intelligaia

Prometheus-Grafa na Installation and Setup

Ву

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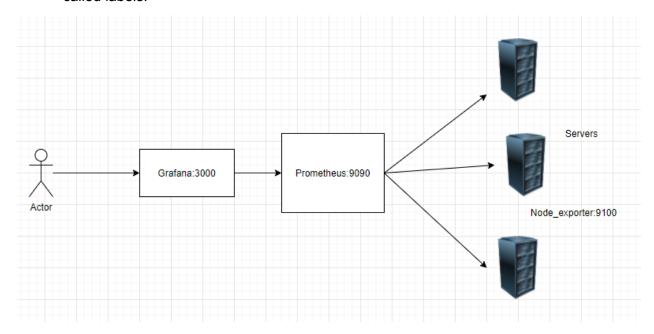
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1. Introduction:

Prometheus

- prometheus is time series metrics based monitoring tools
- node exporter is the agent of the prometheus which provides the system state/cpu/ram/disk
- Prometheus is an open-source systems monitoring and alerting toolkit originally built at SoundCloud. Since its inception in 2012, many companies and organizations have adopted Prometheus, and the project has a very active developer and user community. It is now a standalone open source project and maintained independently of any company. To emphasize this, and to clarify the project's governance structure, Prometheus joined the Cloud Native Computing Foundation in 2016 as the second hosted project, after Kubernetes.
- Prometheus collects and stores its metrics as time series data, i.e. metrics information is stored with the timestamp at which it was recorded, alongside optional key-value pairs called labels.



Features

Prometheus's main features are:

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

Grafana

- The open-source platform for monitoring and observability
- Grafana allows you to query, visualize, alert on and understand your metrics no matter where they are stored. Create, explore, and share dashboards with your team and foster a data-driven culture:
- Visualizations: Fast and flexible client side graphs with a multitude of options. Panel plugins offer many different ways to visualize metrics and logs.
- Dynamic Dashboards: Create dynamic & reusable dashboards with template variables that appear as dropdowns at the top of the dashboard.
- Explore Metrics: Explore your data through ad-hoc queries and dynamic drilldown. Split view and compare different time ranges, queries and data sources side by side.
- Explore Logs: Experience the magic of switching from metrics to logs with preserved label filters. Quickly search through all your logs or streaming them live.
- Alerting: Visually define alert rules for your most important metrics. Grafana will
 continuously evaluate and send notifications to systems like Slack, PagerDuty,
 VictorOps, OpsGenie.
- Mixed Data Sources: Mix different data sources in the same graph! You can specify a data source on a per-query basis. This works for even custom datasources.

2. Prerequisites:

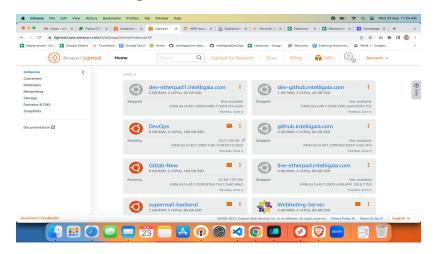
- Linux Server (Ubuntu 20.04 LTS)

We have create lightsail instance with the name DevOps in Mumbai regions with configuration

RAM 8G

2vCPUs

160GB SSD storage



Here we have selected Ubuntu 20.04 LTS

```
root@devops:/home/ubuntu# cat /etc/os-release

NAME="Ubuntu"

VERSION="20.04 LTS (Focal Fossa)"

ID=ubuntu

ID_LIKE=debian

PRETTY_NAME="Ubuntu 20.04 LTS"

VERSION_ID="20.04"

HOME_URL="https://www.ubuntu.com/"

SUPPORT_URL="https://help.ubuntu.com/"

BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"

PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"

VERSION_CODENAME=focal

UBUNTU_CODENAME=focal
```

Docker and Docker-compose installed on ubuntu 20.04

```
root@devops:~# docker --version
Docker version 24.0.5, build ced0996
root@devops:~# docker-compose --version
docker-compose version 1.29.2, build 5becea4c
```

