

DAY6-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
```

```
sathyaseelan@sathyaseelan: ~
Warning: apt-key is deprecated. Manage keyring files in trusted.gpg.d instead (see apt-key(8)).
sathyaseelan@sathyaseelan:~$ sudo rm -f /etc/apt/keyrings/grafana.gpg
sathyaseelan@sathyaseelan:~$ sudo mkdir -p /etc/apt/keyrings
sathyaseelan@sathyaseelan:~$ curl -fsSL https://packages.grafana.com/gpg.key | sudo tee /etc/apt/keyrings/grafana.gpg > /dev/null
pub  rsa3072 2023-08-24 [SC] [expires: 2025-08-23]
uid   B53AE77BAD8630A683046005963FA27710458545
uid   Grafana Labs <engineering@grafana.com>
sub   rsa3072 2023-08-24 [E] [expires: 2025-08-23]

sathyaseelan@sathyaseelan:~$ echo "deb [signed-by=/etc/apt/keyrings/grafana.gpg] https://packages.grafana.com/oss/deb stable main" | sudo tee /etc/apt/sources.list.d/grafana.list > /dev/null
sathyaseelan@sathyaseelan:~$ sudo apt-get update
Hit:1 https://packages.grafana.com/oss/deb stable InRelease
Ign:2 https://pkg.jenkins.io/debian-stable binary/ InRelease
Hit:3 https://pkg.jenkins.io/debian-stable binary/ Release
Err:1 https://packages.grafana.com/oss/deb stable InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545
Hit:5 http://archive.ubuntu.com/ubuntu jammy InRelease
Hit:6 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:7 http://archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:8 http://archive.ubuntu.com/ubuntu jammy-backports InRelease
Reading package lists... Done
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: https://packages.grafana.com/oss/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545
W: Failed to fetch https://packages.grafana.com/oss/deb/dists/stable/InRelease The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 963FA27710458545
W: Some index files failed to download. They have been ignored, or old ones used instead.
sathyaseelan@sathyaseelan:~$ sudo apt-get -y install grafana
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
grafana is already the newest version (11.5.2).
0 upgraded, 0 newly installed, 0 to remove and 1 not upgraded.
sathyaseelan@sathyaseelan:~$ sudo systemctl enable grafana-server
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
sathyaseelan@sathyaseelan:~$ sudo systemctl start grafana-server
sathyaseelan@sathyaseelan:~$ sudo systemctl status grafana-server
● 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 14:36:08 IST; 1h 26min ago
     Docs: http://docs.grafana.org
   Main PID: 41497 (grafana)
     Tasks: 17 (limit: 4624)
    Memory: 155.3M
    CGroup: /system.slice/grafana-server.service
            └─41497 /usr/share/grafana/bin/grafana server --config=/etc/grafana/grafana.ini --pidfile=/run/grafana/grafana-server.pid --packaging=deb cfg:default.paths

Mar 22 15:16:15 sathyaseelan grafana[41497]: logger-plugins.update.checker t=2025-03-22T15:16:15.537126607+05:30 level=info msg="Update check succeeded" duration=384ms
Mar 22 15:26:14 sathyaseelan grafana[41497]: logger-cleanup t=2025-03-22T15:26:14.644884466+05:30 level=info msg="Completed cleanup jobs" duration=70.465507ms
Mar 22 15:26:15 sathyaseelan grafana[41497]: logger-plugins.update.checker t=2025-03-22T15:26:15.492249852+05:30 level=info msg="Update check succeeded" duration=338ms
Mar 22 15:36:14 sathyaseelan grafana[41497]: logger-cleanup t=2025-03-22T15:36:14.702215962+05:30 level=info msg="Completed cleanup jobs" duration=128.569652ms
Mar 22 15:36:15 sathyaseelan grafana[41497]: logger-plugins.update.checker t=2025-03-22T15:36:15.575894316+05:30 level=info msg="Update check succeeded" duration=422ms
Mar 22 15:37:28 sathyaseelan grafana[41497]: logger-infra.usagstats t=2025-03-22T15:37:28.682306142+05:30 level=info msg="Usage stats are ready to report"
Mar 22 15:46:14 sathyaseelan grafana[41497]: logger-cleanup t=2025-03-22T15:46:14.578092816+05:30 level=info msg="Completed cleanup jobs" duration=4.452081ms
Mar 22 15:46:15 sathyaseelan grafana[41497]: logger-plugins.update.checker t=2025-03-22T15:46:15.466769168+05:30 level=info msg="Update check succeeded" duration=313ms
Mar 22 15:56:14 sathyaseelan grafana[41497]: logger-cleanup t=2025-03-22T15:56:14.719925878+05:30 level=info msg="Completed cleanup jobs" duration=146.300774ms
Mar 22 15:56:15 sathyaseelan grafana[41497]: logger-plugins.update.checker t=2025-03-22T15:56:15.516895837+05:30 level=info msg="Update check succeeded" duration=363ms

