1. Install Prometheus Server

- Configuration basic authentication username/password
- Screenshot of login prompt while trying to access prometheus
- Screenshot of prometheus dashboard

Installing Prometheus

Make prometheus user

sudo adduser --no-create-home --disabled-login --shell /bin/false --gecos "Prometheus Monitoring User" prometheus

Make directories and dummy files necessary for prometheus

sudo mkdir /etc/prometheus

sudo mkdir /var/lib/prometheus

sudo touch /etc/prometheus/prometheus.yml

sudo touch /etc/prometheus/prometheus.rules.yml

Assign ownership of the files above to prometheus user

sudo chown -R prometheus:prometheus /etc/prometheus

sudo chown prometheus:prometheus /var/lib/prometheus

Download prometheus

VERSION=latest(2.32)

```
VERSION=$(curl https://raw.githubusercontent.com/prometheus/prometheus/master/VERSION)
```

```
wget https://github.com/prometheus/prometheus/releases/download/v${VERSION}/prometheus-${VERSION}.linux-amd64.tar.gz
```

tar xvzf prometheus-${VERSION}.linux-amd64.tar.gz

Copy utilities to where they should be in the filesystem

sudo cp prometheus-${VERSION}.linux-amd64/prometheus /usr/local/bin/

sudo cp prometheus-${VERSION}.linux-amd64/promtool /usr/local/bin/

sudo cp -r prometheus-${VERSION}.linux-amd64/consoles /etc/prometheus

sudo cp -r prometheus-${VERSION}.linux-amd64/console_libraries /etc/prometheus

Assign the ownership of the tools above to prometheus user

sudo chown -R prometheus:prometheus /etc/prometheus/consoles

sudo chown -R prometheus:prometheus /etc/prometheus/console_libraries

sudo chown prometheus:prometheus /usr/local/bin/prometheus

sudo chown prometheus:prometheus /usr/local/bin/promtool

Editing configuration files

sudo vi /etc/prometheus/prometheus.yml

```
global:
  scrape_interval: 15s

rule_files:
  - 'prometheus.rules.yml'

scrape_configs:

  - job_name: 'prometheus'
    scrape_interval: 5s
    static_configs:
      - targets: ['192.168.1.147:9090']
```

sudo vi /etc/prometheus/prometheus.rules.yml

```
groups:
  - name: example_alert
    rules:
      - alert: InstanceDown
        expr: up == 0
        for: 5m
        labels:
          severity: page
        annotations:
          summary: "Instance {{ $labels.instance }} down"
          description: "{{ $labels.instance }} of job {{ $labels.job }} has been down for more than 5
minutes."
```

sudo vi /etc/systemd/system/prometheus.service

```
[Unit]
Description=Prometheus
Wants=network-online.target
After=network-online.target

[Service]
User=prometheus
Group=prometheus
Type=simple
ExecStart=/usr/local/bin/prometheus \
    --config.file /etc/prometheus/prometheus.yml \
    --storage.tsdb.path /var/lib/prometheus/ \
    --web.console.templates=/etc/prometheus/consoles \
    --web.console.libraries=/etc/prometheus/console_libraries \
    --web.config.file /etc/prometheus/web.yml

[Install]
WantedBy=multi-user.target
```

Reloading system Daemon and starting prometheus

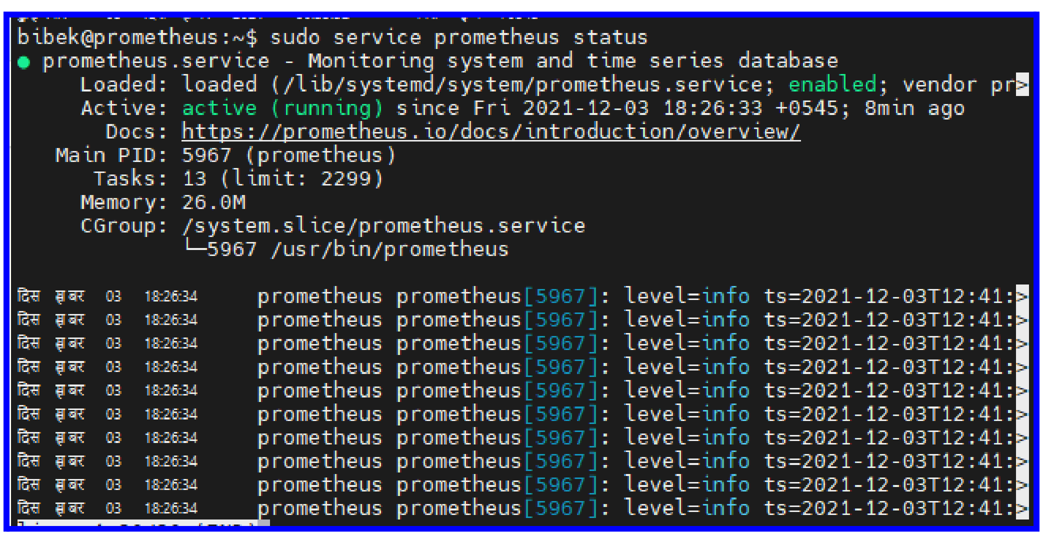
sudo systemctl daemon-reload

sudo systemctl enable prometheus

sudo systemctl start prometheus

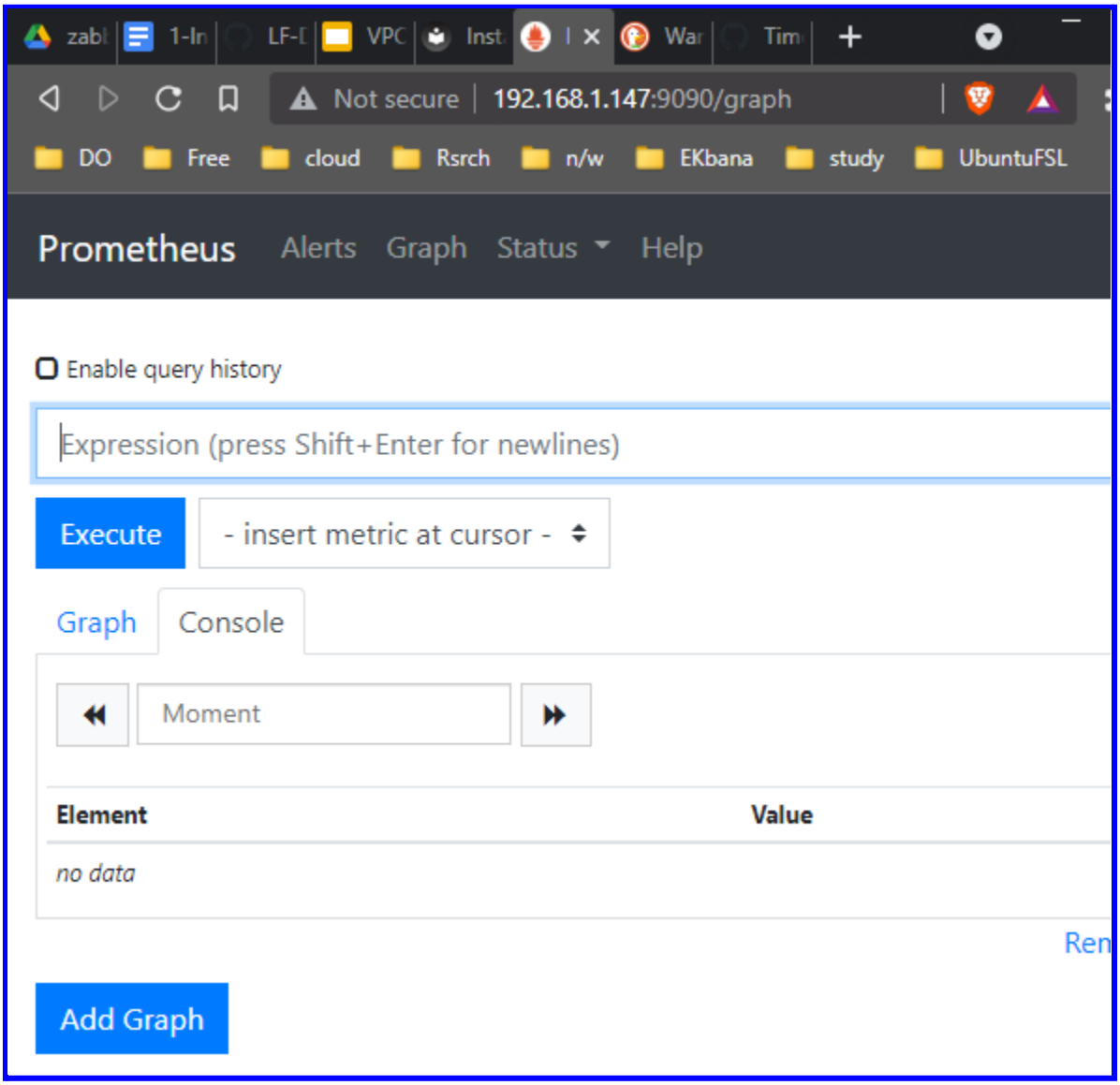
Checking status of Prometheus

sudo service prometheus status



```
bibek@prometheus:~$ sudo service prometheus status
● prometheus.service - Monitoring system and time series database
     Loaded: loaded (/lib/systemd/system/prometheus.service; enabled; vendor pr>
     Active: active (running) since Fri 2021-12-03 18:26:33 +0545; 8min ago
       Docs: https://prometheus.io/docs/introduction/overview/
   Main PID: 5967 (prometheus)
      Tasks: 13 (limit: 2299)
     Memory: 26.0M
     CGroup: /system.slice/prometheus.service
             └─5967 /usr/bin/prometheus

दिसम्बर 03 18:26:34     prometheus prometheus[5967]: level=info ts=2021-12-03T12:41:>
दिसम्बर 03 18:26:34     prometheus prometheus[5967]: level=info ts=2021-12-03T12:41:>
दिसम्बर 03 18:26:34     prometheus prometheus[5967]: level=info ts=2021-12-03T12:41:>
दिसम्बर 03 18:26:34     prometheus prometheus[5967]: level=info ts=2021-12-03T12:41:>
दिसम्बर 03 18:26:34     prometheus prometheus[5967]: level=info ts=2021-12-03T12:41:>
दिसम्बर 03 18:26:34     prometheus prometheus[5967]: level=info ts=2021-12-03T12:41:>
दिसम्बर 03 18:26:34     prometheus prometheus[5967]: level=info ts=2021-12-03T12:41:>
दिसम्बर 03 18:26:34     prometheus prometheus[5967]: level=info ts=2021-12-03T12:41:>
दिसम्बर 03 18:26:34     prometheus prometheus[5967]: level=info ts=2021-12-03T12:41:>
दिसम्बर 03 18:26:34     prometheus prometheus[5967]: level=info ts=2021-12-03T12:41:>
```

Browsing in the web **<server_IP>:9090**



If time difference warning is shown then, install ntp and pool for ntp.org

sudo apt-get update

sudo apt-get install ntp

sudo ntpd pool.ntp.org

It will sync time from ntp server and warning is solved

Configuration basic authentication username/password

Generating hashed-password from python

Python3-bcrypt is needed

sudo apt install python3-bcrypt

Opening python3 shell in ubuntu

python3

Importing getpass and bcrypt

import getpass

import bcrypt

Generating hashed-password

hashed_password = bcrypt.hashpw("123456".encode("utf-8"), bcrypt.gensalt())

Getting the hashed-password

hashed_password.decode()

```
>>> import getpass
>>> import bcrypt
>>> hashed_password = bcrypt.hashpw("123456".encode("utf-8"), bcrypt.gensalt())
>>> hashed_password.decode()
'$2b$12$25NgYqbD.tJy2gHaJjJYVuPFNSECNwsJOoV4BDCafK3zPcHuuKAK2'
>>>
```

*The value we got is hashed-password of "***123456***"*

To set basic_auth, creating web-config file

sudo vi /etc/prometheus/web.yml

```
basic_auth_users:
    admin: $2b$12$25NgYqbD.tJy2gHaJjJYVuPFNSECNwsJOoV4BDCafK3zPcHuuKAK2
```