We can use below link to install docker and docker-compose on ubuntu

Unset

https://docs.docker.com/desktop/install/windows-install/

https://docs.docker.com/compose/install/

- you will need prometheus, grafana and node_exporter
- prometheus runs behind the grafana, grafana is used for visualization and prometheus is the data collector which uses node_exporter agent
- We need to install node_exporter on each and every node which needs to be monitored.
- For installing node exporter we can use below link

Unset

https://prometheus.io/docs/guides/node-exporter/

3. Installation

- We have installed prometheus and grafana using docker-compose
- We have created directory inside **/opt** which is **/opt/prom-graf** then create separate folder for prometheus and grafana
- We have created prom-grafa-compose.yaml inside /opt/prom-graf
- cat prom-grafa-compose.yaml

```
Unset
version: '3.8'
services:
prometheus:
 image: prom/prometheus:v2.28.0
 restart: unless-stopped
 container_name: prometheus
 volumes:
  - ./prometheus.yml:/etc/prometheus/prometheus.yml
  -/opt/prom-graf/prometheus-grafana-nfs/prometheus:/prometheus
 ports:
  - 9090:9090
 command: ["--config.file=/etc/prometheus/prometheus.yml",
"--storage.tsdb.path=/prometheus",
"--web.console.libraries=/etc/prometheus/console_libraries",
"--web.console.templates=/etc/prometheus/consoles"]
 grafana:
 image: grafana/grafana:8.2.3
 container_name: grafana
  restart: unless-stopped
 user: "0"
  environment:
  TZ: "Asia/Kolkata"
  GF_INSTALL_PLUGINS:
"grafana-clock-panel,grafana-simple-json-datasource,simpod-json-datasource,marc
usolsson-json-datasource"
 volumes:
  - ./defaults.ini:/etc/grafana/grafana.ini
  - ./ldap.toml:/usr/share/grafana/conf/ldap.toml
  -/opt/prom-graf/prometheus-grafana-nfs/grafana:/var/lib/grafana
  ports:
  - 3000:3000
 blackbox:
```

```
image: prom/blackbox-exporter:v0.15.1
 privileged: true
 restart: unless-stopped
volumes:
 - ./blackbox.yml:/etc/blackboxexporter/config.yml
ports:
 - '9115:9115'
command: ["--config.file=/etc/blackboxexporter/config.yml"]
pushgateway:
image: prom/pushgateway
container_name: pushgateway
 restart: unless-stopped
ports:
 - "9091:9091"
command:
 - '--web.listen-address=:9091'
 - '--push.disable-consistency-check'
 - '--persistence.interval=5m'
```

