1. Install Prometheus Server

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

Prometheus is installed in our system (Server1 with ip address 192.168.1.64) by downloading a tar.gz file and extracting and installing which used following commands:

wget https://github.com/prometheus/prometheus/releases/download/v2.28.0/prometheus-2.28.0.linux-amd64.tar.gz

tar xvzf prometheus-2.28.0.linux-amd64.tar.gz

```
bj@vm2:~/prometheus$ tar xvzf prometheus-2.28.0.linux-amd64.tar.gz
prometheus-2.28.0.linux-amd64/
```

sudo mv -v prometheus-2.28.0.linux-amd64 /opt/prometheus

sudo chown -Rfv root:root /opt/prometheus

sudo chmod -Rfv 0755 /opt/prometheus

A prometheus user is created:

```
bj@vm2:~$ sudo useradd --system --no-create-home --shell /usr/sbin/nologin prometheus
bj@vm2:~$ ls
```

Then configuration for prometheus is edited in prometheus.yml file using this command:

sudo nano /opt/prometheus/prometheus.yml

And inside the yml file, mostly default values may work, the server target of prometheus must be correctly specified in scrape_configs as shown in following figure:

```
bj@vm2: ~/prometheus    root@vm2: /etc/nginx    bj@batman: /etc/nginx
  GNU nano 4.8                /opt/prometheus/prometheus.yml                Modified
# 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_in>
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 th>
  - job_name: 'prometheus'

    # metrics_path defaults to '/metrics'
    # scheme defaults to 'http'.

    static_configs:
    - targets: ['localhost:9090']
```

To store prometheus metrics, a directory named data is created:

Mkdir -v /opt/prometheus/data

Then a systemd service file is created for prometheus:

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

```
  GNU nano 4.8              /etc/systemd/system/prometheus.service
[Unit]
Description=Monitoring system and time series database

[Service]
Restart=always
User=prometheus
ExecStart=/opt/prometheus/prometheus --config.file=/opt/prometheus/prometheus.yml --sto>
ExecReload=/bin/kill -HUP $MAINPID
TimeoutStopSec=20s
SendSIGKILL=no
LimitNOFILE=8192

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

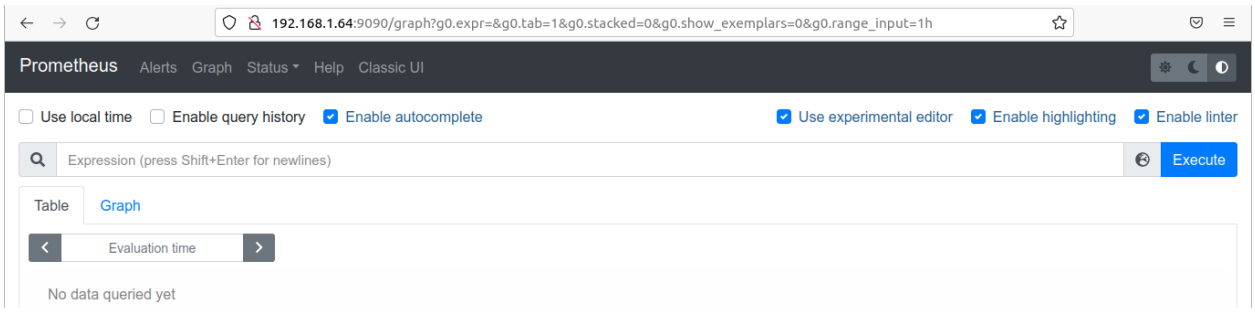
sudo systemctl daemon-reload

sudo systemctl enable prometheus && sudo systemctl start prometheus

sudo systemctl status prometheus

```
bj@vm2:~/prometheus$ sudo systemctl status prometheus.service
● prometheus.service - Monitoring system and time series database
     Loaded: loaded (/etc/systemd/system/prometheus.service; disabled; vendor preset: e>
     Active: active (running) since Fri 2021-12-03 00:26:39 +0545; 4s ago
   Main PID: 5939 (prometheus)
      Tasks: 5 (limit: 2711)
     Memory: 17.1M
     CGroup: /system.slice/prometheus.service
             └─5939 /opt/prometheus/prometheus --config.file=/opt/prometheus/prometheus>
```

Now when can access the dashboard using socket address: 192.168.1.64:9090



For authentication, we used a nginx server, running at port 80, which acts as a reverse proxy server for the prometheus server and we set up the authentication in the nginx server. For that, htpasswd file is generated which is used to authenticate the nginx server.

Htpasswd -c .htpasswd prometheus

