

DevOps Day-6

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
```

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 \

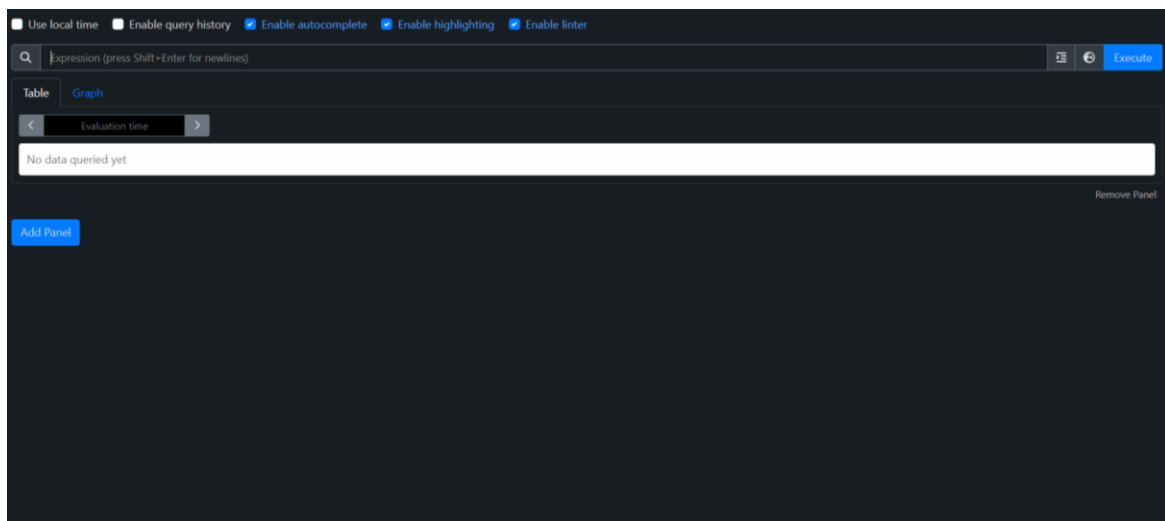
--web.listen-address=0.0.0.0:9090 \

--web.enable-lifecycle

[Install]

WantedBy=multi-user.target

```
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
ragul@Admin:~/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: c4d1a8beff37cc004f1dc4ab9d2e73193f51aeb)
  build user:      root@4829330363be
  build date:      20231004-10:31:16
  go version:      go1.21.1
  platform:        linux/amd64
  tags:            netgo,builtinassets,stringlabels
ragul@Admin:~$ sudo systemctl enable prometheus
sudo systemctl start prometheus
sudo systemctl status prometheus
journalctl -u prometheus -f --no-pager
Created symlink /etc/systemd/system/multi-user.target.wants/prometheus.service → /etc/systemd/system/prometheus.service.
● prometheus.service - Prometheus
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-03-22 08:05:56 UTC; 12ms ago
     Main PID: 19576 (prometheus)
       Tasks: 5 (limit: 9331)
      Memory: 5.1M ( )
        CGroup: /system.slice/prometheus.service
                └─19576 /usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.yml --storage.tsdb.path=/data --web.console.templates=/etc/promethe
```



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`

```

Need to get 139 MB of archives.
After this operation, 533 MB of additional disk space will be used.
Get:1 https://packages.grafana.com/oss/deb stable/main amd64 grafana amd64 11.5.2 [139 MB]
Get:2 http://archive.ubuntu.com/ubuntu noble/universe amd64 musl amd64 1.2.4-2 [416 kB]
Fetched 139 MB in 41s (3390 kB/s)
Selecting previously unselected package musl:amd64.
(Reading database ... 46954 files and directories currently installed.)
Preparing to unpack .../musl_1.2.4-2_amd64.deb ...
Unpacking musl:amd64 (1.2.4-2) ...
Selecting previously unselected package grafana.
Preparing to unpack .../grafana_11.5.2_amd64.deb ...
Unpacking grafana (11.5.2) ...
Setting up musl:amd64 (1.2.4-2) ...
Setting up grafana (11.5.2) ...
info: Selecting UID from range 100 to 999 ...

info: Adding system user 'grafana' (UID 107) ...
info: Adding new user 'grafana' (UID 107) with group 'grafana' ...
info: 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 (2.12.0-4build2) ...
Synchronizing state of grafana-server.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable grafana-server
Created symlink /etc/systemd/system/multi-user.target.wants/grafana-server.service → /usr/lib/systemd/system/grafana-server.service.