- We need to create prometheus.yml file inside the /opt/prom-graf

```
Unset
global:
scrape_interval: 15s
evaluation_interval: 15s
scrape_configs:
  - job_name: 'local-prometheus'
   static_configs:
   - targets: ['localhost:9090']
  - job_name: node
   static_configs:
   - targets: ['localhost:9100']
   - job_name: 'lp-openvpn-1'
   static_configs:
   - targets: ['43.204.0.79:9100']
   - job_name: 'dev-etherpad.intelligaia.com'
   static_configs:
```

```
- targets: ['3.6.9.108:9100']
- job_name: 'dev-github.intelligaia.com'
static_configs:
- targets: ['13.127.115.120:9100']
- job_name: 'exportcomments.io-1'
static_configs:
- targets: ['15.206.99.140:9100']
- job_name: 'github.intelligaia.com-1'
static_configs:
- targets: ['13.233.13.224:9100']
- job_name: 'live-etherpad.intelligaia.com(New)'
static_configs:
- targets: ['3.109.128.148:9100']
- job_name: 'jenkins-worker-1'
static_configs:
- targets: ['43.205.232.119:9100']
- job_name: 'neeraj-sir-1'
static_configs:
- targets: ['43.205.43.56:9100']
- job_name: 'Spacetantra'
static_configs:
- targets: ['3.109.228.117:9100']
- job_name: 'ap-haproxy-1'
static_configs:
- targets: ['3.111.190.147:9100']
- job_name: 'dev-scrumboard.intelligaia.com'
static_configs:
- targets: ['3.111.82.180:9100']
- job_name: 'live-scrumboard.intelligaia.com'
static_configs:
- targets: ['65.0.166.68:9100']
- job_name: 'tuthastu.com'
static_configs:
- targets: ['3.111.66.77:9100']
```

```
- job_name: 'teza.tuthastu.com'
 static_configs:
 - targets: ['13.234.141.192:9100']
- job_name: 'intelligaia.com'
 static_configs:
 - targets: ['13.126.72.99:9100']
- job_name: 'dev.exportcomments.io'
 static_configs:
 - targets: ['43.204.53.156:9100']
- job_name: 'Littlesketchers.com'
 static_configs:
 - targets: ['13.235.90.41:9100']
- job_name: 'dev.aclis.io'
 static_configs:
 - targets: ['172.31.40.33:9100']
- job_name: 'aclis.io'
 static_configs:
 - targets: ['18.197.159.84:9100']
- job_name: 'calendar.intelligaia.com'
 static_configs:
 - targets: ['43.205.28.106:9100']
- job_name: 'dev-calendar.intelligaia.com'
 static_configs:
 - targets: ['15.207.205.179:9100']
- job_name: 'colorshift.intelligaia.com'
 static_configs:
 - targets: ['43.204.89.182:9100']
# - job_name: 'backend-api.intelligaia.com'
# static_configs:
# - targets: ['172.31.5.164:9100']
# - job_name: 'superemail.intelligaia.com'
# static_configs:
# - targets: ['172.31.11.39:9100']
#- job_name: 'test.intelligaia.com'
```

```
# static_configs:
# - targets: ['172.31.26.213:9100']
- job_name: 'pushgateway'
honor_labels: true
 static_configs:
 - targets: ['172.26.2.229:9091']
- job_name: 'blackbox'
 metrics_path:/probe
 params:
 module: [http_2xx] #Look for a HTTP 200 response.
 static_configs:
  - targets:
   - https://intelligaia.com
   - https://exportcomments.io
   - https://dev.exportcomments.io
   - https://dev-etherpad.intelligaia.com
   - https://grafana.intelligaia.com
   - https://jenkins.intelligaia.com/login?from=%2F
   - https://sonarqube.intelligaia.com
   - https://spacetantra.com
   - https://littlesketchers.com
   - https://figma.com
   - https://infina.projectsjunction.com
   - https://dev-github.intelligaia.com
   - https://github.intelligaia.com/
   - https://live-etherpad.intelligaia.com/
   - https://payroll.intelligaia.com/
   - https://dev-scrumboard.intelligaia.com
   - https://scrumboard.intelligaia.com
   - https://tuthastu.com
   - https://admin.tuthastu.com
   - https://teza.tuthastu.com
   - https://teza-admin.tuthastu.com
   - https://greendotexpeditions.com
   - https://gennextsmartschool.com
   - https://projecthost.us
   - https://baljitphotography.com
   - https://littlesketchers.com
   - https://bhumivardaan.com
   - https://cds.ind.in
   - https://intelligaia.com
   - https://rajivkaul.com
```

```
- https://cheenakaul.com
 - https://roopinder.com
 - https://gianigurditsingh.com
 - https://feedback.intelligaia.com
 - https://admin.intelligaia.com
 - https://sendgrid.intelligaia.com
 - https://api.exportcomments.io
 - https://admin.spacetantra.com
 - https://dev-api.exportcomments.io
 - https://intelligaia.com
 - https://dev.aclis.io
 - https://aclis.io
 - https://dev-etherpad-api.intelligaia.com
 - https://ebooks.intelligaia.com
 - https://hpe-grommet.intelligaia.com
 - https://zoom-freshsales.intelligaia.com
 - https://live-etherpad-api.intelligaia.com
 - https://api-scrumboard.intelligaia.com
 - https://timer-scrumboard.intelligaia.com
 - https://api-dev-scrumboard.intelligaia.com
 - https://timer-dev-scrumboard.intelligaia.com
 - https://colorshift.intelligaia.com
 - https://dev-calendar.intelligaia.com
 - https://calendar.intelligaia.com
 - https://backend-api.intelligaia.com
 - https://superemail.intelligaia.com
 - https://superemail-api-v1.intelligaia.com
relabel_configs:
- source_labels: [__address__]
 target_label: __param_target
- source_labels: [__param_target]
 target_label: instance
- target_label: __address__
 replacement: 172.26.2.229:9115
```

