

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

```

```

saha@SAHASRAN: ~
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=20250322T064212Z&X-Amz-Expires=300&X-Amz-Signature=984b419e506787341bcb340d11ea6b0793b94579632191ef86259c8bbdc3f516X-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 12:13:22-- 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=20250322T064212Z&X-Amz-Expires=300&X-Amz-Signature=984b419e506787341bcb340d11ea6b0793b94579632191ef86259c8bbdc3f516X-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)... 185.199.110.133, 185.199.109.133, 185.199.108.133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)[185.199.110.133]: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-amd 100%[=====] 9.89M 1.36MB/s in 6.2s

2025-03-22 12:13:29 (1.60 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
saha@SAHASRAN:~$

saha@SAHASRAN: ~
Memory: 5.9M
CGroup: /system.slice/prometheus.service
└─12855 /usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.yml --storage.tsdb.path=/data

Mar 22 12:11:51 SAHASRAN systemd[1]: Started Prometheus.
[lines 1-10/10 (END)]
Mar 22 12:11:51 SAHASRAN prometheus[12855]: ts=2025-03-22T06:41:51.346Z caller=head.go:681 level=info component=tsdb msg="On-disk memory mappable chunks replay completed" duration=2.537µs
Mar 22 12:11:51 SAHASRAN prometheus[12855]: ts=2025-03-22T06:41:51.346Z caller=head.go:689 level=info component=tsdb msg="Replaying WAL, this may take a while"
Mar 22 12:11:51 SAHASRAN prometheus[12855]: ts=2025-03-22T06:41:51.347Z caller=head.go:760 level=info component=tsdb msg="WAL segment loaded" segment=0 maxSegment=0
Mar 22 12:11:51 SAHASRAN prometheus[12855]: ts=2025-03-22T06:41:51.347Z caller=head.go:797 level=info component=tsdb msg="WAL replay completed" checkpoint_replay_duration=19.34µs wal_replay_duration=850.03µs wbl_replay_duration=226ns total_replay_duration=892.56µs
Mar 22 12:11:51 SAHASRAN prometheus[12855]: ts=2025-03-22T06:41:51.348Z caller=main.go:1045 level=info fs_type=EXT4_SUPER_MAGIC
Mar 22 12:11:51 SAHASRAN prometheus[12855]: ts=2025-03-22T06:41:51.349Z caller=main.go:1048 level=info msg="TSDB started"
Mar 22 12:11:51 SAHASRAN prometheus[12855]: ts=2025-03-22T06:41:51.349Z caller=main.go:1229 level=info msg="Loading configuration file" filename=/etc/prometheus/prometheus.yml
Mar 22 12:11:51 SAHASRAN prometheus[12855]: ts=2025-03-22T06:41:51.349Z caller=main.go:1266 level=info msg="Completed loading of configuration file" filename=/etc/prometheus/prometheus.yml totalDuration=463.073µs db_storage=1.191µs remote_storage=2.225µs web_handler=834ns query_engine=1.09µs scrape=177.905µs scrape_sd=25.079µs notify=21.515µs notify_sd=5.954µs rules=1.734µs tracing=6.475µs
Mar 22 12:11:51 SAHASRAN prometheus[12855]: ts=2025-03-22T06:41:51.349Z caller=main.go:1009 level=info msg="Server is ready to receive web requests."
Mar 22 12:11:51 SAHASRAN prometheus[12855]: ts=2025-03-22T06:41:51.349Z caller=manager.go:1009 level=info component="rule manager" msg="Starting rule manager..."

```

2025-03-22 12:08:17 (1.60 MB/s) - 'prometheus-2.47.1.linux-amd64.tar.gz' saved [95713066/95713066]

```
prometheus-2.47.1.linux-amd64/
prometheus-2.47.1.linux-amd64/LICENSE
prometheus-2.47.1.linux-amd64/NOTICE
prometheus-2.47.1.linux-amd64/prometheus.yml
prometheus-2.47.1.linux-amd64/conssoles/
prometheus-2.47.1.linux-amd64/conssoles/prometheus.html
prometheus-2.47.1.linux-amd64/conssoles/prometheus-overview.html
prometheus-2.47.1.linux-amd64/conssoles/node-cpu.html
prometheus-2.47.1.linux-amd64/conssoles/index.html.example
prometheus-2.47.1.linux-amd64/conssoles/node.html
prometheus-2.47.1.linux-amd64/conssoles/node-disk.html
prometheus-2.47.1.linux-amd64/conssoles/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
saha@SAHASRAN:~/prometheus-2.47.1.linux-amd64$ cd
```

2025-03-22 12:08:17 (1.60 MB/s) - 'prometheus-2.47.1.linux-amd64.tar.gz' saved [95713066/95713066]

```
prometheus-2.47.1.linux-amd64/
prometheus-2.47.1.linux-amd64/LICENSE
prometheus-2.47.1.linux-amd64/NOTICE
prometheus-2.47.1.linux-amd64/prometheus.yml
prometheus-2.47.1.linux-amd64/conssoles/
prometheus-2.47.1.linux-amd64/conssoles/prometheus.html
prometheus-2.47.1.linux-amd64/conssoles/prometheus-overview.html
prometheus-2.47.1.linux-amd64/conssoles/node-cpu.html
prometheus-2.47.1.linux-amd64/conssoles/index.html.example
prometheus-2.47.1.linux-amd64/conssoles/node.html
prometheus-2.47.1.linux-amd64/conssoles/node-disk.html
prometheus-2.47.1.linux-amd64/conssoles/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
saha@SAHASRAN:~/prometheus-2.47.1.linux-amd64$ cd
rm -rf prometheus-2.47.1.linux-amd64.tar.gz
prometheus --version
sudo vim /etc/systemd/system/prometheus.service
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,builtinassets,stringlabels
saha@SAHASRAN:~$ |
```