● grafana-server.service - Grafana instance
   Loaded: loaded (/usr/lib/systemd/system/grafana-server.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-03-22 08:15:39 UTC; 13ms ago
     Docs: http://docs.grafana.org
    Main PID: 22598 ((grafana))
      Tasks: 1 (limit: 9331)
     Memory: 256.0K ()
    CGroup: /system.slice/grafana-server.service
            └─22598 " (grafana)"

Mar 22 08:15:39 Admin systemd[1]: Started grafana-server.service - Grafana instance.
ragul@Admin: $

```

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

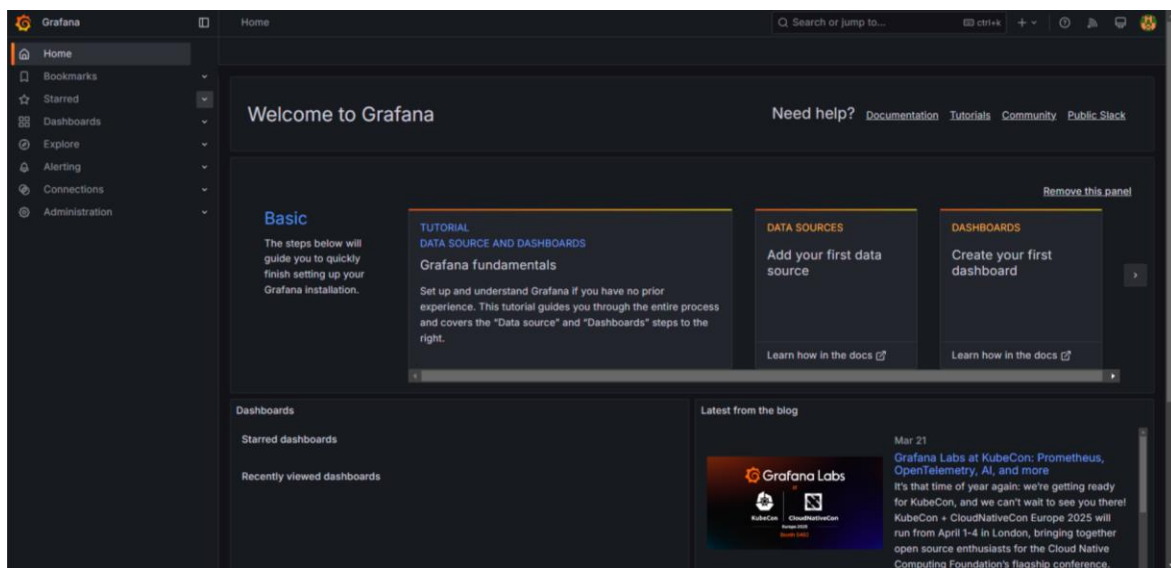
Prometheus Alerts Graph Status Help					
Targets					
<div> All scrape pools All Unhealthy Collapse All <input type="text" value="Filter by endpoint or labels"/> Unknown Unhealthy Healthy </div>					
jenkins (0/1 up) Show logs					
Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:8080/prometheus	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:

Prometheus Alerts Graph Status * Help

Targets

All scrape pools * All Unhealthy Collapse All Unknown Unhealthy Healthy

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

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:8080/prometheus	DOWN	instance="localhost:8080" job="jenkins"	-872.000ms ago	1.723ms	server returned HTTP status 403 Forbidden

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

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:9100/metrics	UP	instance="localhost:9100" job="node_export"	9.665s ago	22.271ms	

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

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:9090/metrics	UP	instance="localhost:9090" job="prometheus"	5.576s ago	3.332ms	

Metrics in Prometheus:

```
# HELP go_gc_duration_seconds A summary of the pause duration of garbage collection cycles.
# TYPE go_gc_duration_seconds summary
go_gc_duration_seconds{quantile="0"} 6.3341e-05
go_gc_duration_seconds{quantile="0.25"} 0.00036033
go_gc_duration_seconds{quantile="0.5"} 0.000377667
go_gc_duration_seconds{quantile="0.75"} 0.000880275
go_gc_duration_seconds{quantile="1"} 0.00268009
go_gc_duration_seconds_sum 0.027268895
go_gc_duration_seconds_count 40
# HELP go_goroutines Number of goroutines that currently exist.
# TYPE go_goroutines gauge
go_goroutines 38
# HELP go_info Information about the Go environment.
# TYPE go_info gauge
go_info{version="go1.21.1"} 1
# HELP go_memstat_alloc_bytes Number of bytes allocated and still in use.
# TYPE go_memstat_alloc_bytes gauge
go_memstat_alloc_bytes 2.5950728e+07
# HELP go_memstat_alloc_bytes_total Total number of bytes allocated, even if freed.
# TYPE go_memstat_alloc_bytes_total counter
go_memstat_alloc_bytes_total 2.8260876e+08
# HELP go_memstat_buck_hash_sys_bytes Number of bytes used by the profiling bucket hash table.
# TYPE go_memstat_buck_hash_sys_bytes gauge
go_memstat_buck_hash_sys_bytes 1.491295e+06
# HELP go_memstat_free_total Total number of frees.
# TYPE go_memstat_free_total counter
go_memstat_free_total 1.46048e+06
# HELP go_memstat_gc_sys_bytes Number of bytes used for garbage collection system metadata.
# TYPE go_memstat_gc_sys_bytes gauge
go_memstat_gc_sys_bytes 4.77956e+06
# HELP go_memstat_heap_alloc_bytes Number of heap bytes allocated and still in use.
# TYPE go_memstat_heap_alloc_bytes gauge
go_memstat_heap_alloc_bytes 2.5950728e+07
# HELP go_memstat_heap_idle_bytes Number of heap bytes waiting to be used.
# TYPE go_memstat_heap_idle_bytes gauge
go_memstat_heap_idle_bytes 2.3437312e+07
# HELP go_memstat_heap_inuse_bytes Number of heap bytes that are in use.
# TYPE go_memstat_heap_inuse_bytes gauge
go_memstat_heap_inuse_bytes 2.9745152e+07
# HELP go_memstat_heap_objects Number of allocated objects.
# TYPE go_memstat_heap_objects gauge
go_memstat_heap_objects 118663
# HELP go_memstat_heap_released_bytes Number of heap bytes released to OS.
# TYPE go_memstat_heap_released_bytes gauge
go_memstat_heap_released_bytes 1.8579456e+07
# HELP go_memstat_heap_sys_bytes Number of heap bytes obtained from system.
# TYPE go_memstat_heap_sys_bytes gauge
go_memstat_heap_sys_bytes 5.3182464e+07
# HELP go_memstat_last_gc_time_seconds Number of seconds since 1970 of last garbage collection.
# TYPE go_memstat_last_gc_time_seconds gauge
go_memstat_last_gc_time_seconds 1.7426345969733205e+09
# HELP go_memstat_lookups_total Total number of pointer lookups.
```

Node Exporter:

HomeDashboardsImport dashboard

Search or jump to...

ctrl+k

Import dashboard

Import dashboard from file or Grafana.com

Importing dashboard from Grafana.com

Published by

rtmoz

Updated on

2024-05-22 21:37:35

Options

Name

Node Exporter Full1

Folder


Dashboards

Unique Identifier (UID)

The unique identifier (UID) of a dashboard can be used to uniquely identify a dashboard between multiple Grafana installs. The UID allows having consistent URLs for accessing dashboards so changing the title of a dashboard will not break any bookmarked links to that dashboard.

