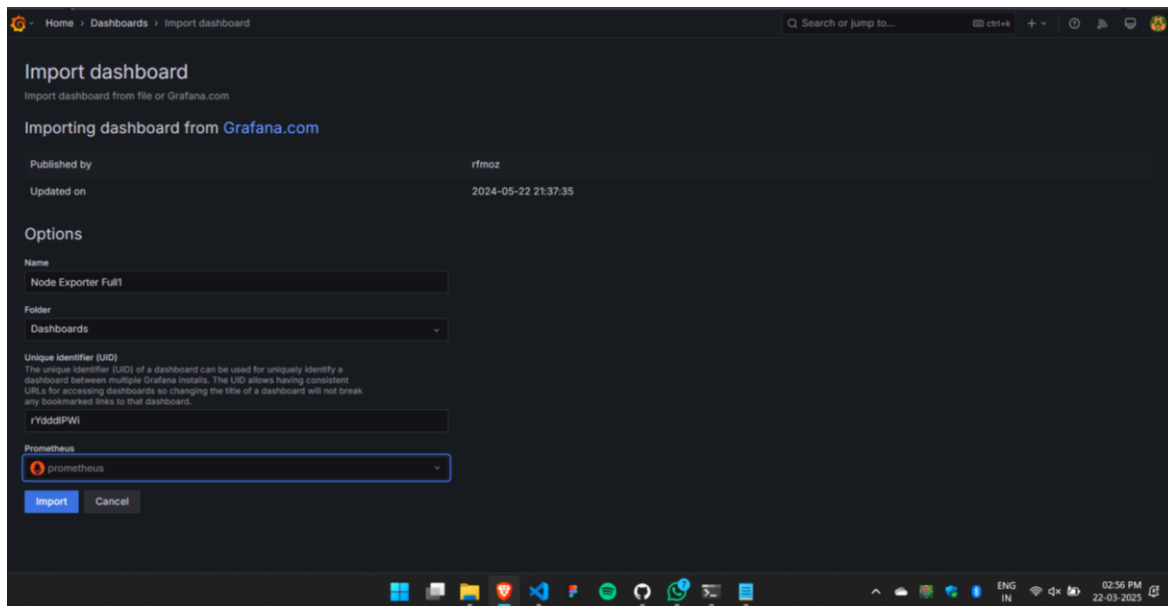
Status in promethues:



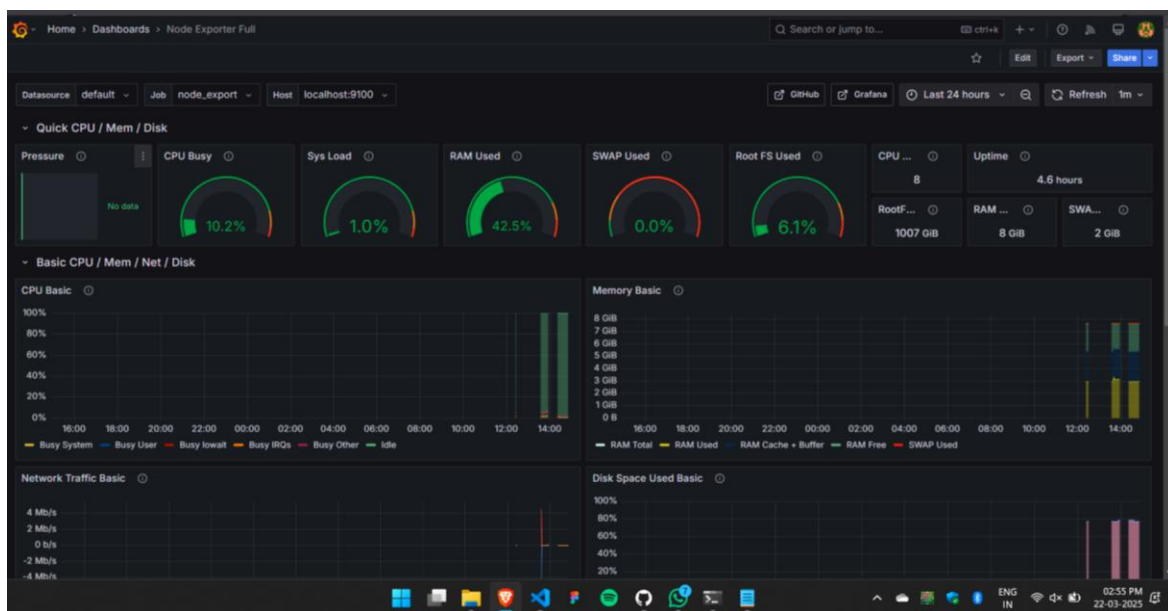
Metrics in Prometheus:

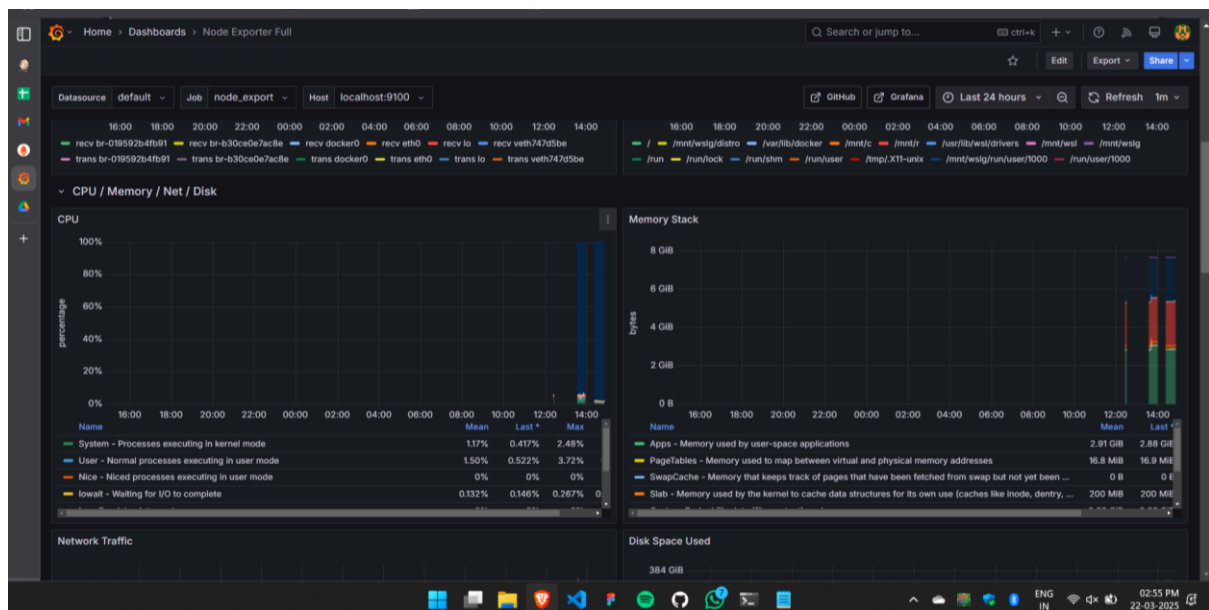


Node Exporter:



Dashboard:





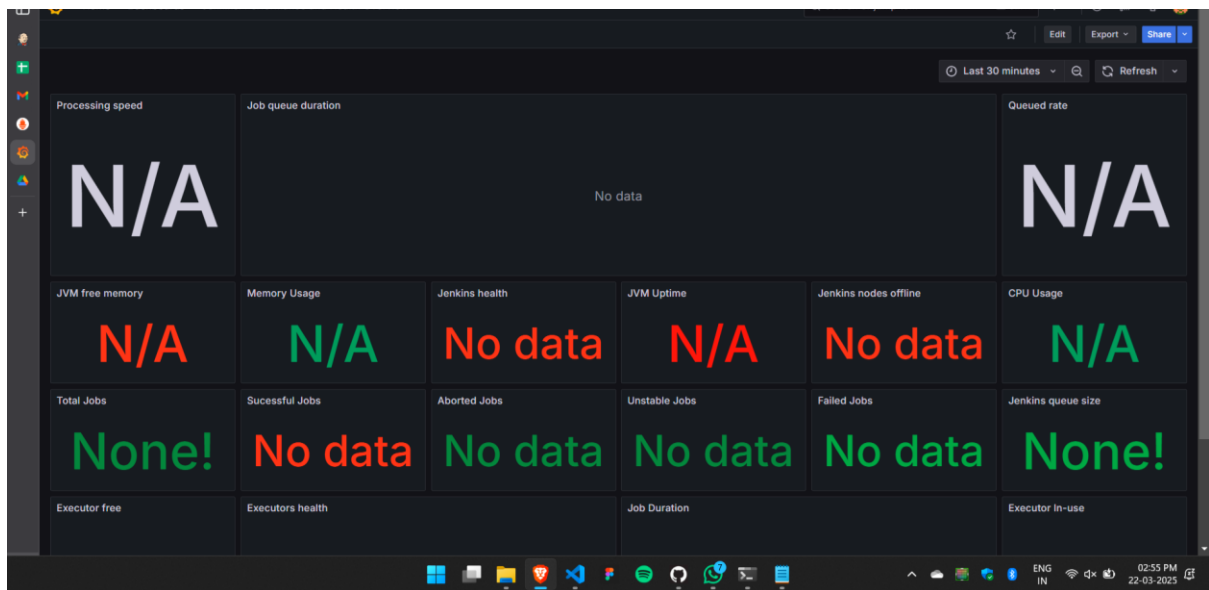
Jenkins Overview:

The image shows the 'Import dashboard' dialog box in Grafana. The dialog box is titled 'Import dashboard' and has a subtitle 'Import dashboard from file or Grafana.com'. It contains the following information:

- Published by**: haryan
- Updated on**: 2023-08-24 15:04:53
- Options**:
 - Name**: Jenkins: Performance and Health Overview1
 - Folder**: Dashboards
 - Unique Identifier (UID)**: haryan-jenkin
 - Prometheus**: prometheus

At the bottom of the dialog box, there are two buttons: 'Import' and 'Cancel'.

Dashboard:

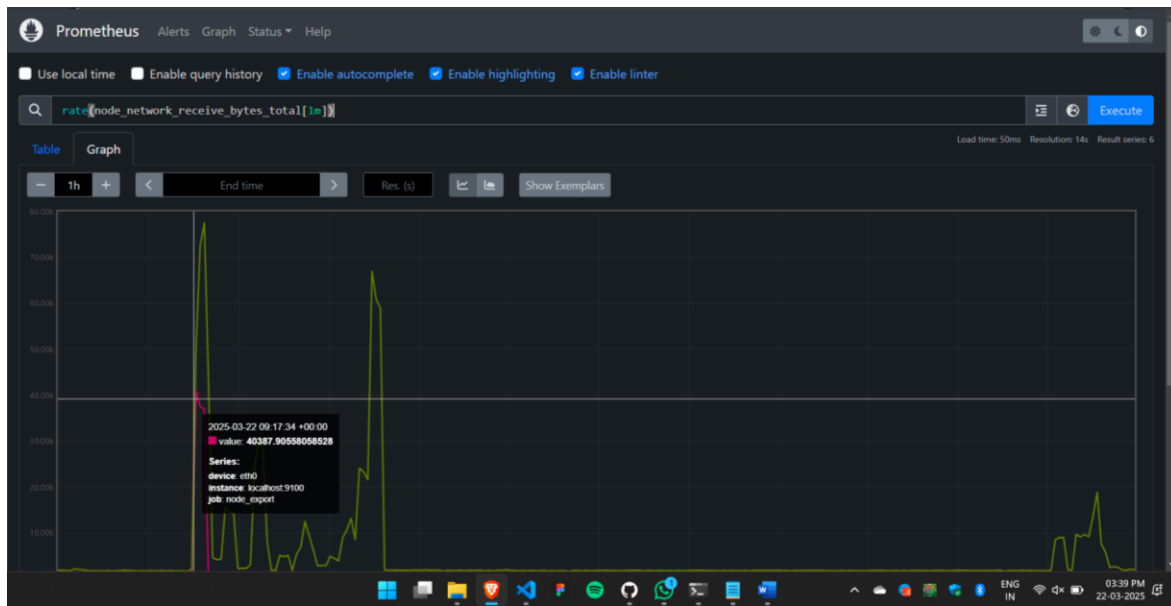


Prometheus analysis:

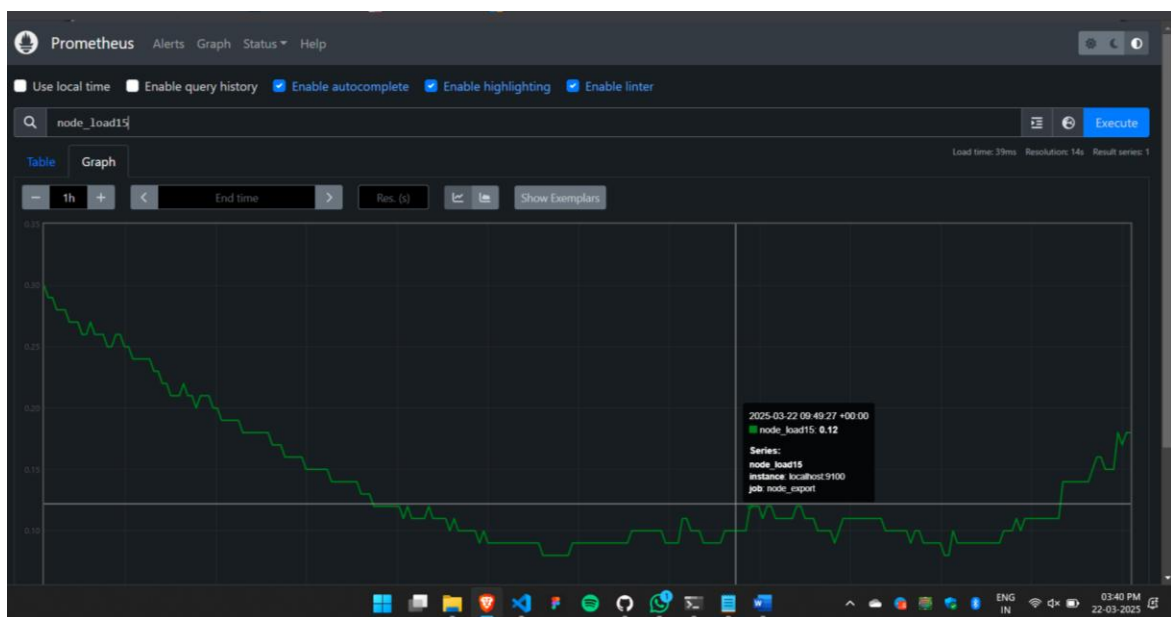
```
rate(node_cpu_seconds_total{mode="system"}[1m])
```



```
rate(node_network_receive_bytes_total[1m])
```