Save and exit

Configuring in systemd for basic auth with above web.yml file

sudo vi /etc/systemd/system/prometheus.service

*Adding line "***--web.config.file /etc/prometheus/web.yml***"*

```
Type=simple
ExecStart=/usr/local/bin/prometheus \
    --config.file /etc/prometheus/prometheus.yml \
    --storage.tsdb.path /var/lib/prometheus/ \
    --web.console.templates=/etc/prometheus/consoles \
    --web.console.libraries=/etc/prometheus/console_libraries \
    --web.config.file /etc/prometheus/web.yml

[Install]
WantedBy=multi-user.target
```

While restarting prometheus service, it will use this web.yml as authentication file

Providing authentication in prometheus job so that it will be authorized, and we can get the in UP state

sudo vi /etc/prometheus/prometheus.yml

```
global:
  scrape_interval: 15s

rule_files:
  - 'prometheus.rules.yml'

scrape_configs:

  - job_name: 'prometheus'
    scrape_interval: 5s
    static_configs:
      - targets: ['192.168.1.147:9090']
    basic_auth:
      username: admin
      password: 123456
```

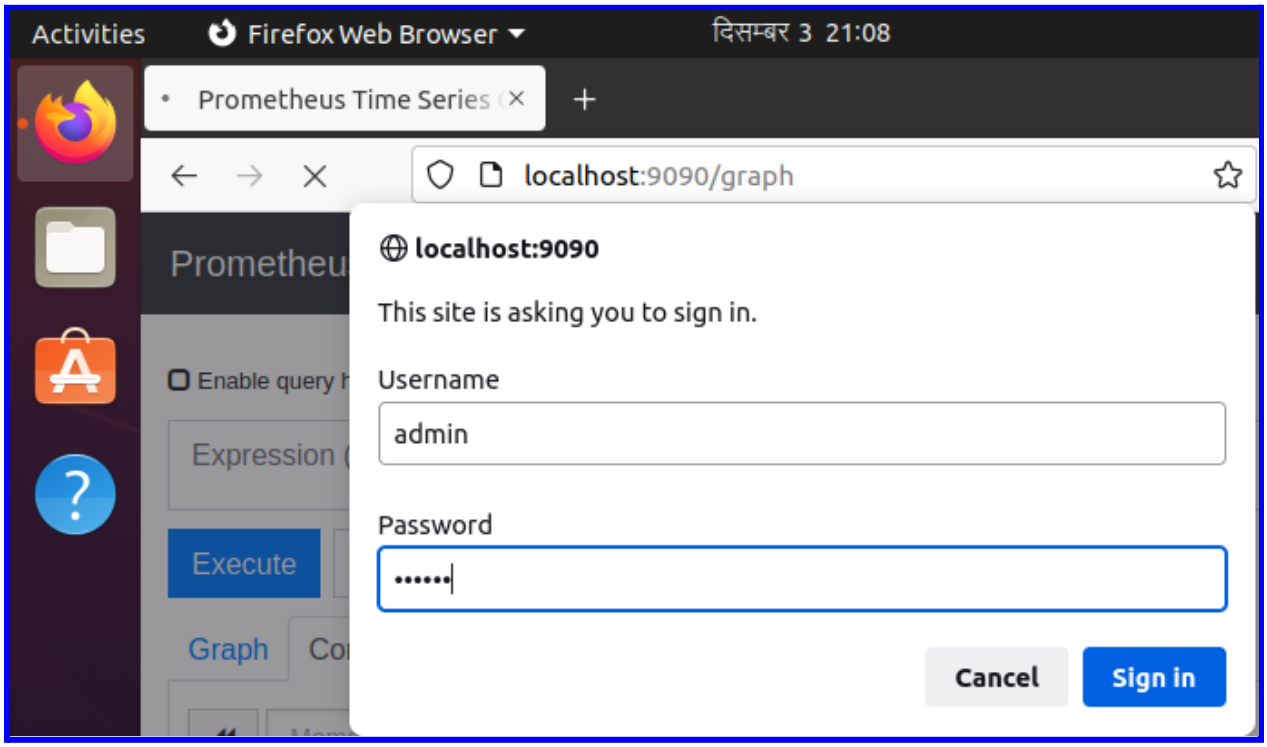
Restarting prometheus

sudo systemctl restart prometheus.service

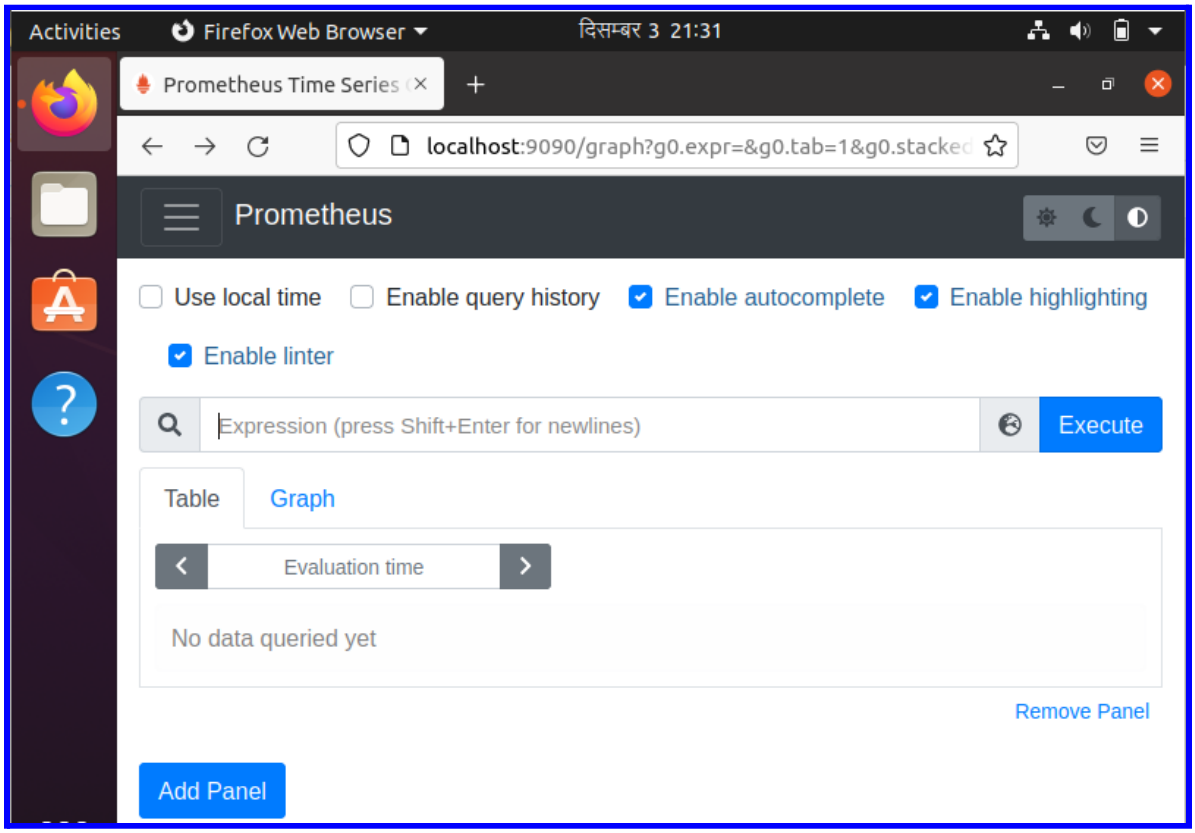
```
bibek@prometheus:/etc/prometheus$ sudo systemctl restart prometheus.service
bibek@prometheus:/etc/prometheus$ sudo systemctl status prometheus.service
● prometheus.service - Prometheus
     Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; vendor pr>
     Active: active (running) since Fri 2021-12-03 22:00:46 +0545; 8s ago
   Main PID: 20909 (prometheus)
      Tasks: 7 (limit: 2299)
     Memory: 62.1M
     CGroup: /system.slice/prometheus.service
             └─20909 /usr/local/bin/prometheus --config.file /etc/prometheus/pr>
```

Prometheus service is up and running

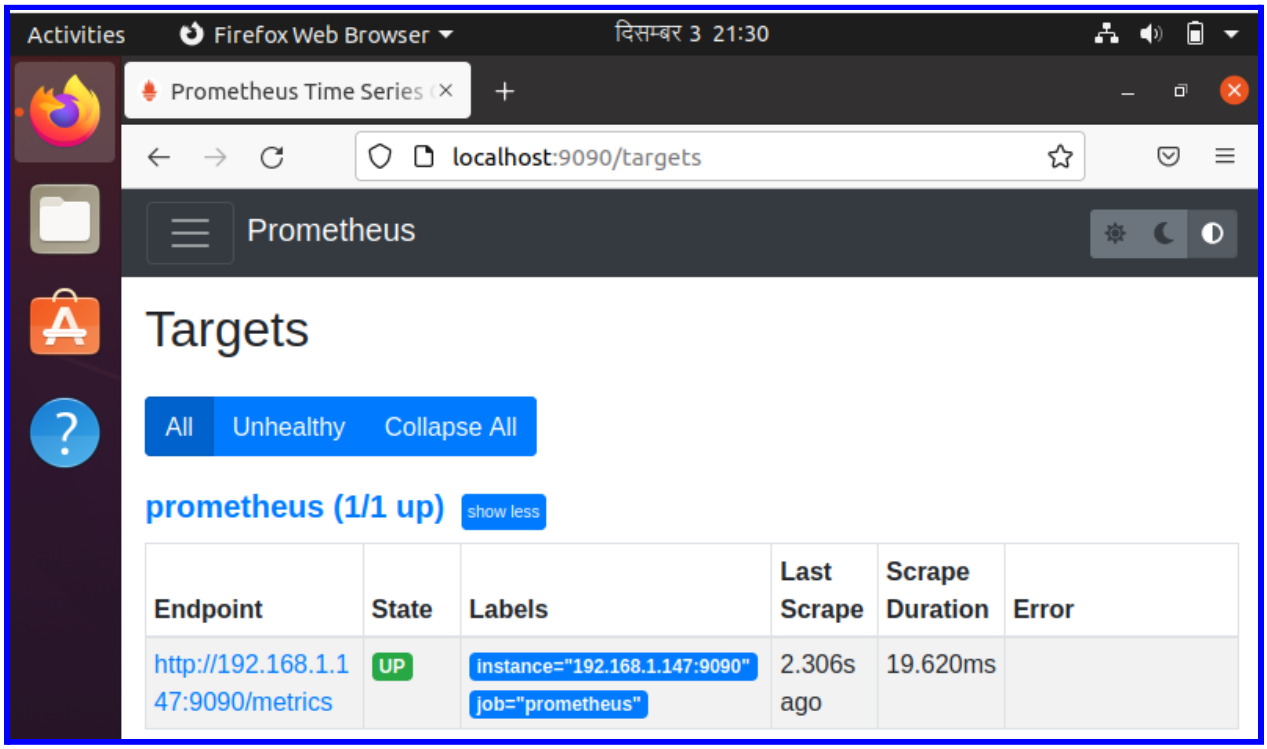
Accessing in the browser will ask for authentication