- With prometheus.yml we need to create blackbox.yml
- Cat blackbox.yml

```
Unset
modules:
http_2xx:
prober: http
timeout: 5s
http:
method: GET
```

- We need to create and mount all the files and folders listed in docker-compose file
- For Grafana we need to create defaults.ini with few configurational changes and Idap.toml which has active directory configuration
- Cat Idap.toml

```
Unset
# To troubleshoot and get more log info enable ldap debug logging in grafana.ini
#filters = ldap:debug
[[servers]]
# Ldap server host (specify multiple hosts space separated)
host = "dc1.ad.intelligaia.com"
# Default port is 389 or 636 if use_ssl = true
# Set to true if LDAP server should use an encrypted TLS connection (either with
STARTTLS or LDAPS)
use_ssl = false
# If set to true, use LDAP with STARTTLS instead of LDAPS
start tls = false
# set to true if you want to skip ssl cert validation
ssl_skip_verify = false
# set to the path to your root CA certificate or leave unset to use system defaults
# root_ca_cert = "/path/to/certificate.crt"
# Authentication against LDAP servers requiring client certificates
# client_cert = "/path/to/client.crt"
# client_key = "/path/to/client.key"
# Search user bind dn
#bind_dn = "cn=admin, dc=grafana, dc=org"
bind_dn = "CN=grafana-svc,OU=ServiceAccounts,DC=ad,DC=intelligaia,DC=com"
#bind_dn = "grafana-svc@ad.intelligaia.com"
```

```
# Search user bind password
# If the password contains # or ; you have to wrap it with triple quotes. Ex
"""#password;"""
bind_password = 'vibgyor@158'
#User search filter, for example "(cn=%s)" or "(sAMAccountName=%s)" or "(uid=%s)"
#search_filter = "(cn=%s)"
search_filter = "(sAMAccountName=%s)"
# An array of base dns to search through
#search_base_dns = ["dc=grafana, dc=org"]
search_base_dns = ["DC=ad, DC=intelligaia, DC=com"]
## For Posix or LDAP setups that does not support member_of attribute you can define the
below settings
## Please check grafana LDAP docs for examples
# group_search_filter = "(&(objectClass=posixGroup)(memberUid=%s))"
# group_search_base_dns = ["ou=groups, dc=grafana, dc=org"]
group_search_base_dns = ["OU=ServiceAccounts,DC=ad,DC=intelligaia,DC=com"]
# group_search_filter_user_attribute = "uid"
# Specify names of the ldap attributes your ldap uses
[servers.attributes]
#name = "Name"
#surname = "Surname"
#username = "sAMAccountName"
#member_of = "MemberOf"
#email = "EmailAddress"
name = "givenName"
surname = "sn"
username = "sAMAccountName"
member of = "memberOf"
email = "mail"
# Map ldap groups to grafana org roles
[[servers.group_mappings]]
#group_dn = "cn=admins,ou=groups,dc=grafana,dc=org"
group_dn = "CN=grafana-admin,OU=ServiceAccounts,DC=ad,DC=intelligaia,DC=com"
org_role = "Admin"
# To make user an instance admin (Grafana Admin) uncomment line below
#grafana_admin = true
# The Grafana organization database id, optional, if left out the default org (id 1)
will be used
```

```
#org_id = 1

[[servers.group_mappings]]
#group_dn = "cn=users, ou=groups, dc=grafana, dc=org"
group_dn = "CN=grafana-editor, OU=ServiceAccounts, DC=ad, DC=intelligaia, DC=com"
org_role = "Editor"

[[servers.group_mappings]]
# If you want to match all (or no ldap groups) then you can use wildcard
group_dn = "CN=grafana-viewer, OU=ServiceAccounts, DC=ad, DC=intelligaia, DC=com"
org_role = "Viewer"
```