```
saha@SAHASRAN: ~
Preparing to unpack .../grafana_11.5.2_amd64.deb ...
Unpacking grafana (11.5.2) ...
Setting up musl:amd64 (1.2.2-4) ...
Setting up grafana (11.5.2) ...
Adding system user 'grafana' (UID 111) ...
Adding new user 'grafana' (UID 111) with group 'grafana' ...
Not creating home directory '/usr/share/grafana'.
### NOT starting on installation, please execute the following statements to configure grafana to start automatically using systemd
  sudo /bin/systemctl daemon-reload
  sudo /bin/systemctl enable grafana-server
### You can start grafana-server by executing
  sudo /bin/systemctl start grafana-server
Processing triggers for man-db (2.10.2-1) ...
Synchronizing state of grafana-server.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable grafana-server
Created symlink /etc/systemd/system/multi-user.target.wants/grafana-server.service → /lib/systemd/system/grafana-server.service.
● grafana-server.service - Grafana instance
   Loaded: loaded (/lib/systemd/system/grafana-server.service; enabled; vendor preset: enabled)
   Active: active (running) since Sat 2025-03-22 12:26:56 IST; 10ms ago
     Docs: http://docs.grafana.org
    Main PID: 16970 ((grafana))
      Tasks: 1 (limit: 19000)
    Memory: 384.0K
    CGroup: /system.slice/grafana-server.service
            └─16970 "(grafana)"

Mar 22 12:26:56 SAHASRAN systemd[1]: Started Grafana instance.
saha@SAHASRAN:~$ |
```

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 \

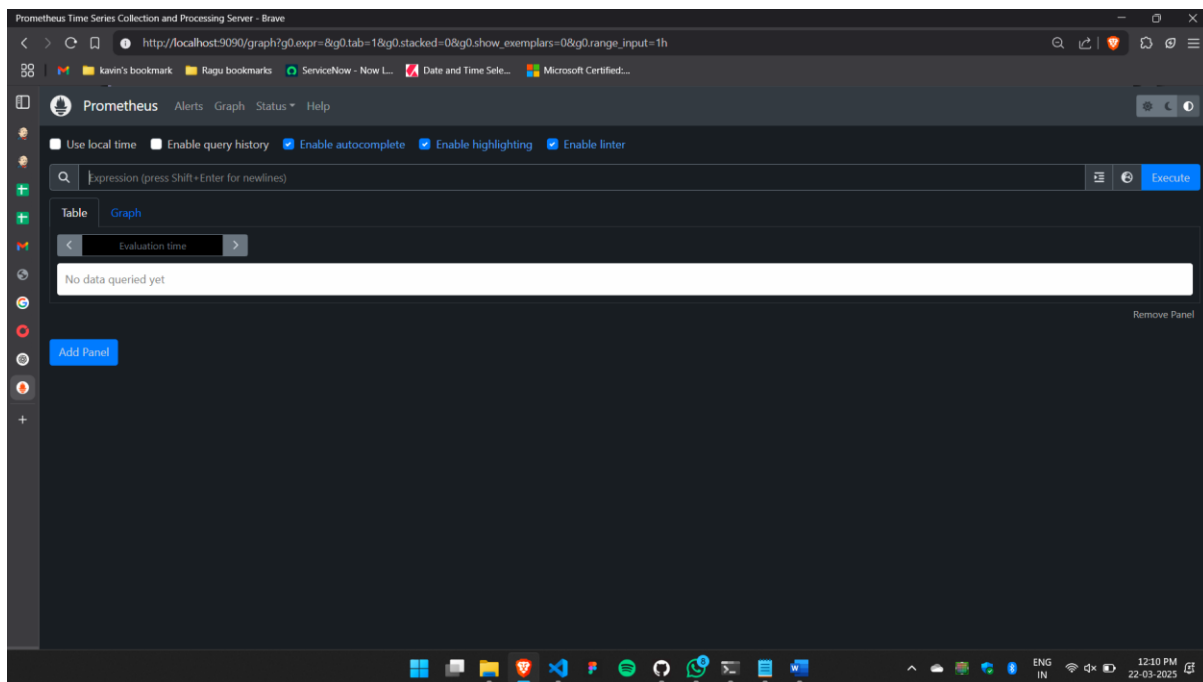
--web.listen-address=0.0.0.0:9090 \

--web.enable-lifecycle

[Install]

WantedBy=multi-user.target

```
saha@SAHASRAN: ~  
Mar 22 12:18:02 SAHASRAN node_exporter[14218]: ts=2025-03-22T06:48:02.379Z caller=tls_config.go:277 level=info msg="TLS  
tor=thermal_zone  
Mar 22 12:18:02 SAHASRAN node_exporter[14218]: ts=2025-03-22T06:48:02.378Z caller=node_exporter.go:117 level=info collec  
tor=time  
Mar 22 12:18:02 SAHASRAN node_exporter[14218]: ts=2025-03-22T06:48:02.378Z caller=node_exporter.go:117 level=info collec  
tor=timex  
Mar 22 12:18:02 SAHASRAN node_exporter[14218]: ts=2025-03-22T06:48:02.378Z caller=node_exporter.go:117 level=info collec  
tor=udp_queues  
Mar 22 12:18:02 SAHASRAN node_exporter[14218]: ts=2025-03-22T06:48:02.378Z caller=node_exporter.go:117 level=info collec  
tor=uname  
Mar 22 12:18:02 SAHASRAN node_exporter[14218]: ts=2025-03-22T06:48:02.378Z caller=node_exporter.go:117 level=info collec  
tor=vmstat  
Mar 22 12:18:02 SAHASRAN node_exporter[14218]: ts=2025-03-22T06:48:02.378Z caller=node_exporter.go:117 level=info collec  
tor=xfs  
Mar 22 12:18:02 SAHASRAN node_exporter[14218]: ts=2025-03-22T06:48:02.379Z caller=node_exporter.go:117 level=info collec  
tor=zfs  
Mar 22 12:18:02 SAHASRAN node_exporter[14218]: ts=2025-03-22T06:48:02.379Z caller=tls_config.go:274 level=info msg="List  
ening on" address=[::]:9100  
Mar 22 12:18:02 SAHASRAN node_exporter[14218]: ts=2025-03-22T06:48:02.379Z caller=tls_config.go:277 level=info msg="TLS  
is disabled." http2=false address=[::]:9100  
^C  
saha@SAHASRAN:~$ sudo vim /etc/prometheus/prometheus.yml  
saha@SAHASRAN:~$ promtool check config /etc/prometheus/prometheus.yml  
Checking /etc/prometheus/prometheus.yml  
SUCCESS: /etc/prometheus/prometheus.yml is valid prometheus config file syntax  
saha@SAHASRAN:~$ curl -X POST http://localhost:9090/-/reload  
saha@SAHASRAN:~$
```



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