Dashboard of Prometheus after logged in



Target of Prometheus Job assigned



2. **Install node exporter on another machine than the server**

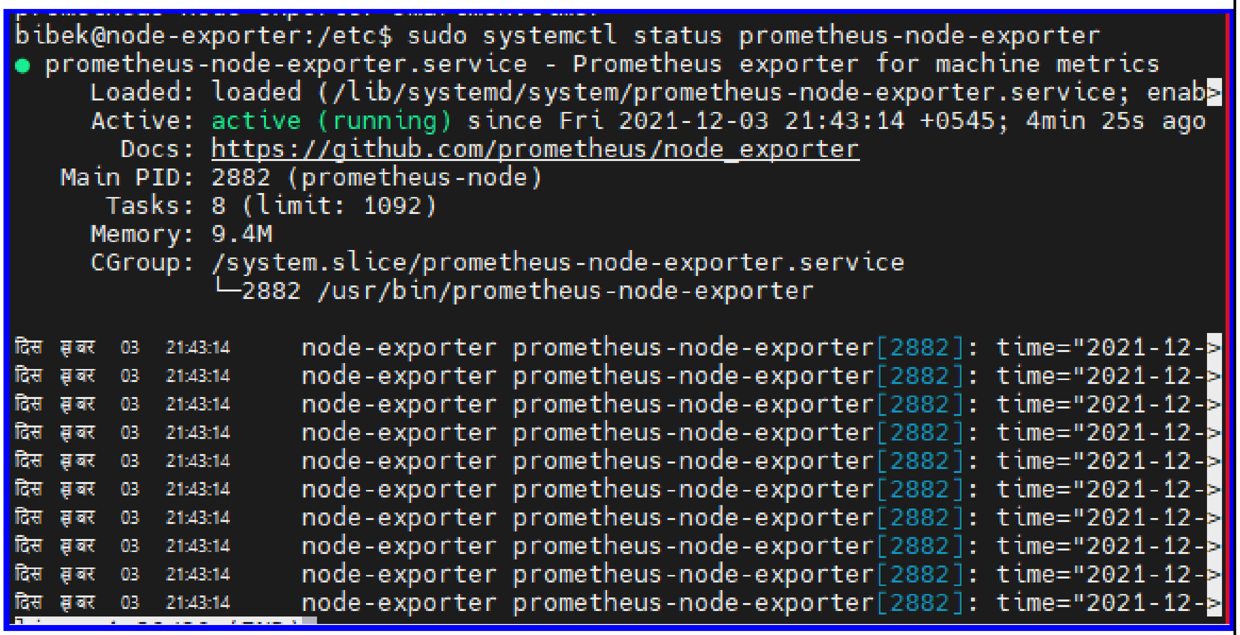
- **Add that machine target to server configuration**
- **Share screenshot from status->targets to show the available nodes**
- **Share configuration of node exporter & prometheus server**

Installing Prometheus Node-exporter service on another ubuntu host(**192.168.1.93**)

sudo apt install prometheus-node-exporter

Checking status of node-exporter

sudo systemctl status prometheus-node-exporter



```
bibek@node-exporter:/etc$ sudo systemctl status prometheus-node-exporter
● prometheus-node-exporter.service - Prometheus exporter for machine metrics
     Loaded: loaded (/lib/systemd/system/prometheus-node-exporter.service; enab>
     Active: active (running) since Fri 2021-12-03 21:43:14 +0545; 4min 25s ago
       Docs: https://github.com/prometheus/node_exporter
   Main PID: 2882 (prometheus-node)
      Tasks: 8 (limit: 1092)
     Memory: 9.4M
     CGroup: /system.slice/prometheus-node-exporter.service
             └─2882 /usr/bin/prometheus-node-exporter

दिस शुक्र 03 21:43:14 node-exporter prometheus-node-exporter[2882]: time="2021-12->
दिस शुक्र 03 21:43:14 node-exporter prometheus-node-exporter[2882]: time="2021-12->
दिस शुक्र 03 21:43:14 node-exporter prometheus-node-exporter[2882]: time="2021-12->
दिस शुक्र 03 21:43:14 node-exporter prometheus-node-exporter[2882]: time="2021-12->
दिस शुक्र 03 21:43:14 node-exporter prometheus-node-exporter[2882]: time="2021-12->
दिस शुक्र 03 21:43:14 node-exporter prometheus-node-exporter[2882]: time="2021-12->
दिस शुक्र 03 21:43:14 node-exporter prometheus-node-exporter[2882]: time="2021-12->
दिस शुक्र 03 21:43:14 node-exporter prometheus-node-exporter[2882]: time="2021-12->
दिस शुक्र 03 21:43:14 node-exporter prometheus-node-exporter[2882]: time="2021-12->
दिस शुक्र 03 21:43:14 node-exporter prometheus-node-exporter[2882]: time="2021-12->
```

Adding the node-exporter target to Prometheus server

sudo vi /etc/prometheus/prometheus.yml

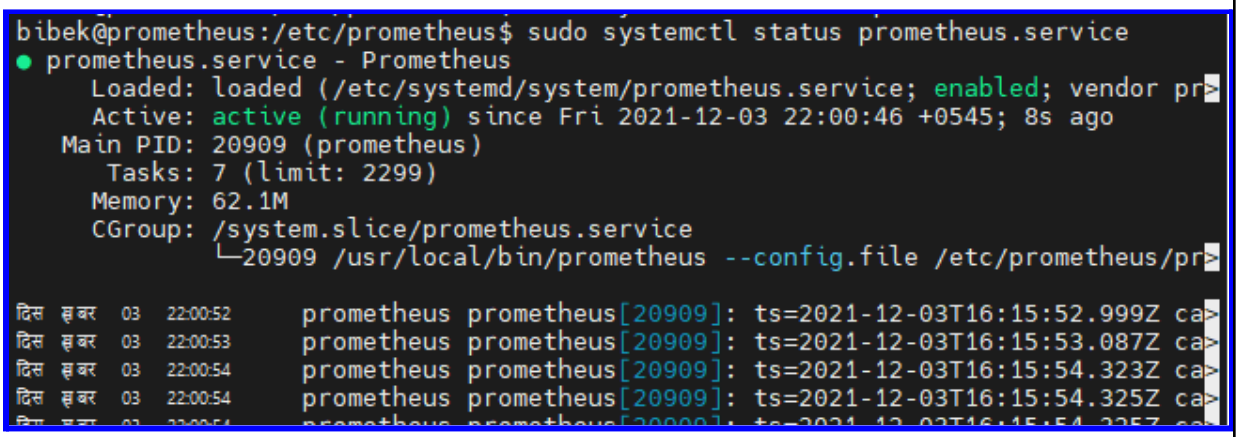
Configuration file of Prometheus Server

```
global:
  scrape_interval: 15s

rule_files:
  - 'prometheus.rules.yml'

scrape_configs:

  - job_name: 'prometheus'
    scrape_interval: 5s
    static_configs:
```

```
    - targets: ['192.168.1.147:9090']
  basic_auth:
    username: admin
    password: 123456

- job_name: 'node_exporter'
  scrape_interval: 5s
  static_configs:
    - targets: ['192.168.1.93:9100']
```

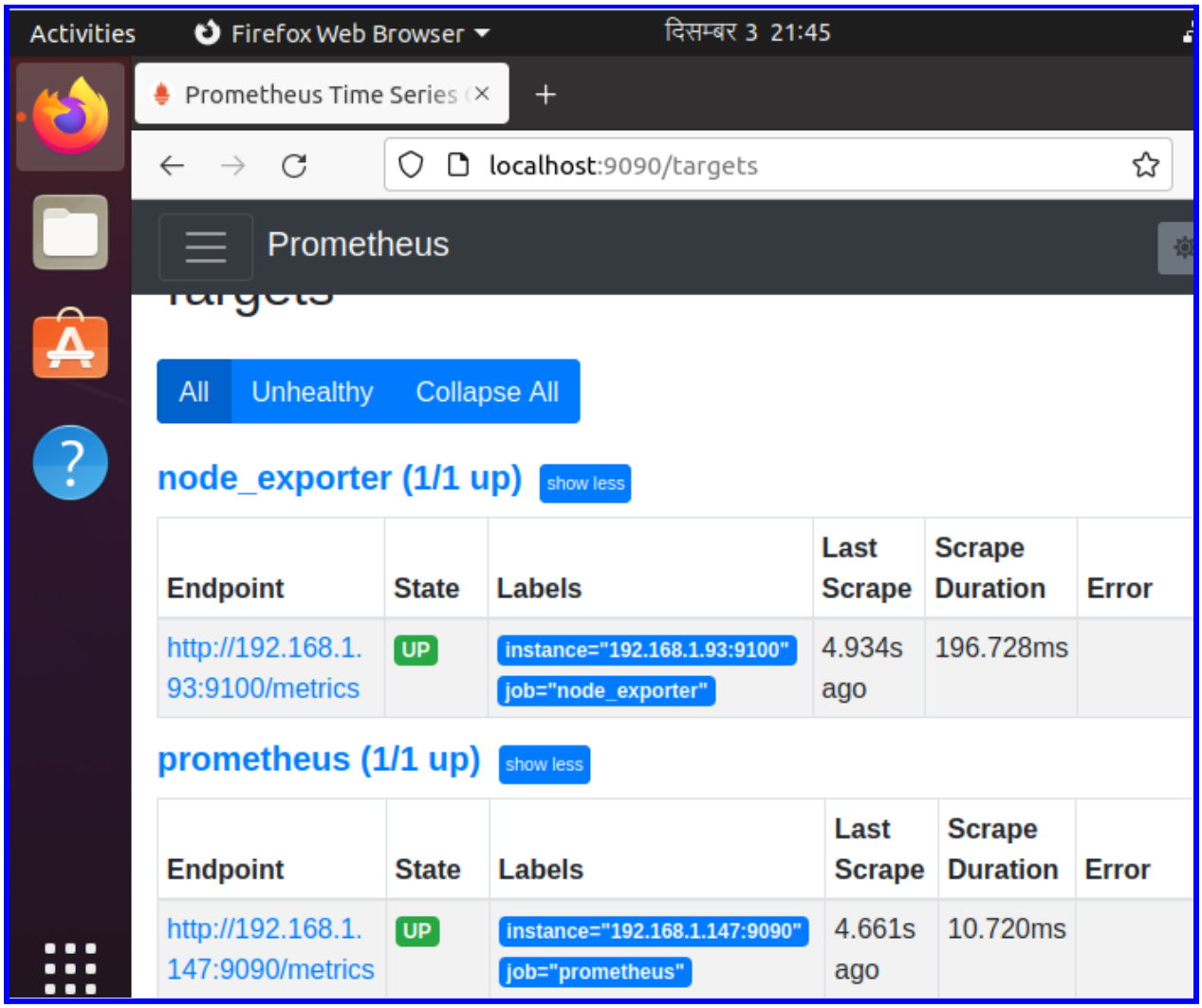
Restarting the Prometheus service

sudo systemctl restart prometheus.service



Prometheus service is running successfully

Checking the node_exporter target in prometheus Dashboard



3. **Install grafana server on same server as prometheus**

- **Add prometheus data source to grafana, should be connected through basic auth**
- **Screenshot of working data source config**
- **Import & apply dashboard for node_exporter**
- **Screenshot of dashboard of nodes with live metrics shown.**

Installing latest OSS grafana on the same host where Prometheus service is installed(**192.168.1.147**)

sudo apt-get install -y apt-transport-https

sudo apt-get install -y software-properties-common wget

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

```
bibek@prometheus:/etc/prometheus$ wget -q -O - https://packages.grafana.com/gpg.
key | sudo apt-key add -
OK
bibek@prometheus:/etc/prometheus$ echo "deb https://packages.grafana.com/oss/deb
 stable main" | sudo tee -a /etc/apt/sources.list.d/grafana.list
deb https://packages.grafana.com/oss/deb stable main
bibek@prometheus:/etc/prometheus$ sudo apt-get update
Hit:1 http://np.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:3 https://artifacts.elastic.co/packages/7.x/apt stable InRelease
Get:4 http://np.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:5 https://download.docker.com/linux/ubuntu focal InRelease [57.7 kB]
Get:6 http://np.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:7 https://packages.grafana.com/oss/deb stable InRelease [12.1 kB]
Get:8 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metadat
```

sudo apt-get install grafana

```
(Reading database ... 179896 files and directories currently installed.)
Preparing to unpack .../grafana_8.3.0_amd64.deb ...
Unpacking grafana (8.3.0) ...
Setting up grafana (8.3.0) ...
Adding system user `grafana' (UID 135) ...
Adding new user `grafana' (UID 135) with group `grafana' ...
Not creating home directory `/usr/share/grafana'.
### NOT starting on installation, please execute the following statements to
figure 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 systemd (245.4-4ubuntu3.13) ...
```