sathyaseelan@sathyaseelan:~$
```

```
sathiyaseelan@sathiyaseelan: ~
14:11 error too many blank lines (1 > 0) (empty-lines)

sathiyaseelan@sathiyaseelan:~$ sudo vim /etc/prometheus/prometheus.yml
sathiyaseelan@sathiyaseelan:~$ yamllint /etc/prometheus/prometheus.yml
sathiyaseelan@sathiyaseelan:~$ sudo systemctl daemon-reload
sathiyaseelan@sathiyaseelan:~$ sudo systemctl restart prometheus
sathiyaseelan@sathiyaseelan:~$ sudo systemctl status prometheus
● prometheus.service - Prometheus Server
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; vendor preset: enabled)
   Active: failed (Result: exit-code) since Sat 2025-03-22 15:37:42 IST; 3s ago
   Process: 59857 ExecStart=/usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.yml --storage.tsdb.path=/var/lib/prometheus --web.listen-address=0.0.0.0 (code=exited, status=2)
   Main PID: 59857 (code=exited, status=2)

Mar 22 15:37:42 sathiyaseelan prometheus[59857]: ts=2025-03-22T10:07:42.237Z caller=query_logger.go:115 level=error component=activeQueryTracker msg="Failed to create
Mar 22 15:37:42 sathiyaseelan prometheus[59857]: ts=2025-03-22T10:07:42.237Z caller=query_logger.go:93 level=error component=activeQueryTracker msg="Error opening quer
Mar 22 15:37:42 sathiyaseelan prometheus[59857]: panic: Unable to create mmap-ed active query log
Mar 22 15:37:42 sathiyaseelan prometheus[59857]: goroutine 1 [running]:
Mar 22 15:37:42 sathiyaseelan prometheus[59857]: github.com/prometheus/prometheus/promql.NewActiveQueryTracker({0x7ffde3360e4d, 0x13}, 0x14, {0x3df5b80, 0xc00017b040})
Mar 22 15:37:42 sathiyaseelan prometheus[59857]: /app/promql/query_logger.go:123 +0x411
Mar 22 15:37:42 sathiyaseelan prometheus[59857]: main.main()
Mar 22 15:37:42 sathiyaseelan prometheus[59857]: /app/cmd/prometheus/main.go:645 +0x7812
Mar 22 15:37:42 sathiyaseelan systemd[1]: prometheus.service: Main process exited, code=exited, status=2/INVALIDARGUMENT
Mar 22 15:37:42 sathiyaseelan systemd[1]: prometheus.service: Failed with result 'exit-code'.

sathiyaseelan@sathiyaseelan:~$ sudo chown -R prometheus:prometheus /var/lib/prometheus
hmod -R 775 /var/lib/prometheus
sudo chmod -R 775 /var/lib/prometheus
chown: cannot access '/var/lib/prometheus': No such file or directory
sathiyaseelan@sathiyaseelan:~$ sudo mkdir -p /var/lib/prometheus
sathiyaseelan@sathiyaseelan:~$ sudo chown -R prometheus:prometheus /var/lib/prometheus
sathiyaseelan@sathiyaseelan:~$ sudo chmod -R 775 /var/lib/prometheus
sathiyaseelan@sathiyaseelan:~$ sudo systemctl daemon-reload
sathiyaseelan@sathiyaseelan:~$ sudo systemctl restart prometheus
sathiyaseelan@sathiyaseelan:~$ sudo systemctl status prometheus
● prometheus.service - Prometheus Server
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; vendor preset: enabled)
   Active: active (running) since Sat 2025-03-22 15:39:07 IST; 6s ago
   Main PID: 60223 (prometheus)
   Tasks: 9 (limit: 4624)
   Memory: 20.5M
   CGroup: /system.slice/prometheus.service
           └─60223 /usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.yml --storage.tsdb.path=/var/lib/prometheus --web.listen-address=0.0.0.0:9090