```
ragu_ubuntu@Kavin: ~$ cat /etc/prometheus/prometheus.yml
# 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 31,27 All
```

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

Prometheus Time Series Collection and Processing Server - Brave

http://localhost:9090/targets?search=#pool-node\_export

Prometheus Alerts Graph Status Help

### Targets

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

**jenkins (0/1 up)** [show less](#)

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 less](#)

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 less](#)

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
```

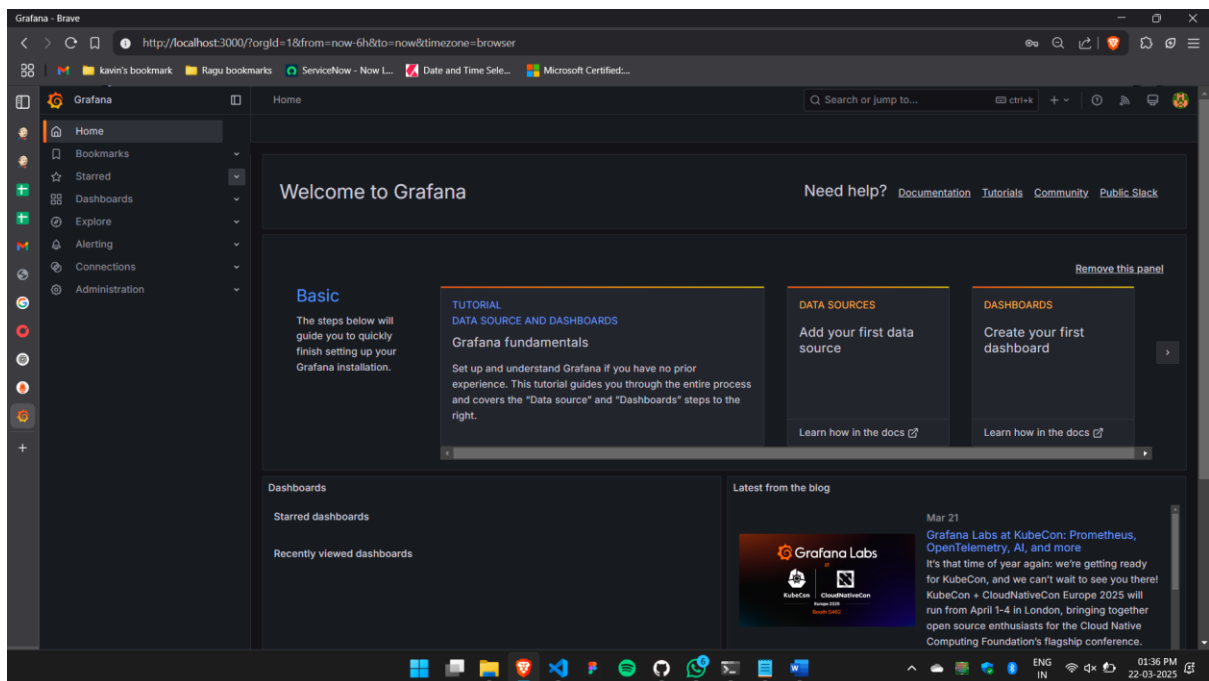
```
sudo apt-get -y install grafana
```

```
sudo systemctl enable grafana-server
```

```
sudo systemctl start grafana-server
```

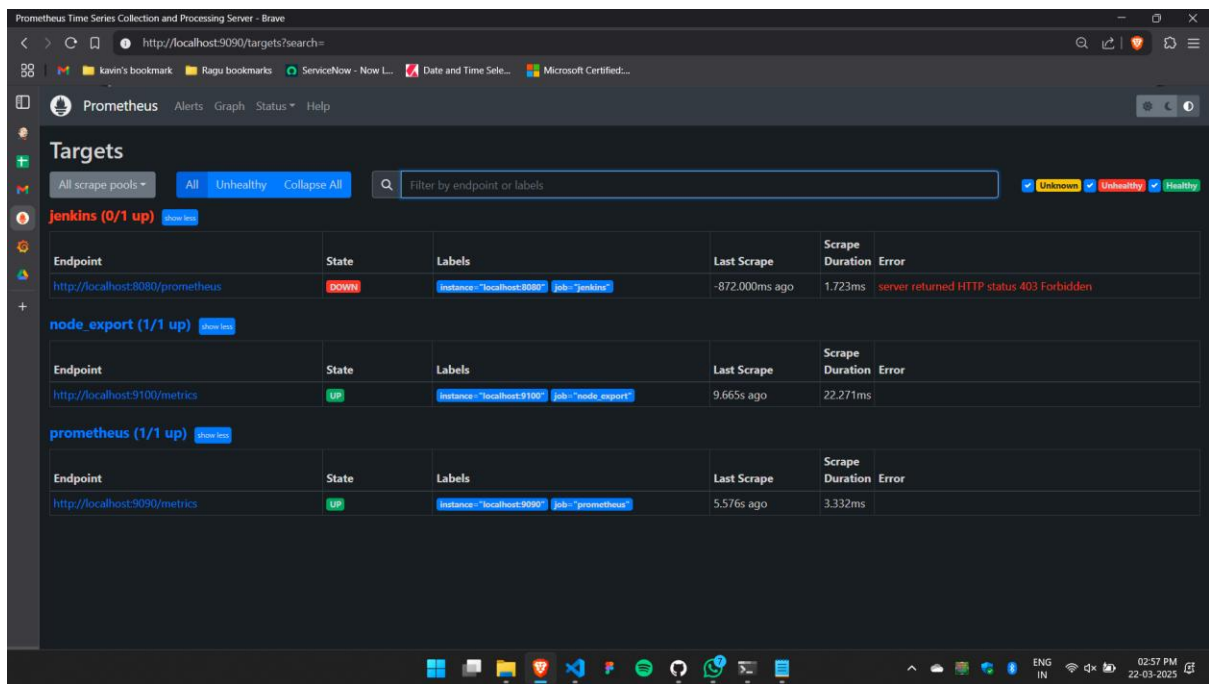
```
sudo systemctl status grafana-server
```

