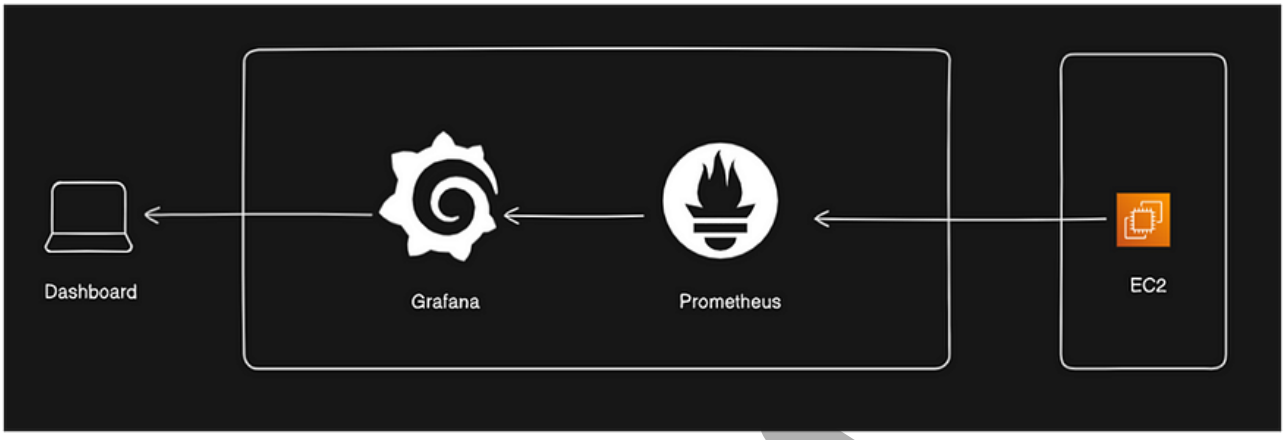
GRAFANA INSTALL ON UBUNTU EC2



Introduction

In today's dynamic IT landscape, effective infrastructure monitoring is crucial for ensuring optimal performance and reliability. This project aims to explore the power of Grafana and Prometheus in monitoring CPU and memory utilization on EC2 instances. By leveraging these tools, we can gain valuable insights into our infrastructure's health and performance, enabling us to make data-driven decisions and proactively address any issues.

Aim

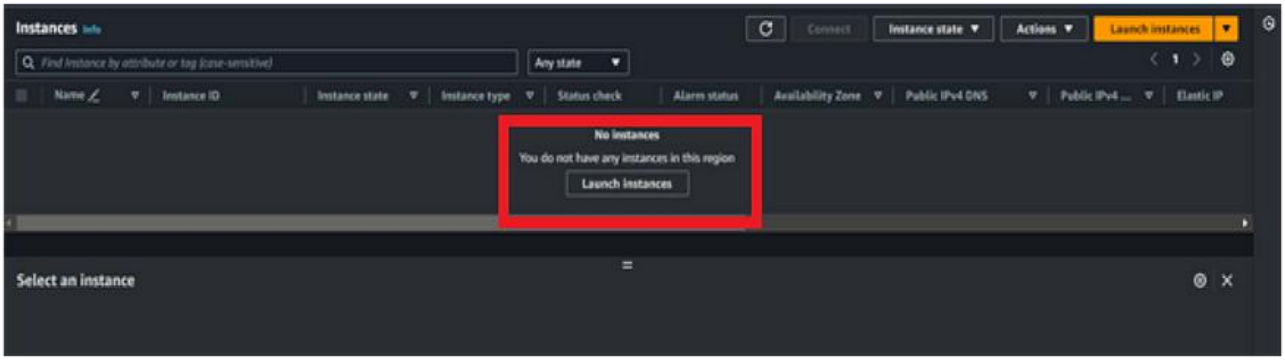
The aim of this project is to set up a robust monitoring system using Grafana and Prometheus to track CPU and memory utilization on EC2 instances. By monitoring these key metrics in real-time, we can identify performance bottlenecks, optimize resource allocation, and ensure the smooth operation of our infrastructure.