Mar 22 15:39:07 sathiyaseelan prometheus[60223]: ts=2025-03-22T10:09:07.457Z caller=head.go:681 level=info component=tsdb msg="On-disk memory mappable chunks replay co
sathiyaseelan@sathiyaseelan:~$ sudo chown -R prometheus:prometheus /var/lib/prometheus
hmod -R 775 /var/lib/prometheus
sudo chmod -R 775 /var/lib/prometheus
chown: cannot access '/var/lib/prometheus': No such file or directory
sathiyaseelan@sathiyaseelan:~$ sudo mkdir -p /var/lib/prometheus
sathiyaseelan@sathiyaseelan:~$ sudo chown -R prometheus:prometheus /var/lib/prometheus
sathiyaseelan@sathiyaseelan:~$ sudo chmod -R 775 /var/lib/prometheus
sathiyaseelan@sathiyaseelan:~$ sudo systemctl daemon-reload
sathiyaseelan@sathiyaseelan:~$ sudo systemctl restart prometheus
sathiyaseelan@sathiyaseelan:~$ sudo systemctl status prometheus
● prometheus.service - Prometheus Server
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; vendor preset: enabled)
   Active: active (running) since Sat 2025-03-22 15:39:07 IST; 6s ago
   Main PID: 60223 (prometheus)
   Tasks: 9 (limit: 4624)
   Memory: 20.5M
   CGroup: /system.slice/prometheus.service
           └─60223 /usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.yml --storage.tsdb.path=/var/lib/prometheus --web.listen-address=0.0.0.0:9090

Mar 22 15:39:07 sathiyaseelan prometheus[60223]: ts=2025-03-22T10:09:07.457Z caller=head.go:681 level=info component=tsdb msg="On-disk memory mappable chunks replay co
Mar 22 15:39:07 sathiyaseelan prometheus[60223]: ts=2025-03-22T10:09:07.457Z caller=head.go:689 level=info component=tsdb msg="Replaying WAL, this may take a while"
Mar 22 15:39:07 sathiyaseelan prometheus[60223]: ts=2025-03-22T10:09:07.459Z caller=head.go:760 level=info component=tsdb msg="WAL segment loaded" segment=0 maxSegment=
Mar 22 15:39:07 sathiyaseelan prometheus[60223]: ts=2025-03-22T10:09:07.459Z caller=head.go:797 level=info component=tsdb msg="WAL replay completed" checkpoint_replay=
Mar 22 15:39:07 sathiyaseelan prometheus[60223]: ts=2025-03-22T10:09:07.464Z caller=main.go:1045 level=info fs_type=EXT4_SUPER_MAGIC
Mar 22 15:39:07 sathiyaseelan prometheus[60223]: ts=2025-03-22T10:09:07.464Z caller=main.go:1048 level=info msg="TSDB started"
Mar 22 15:39:07 sathiyaseelan prometheus[60223]: ts=2025-03-22T10:09:07.464Z caller=main.go:1229 level=info msg="Loading configuration file" filename=/etc/prometheus/p
Mar 22 15:39:07 sathiyaseelan prometheus[60223]: ts=2025-03-22T10:09:07.474Z caller=main.go:1266 level=info msg="Completed loading of configuration file" filename=/etc
Mar 22 15:39:07 sathiyaseelan prometheus[60223]: ts=2025-03-22T10:09:07.474Z caller=main.go:1009 level=info msg="Server is ready to receive web requests."
Mar 22 15:39:07 sathiyaseelan prometheus[60223]: ts=2025-03-22T10:09:07.474Z caller=manager.go:1009 level=info component="rule manager" msg="Starting rule manager..."