## Grafana UI:

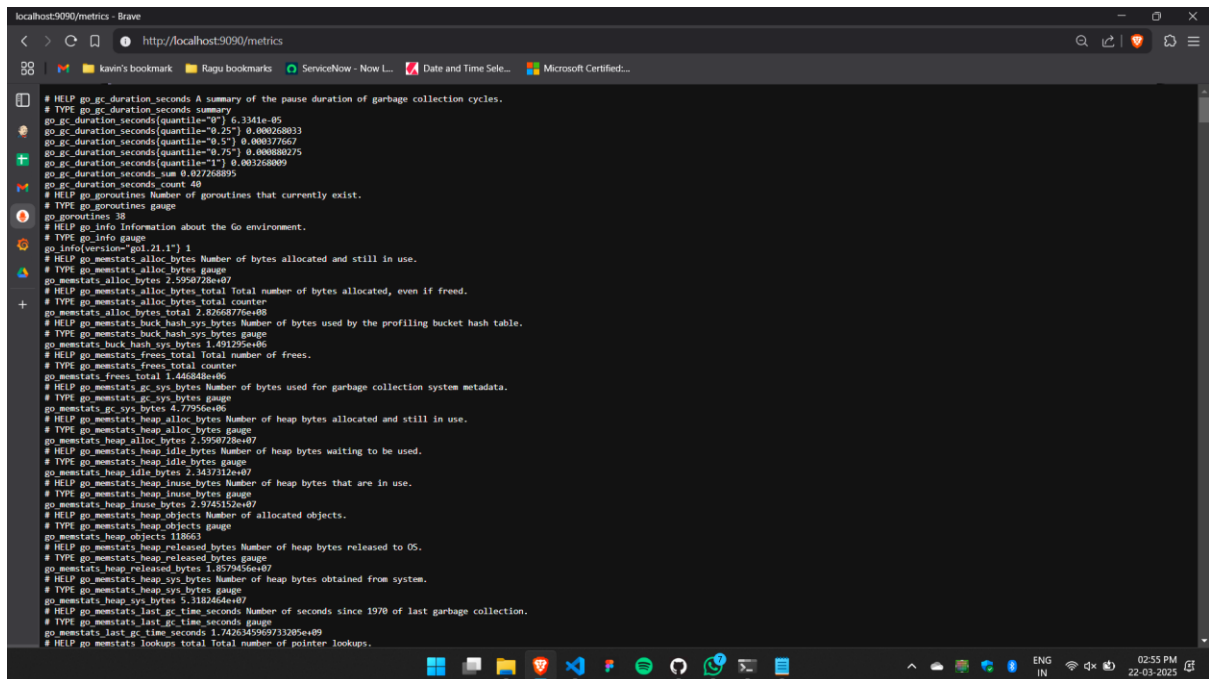


## Status in promethues:

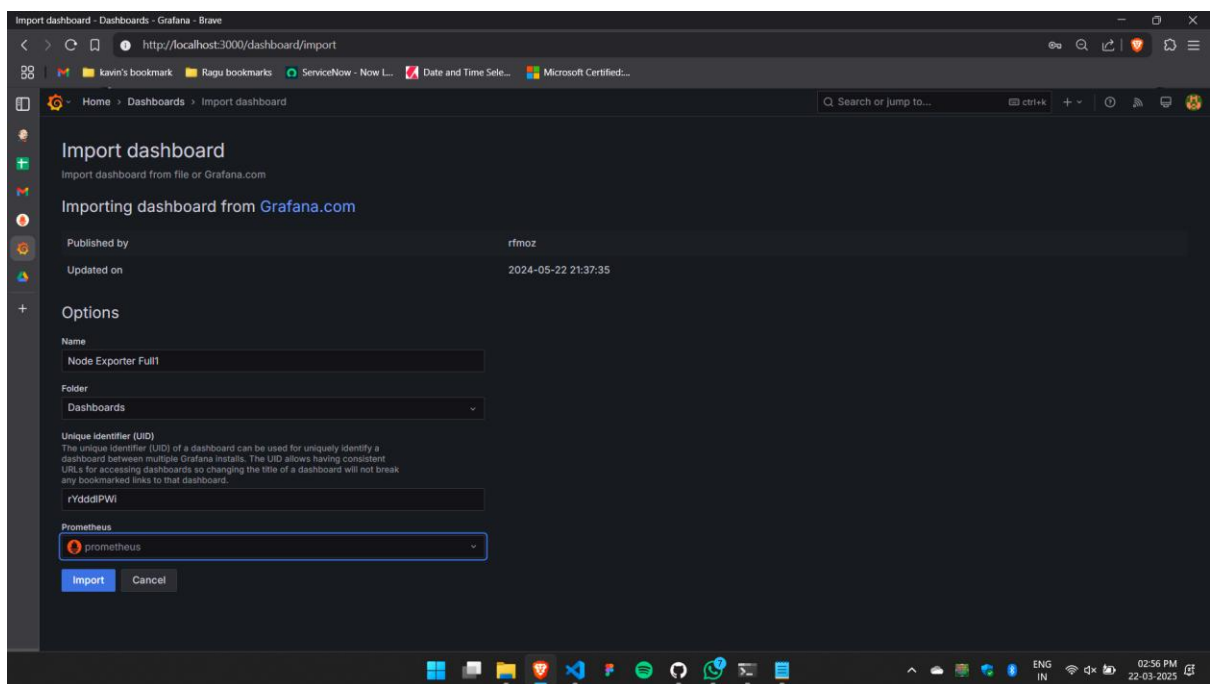