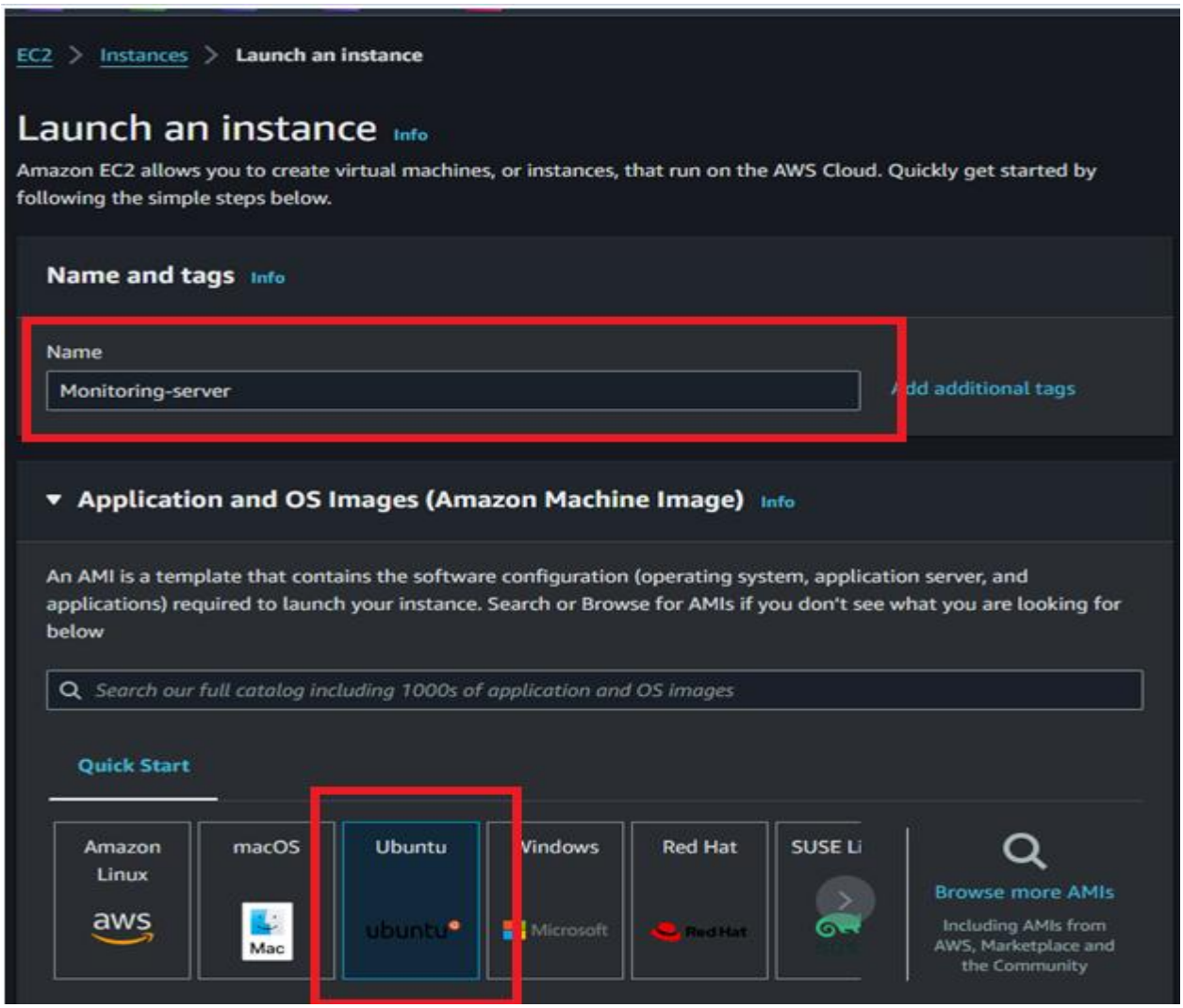
Objective

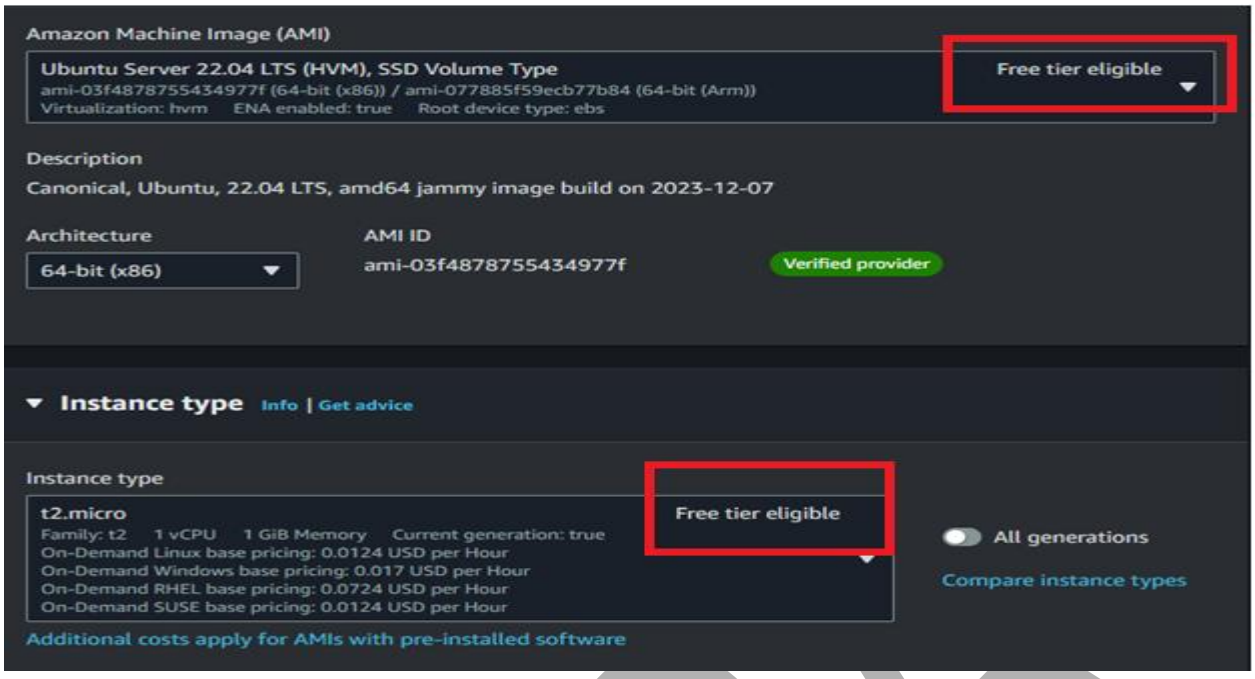
- Configure Prometheus to scrape metrics from EC2 instances
- Set up Grafana to visualize CPU and memory utilization metrics
- Create dashboards in Grafana to monitor and analyze infrastructure performance
- Establish alerting mechanisms to notify stakeholders of any anomalies or issues
- Optimize resource allocation based on monitoring data to improve overall infrastructure efficiency