sathiyaseelan@sathiyaseelan:~$ sudo apt-get install -y apt-transport-https software-properties-common
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
software-properties-common is already the newest version (0.99.22.9).
```

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 \

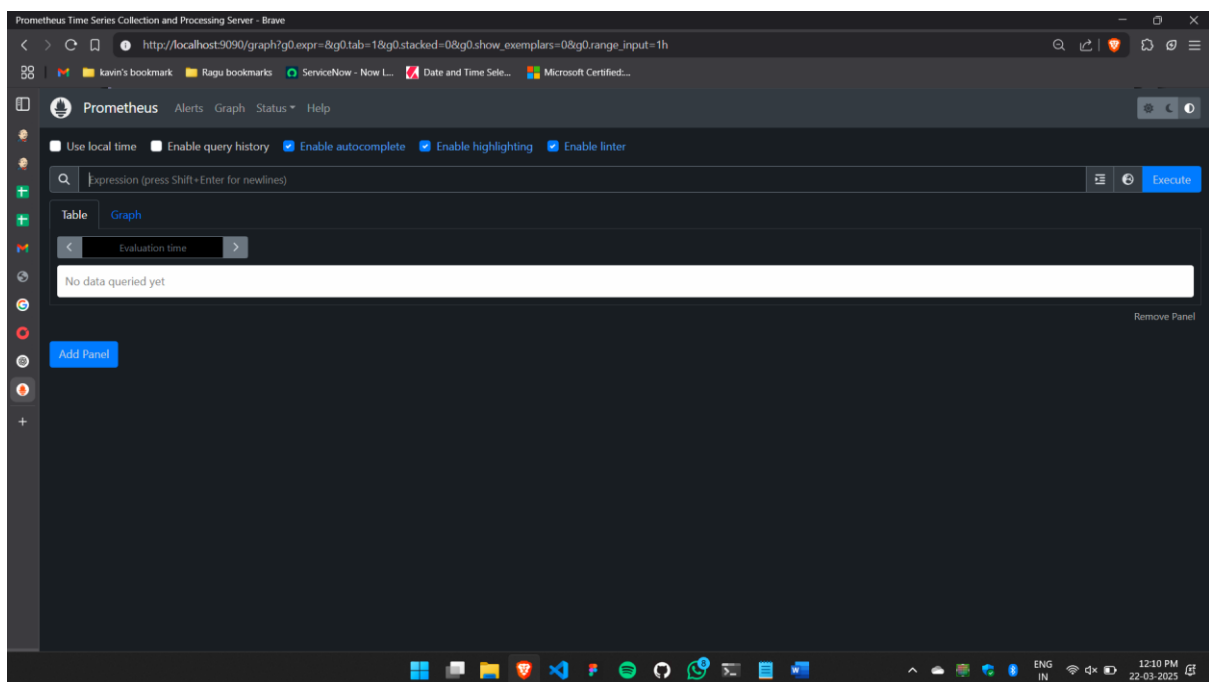
--web.console.libraries=/etc/prometheus/console_libraries \

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

--web.enable-lifecycle

[Install]

WantedBy=multi-user.target



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

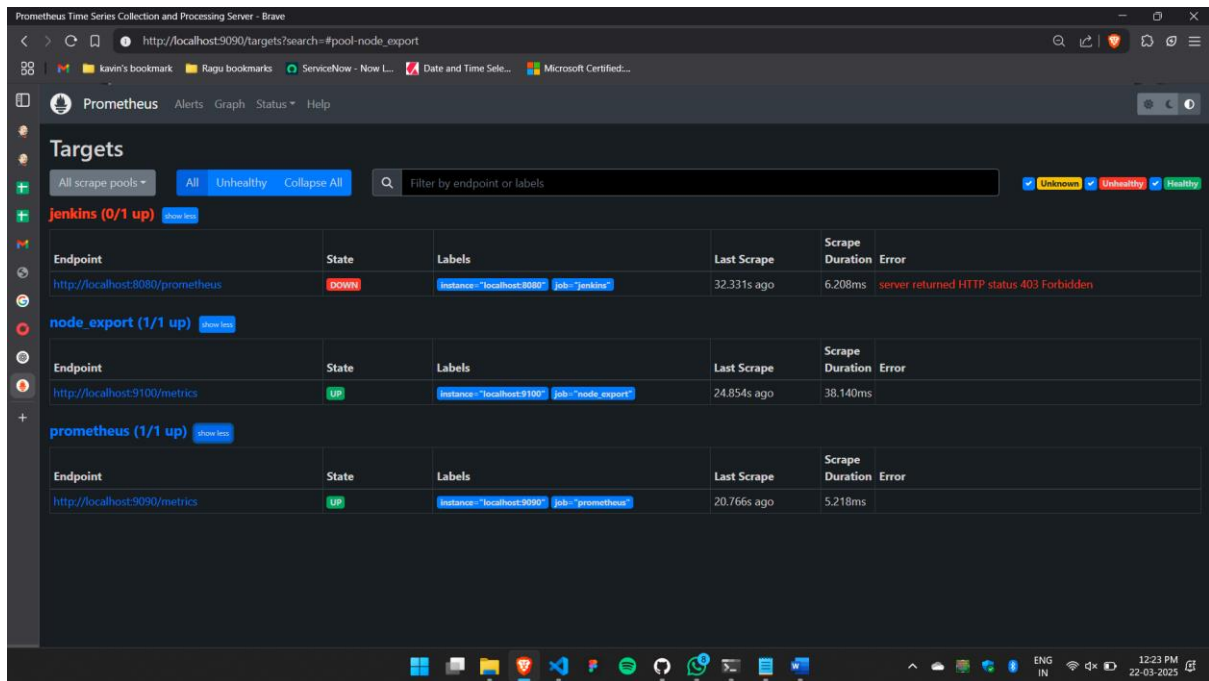
Service check :`sudo systemctl enable node_exporter`

`sudo systemctl start node_exporter`

`sudo systemctl status node_exporter`

```
journalctl -u node_exporter -f --no-pager
```

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



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
```