```
root@vm2:/etc/nginx# htpasswd -c .htpasswd prometheus
New password:
Re-type new password:
Adding password for user prometheus
root@vm2:/etc/nginx#
```

The server configuration for nginx is as:

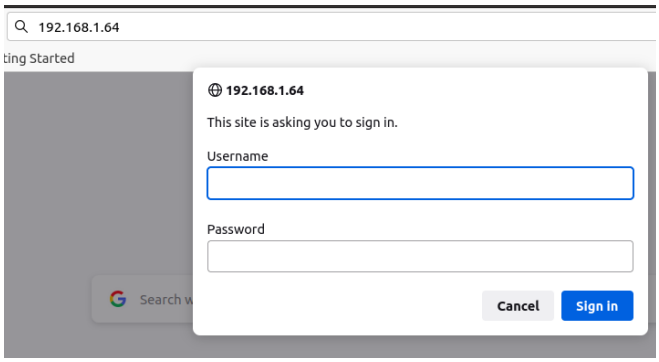
Nano /etc/nginx/sites-available/nginx.conf

For reverse proxy and authentication, this content was saved in nginx.conf file:

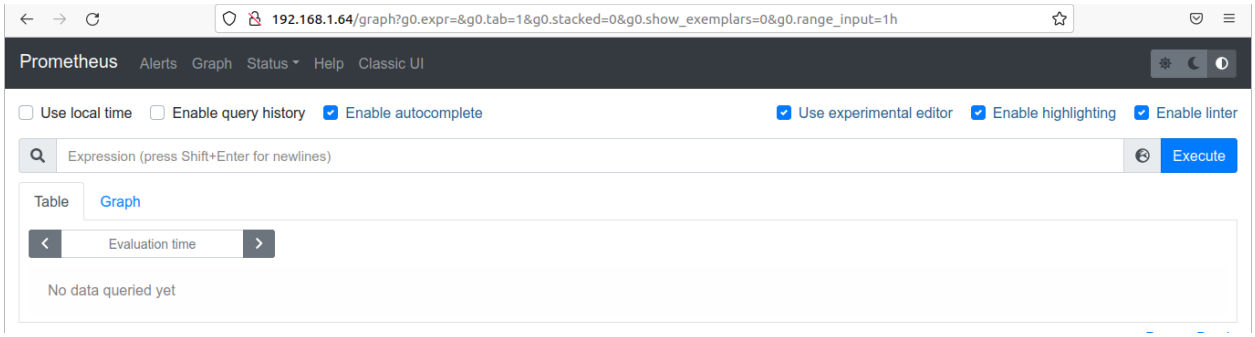
```
        server_name 192.168.1.64;

        location / {

                proxy_pass http://192.168.1.64:9090;
                proxy_set_header Connection keep-alive;
                auth_basic "prometheus";
                auth_basic_user_file "../.htpasswd";


                # First attempt to serve request as file, then
                # as directory, then fall back to displaying a 40
#               try_files $uri $uri/ =404;
        }
```

Systemctl restart nginx

Now when we access the server ip: 192.168.1.64:80, it prompts for authentication.



And only after providing correct credentials provided before, we can access the prometheus server.



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

We installed Node Exporter on another server with ip 192.168.1.67 which is my host machine in this case.

Node exporter is installed by downloading a tar file and extracting it in our location.

wget https://github.com/prometheus/node_exporter/releases/download/v1.1.2/node_exporter-1.1.2.linux-amd64.tar.gz

```
bj@batman:~$ cd prometheus/
bj@batman:~/prometheus$ wget https://github.com/prometheus/node_exporter/r
eleases/download/v1.1.2/node_exporter-1.1.2.linux-amd64.tar.gz
--2021-12-03 00:51:42--  https://github.com/prometheus/node_exporter/relea
ses/download/v1.1.2/node_exporter-1.1.2.linux-amd64.tar.gz
Resolving github.com (github.com)... 20.205.243.166
```

tar xzf node_exporter-1.1.2.linux-amd64.tar.gz

sudo mv -v node_exporter-1.1.2.linux-amd64/node_exporter /usr/local/bin/

sudo chown root:root /usr/local/bin/node_exporter

```
bj@batman:~/prometheus$ tar xzf node_exporter-1.1.2.linux-amd64.tar.gz
bj@batman:~/prometheus$ ls
node_exporter-1.1.2.linux-amd64  node_exporter-1.1.2.linux-amd64.tar.gz
bj@batman:~/prometheus$ sudo mv -v node_exporter-1.1.2.linux-amd64/node_ex
porter /usr/local/bin/
copied 'node_exporter-1.1.2.linux-amd64/node_exporter' -> '/usr/local/bin/
node_exporter'
removed 'node_exporter-1.1.2.linux-amd64/node_exporter'
bj@batman:~/prometheus$ sudo chown root:root /usr/local/bin/node_exporter
```

Now a service file is created for node-exporter.

sudo nano /etc/systemd/system/node-exporter.service

And this content is saved in the service file:

```
  GNU nano 4.8                                          /etc/systemd/system/node-exporter.
[Unit]
Description=Prometheus exporter for machine metrics
Wants=network-online.target
After=network-online.target


[Service]
Restart=always
User=root
ExecStart=/usr/local/bin/node_exporter --collector.textfile.directory=/prometheus/metrics
ExecReload=/bin/kill -HUP $MAINPID
TimeoutStopSec=20s
SendSIGKILL=no

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

Daemon is reloaded and node-exporter is started:

sudo systemctl daemon-reload

sudo systemctl enable node-exporter.service && sudo systemctl start node-exporter.service

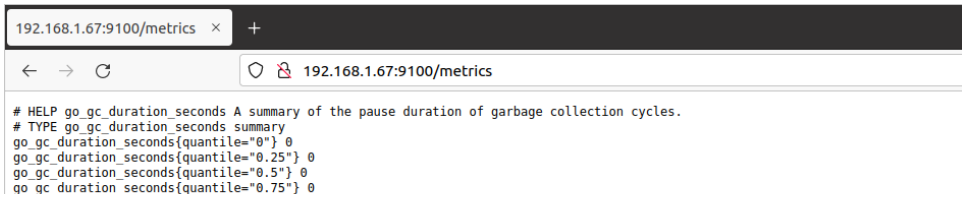
```
bj@batman:~/prometheus$ sudo nano /etc/systemd/system/node-exporter.servic
e
bj@batman:~/prometheus$ sudo systemctl daemon-reload
bj@batman:~/prometheus$ sudo systemctl start node-exporter
bj@batman:~/prometheus$ sudo systemctl enable node-exporter
Created symlink /etc/systemd/system/multi-user.target.wants/node-exporter.
service → /etc/systemd/system/node-exporter.service.
bj@batman:~/prometheus$ sudo systemctl status node-exporter
```

sudo systemctl status node-exporter.service

```
bj@batman:~/prometheus$ sudo systemctl status node-exporter.service
● node-exporter.service - Prometheus exporter for machine metrics
     Loaded: loaded (/etc/systemd/system/node-exporter.service; enabled; vendor preset: enabled)
     Active: active (running) since Fri 2021-12-03 01:10:14 +0545; 40s ago
   Main PID: 47249 (node_exporter)
      Tasks: 6 (limit: 9110)
     Memory: 2.7M
     CGroup: /system.slice/node-exporter.service
             └─47249 /usr/local/bin/node_exporter --collector.textfile.directory=/prometheus/metrics
```

Now with our ip, 192.168.1.67 we can see metrics in our browser using url:

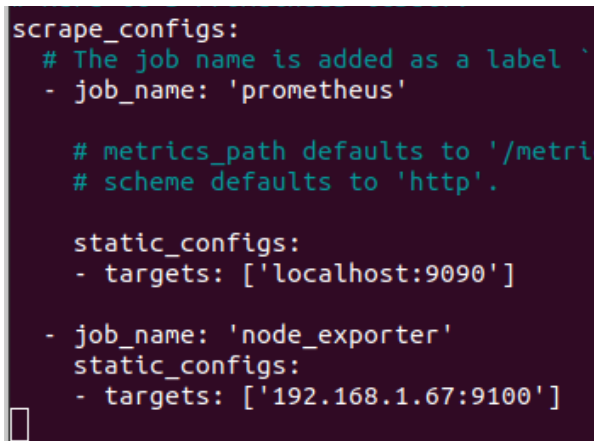
192.168.1.67:9100/metrics



Now, node exporter was added to prometheus in prometheus.yml file:

sudo nano /opt/prometheus/prometheus.yml

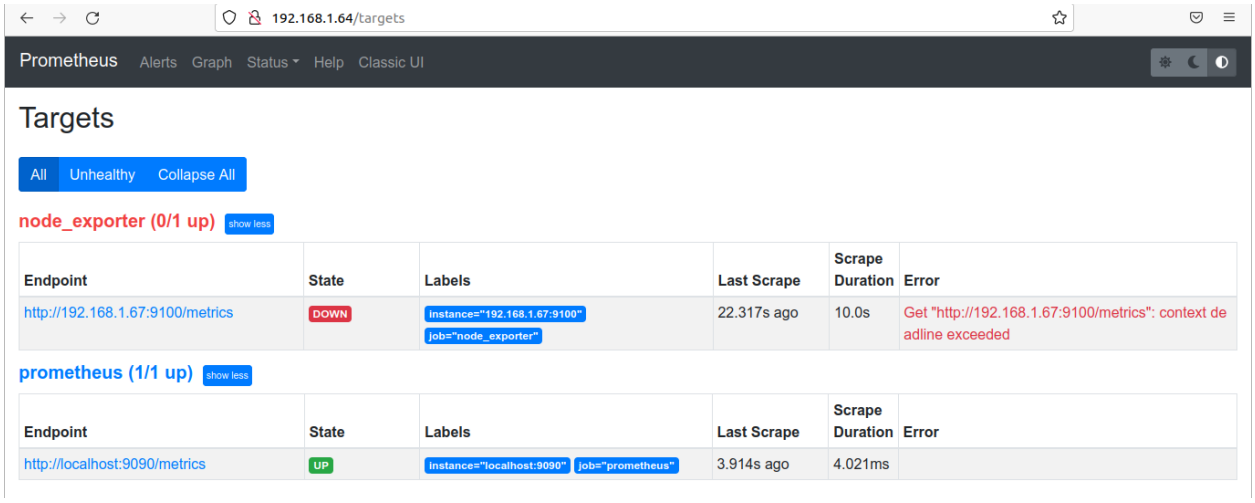
And inside this file, this part was appended in scrape_configs section:



And prometheus was restarted:

sudo systemctl restart prometheus

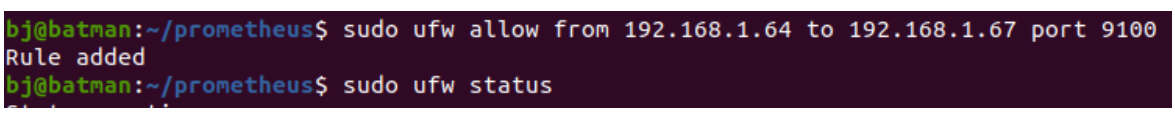
Now in our browser, accessing the Prometheus server, we can see the targets with some details as follows.



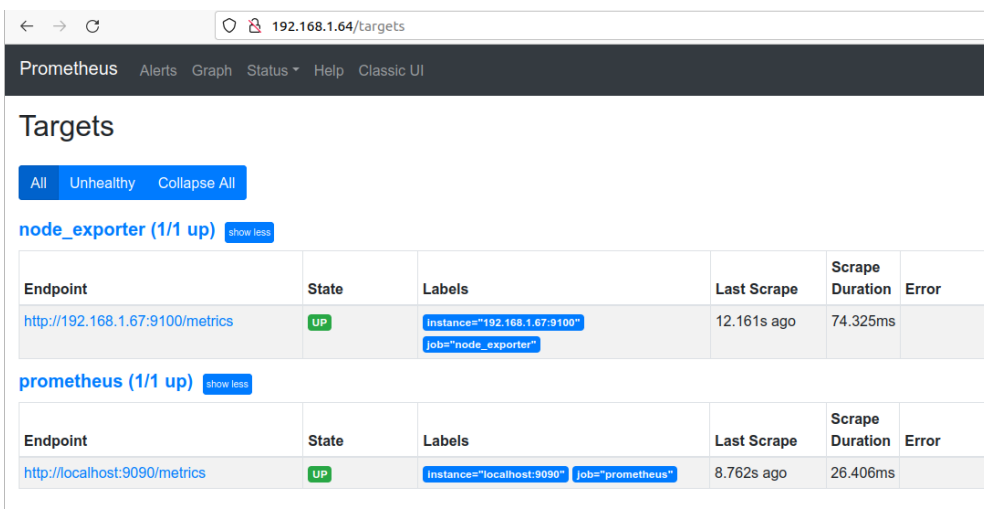
Since we are in different servers, we have to allow traffic from the first server in second server with following command:

Sudo ufw allow from 192.168.1.64 to 192.168.1.67 port 9100

Sudo ufw reload



Now all of the targets are up. We can manually see graphs of metrics also.



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.

First, I ssh into the server containing prometheus with ssh command as:

```
bj@batman:~/Downloads/LeapFrog Internship Documents$ ssh bj@192.168.1.64
bj@192.168.1.64's password:
Welcome to Ubuntu 20.04.3 LTS (GNU/Linux 5.11.0-41-generic x86_64)
```

And installed the required packages by adding gpg key and updating packages and then finally installing grafana with the following commands:

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 install grafana

```
root@vm2:/home/bj/prometheus# sudo apt-get install grafana
Reading package lists... Done
Building dependency tree
```