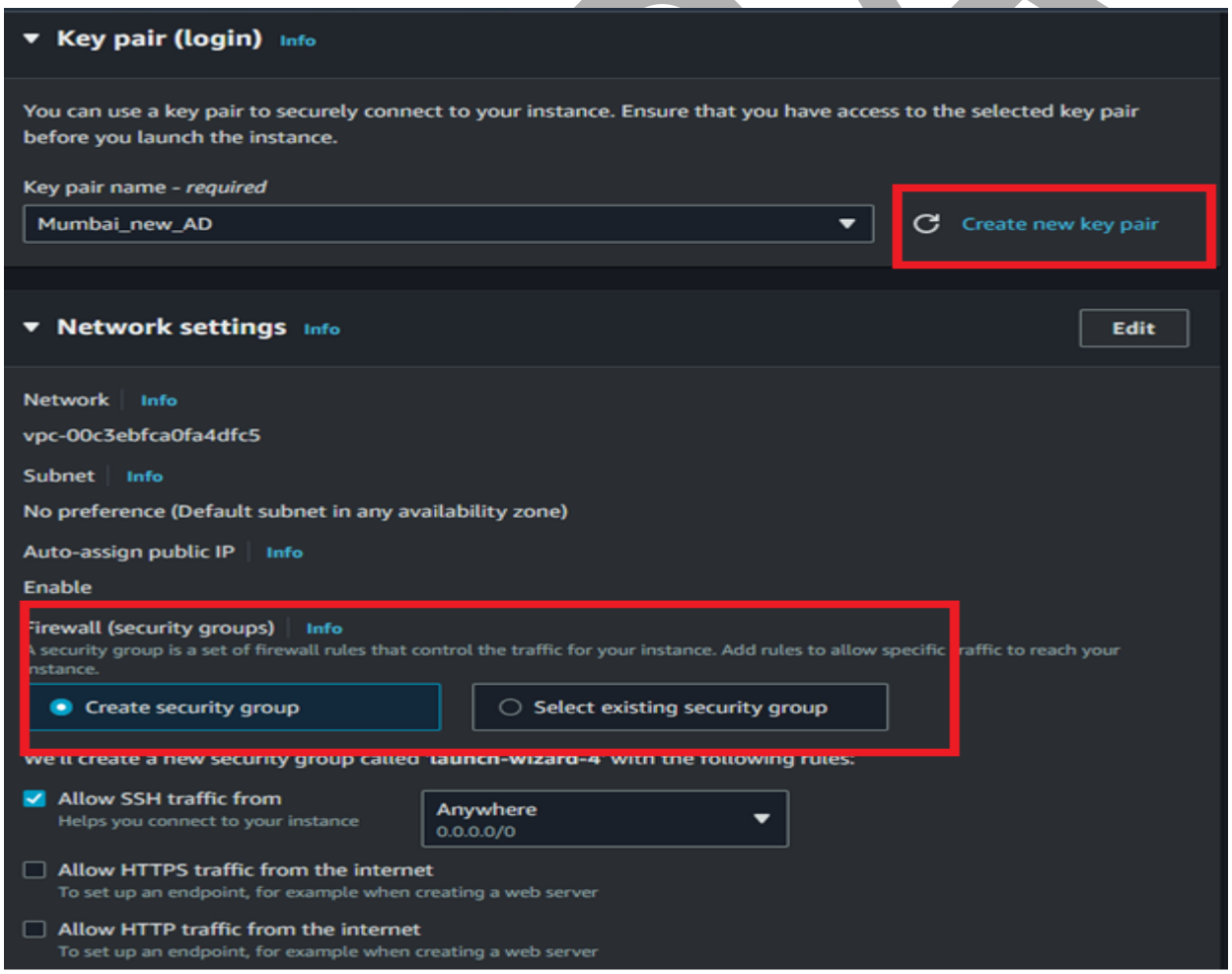
Process

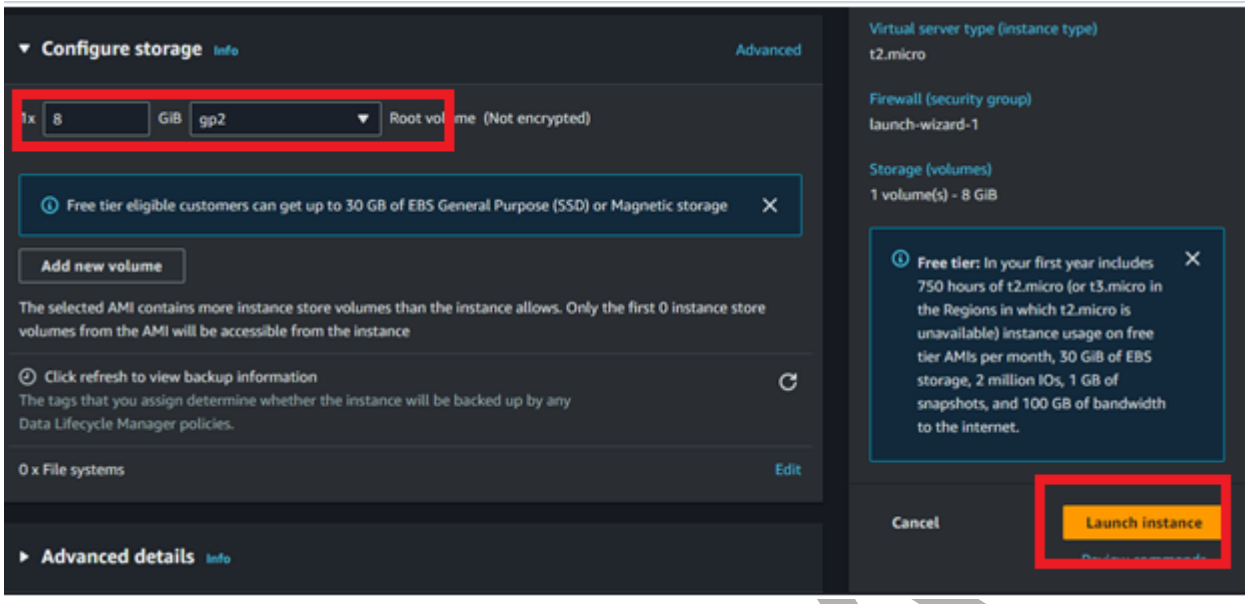
1. Setting up EC2 instance


Instances Info
Connect
Instance state
Actions
Launch instances
Any state
Name
Instance ID
Instance state
Instance type
Status check
Alarm status
Availability Zone
Public IPv4 DNS
Public IPv4 ...
Elastic IP
No instances
You do not have any instances in this region
Launch instances
Select an instance


EC2 > Instances > Launch an instance
Launch an instance Info
Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.
Name and tags Info
Name
Monitoring-server
Add additional tags
Application and OS Images (Amazon Machine Image) Info
An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below
Search our full catalog including 1000s of application and OS images
Quick Start
Amazon Linux
macOS
Ubuntu
Windows
Red Hat
SUSE Li
Browse more AMIs
Including AMIs from AWS, Marketplace and the Community