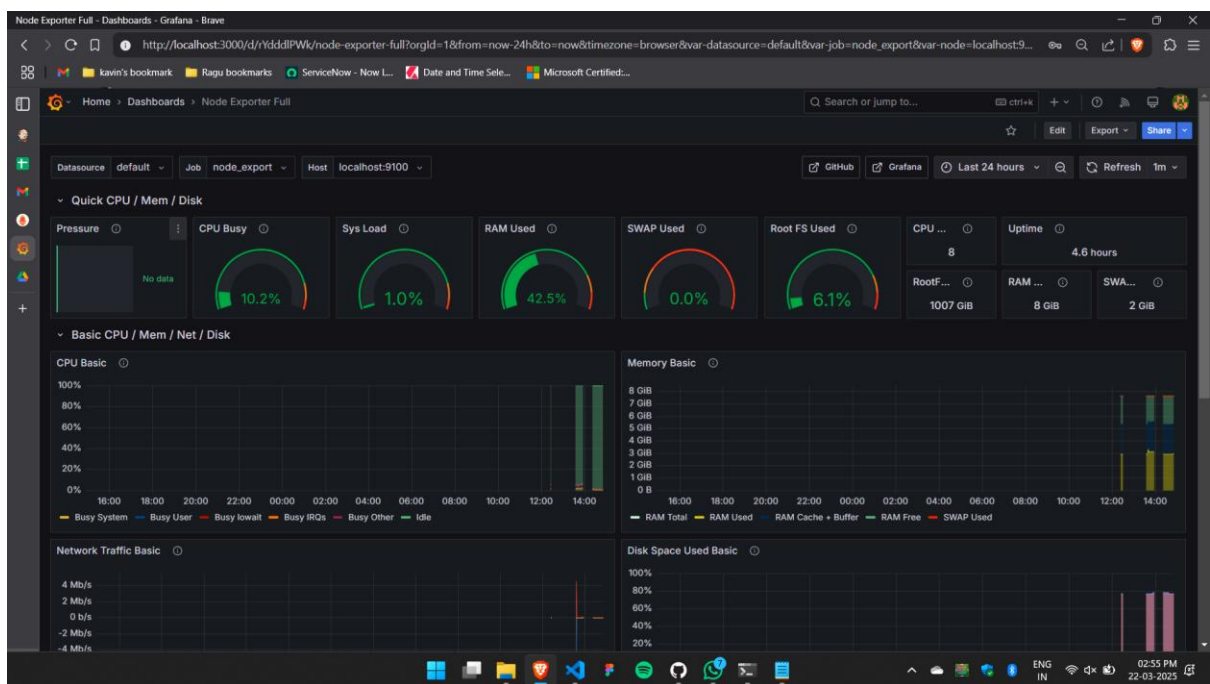
## Metrics in Prometheus:

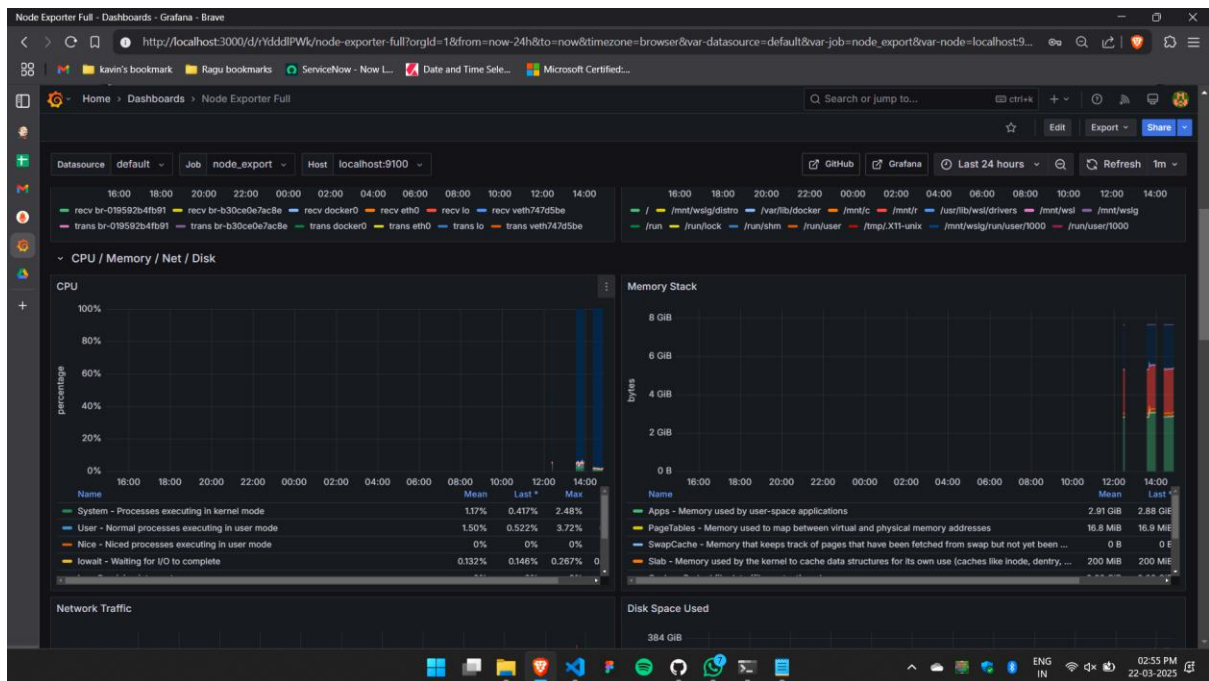


## Node Exporter:



Dashboard:



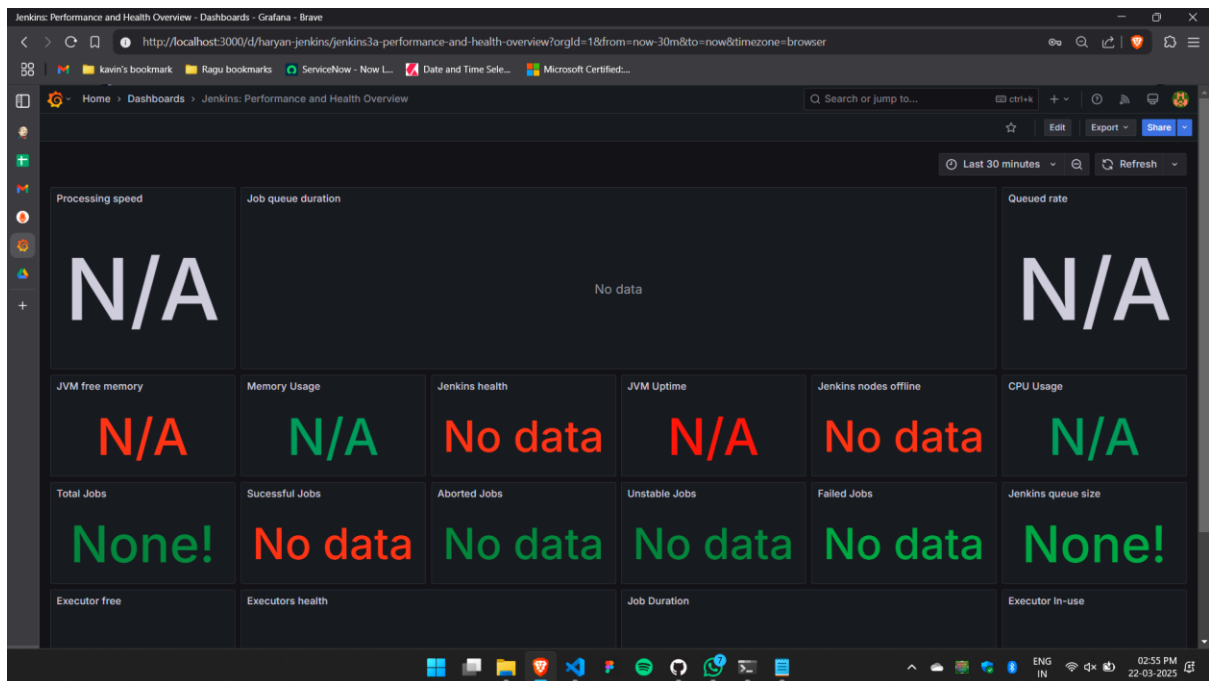


## Jenkins Overview:

The image shows the "Import dashboard" form in Grafana. The form is titled "Import dashboard" and "Importing dashboard from Grafana.com". It includes the following fields and options:

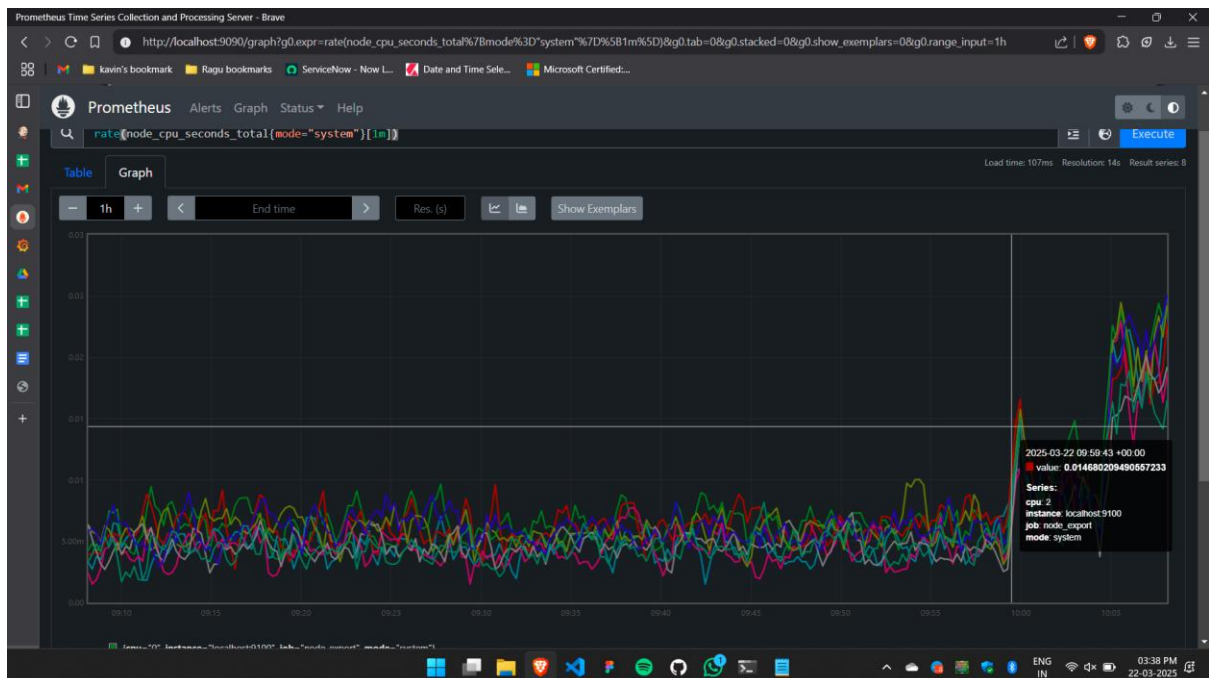
- Published by**: haryan
- Updated on**: 2023-08-24 15:04:53
- Options**:
  - Name**: Jenkins: Performance and Health Overview1
  - Folder**: Dashboards
  - Unique Identifier (UID)**: haryan-jenkin
  - Prometheus**: prometheus
- Buttons**: Import, Cancel