- You need to add necessary parameters such as

```
host = "dc1.ad.intelligaia.com"
port = 389
bind_dn = "CN=grafana-svc,OU=ServiceAccounts,DC=ad,DC=intelligaia,DC=com"
bind_password = 'vibgyor@158'
search_filter = "(sAMAccountName=%s)"
search_base_dns = ["DC=ad,DC=intelligaia,DC=com"]
[servers.attributes]
name = "givenName"
surname = "sn"
username = "sAMAccountName"
member_of = "memberOf"
email = "mail"
group_dn = "CN=grafana-admin,OU=ServiceAccounts,DC=ad,DC=intelligaia,DC=com"
org_role = "Admin"
group_dn = "CN=grafana-editor,OU=ServiceAccounts,DC=ad,DC=intelligaia,DC=com"
org_role = "Editor"
group_dn = "CN=grafana-viewer,OU=ServiceAccounts,DC=ad,DC=intelligaia,DC=com"
org_role = "Viewer"
```

- Once you're ready with all the mount directory and files then we can run below command to begin setup

```
Unset
docker-compose -f prom-grafa-compose.yaml up -d
```

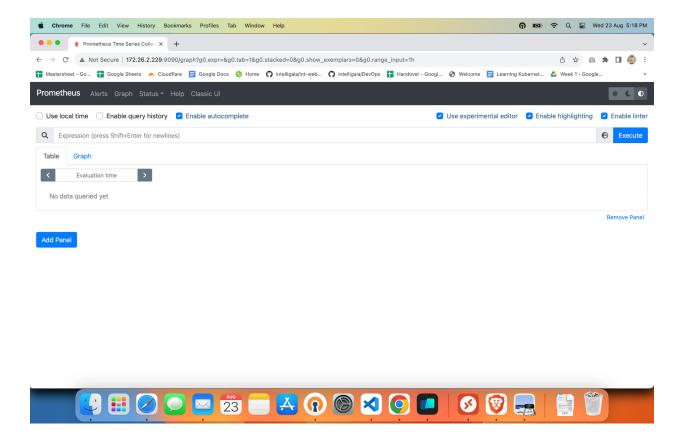
You can use docker ps to check all the containers are in starting state

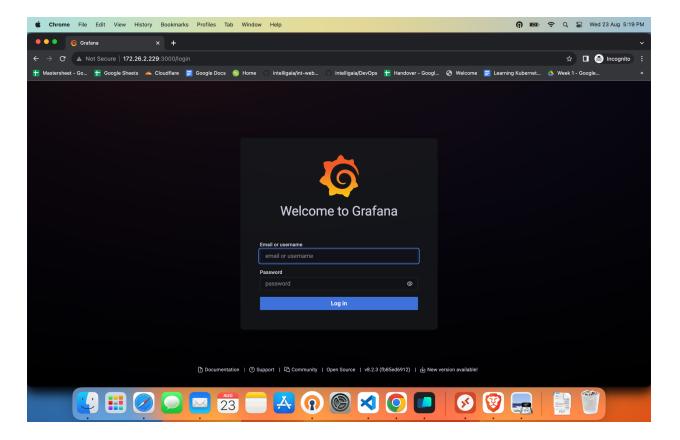


You might want to expose the necessary ports to access the applications, Make sure you do not expose prometheus to the internet, it's just need communication with grafana.