Amazon Machine Image (AMI)
Ubuntu Server 22.04 LTS (HVM), SSD Volume Type
ami-03f4878755434977f (64-bit (x86)) / ami-077885f59ecb77b84 (64-bit (Arm))
Virtualization: hvm ENA enabled: true Root device type: ebs
Free tier eligible
Description
Canonical, Ubuntu, 22.04 LTS, amd64 jammy image build on 2023-12-07
Architecture
64-bit (x86)
AMI ID
ami-03f4878755434977f
Verified provider
Instance type Info | Get advice
Instance type
t2.micro
Family: t2 1 vCPU 1 GiB Memory Current generation: true
On-Demand Linux base pricing: 0.0124 USD per Hour
On-Demand Windows base pricing: 0.017 USD per Hour
On-Demand RHEL base pricing: 0.0724 USD per Hour
On-Demand SUSE base pricing: 0.0124 USD per Hour
Free tier eligible
All generations
Compare instance types
Additional costs apply for AMIs with pre-installed software


Key pair (login) Info
You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.
Key pair name - required
Mumbai_new_AD
Create new key pair
Network settings Info
Edit
Network Info
vpc-00c3ebfca0fa4dfc5
Subnet Info
No preference (Default subnet in any availability zone)
Auto-assign public IP Info
Enable
Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.
Create security group
Select existing security group
launch-wizard-4
Allow SSH traffic from
Helps you connect to your instance
Anywhere
0.0.0.0/0
Allow HTTPS traffic from the internet
To set up an endpoint, for example when creating a web server
Allow HTTP traffic from the internet
To set up an endpoint, for example when creating a web server



2. Configuring Grafana

- Install and configure Grafana on the same server as Prometheus
- Connect Grafana to Prometheus as a data source

About Grafana
Grafana is an open-source analytics and visualization platform that allows users to query, visualize, alert on, and understand their metrics no matter where they are stored. It enables users to create, explore, and share dashboards with team members to monitor the metrics and understand trends in real-time. Grafana supports a wide range of data sources, including Prometheus, InfluxDB, Elasticsearch, Graphite, and more.

About Prometheus
Prometheus, on the other hand, is an open-source monitoring and alerting toolkit designed for reliability, scalability, and automation of metrics collection, storage, and querying. It collects metrics from monitored targets by scraping HTTP endpoints, and stores the data in a time-series database where it can be queried, analyzed, and visualized. Prometheus also includes a powerful query language (PromQL) for slicing and dicing the collected data to gain insights into system performance and behavior. It is often used in conjunction with Grafana for creating dashboards and visualizing the collected metrics.

Install Grafana

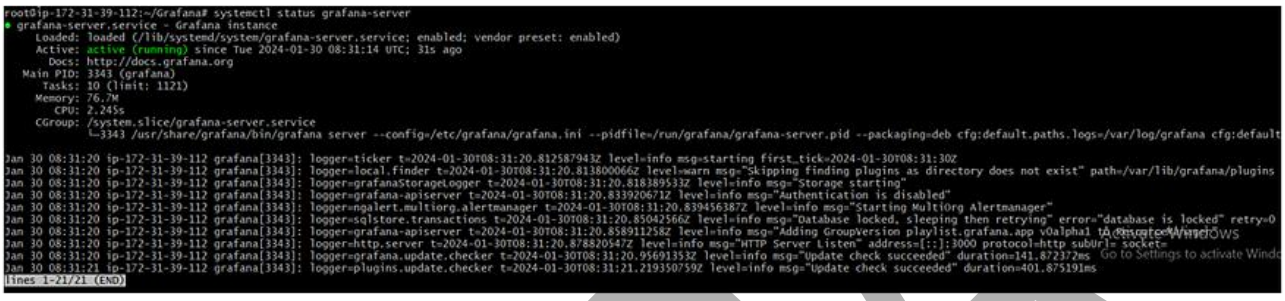
```
ubuntu@ip-172-31-39-112:~$ sudo -i
root@ip-172-31-39-112:~# mkdir Grafana
root@ip-172-31-39-112:~# ls
Grafana  snap
root@ip-172-31-39-112:~# cd Grafana/
root@ip-172-31-39-112:~/Grafana# ls
root@ip-172-31-39-112:~/Grafana# vim Install-Grafana.sh
root@ip-172-31-39-112:~/Grafana# chmod +X Install-Grafana.sh
root@ip-172-31-39-112:~/Grafana# ls
Install-Grafana.sh
```

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

sudo add-apt-repository "deb https://packages.grafana.com/oss/deb stable main"
wget -q -O - https://packages.grafana.com/gpg.key | sudo apt-key add -
sudo apt-get update
sudo apt-get install grafana

```
root@ip-172-31-39-112:~/Grafana# chmod +x Install-Grafana.sh
root@ip-172-31-39-112:~/Grafana# ls
Install-Grafana.sh
```

sudo systemctl start grafana-server
sudo systemctl enable grafana-server



Install Prometheus

```
root@ip-172-31-39-112:~/Grafana# sudo apt-get install prometheus
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  fonts-glyphicons-halflings javascript-common libio-pty-perl libipc-run-perl libjs-bootstrap
```

sudo apt-get install prometheus
sudo systemctl enable prometheus

sudo apt update

sudo apt install -y stress

```
root@ip-172-31-39-112:~/Grafana# sudo systemctl status prometheus
● prometheus.service - Monitoring system and time series database
     Loaded: loaded (/lib/systemd/system/prometheus.service; enabled; vendor preset: enabled)
     Active: active (running) since Tue 2024-01-30 08:32:52 UTC; 22s ago
       Docs: https://prometheus.io/docs/introduction/overview/
             man:prometheus(1)
   Main PID: 4484 (prometheus)
      Tasks: 7 (limit: 1121)
     Memory: 18.5M
        CPU: 156ms
     CGroup: /system.slice/prometheus.service
             └─4484 /usr/bin/prometheus
```