Starting Grafana service

sudo systemctl start grafana-server.service

sudo systemctl status grafana-server.service

```
bibek@prometheus:/etc/apt/sources.list.d$ sudo systemctl start grafana-server.se
rvice
bibek@prometheus:/etc/apt/sources.list.d$ sudo systemctl status grafana-server.s
ervice
● grafana-server.service - Grafana instance
     Loaded: loaded (/lib/systemd/system/grafana-server.service; disabled; vend>
     Active: active (running) since Fri 2021-12-03 21:58:03 +0545; 2s ago
       Docs: http://docs.grafana.org
   Main PID: 20811 (grafana-server)
      Tasks: 5 (limit: 2299)
     Memory: 42.1M
     CGroup: /system.slice/grafana-server.service
             └─20811 /usr/sbin/grafana-server --config=/etc/grafana/grafana.ini>

दिस  ३ब्र  03  21:58:06     prometheus grafana-server[20811]: t=2021-12-03T21:58:06+0545>
```

Grafana is installed and running

Configuring grafana in prometheus job

sudo vi /etc/prometheus/prometheus.yml

```
- job_name: 'grafana'
  scrape_interval: 5s
  static_configs:
    - targets:
      - 192.168.1.147:3000
  basic_auth:
    username: admin
    password: 123456
```

Save and exit

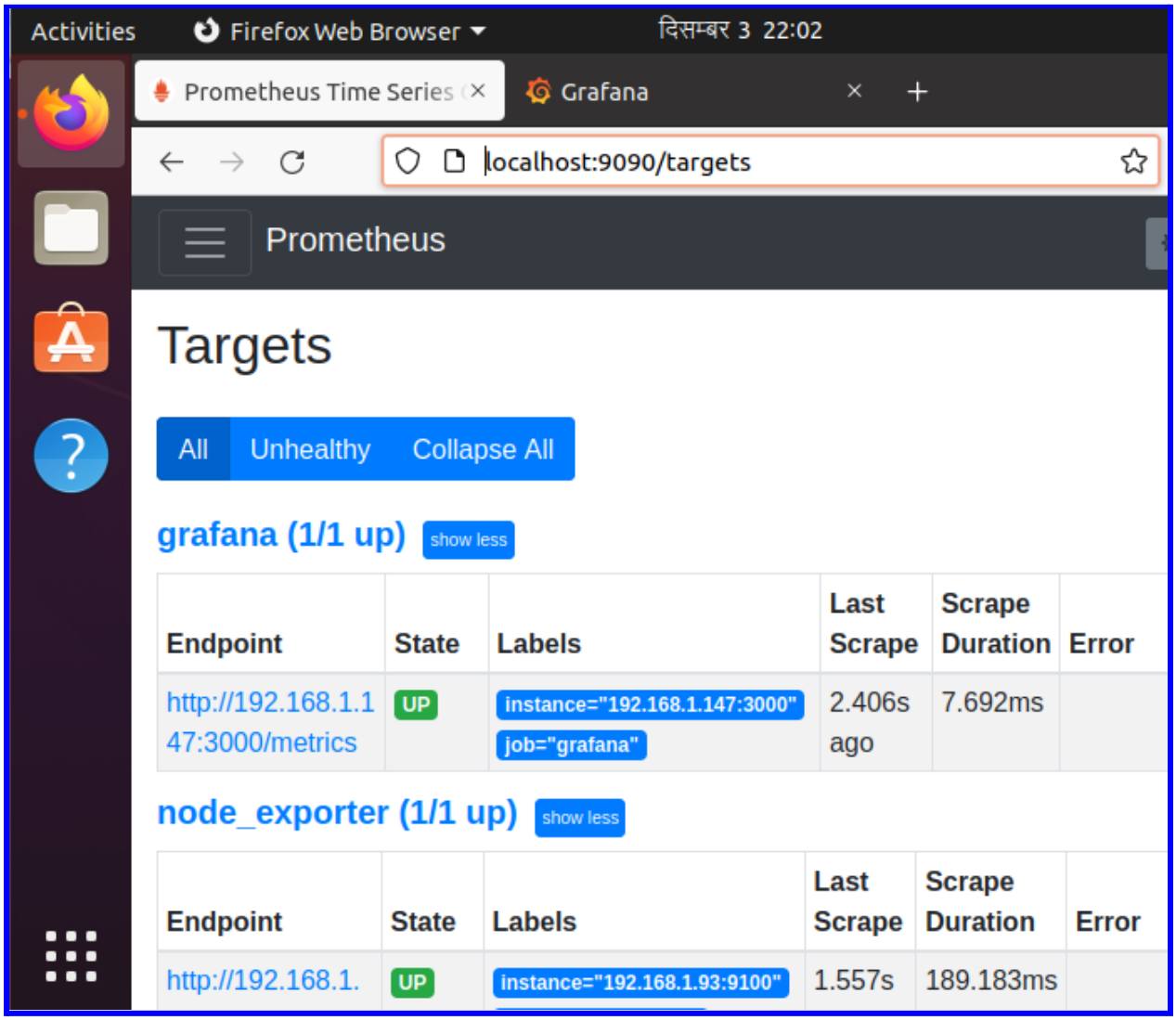
Restarting the prometheus service

sudo systemctl restart prometheus.service

```
bibek@prometheus:/etc/prometheus$ sudo systemctl restart prometheus.service
bibek@prometheus:/etc/prometheus$ sudo systemctl status prometheus.service
● prometheus.service - Prometheus
     Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; vendor pr>
     Active: active (running) since Fri 2021-12-03 22:00:46 +0545; 8s ago
   Main PID: 20909 (prometheus)
      Tasks: 7 (limit: 2299)
     Memory: 62.1M
     CGroup: /system.slice/prometheus.service
             └─20909 /usr/local/bin/prometheus --config.file /etc/prometheus/pr>

दिस  ३ब्र  03  22:00:52     prometheus prometheus[20909]: ts=2021-12-03T16:15:52.999Z ca>
दिस  ३ब्र  03  22:00:53     prometheus prometheus[20909]: ts=2021-12-03T16:15:53.087Z ca>
```