Prometheus runs on port 9090

You can go into **Status > Targets** to see all configuration of prometheus.yml





- We need to install node_exporter on the worker nodes which needs to be monitored
- install the node_exporter on the client server follow below steps

```
Unset
wget
https://github.com/prometheus/node_exporter/releases/download/v1.0.0-rc.0/node_
exporter-1.0.0-rc.0.linux-amd64.tar.gz

tar -xzf node_exporter-1.0.0-rc.0.linux-amd64.tar.gz

mv node_exporter-1.0.0-rc.0.linux-amd64/node_exporter/usr/local/bin/
```

Create service for node_exporter

- use below command to do so

```
Unset
echo'[Unit]
Description=Node Exporter
Wants=network-online.target
After=network-online.target

[Service]
User=root
Group=root
Type=simple
Restart=on-failure
ExecStart=/usr/local/bin/node_exporter

[Install]
WantedBy=multi-user.target
'>/etc/systemd/system/node_exporter.service
```

Enable and start node_exporter service

```
Unset

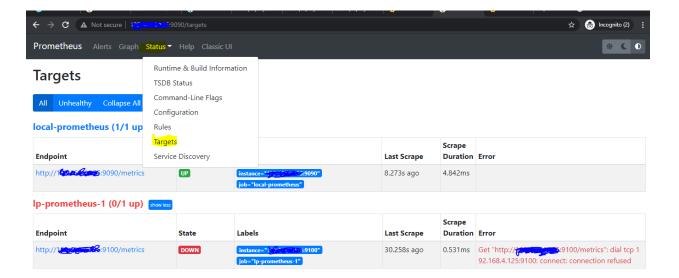
systemctl daemon-reload

systemctl enable node_exporter

systemctl start node_exporter

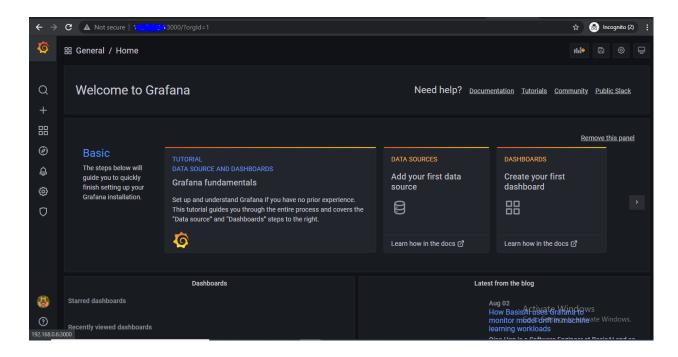
systemctl status node_exporter
```

- Make sure you open the port 9100 from the worker node in security group

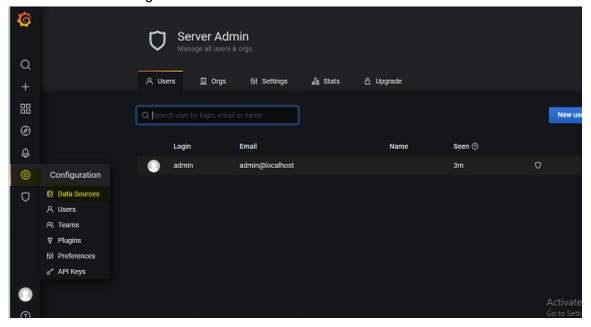


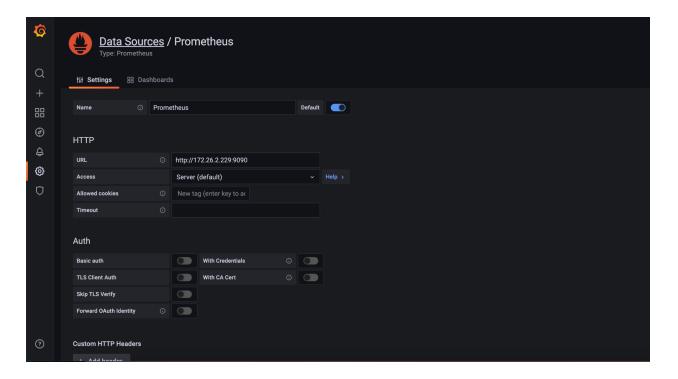
Grafana Dashboard setup

- login first time by using default password admin admin it will ask you to change the password
- But here we have configured Idap so we can use active directory password
- After login we can see this page, We need to configured the datasource and then we need to configure the dashboard