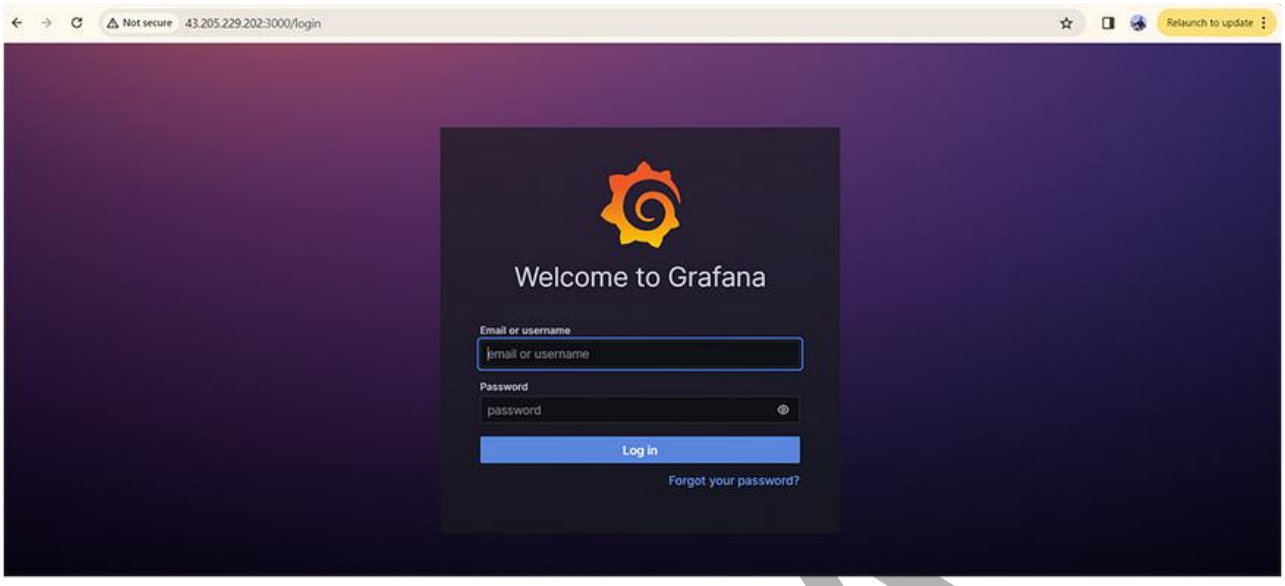
Accessing Grafana:

We can access Grafana via browser by using our instance IP **:3000**

Username is admin

Password is admin

After that change the password

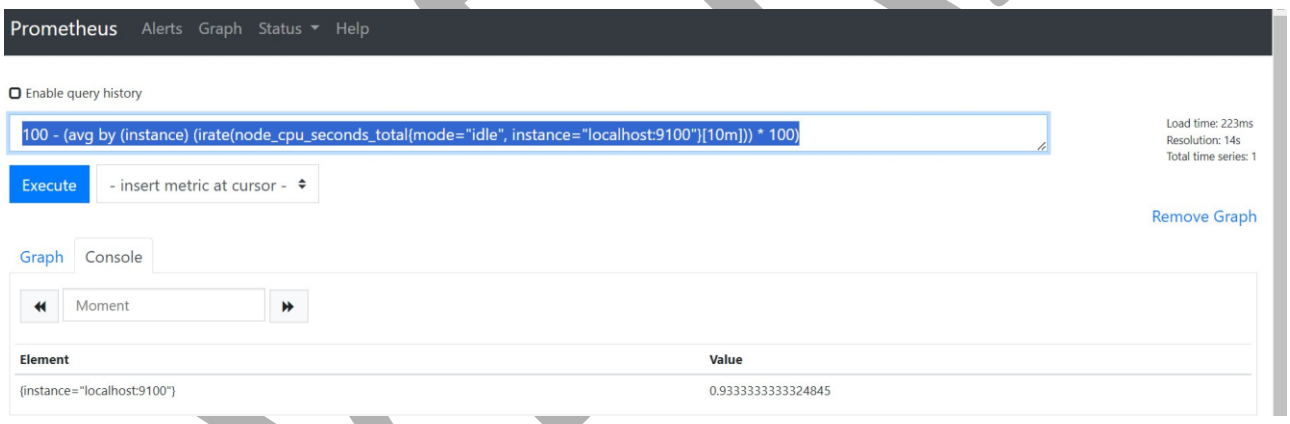


Accessing Prometheus:

We can access Grafana via browser by using our instance IP **:9090**

Run below query to check the load

100 - (avg by (instance) (irate(node_cpu_seconds_total{mode="idle", instance="localhost:9100"}[10m])) * 100)



Explanation:

node_cpu_seconds_total{mode="idle"}:

This metric tracks the total number of seconds the CPU has spent in an idle state, which is available for all servers (instances) that are being monitored by Prometheus. The {mode="idle"} part filters for idle time only.

irate(node_cpu_seconds_total{mode="idle"}[5m]):

The irate() function calculates the rate of change (per second) for the node_cpu_seconds_total metric over the last 5 minutes ([5m]). It returns how much idle time occurred during the last 5-minute window for each instance.

avg by (instance):

This function averages the rate of idle CPU time over all CPU cores for each instance. So, it aggregates the CPU idle rate per instance, providing a single value per instance.

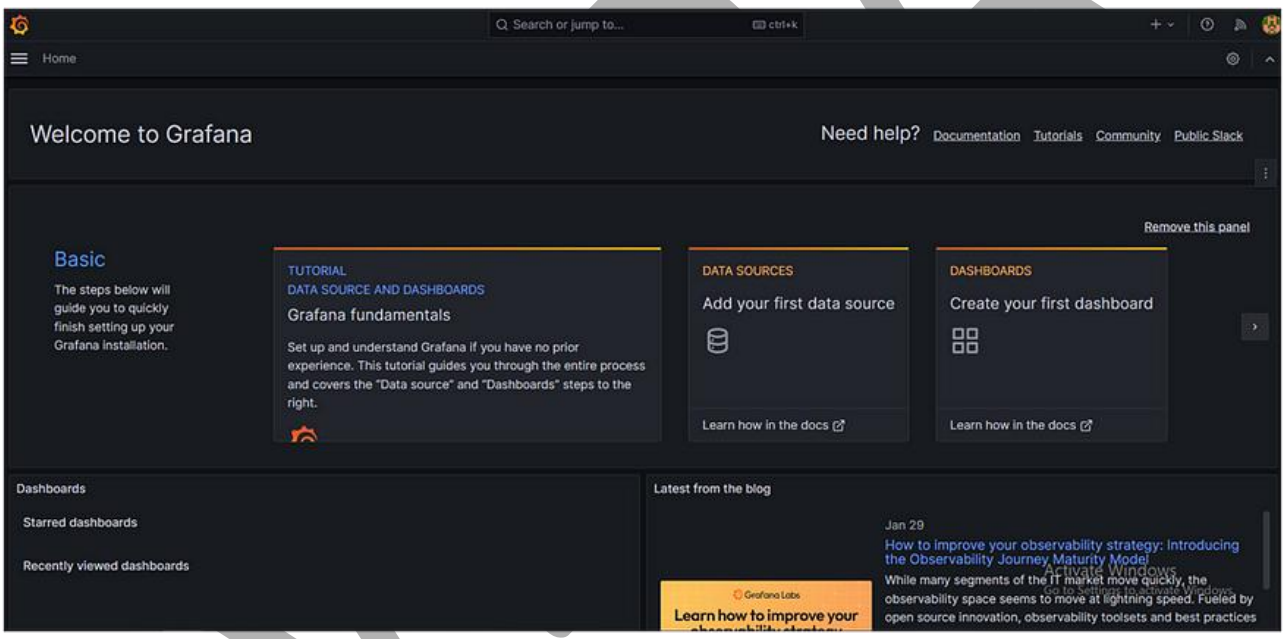
* 100 and 100 - (...):