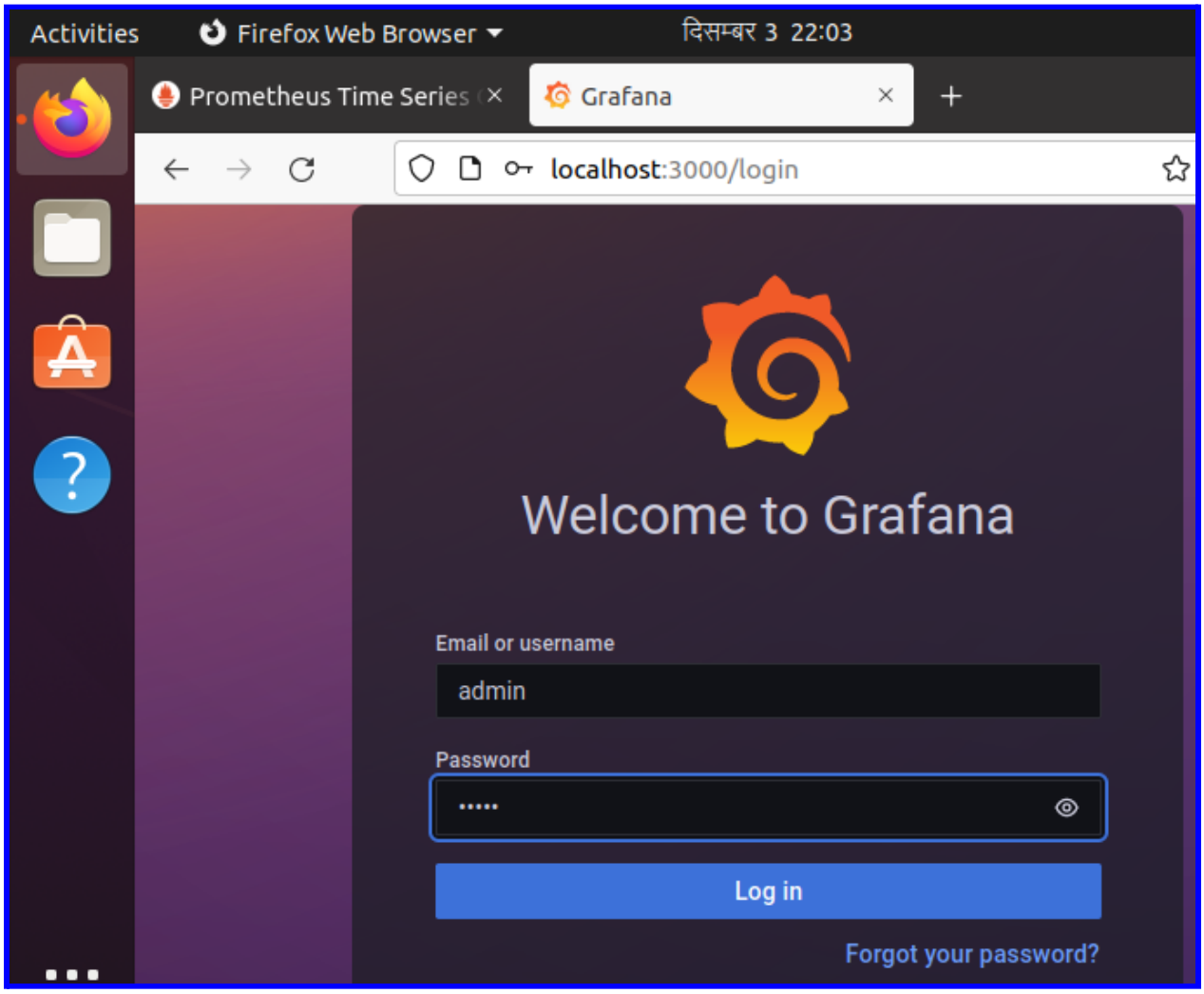
Prometheus service is running

Target of Prometheus which shows grafana is in UP state

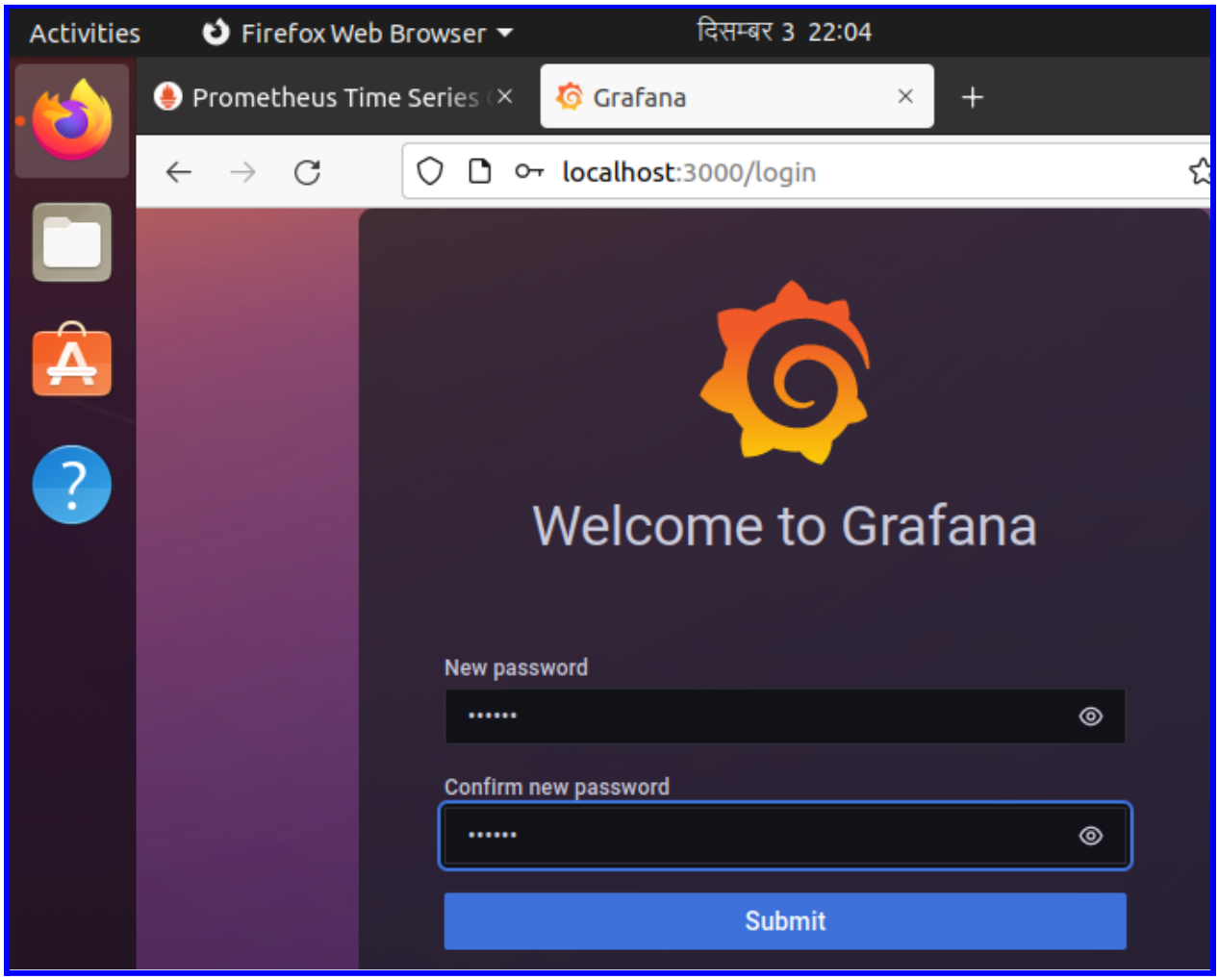


Opening Grafana at port 3000

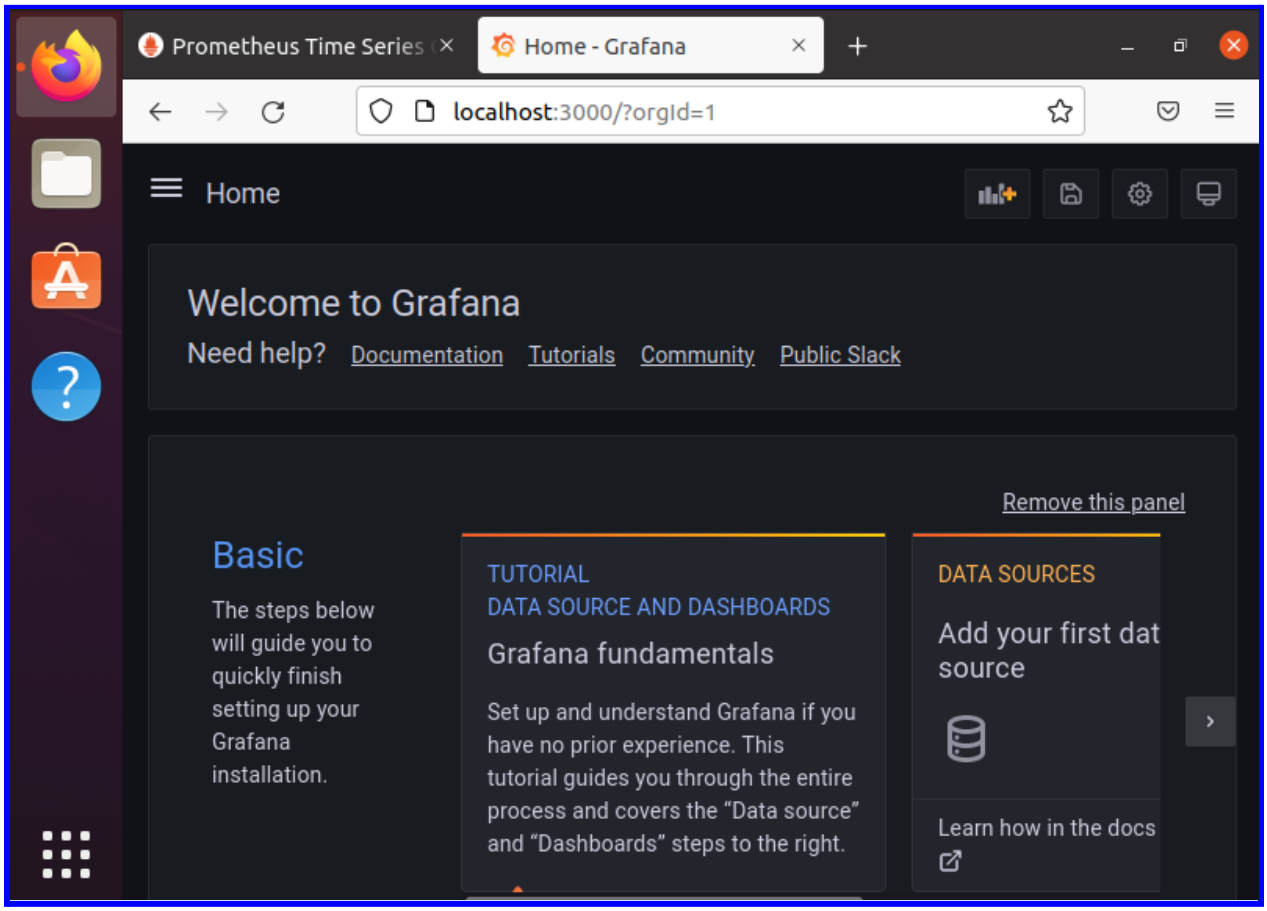
Default username password is **admin**



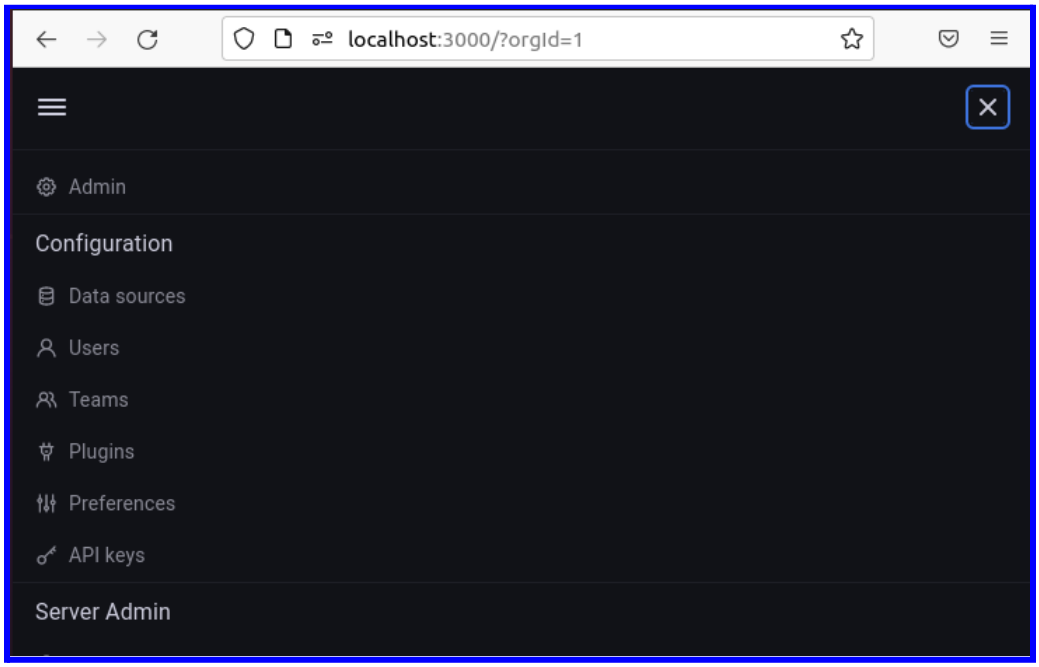
Changing default password



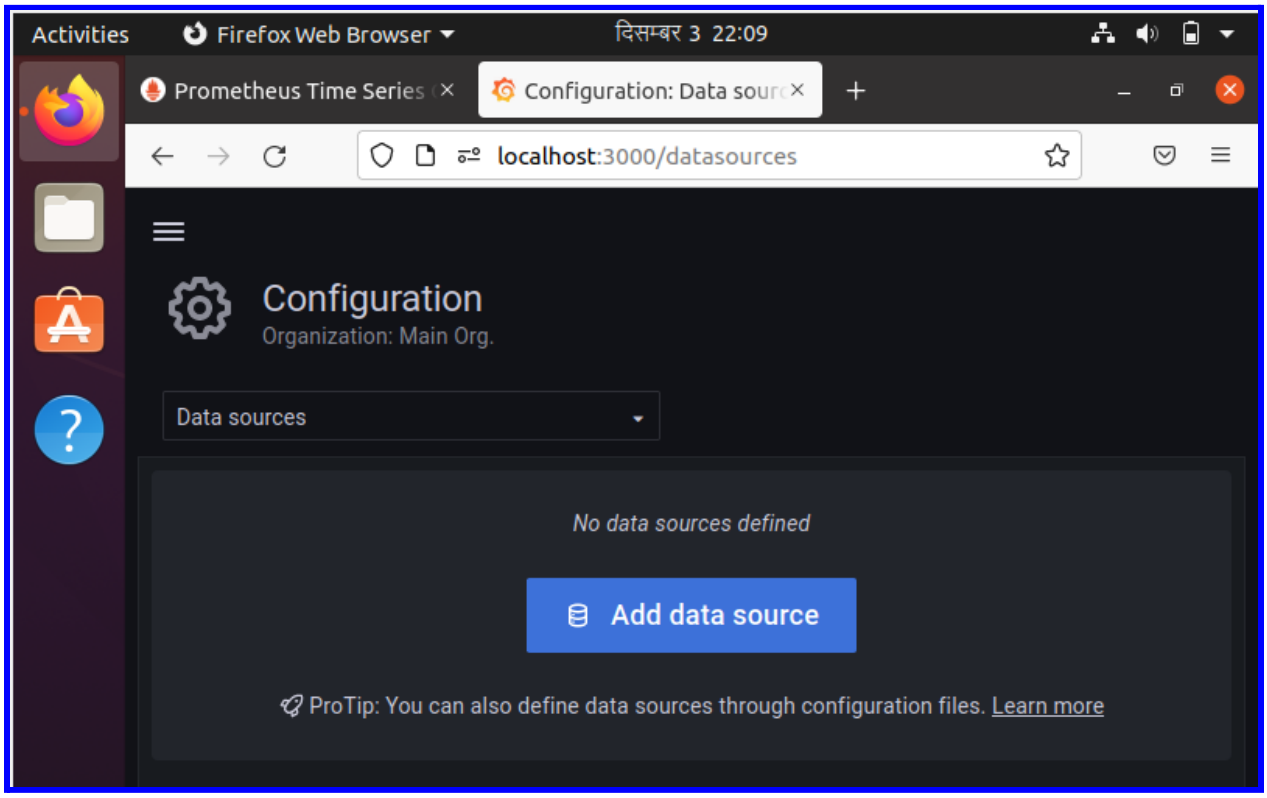
Default Welcome page of Grafana



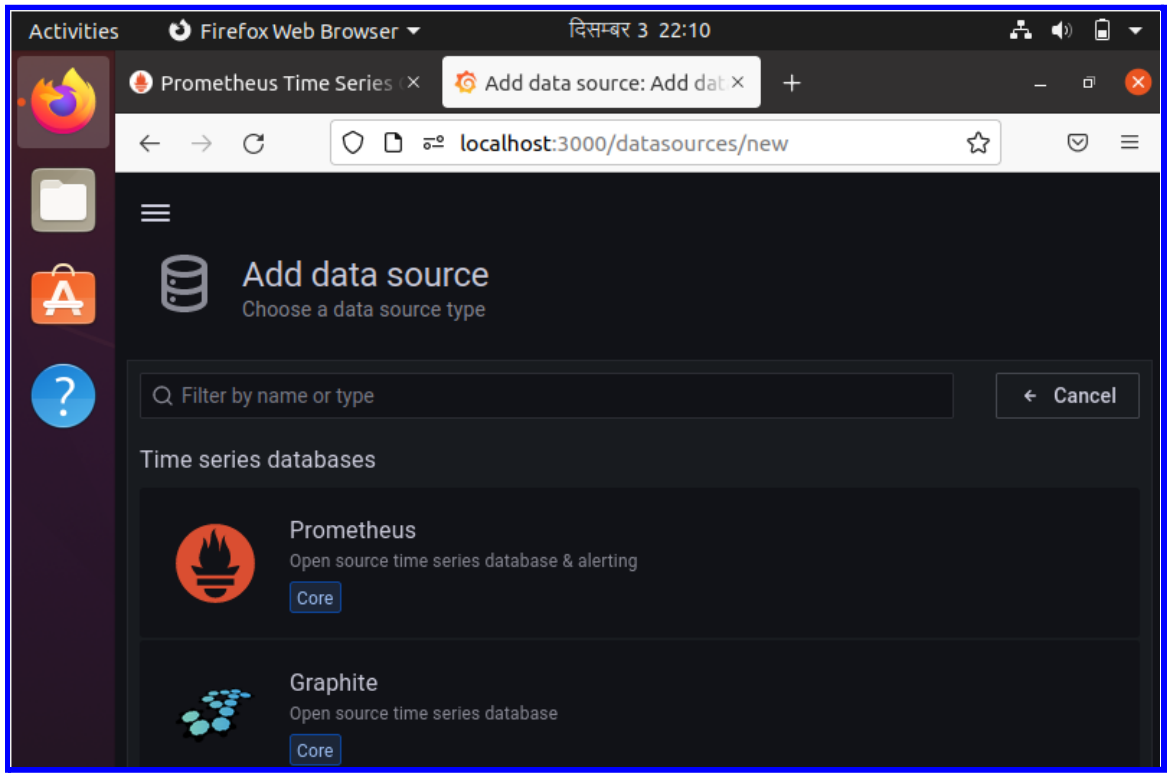
Adding Datasource Prometheus to Grafana (*configuration >> Datasources*)