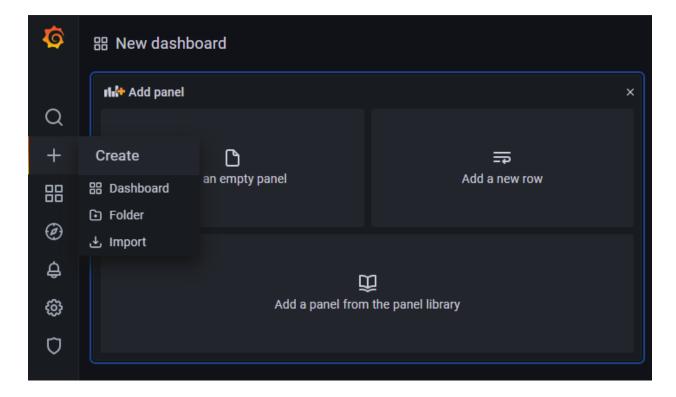


Click on setting and datasource

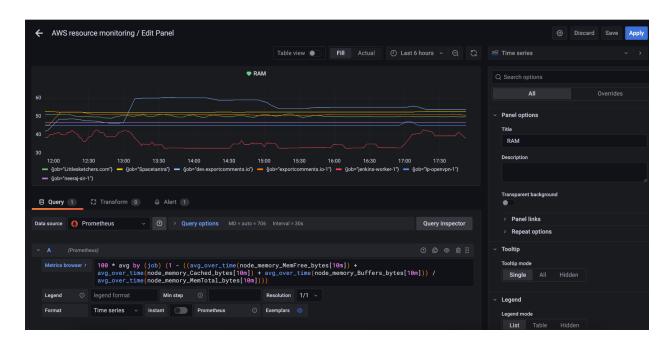




- Click on save and test it will show successful
- Make sure you open the port 9090 so that grafana can detect and communicate.
- Now we can proceed to create dashboard



You can create new panel inside the dashboard



- You can use below query to monitor RAM

```
Unset
100 * avg by (job) (1 -
  ((avg_over_time(node_memory_MemFree_bytes[10m]) +
  avg_over_time(node_memory_Cached_bytes[10m]) +
  avg_over_time(node_memory_Buffers_bytes[10m])) /
  avg_over_time(node_memory_MemTotal_bytes[10m])))
```

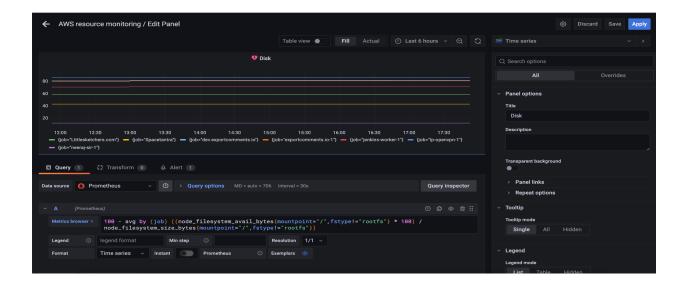
- We can Title the panel RAM and then we can begin adding new panels
- We can use below queries to the respective panels and save with the respective names.