To start and enable grafana, we used following commands:

sudo systemctl start grafana-server

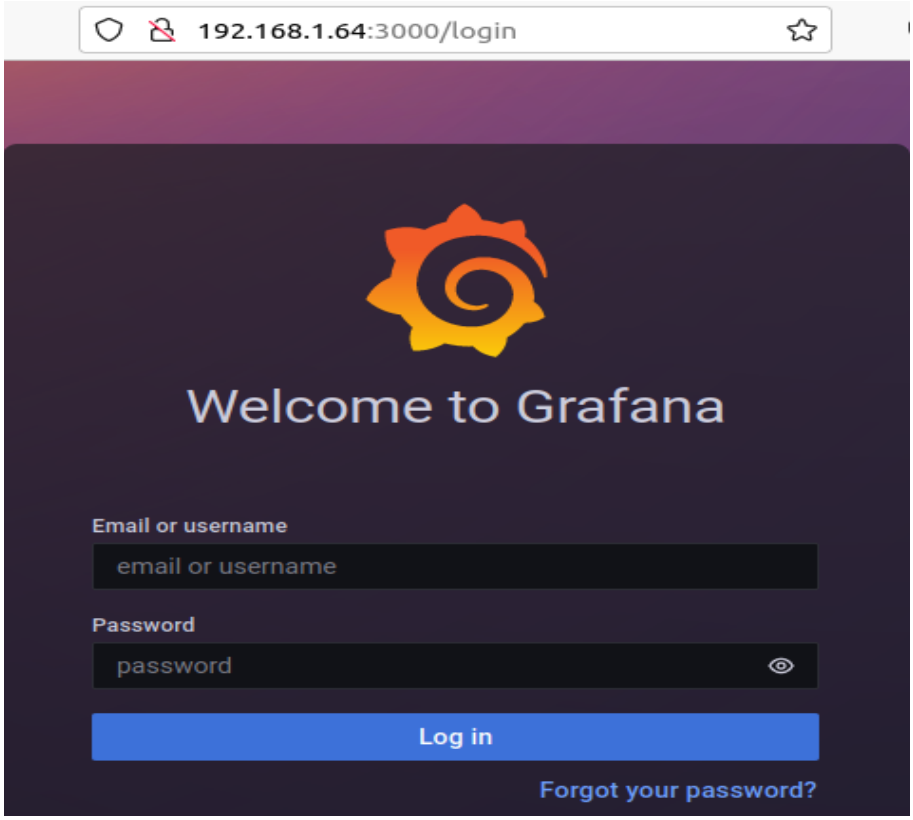
sudo systemctl enable grafana-server

sudo systemctl status grafana-server

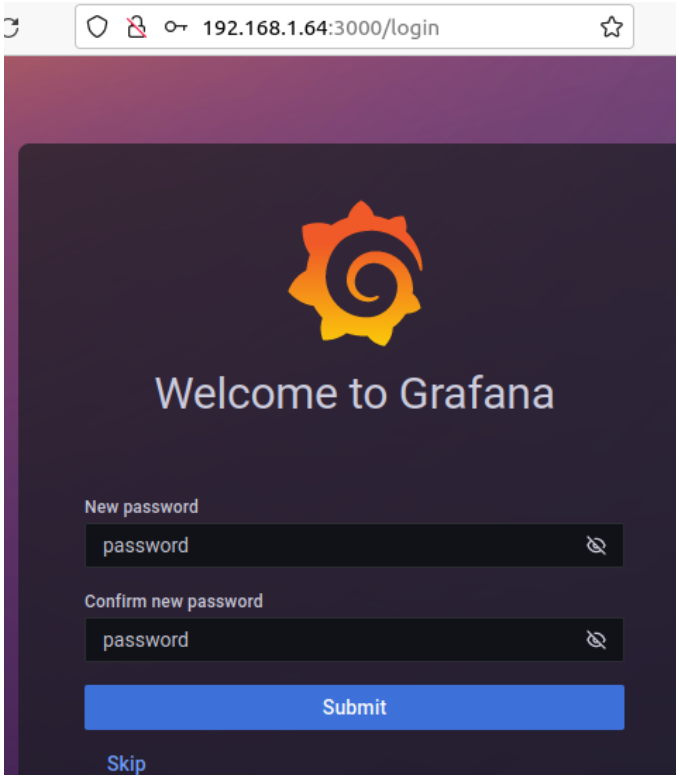
```
root@vm2:/home/bj/prometheus# sudo systemctl start grafana-server
root@vm2:/home/bj/prometheus# sudo systemctl status grafana-server
● grafana-server.service - Grafana instance
     Loaded: loaded (/lib/systemd/system/grafana-server.service; disabled>
     Active: active (running) since Fri 2021-12-03 23:08:00 +0545; 8s ago
       Docs: http://docs.grafana.org
   Main PID: 3800 (grafana-server)
      Tasks: 9 (limit: 2711)
     Memory: 29.9M
     CGroup: /system.slice/grafana-server.service
             └─3800 /usr/sbin/grafana-server --config=/etc/grafana/grafan>
```