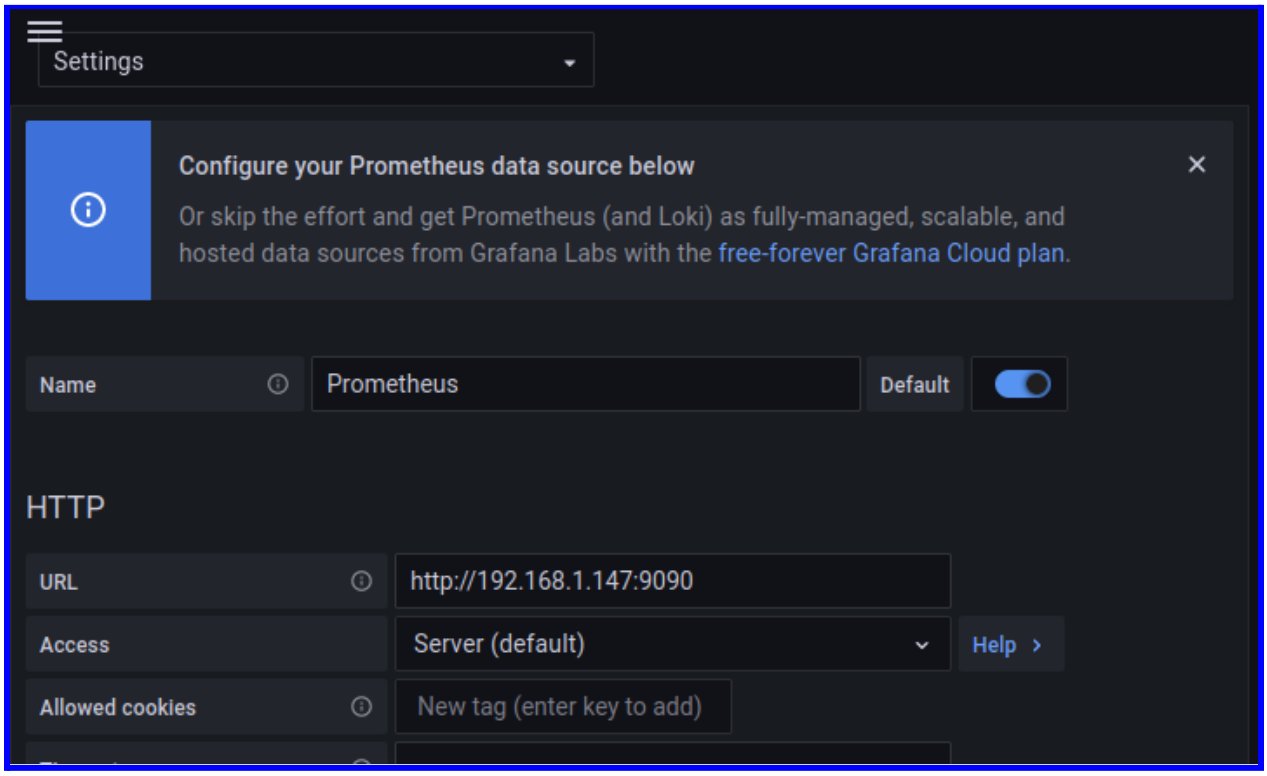
Add Data Source



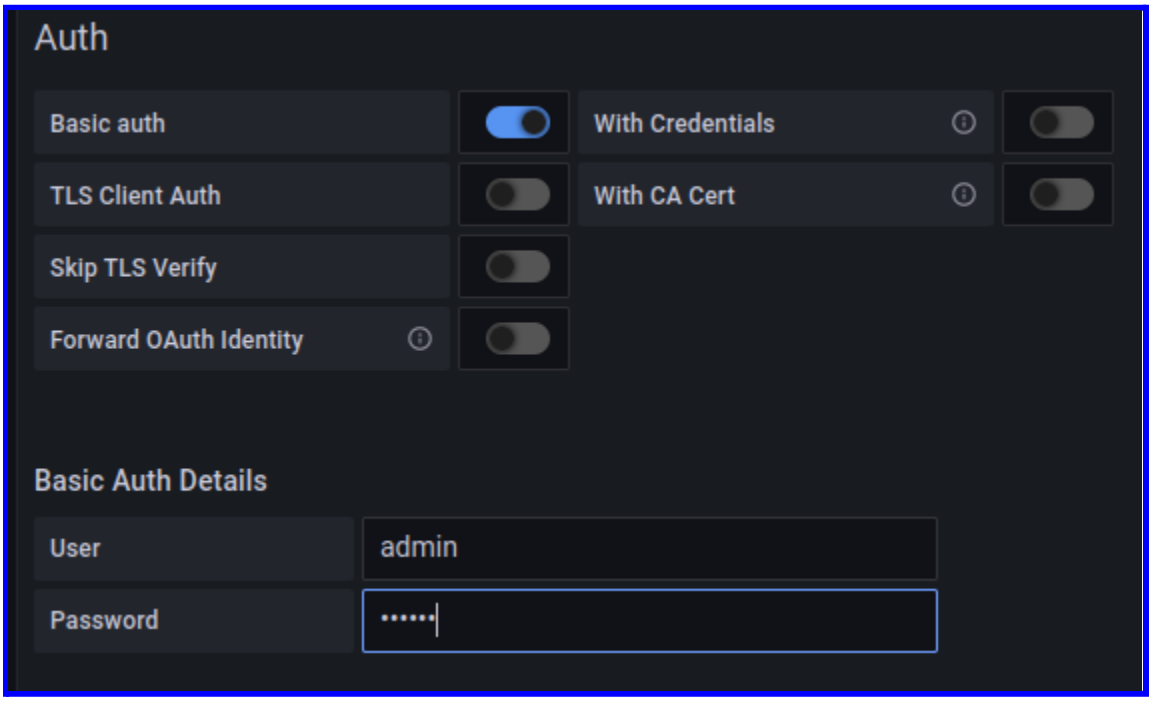
Selecting Prometheus as Data Source



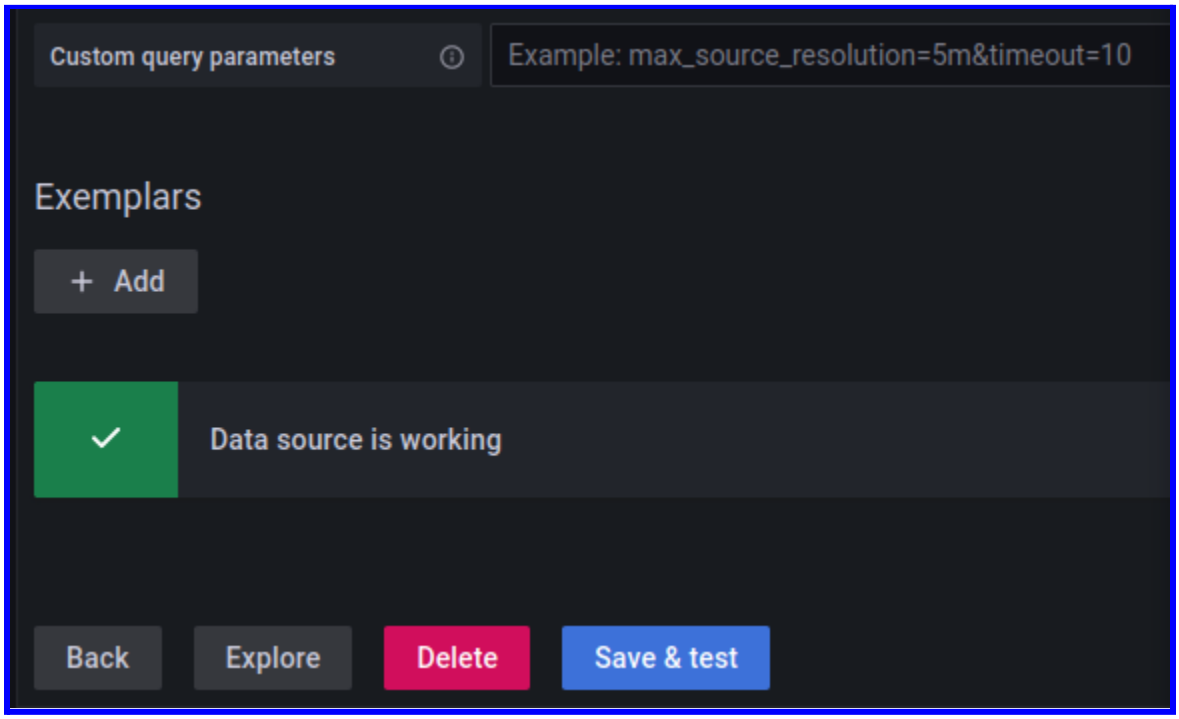
Giving the URL of Prometheus <IP:Port>



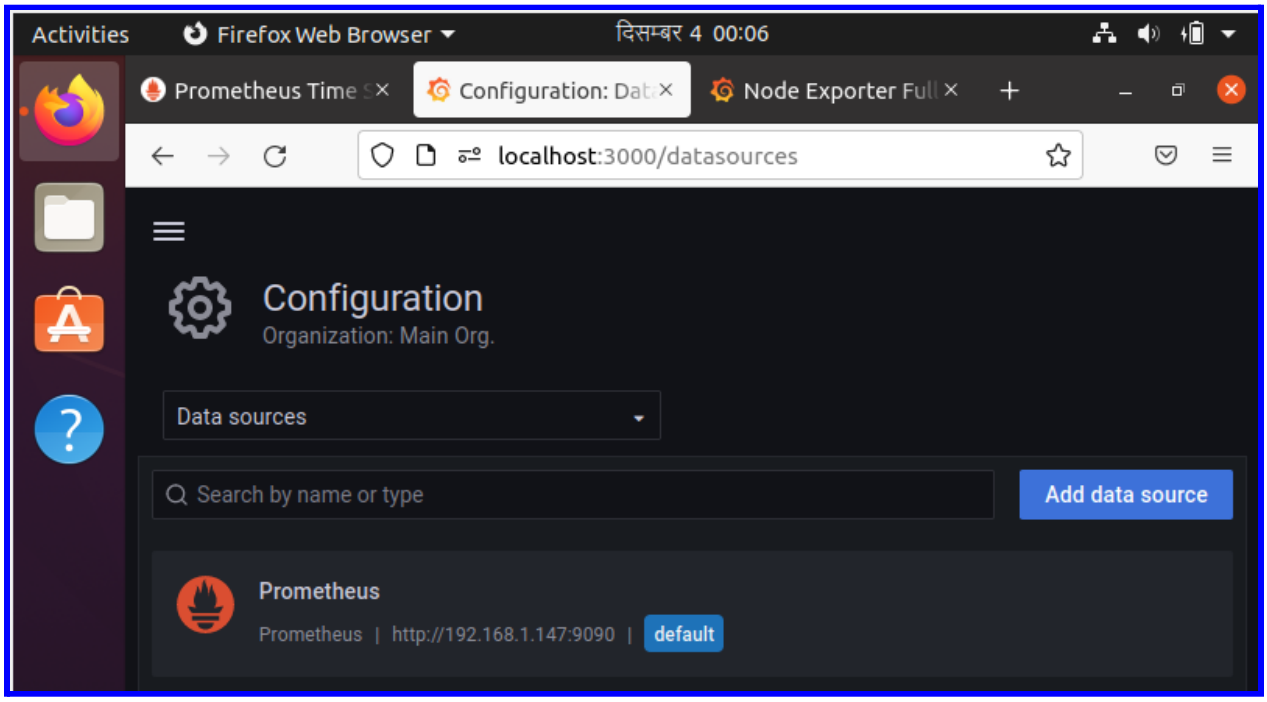
Enabling Basic Auth and giving user name and Password