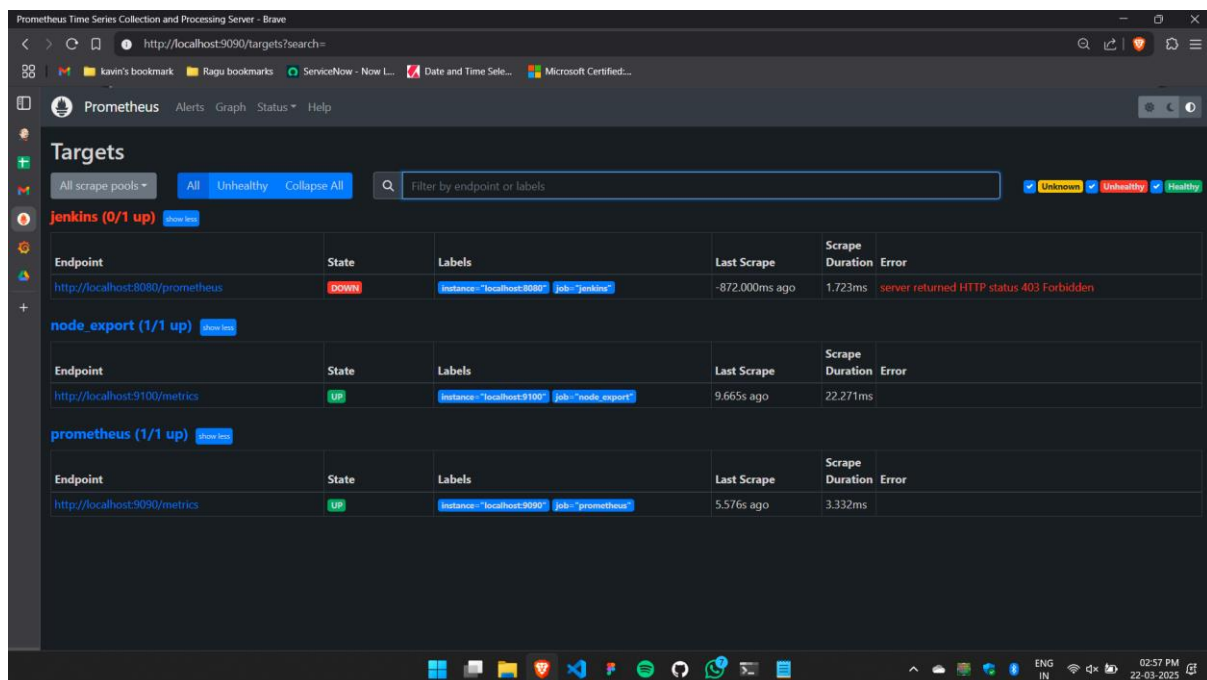
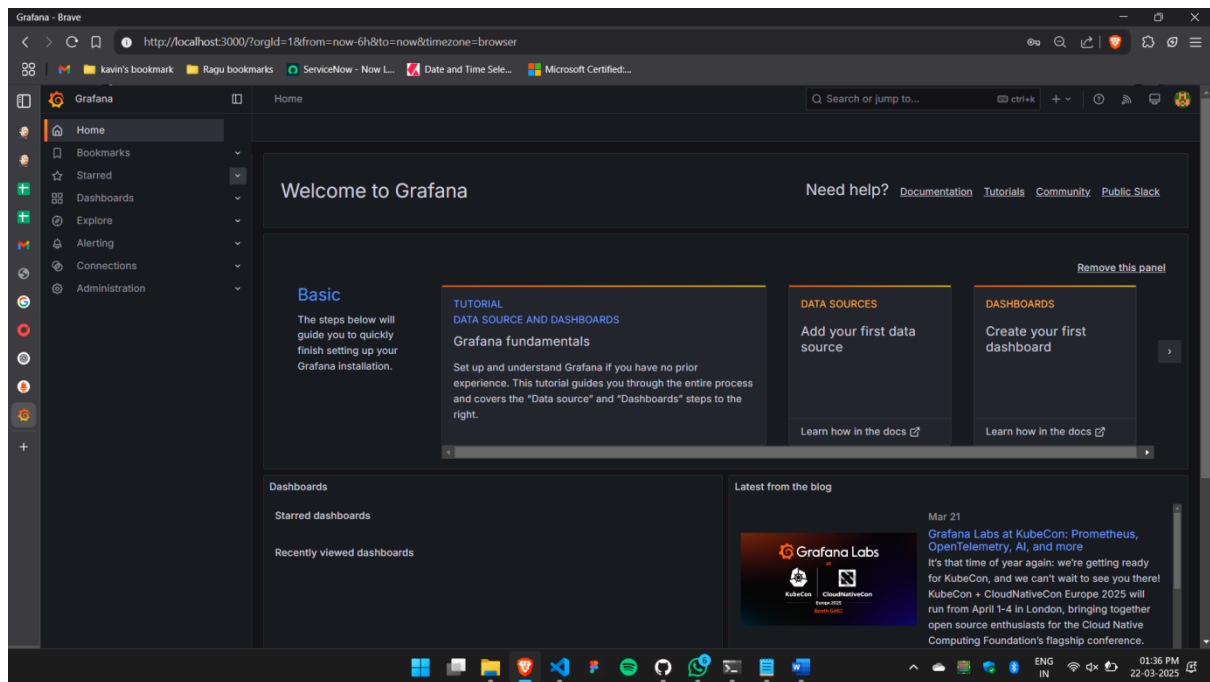
```
sudo apt-get update
```