The multiplication by 100 converts the idle rate into a percentage.

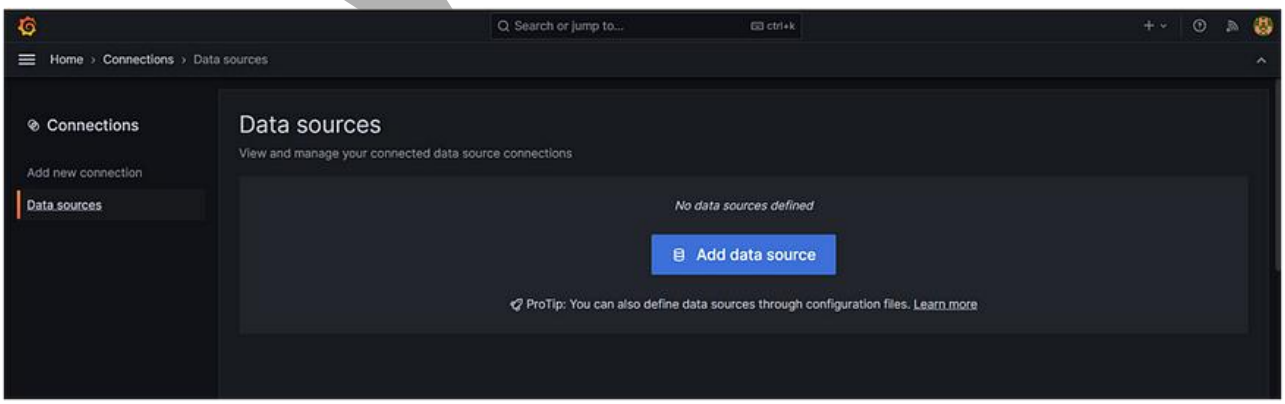
Subtracting this from 100 calculates the CPU usage percentage. This shows how much time the CPU has been actively used, rather than idle, for each instance.