Save & Test

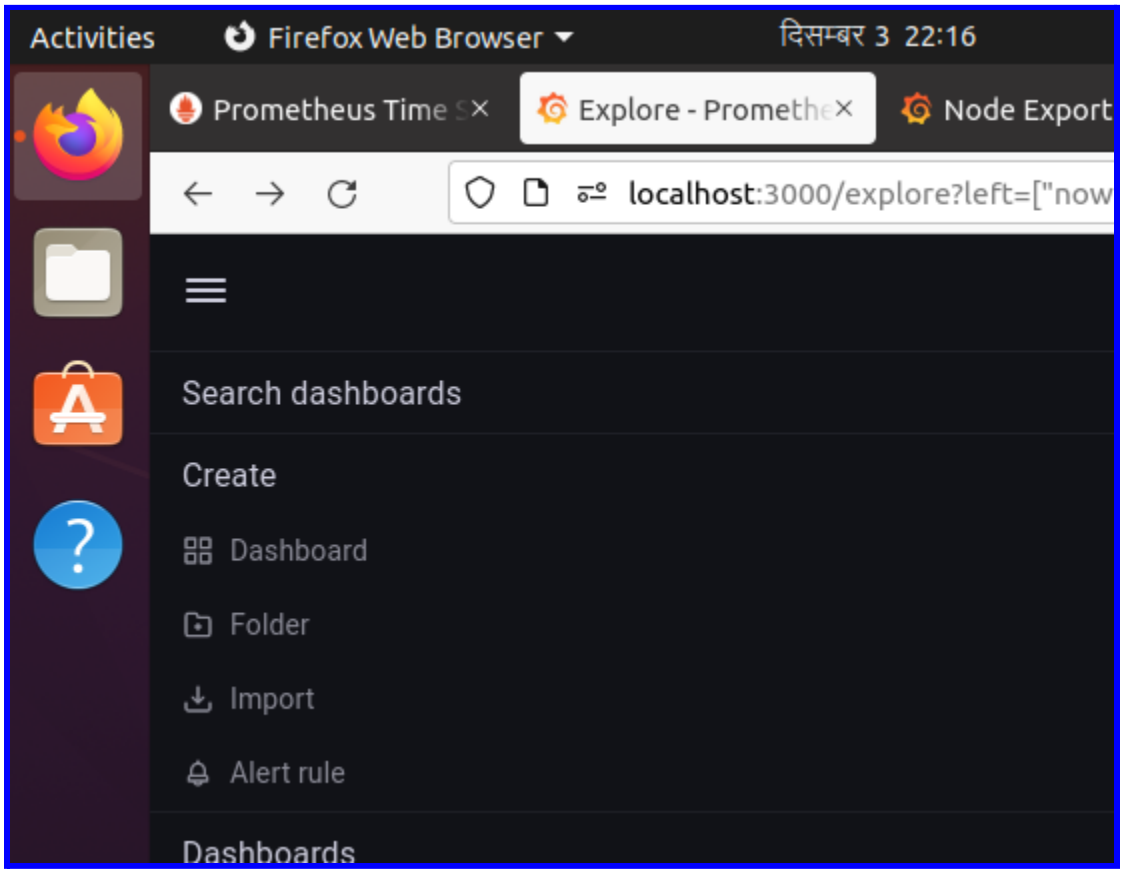


Data Source is working…

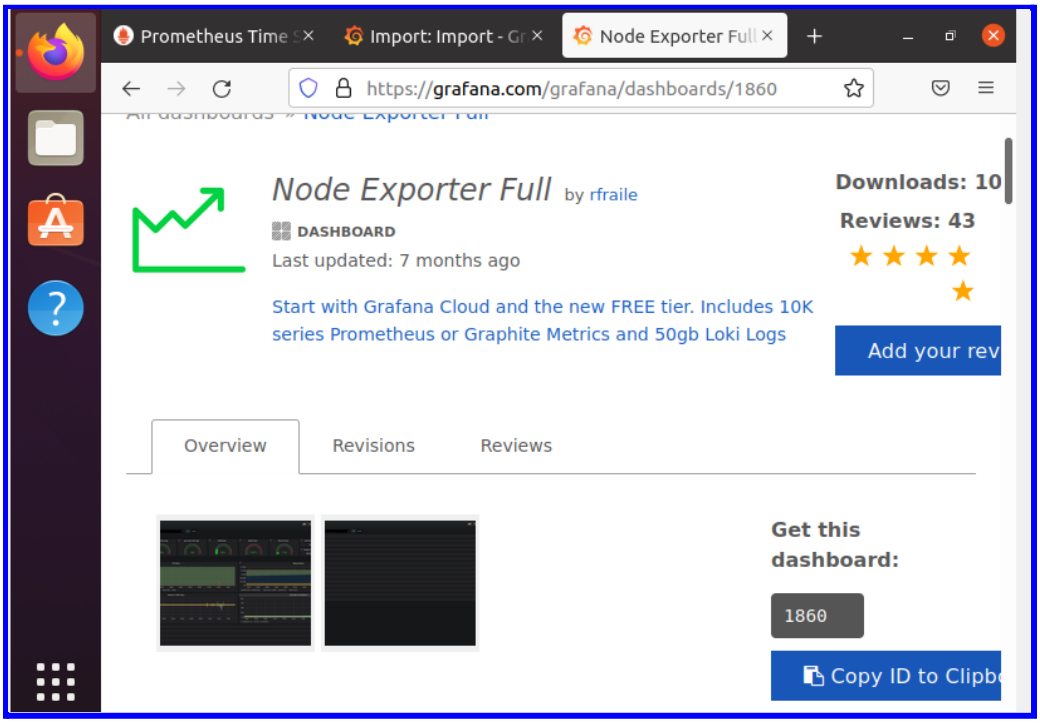


We can see the Prometheus configured as Data Source for grafana

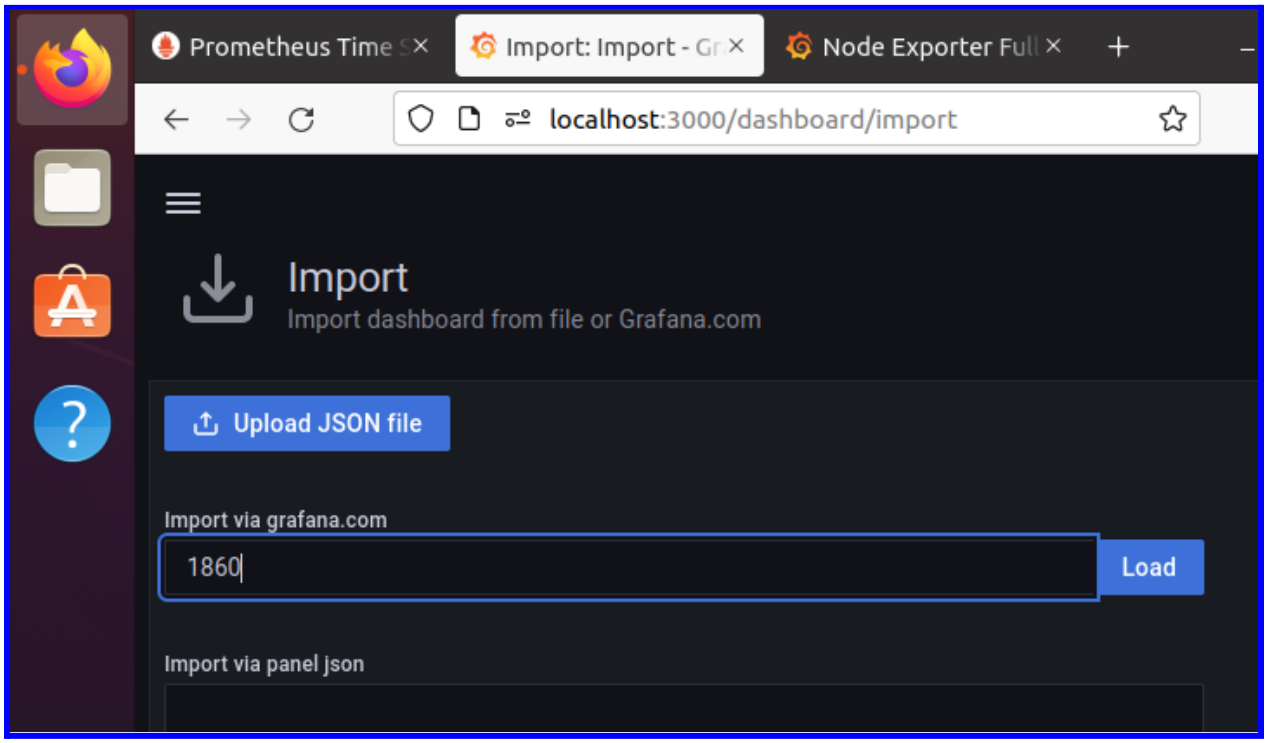
Importing Dashboard for Node-Exporter (**Create >> Import**)



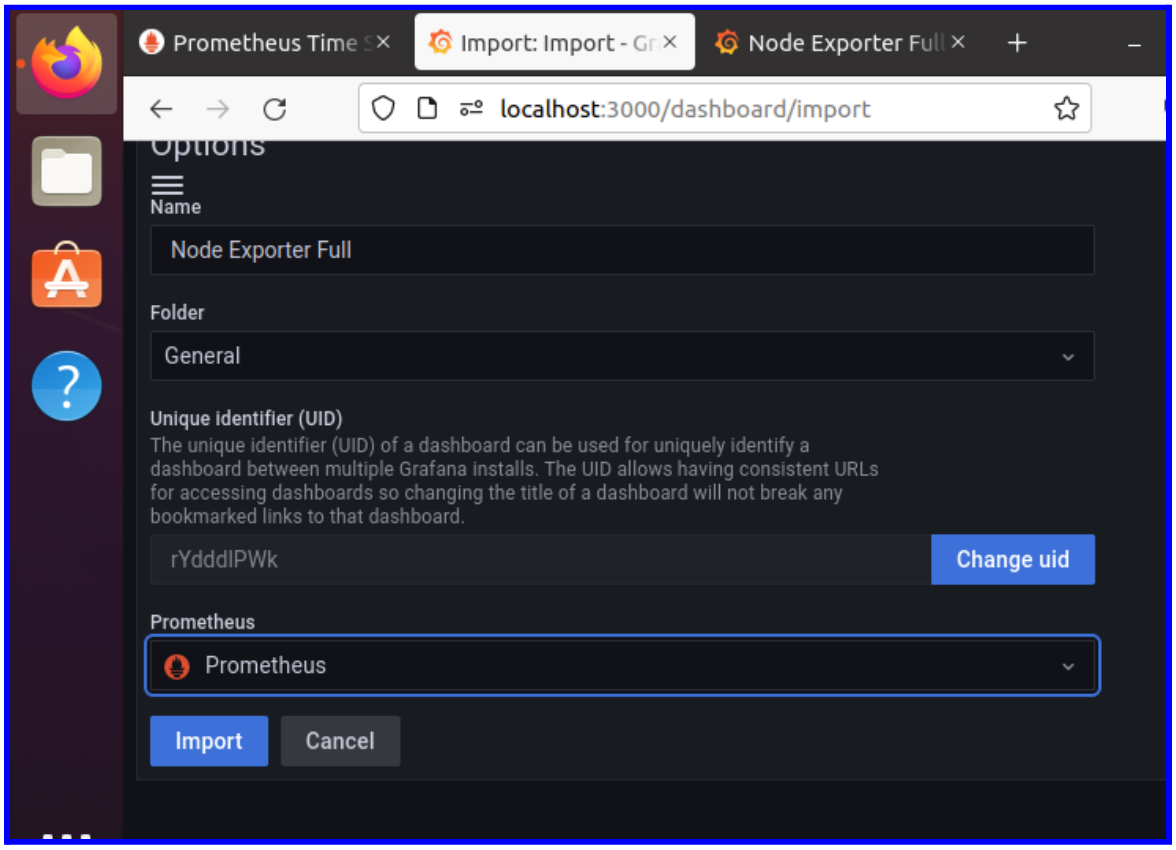
Importing Node-Exporter full (**using its ID 1860**)