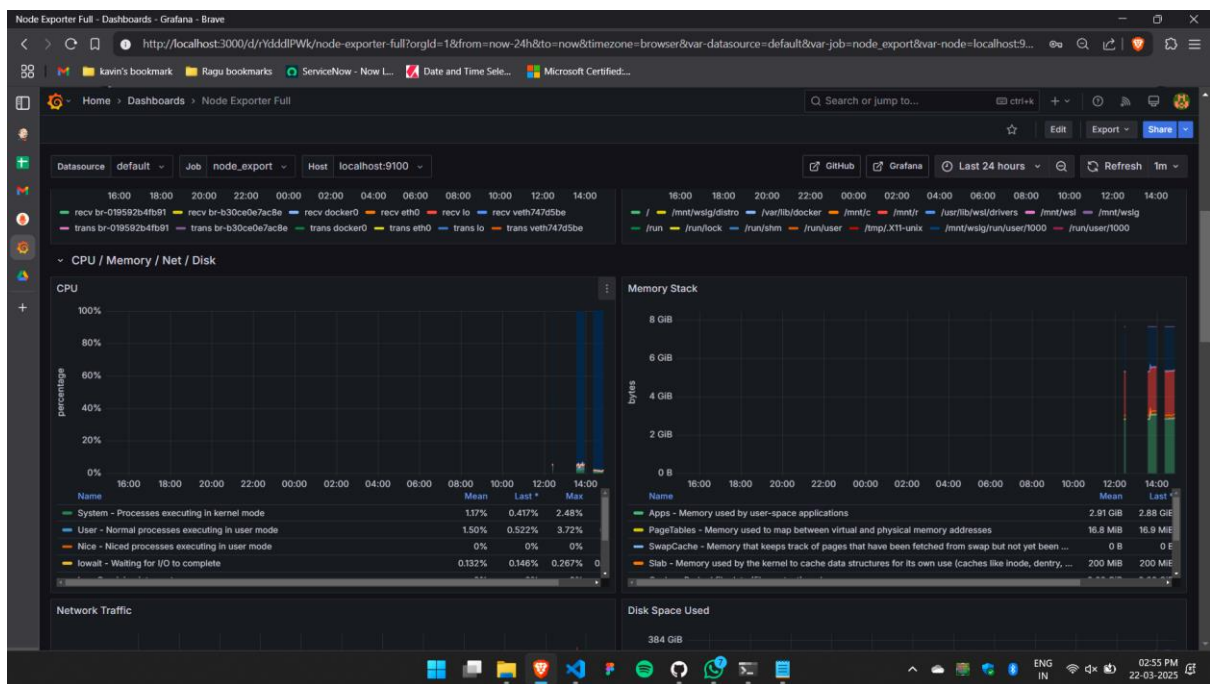
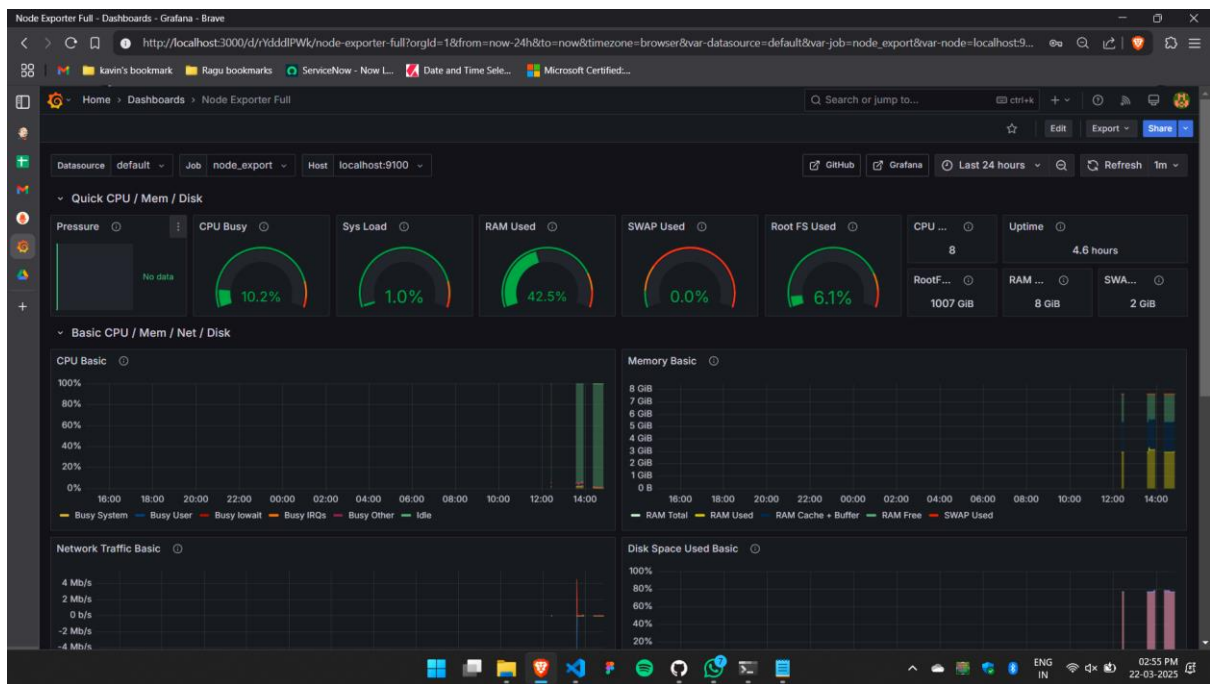
```
sudo apt-get -y install grafana
```