rYddidPWI

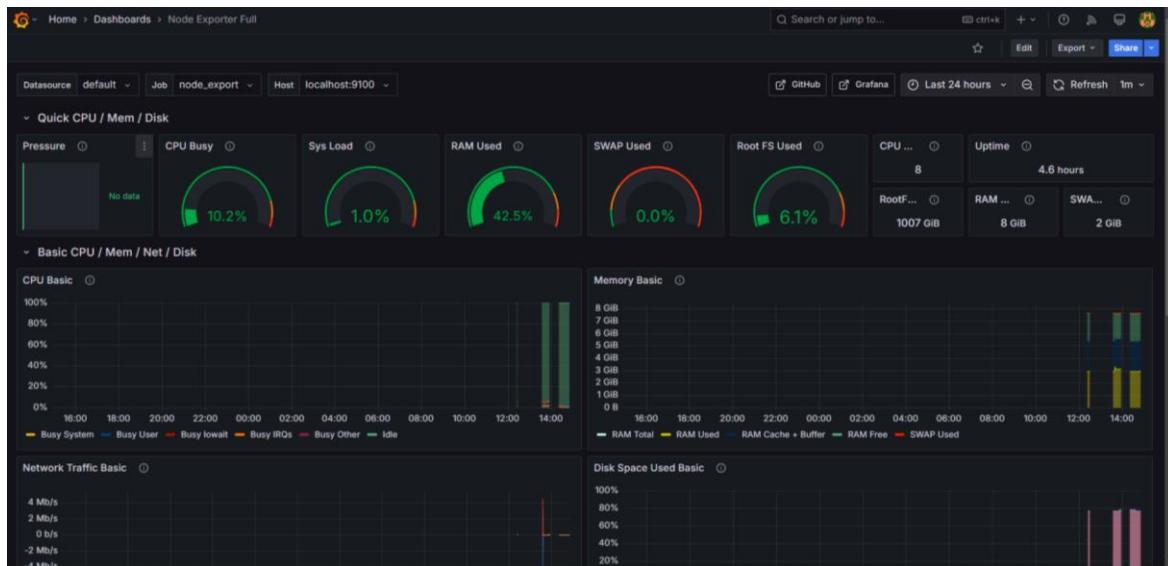
Prometheus

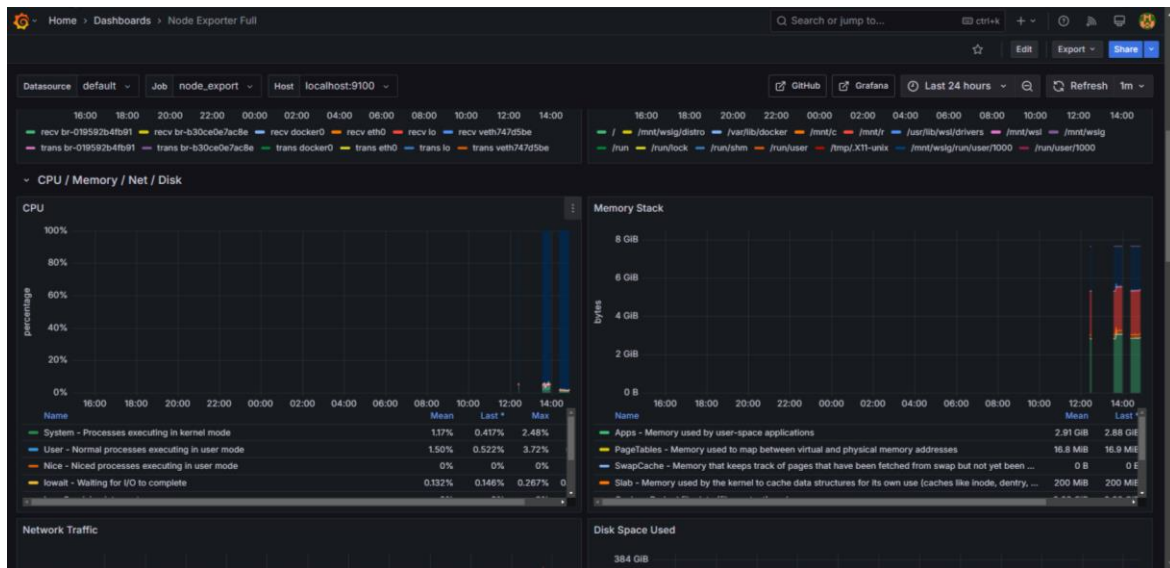
 prometheus

Import

Cancel

Dashboard:





Jenkins Overview:

The screenshot shows the 'Import dashboard' page in Grafana. The page title is 'Import dashboard' with a subtitle 'Import dashboard from file or Grafana.com'. The main heading is 'Importing dashboard from Grafana.com'. The page includes the following information:

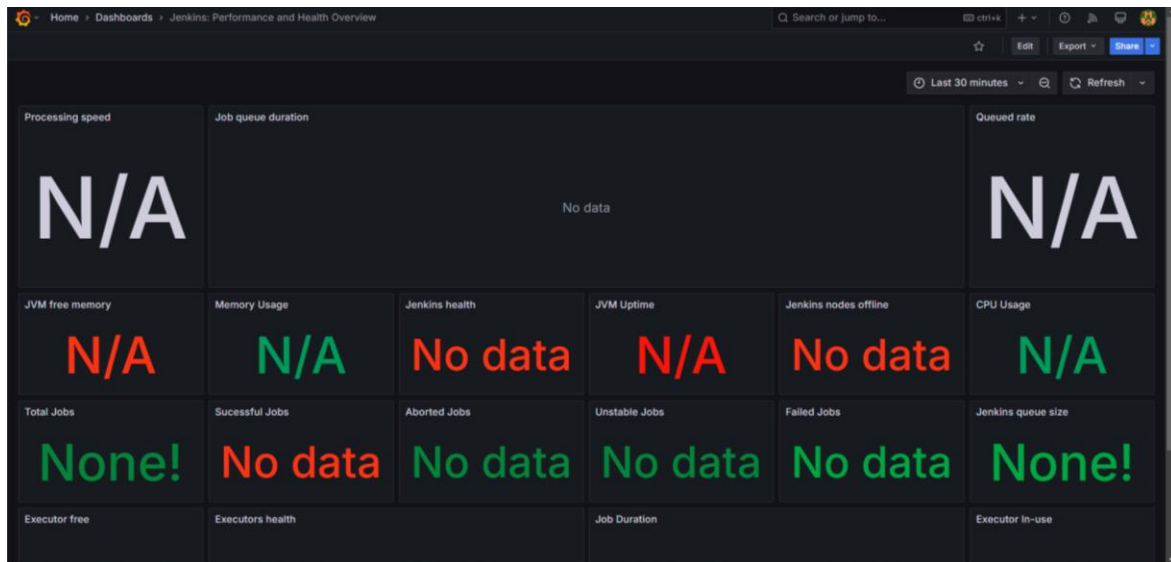
- Published by**: haryan
- Updated on**: 2023-08-24 15:04:53
- Options**: A section for configuring the dashboard import.

The 'Options' section includes the following fields:

- Name**: Jenkins: Performance and Health Overview1
- Folder**: Dashboards
- Unique Identifier (UID)**: haryan-jenkin
- Prometheus**: prometheus

At the bottom of the 'Options' section, there are 'Import' and 'Cancel' buttons.