Dashboard:

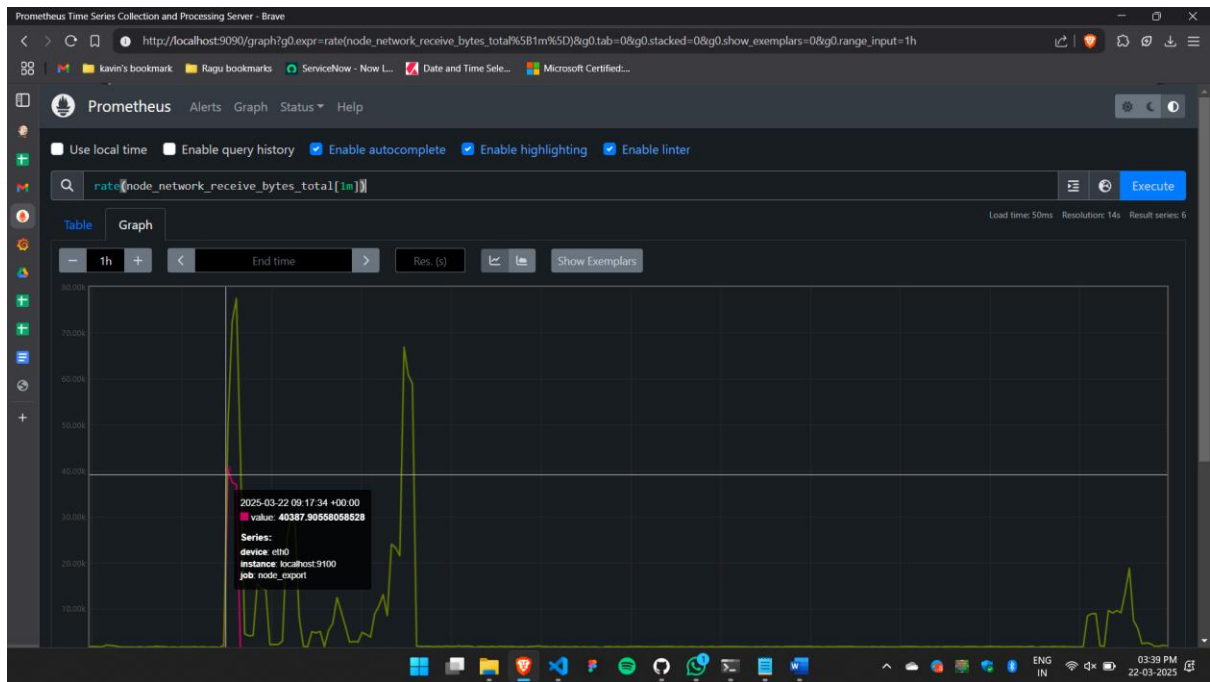


Prometheus analysis:

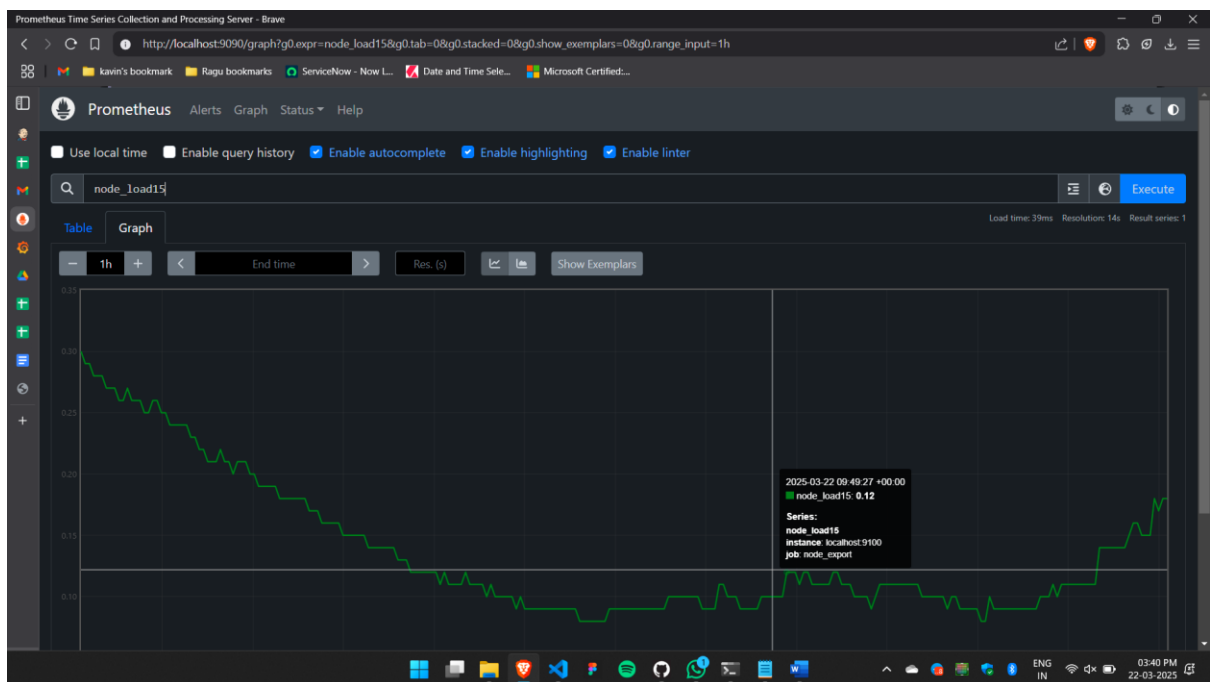
`rate(node_cpu_seconds_total{mode="system"}[1m])`