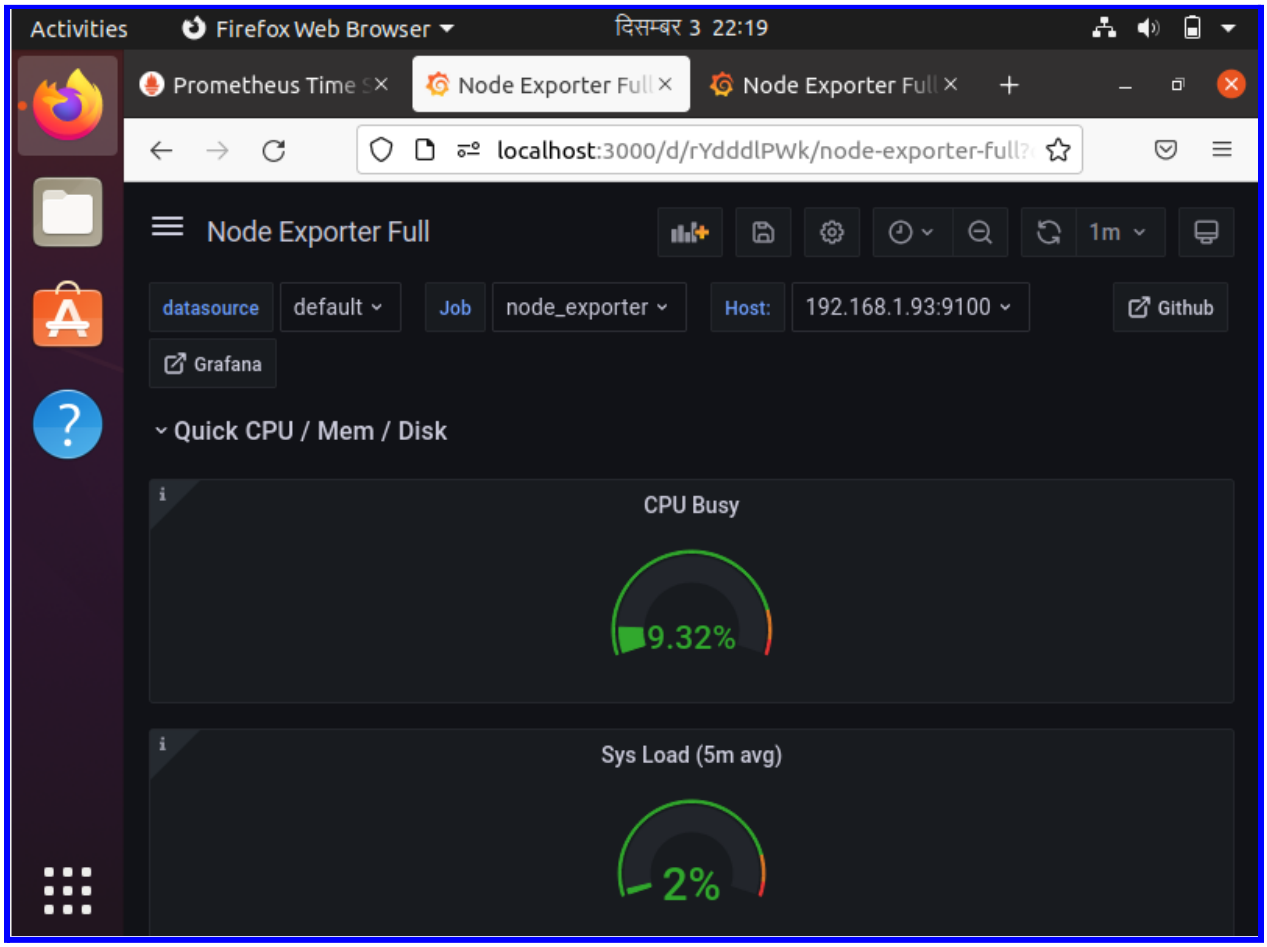
Loading the ID 1860



Importing Node-Exporter Full (**Default folder - General, Default UUID**)

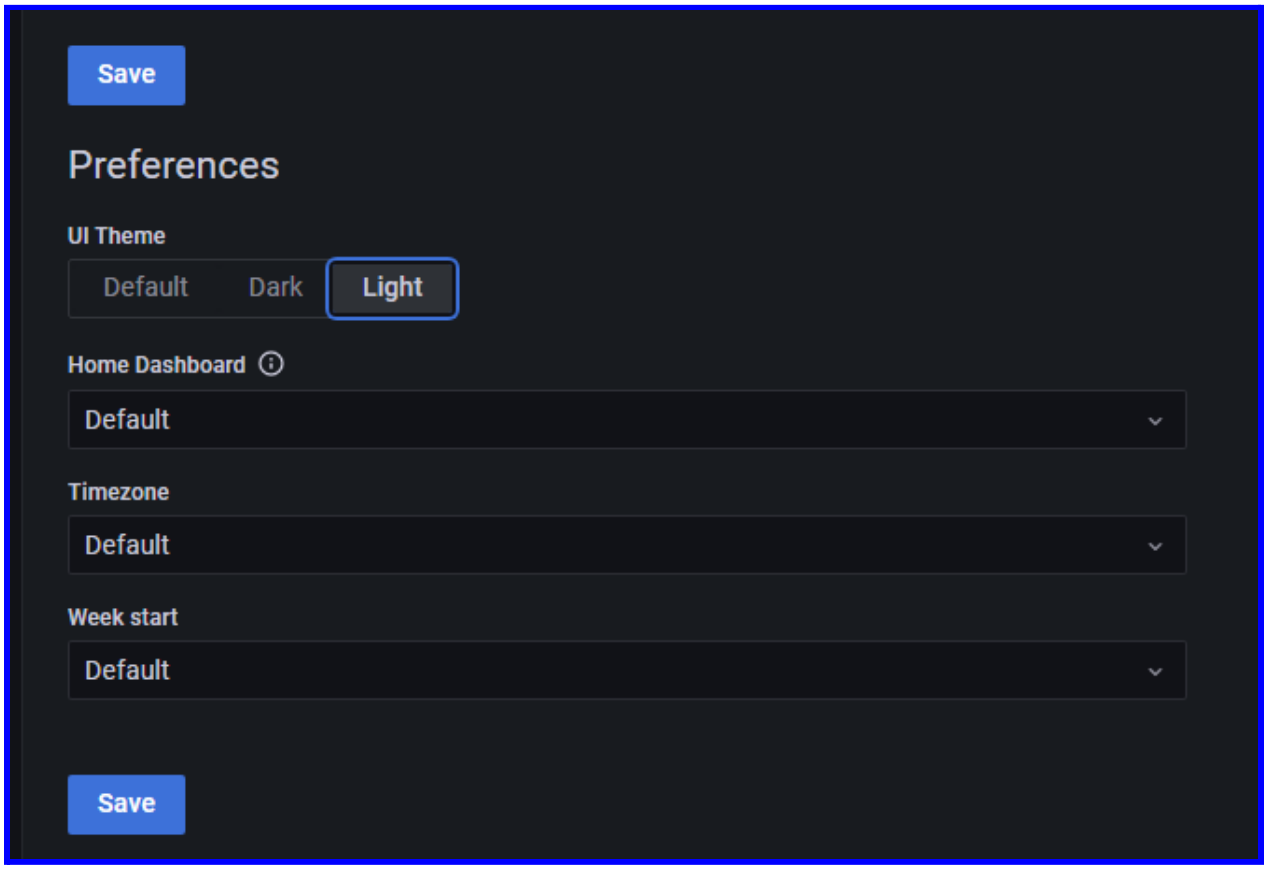


We can see the Metrics of Node Exporter Host (**192.168.1.93**)

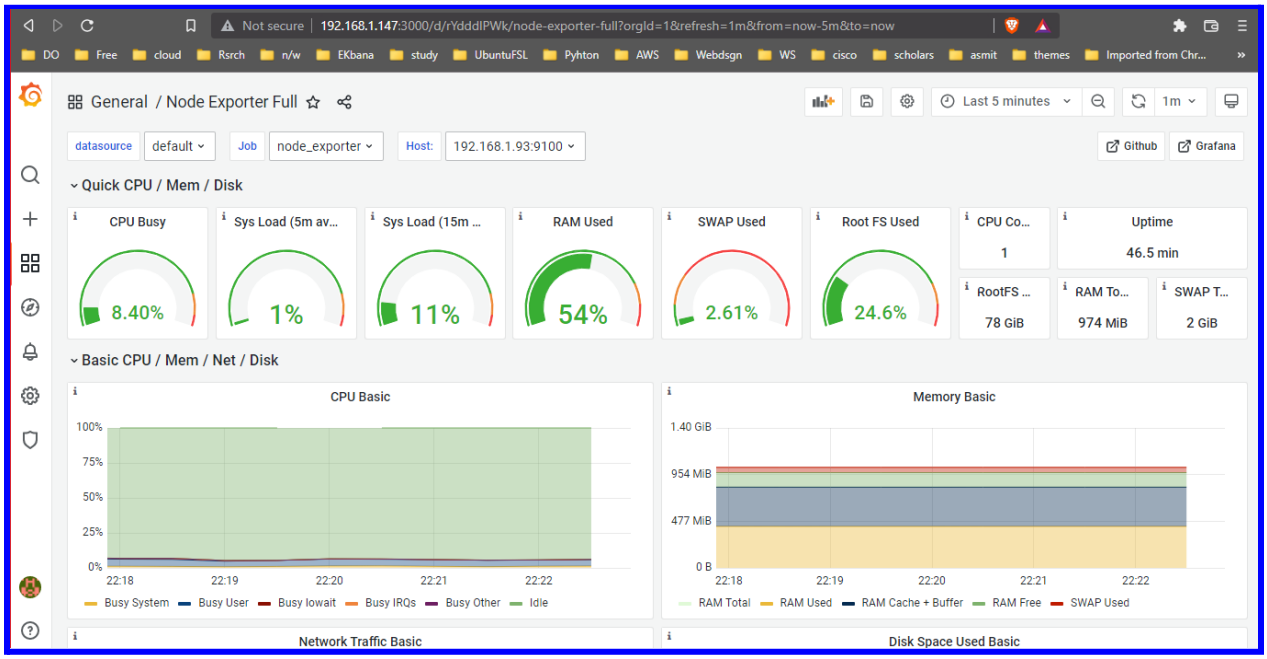


Metrics opened in Full screen on Windows host Via Host IP

Changing the theme colour to Light (preferences)



Screenshots of Metrics we got of the Node-Exporter Host (192.168.1.93)



Screenshots