Dashboard:

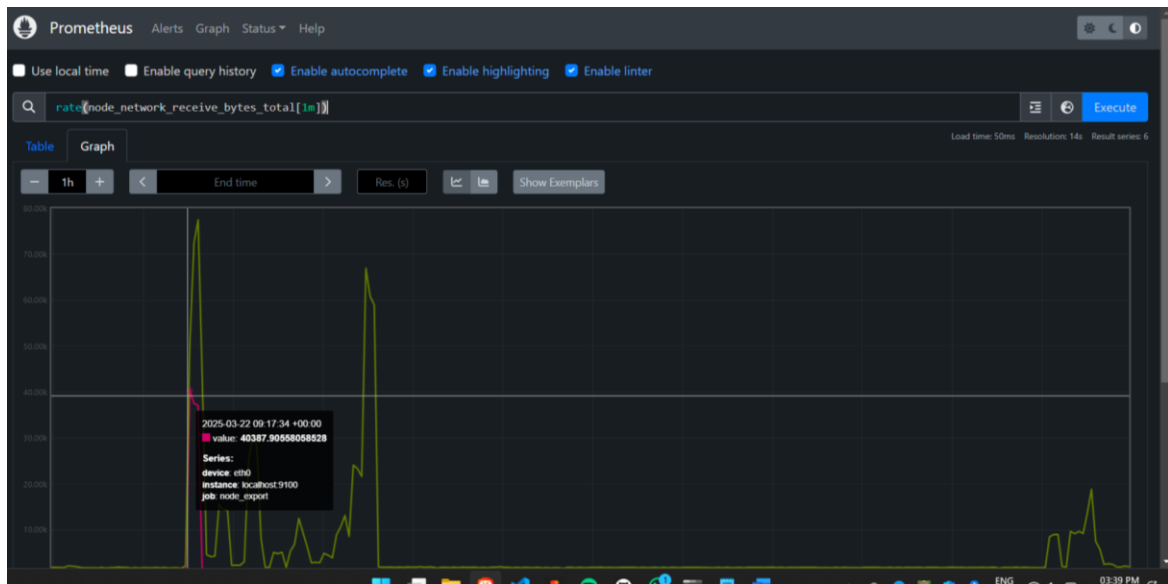


Prometheus analysis:

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



`rate(node_network_receive_bytes_total[1m])`

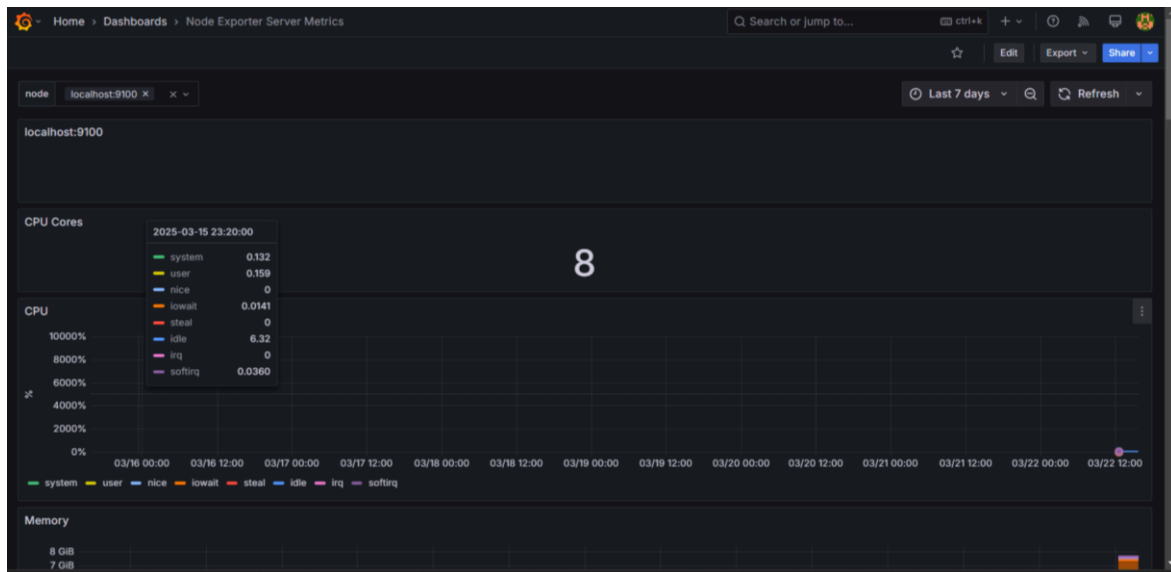


node_load15



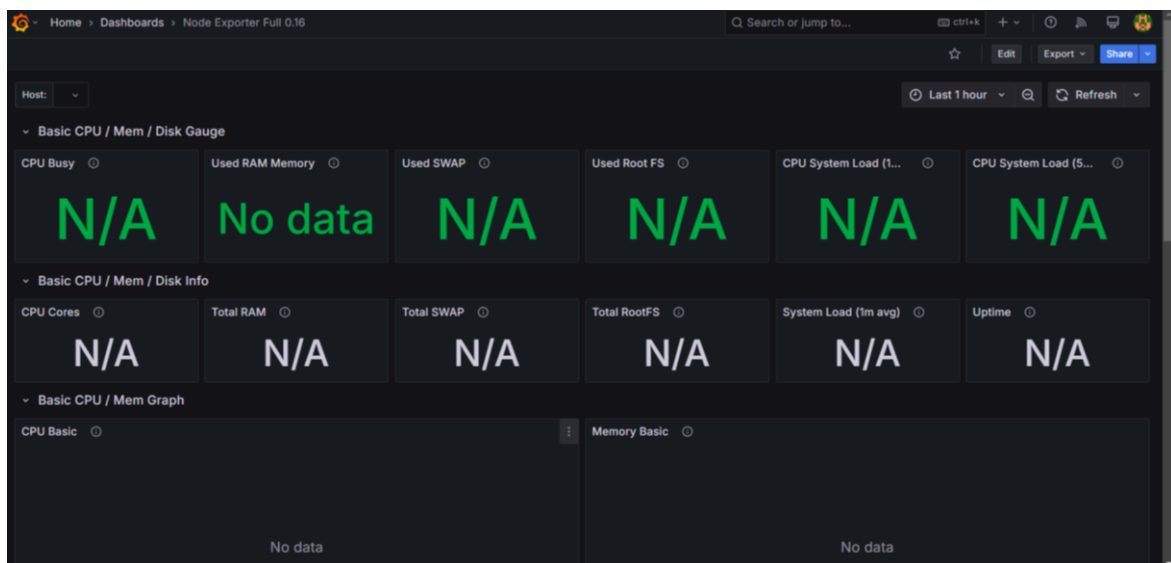
Dashboard: (405)

Node Exporter Service metrics,



Dashboard (5174):

Node Exporter Full 0.16,



Dashboard (9096):

1 Node Exporter 1.0.1