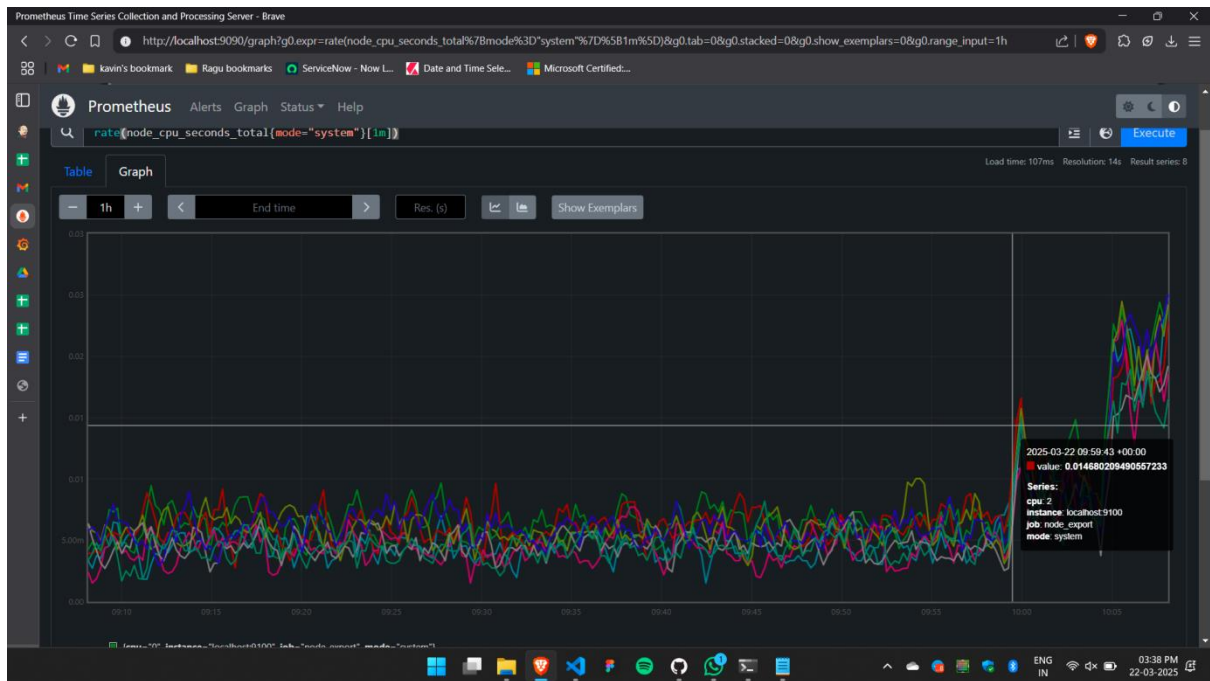
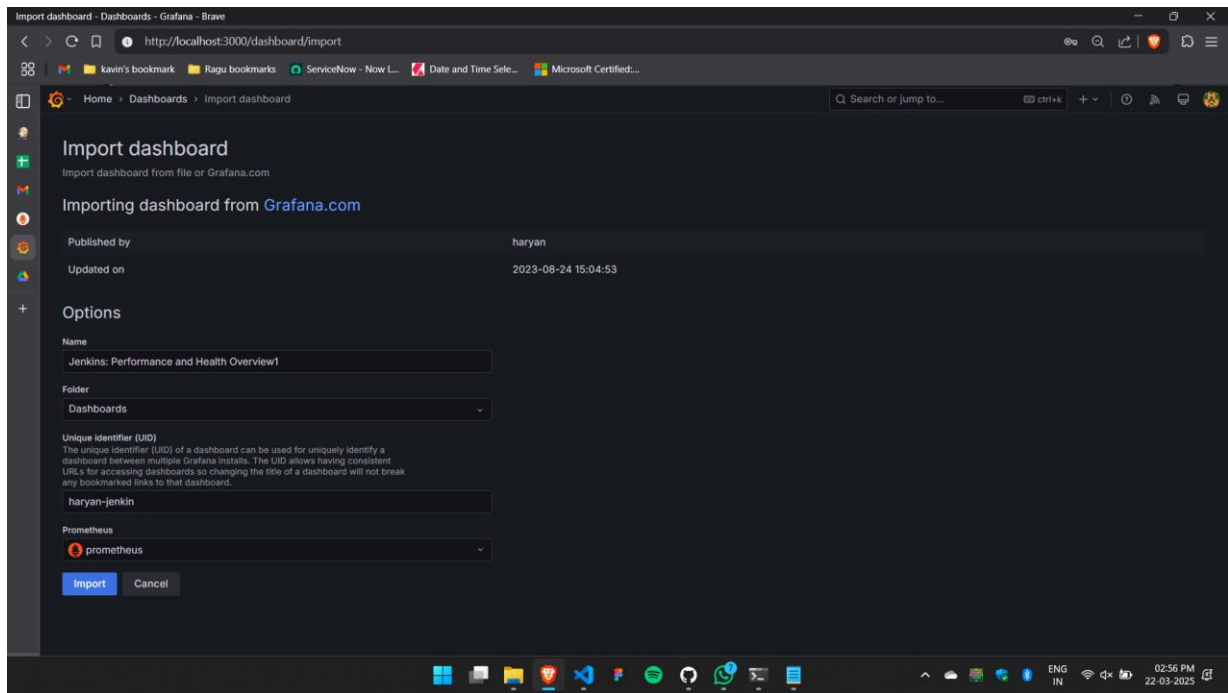
```
sudo systemctl enable grafana-server
```