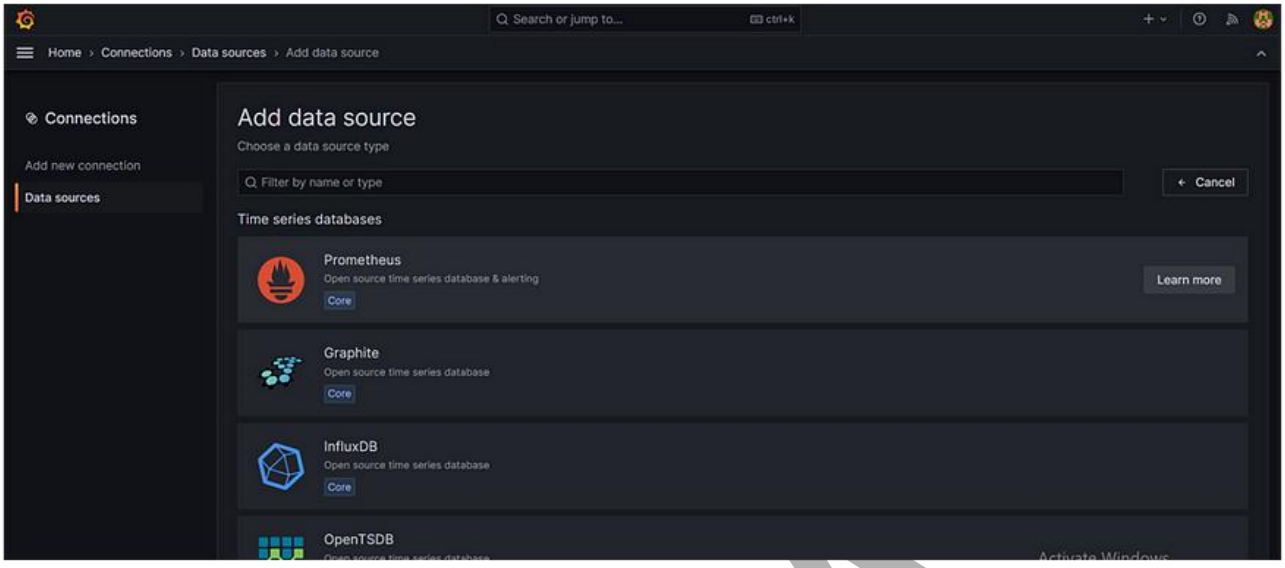
3. Creating Dashboards

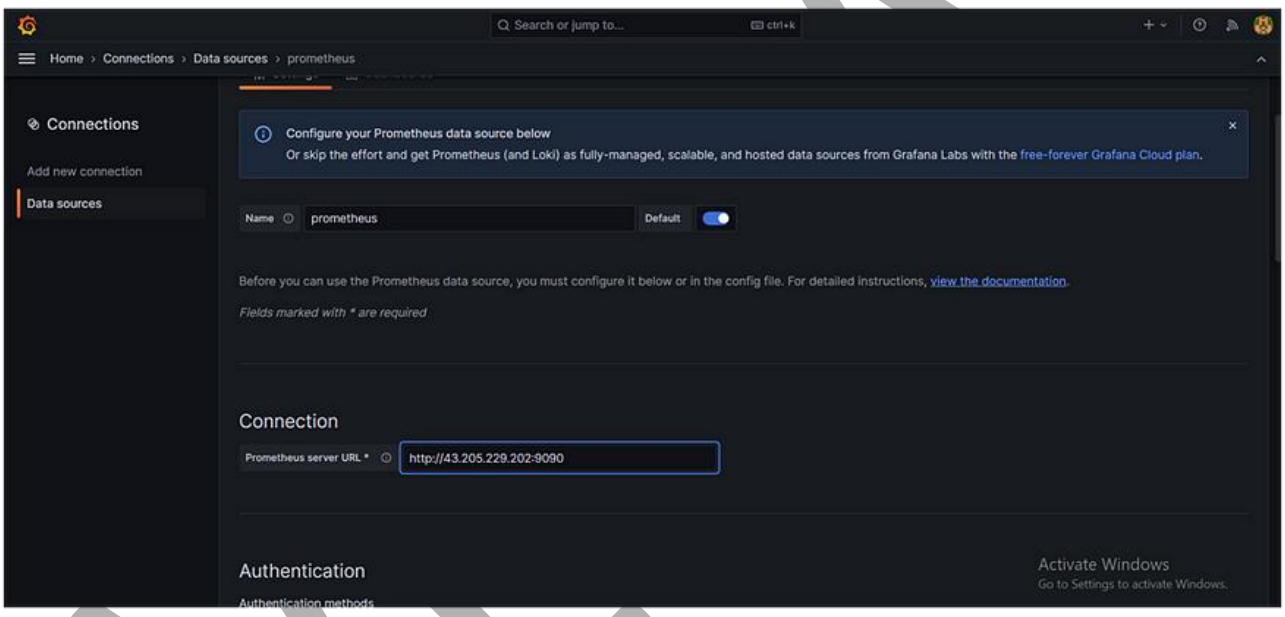
- Design custom dashboards in Grafana to visualize CPU and memory utilization metrics
- Customize graphs and panels to display relevant information in real-time