`rate(node_network_receive_bytes_total[1m])`

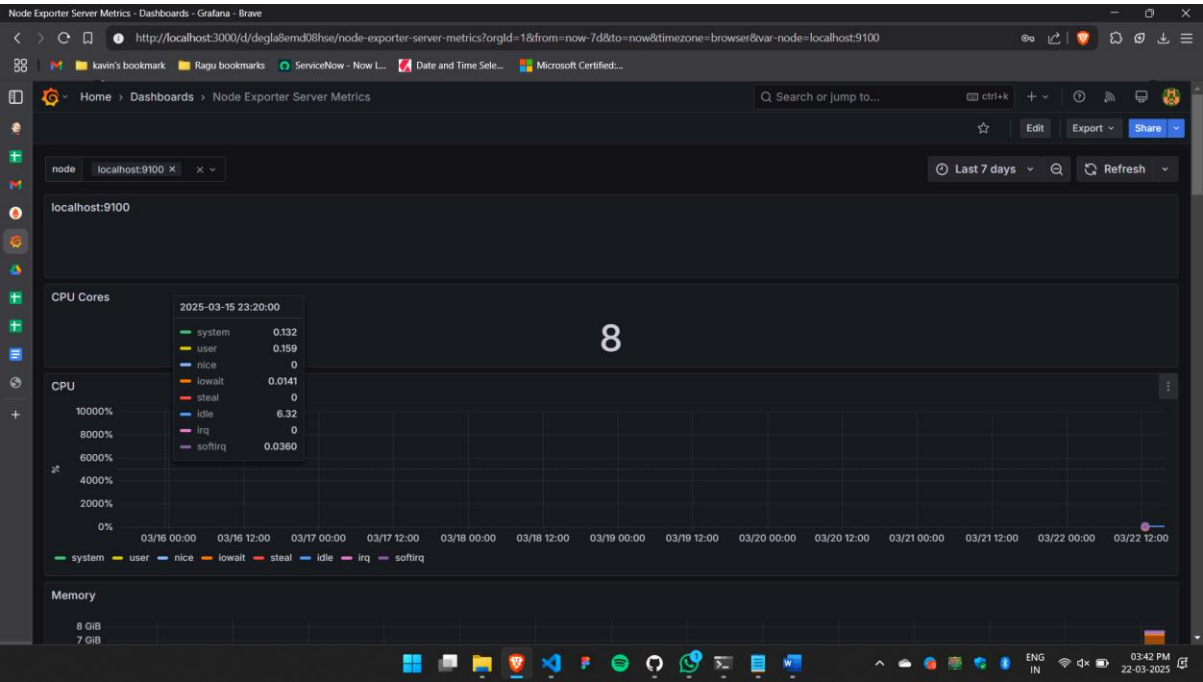


node\_load15



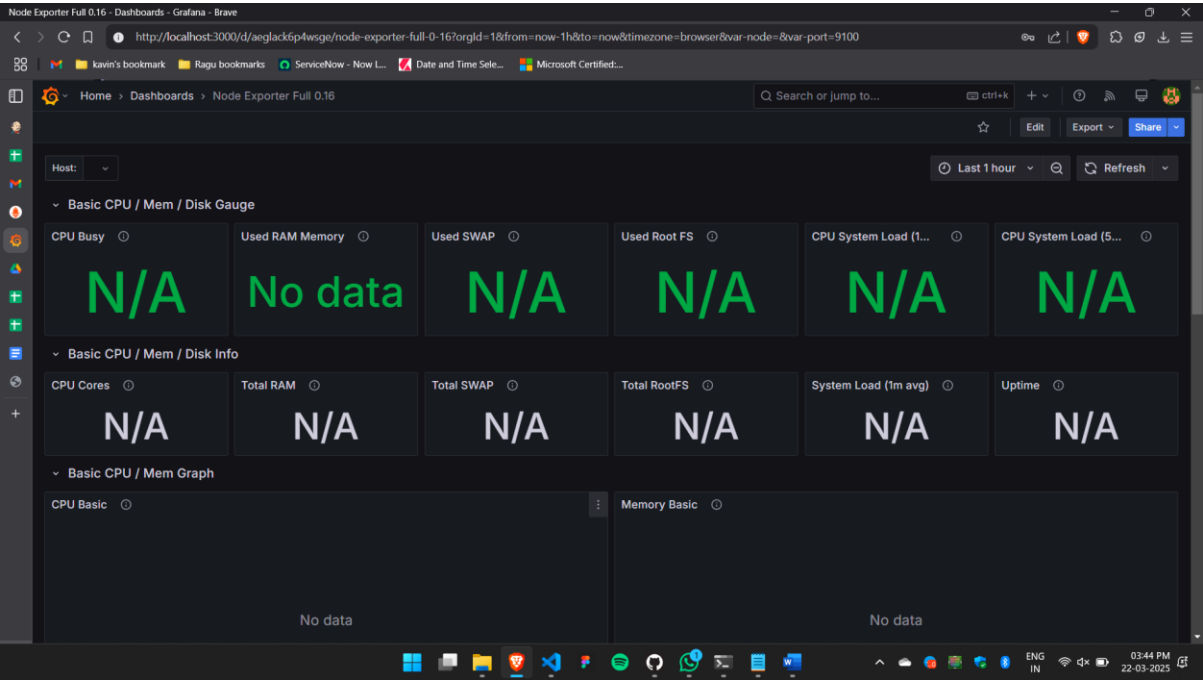
Dashboard: (405)

Node Exporter Service metrics,



Dashboard (5174):

Node Exporter Full 0.16,



Dashboard (9096):

## 1 Node Exporter 1.0.1