Now that the grafana server is up and running, we can visit the dashboard in browser:

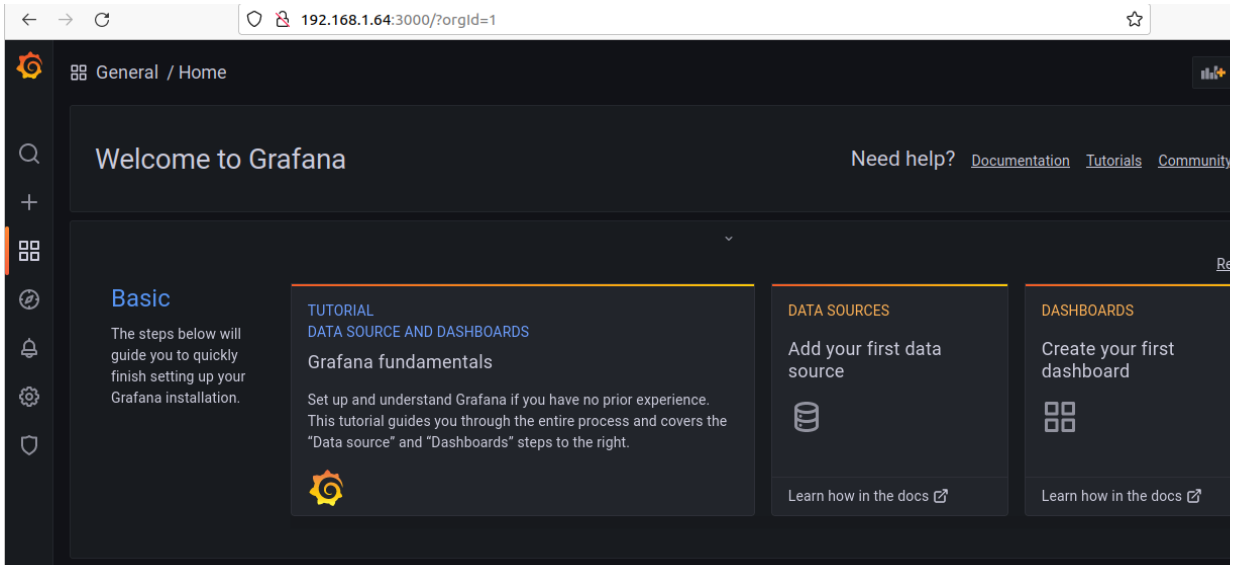
With server address- 192.168.1.64:3000



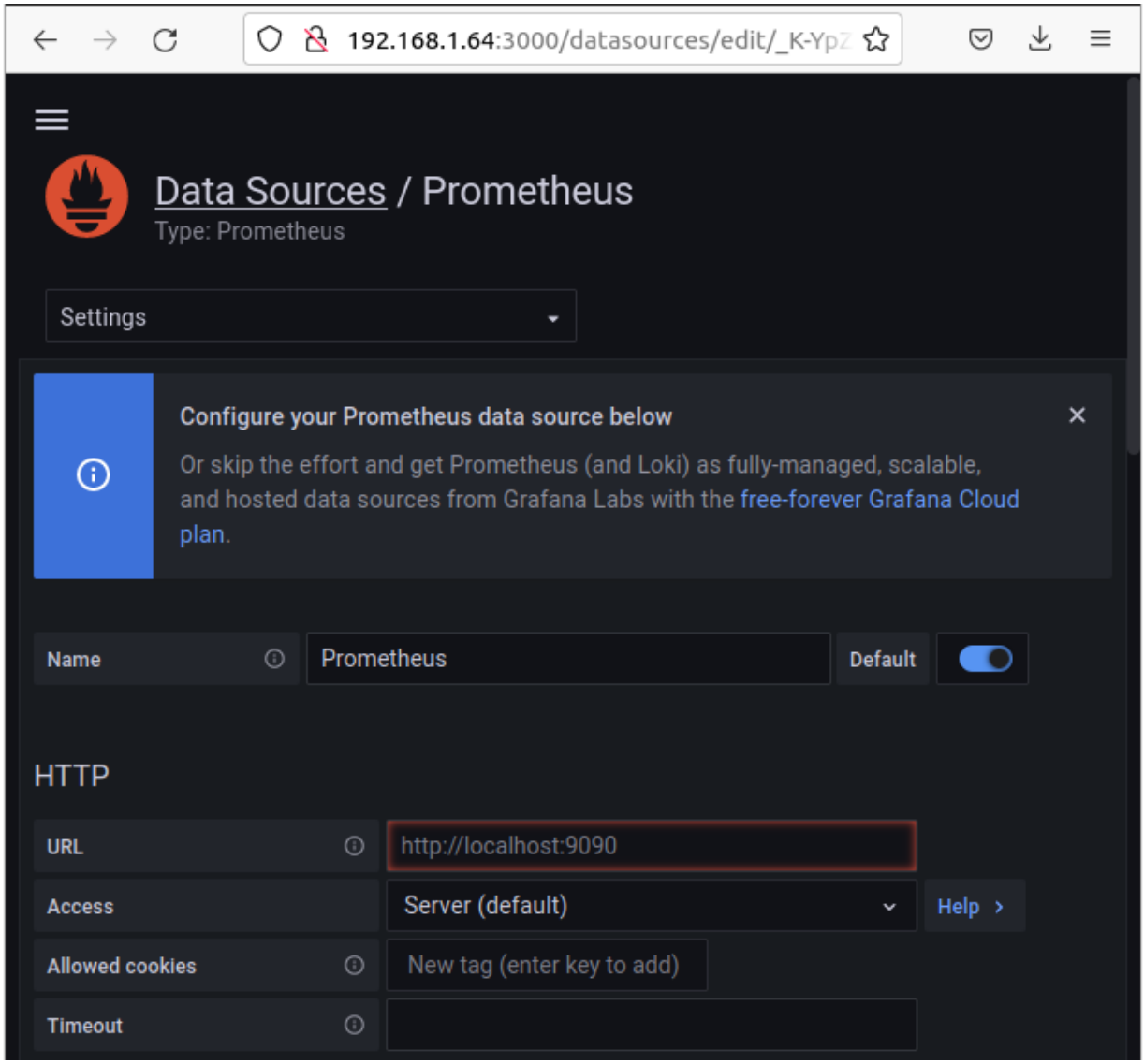
By logging in with default username ‘*admin*’ and password ‘*admin*’ we can change the default password for the first time:



And after setting new password, we can access the dashboard:

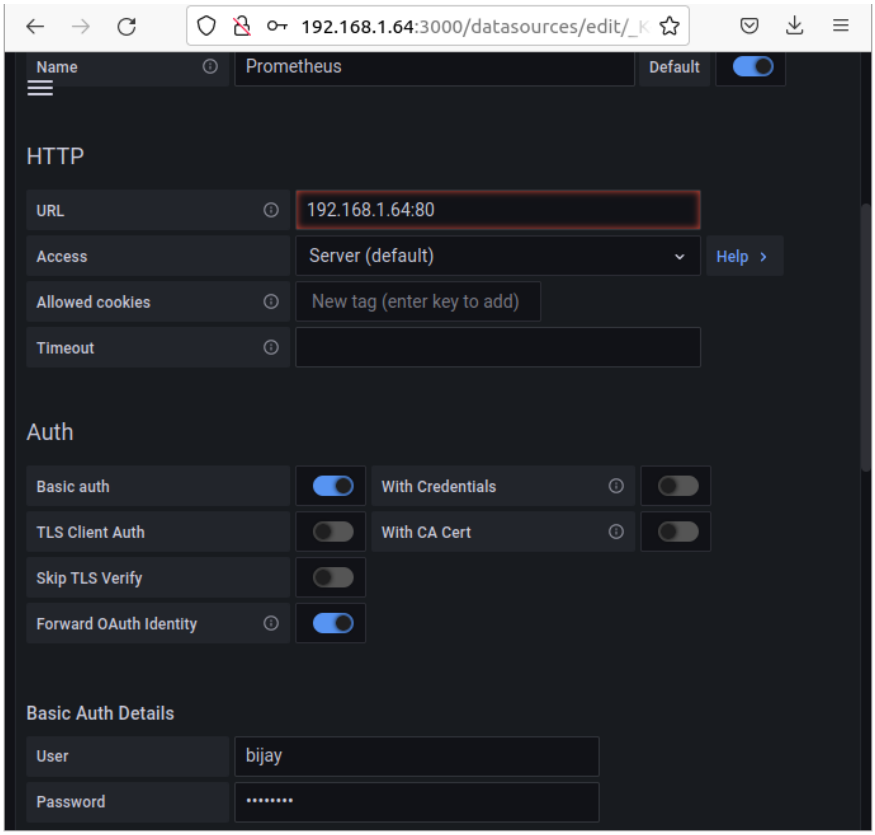


Now Prometheus is to be added as data sources from settings>DataSources:

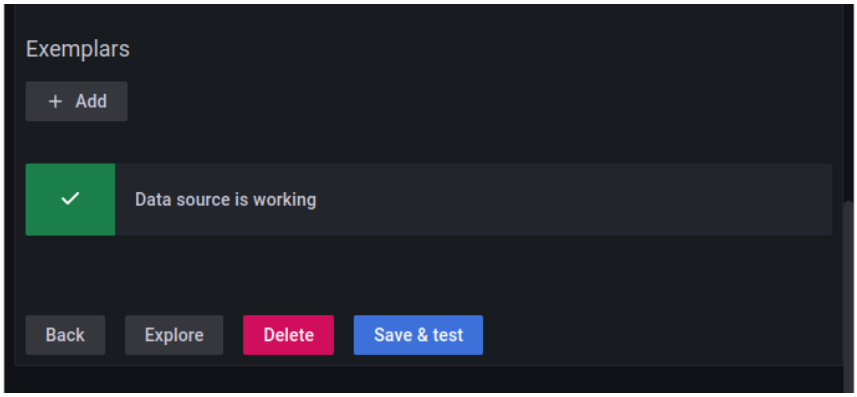


And the server address of prometheus is entered in URL field:

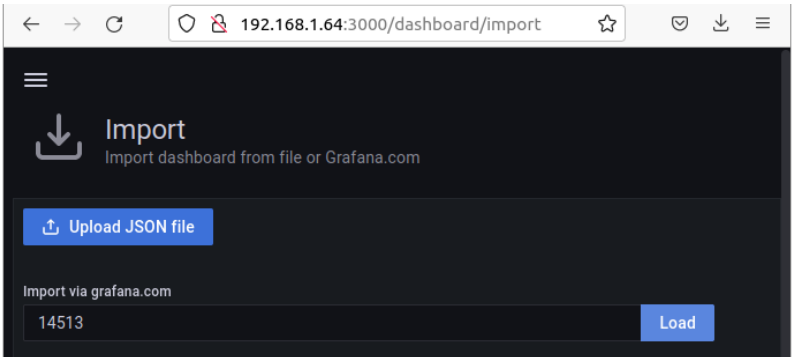
If needed, basic auth can be used for basic authentication to the server.



Then save and test returns the result ‘Data source is working’

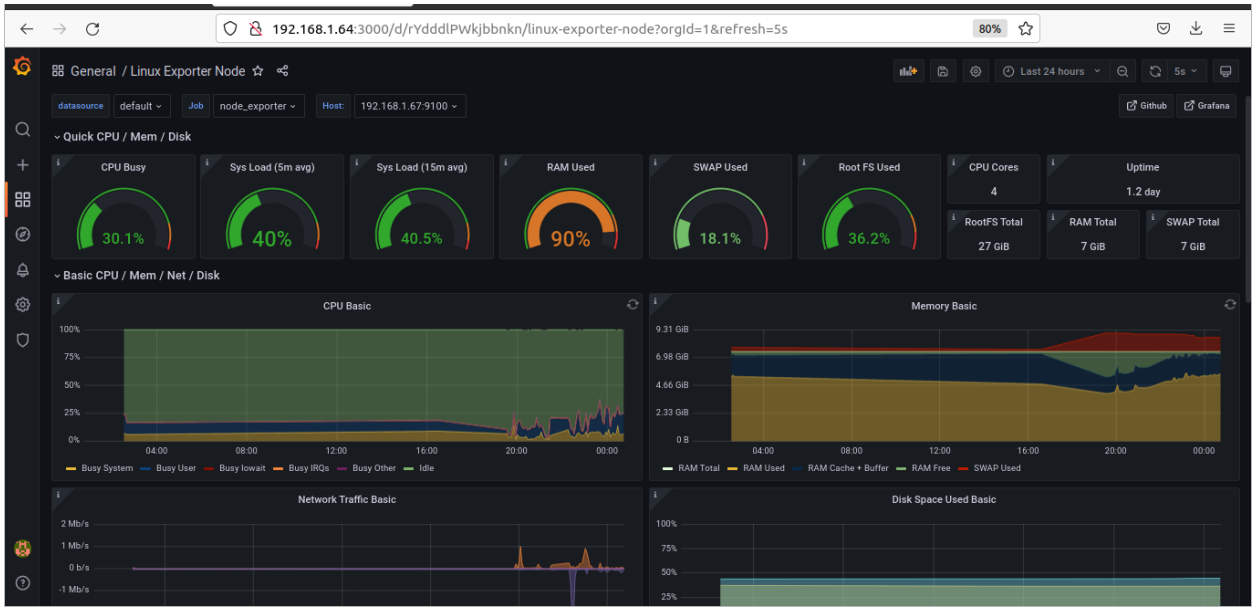


To build dashboard in grafana, we use 14513 to import grafana by selecting + button on left side of the dashboard and then import:



Prometheus is selected for datasource and click on import.

Now we can see live metrics which are refreshed every 5 seconds.



We can see other panels too which can be expanded just by clicking.