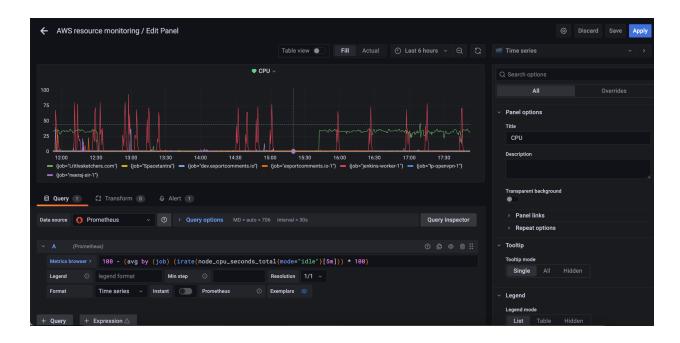
```
#CPU: 100 - (avg by (job)
(irate(node_cpu_seconds_total{mode="idle"}[5m])) *
100)

#DISK usage: 100 - avg by (job)
((node_filesystem_avail_bytes{mountpoint="/",fstype!=
"rootfs"} * 100) /
node_filesystem_size_bytes{mountpoint="/",fstype!="ro
otfs"})

#DISK read IO: avg by (job)
(irate(node_disk_read_bytes_total{device="sda"}[5m])
/ 1024 / 1024)

#DISK WRITE IO: avg by (job)
(irate(node_disk_written_bytes_total{device="sda"}[1m]) / 1024 / 1024)
```





- For exposing the grafana dashboard on grafana.intelligaia.com we have used nginx
- Nginx can be installed using below command

```
Unset
apt update
apt install nginx -y
```

- The nginx configuration are configured at /etc/nginx/conf.d/grafana.conf and /etc/nginx/conf.d/pushgateway.conf
- Cat /etc/nginx/conf.d/grafana.conf

```
proxy_set_header X-Forwarded-Proto http;
   proxy_max_temp_file_size 0;
   proxy_connect_timeout 150;
   proxy_send_timeout
                         100;
   proxy_read_timeout 100;
   proxy_buffer_size 8k;
   proxy_buffers 4 32k;
   proxy_busy_buffers_size 64k;
   proxy_temp_file_write_size 64k;
 }
 listen 443 ssl; # managed by Certbot
 ssl_certificate/etc/letsencrypt/live/grafana.intelligaia.com/fullchain.pem; #
managed by Certbot
  ssl_certificate_key /etc/letsencrypt/live/grafana.intelligaia.com/privkey.pem;
# managed by Certbot
 include /etc/letsencrypt/options-ssl-nginx.conf; # managed by Certbot
 ssl_dhparam /etc/letsencrypt/ssl-dhparams.pem; # managed by Certbot
}
server {
 if ($host = grafana.intelligaia.com) {
   return 301 https://$host$request_uri;
  } # managed by Certbot
 server_name grafana.intelligaia.com;
 listen 80;
  return 404; # managed by Certbot
}
```

- Cat /etc/nginx/conf.d/pushgateway.conf

```
Unset
server {
  server_name pushgateway.intelligaia.com;
  access_log off;
```

```
location / {
   proxy_pass
                 http://127.0.0.1:9091;
   proxy_set_header Host
                               $host;
   proxy_set_header X-Real-IP $remote_addr;
   proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
   proxy_set_header X-Forwarded-Proto http;
   proxy_max_temp_file_size 0;
   proxy_connect_timeout 150;
   proxy_send_timeout
                          100;
   proxy_read_timeout
                          100;
   proxy_buffer_size
                         8k;
   proxy_buffers
                    4 32k;
   proxy_busy_buffers_size 64k;
   proxy_temp_file_write_size 64k;
 }
 listen 443 ssl; # managed by Certbot
 ssl_certificate
/etc/letsencrypt/live/pushgateway.intelligaia.com/fullchain.pem; # managed by
Certbot
 ssl_certificate_key
/etc/letsencrypt/live/pushgateway.intelligaia.com/privkey.pem; # managed by
Certbot
 include /etc/letsencrypt/options-ssl-nginx.conf; # managed by Certbot
 ssl_dhparam /etc/letsencrypt/ssl-dhparams.pem; # managed by Certbot
}
server {
 if ($host = pushgateway.intelligaia.com) {
   return 301 https://$host$request_uri;
 } # managed by Certbot
 server_name pushgateway.intelligaia.com;
 return 404; # managed by Certbot
}
```