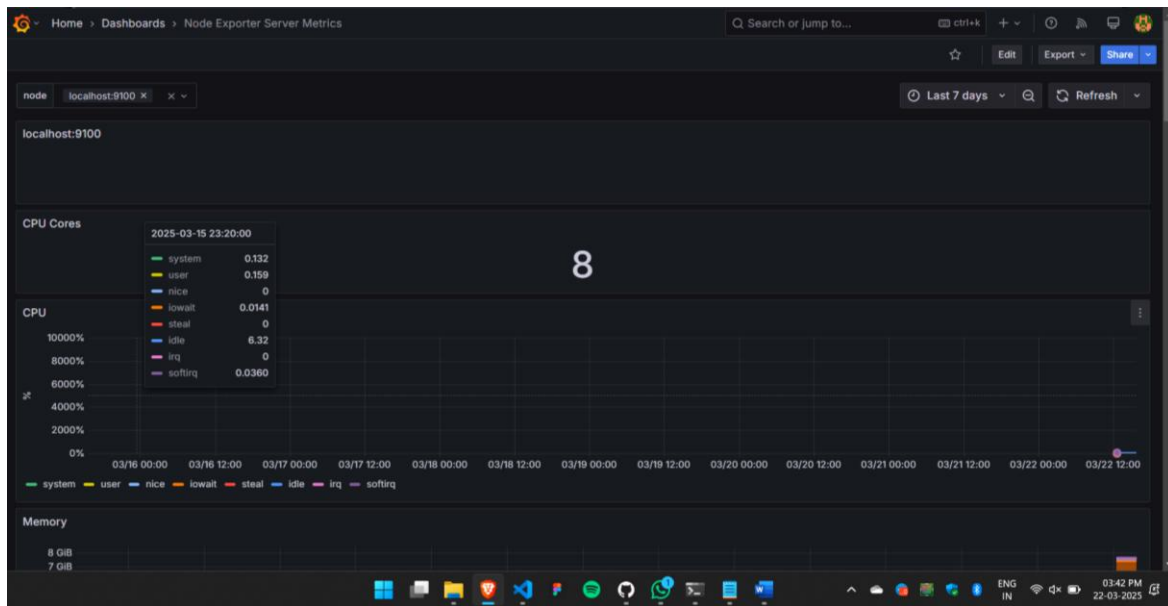


node_load15



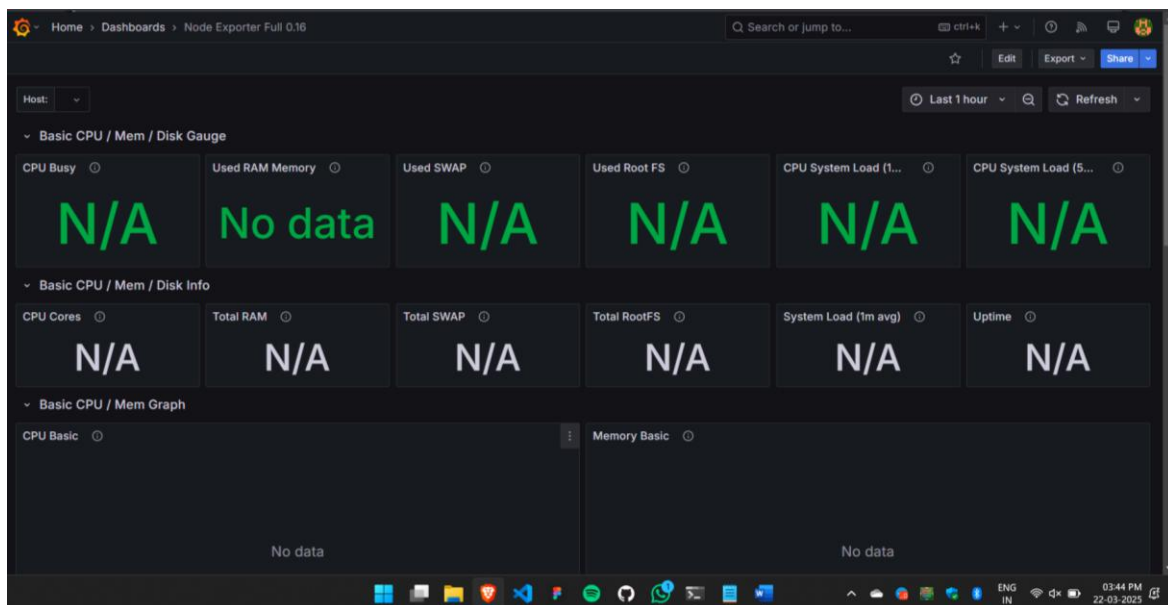
Dashboard: (405)

Node Exporter Service metrics,



Dashboard (5174):

Node Exporter Full 0.16,



Dashboard (9096):

1 Node Exporter 1.0.1