Add Prometheus

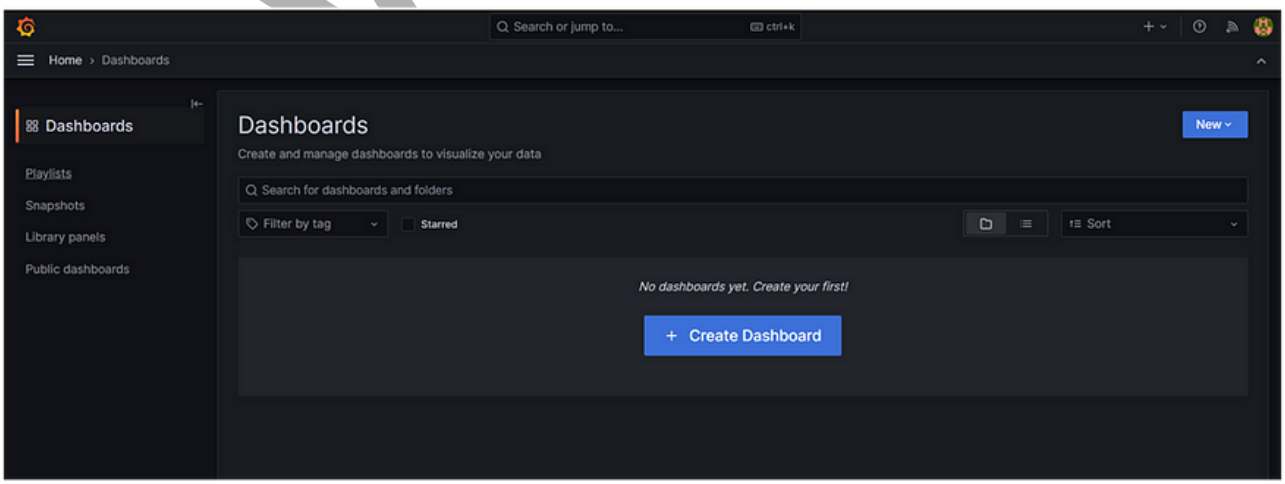




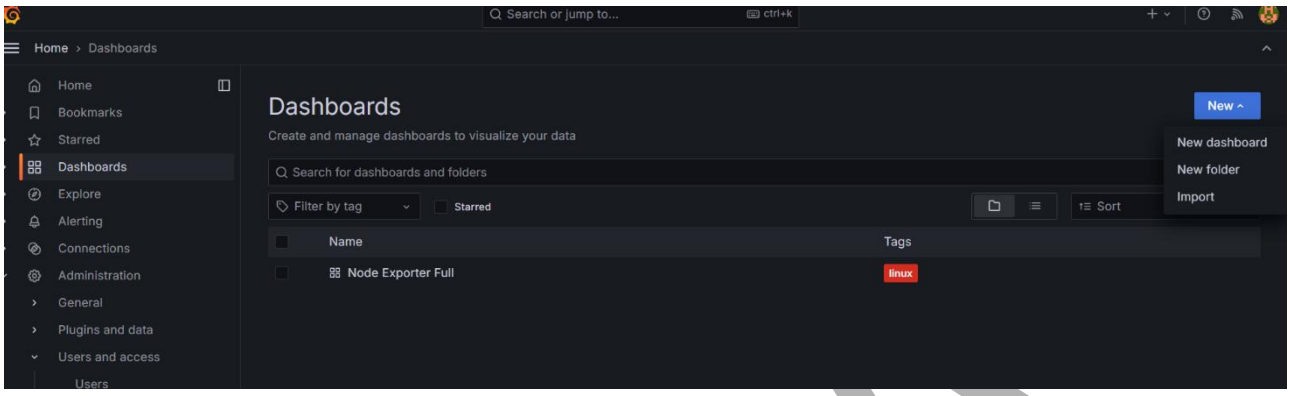


Create Dashboard

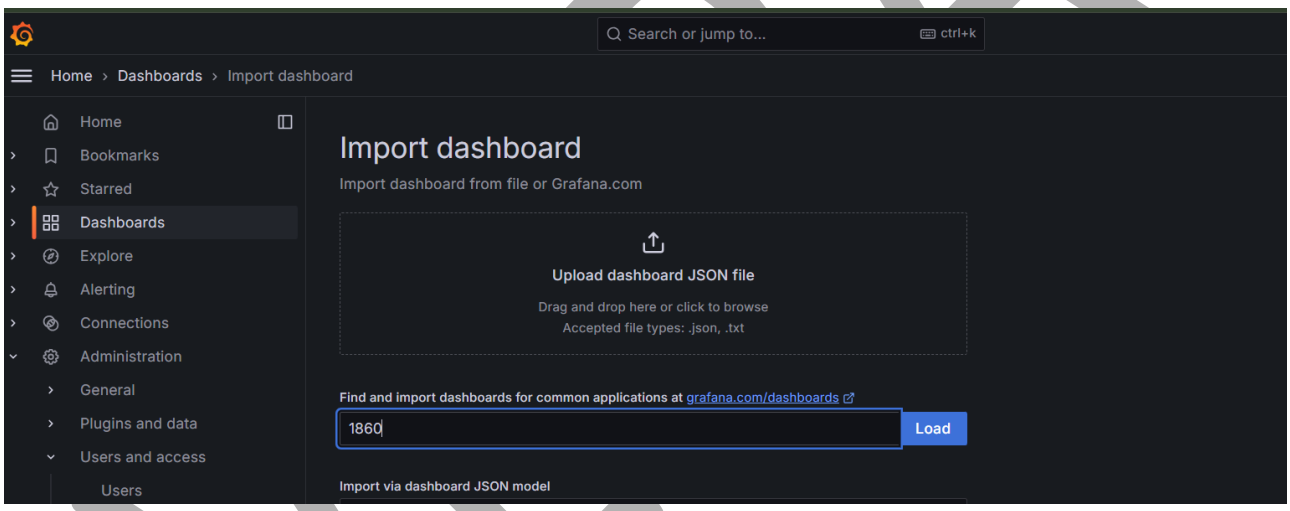
Click on new



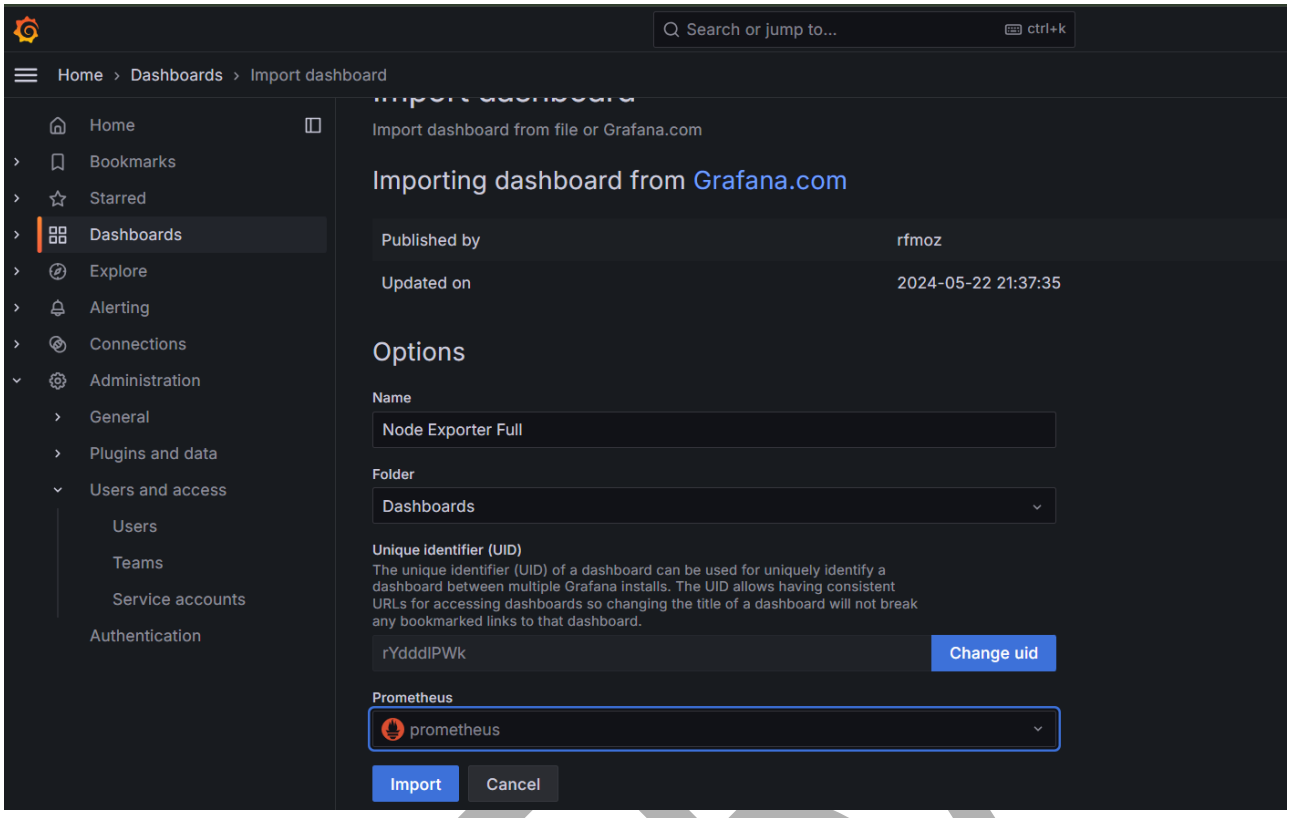
Click on import



Enter the dasbord number ==1860 then click on load



Select the source is prometheus and clicki on import



Install stress

sudo apt update

sudo apt install -y stress

stress --vm 1 --vm-bytes 512mb --vm-keep --timeout 60s

stress --cpu 1 --timeout 60

```
root@ip-172-31-39-112:~# sudo apt-get install stress
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  stress
0 upgraded, 1 newly installed, 0 to remove and 55 not upgraded.
Need to get 18.4 kB of archives.
After this operation, 52.2 kB of additional disk space will be used.
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 stress amd64 1.0.5-1 [18.4 kB]
Fetched 18.4 kB in 0s (45.3 kB/s)
Selecting previously unselected package stress.
(Reading database ... 76102 files and directories currently installed.)
```

Final Dashboard

Conclusion