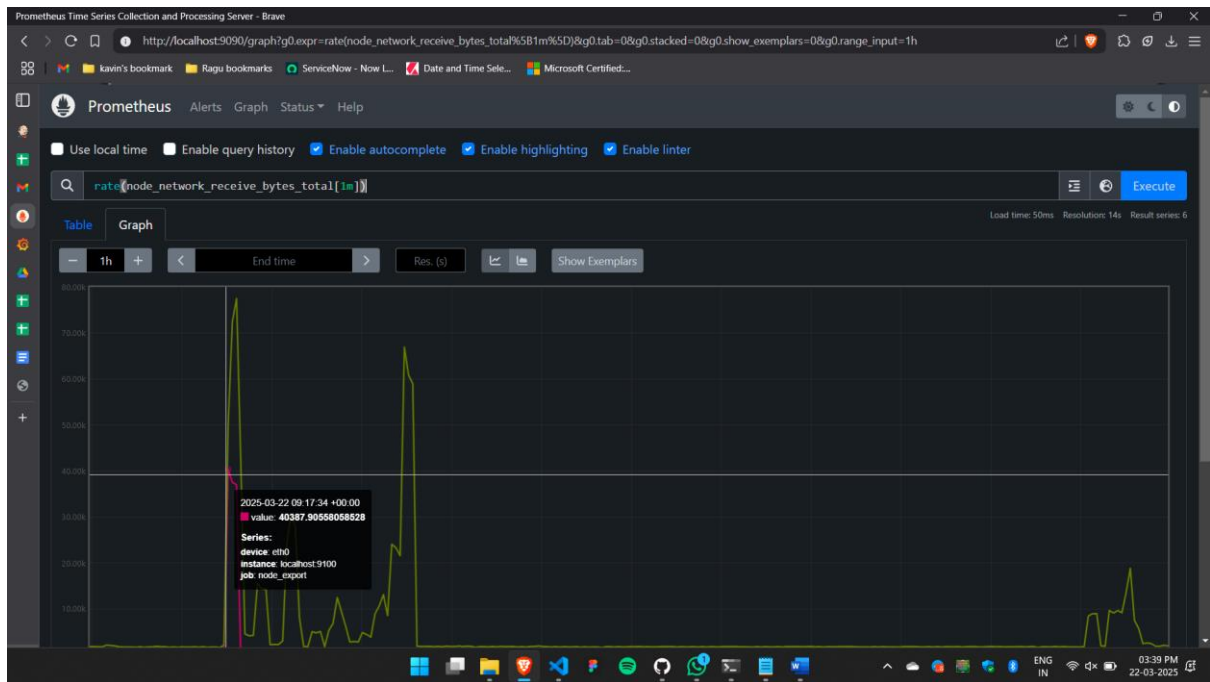
```
sudo systemctl start grafana-server
```

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









node_load15

