Indian Institute of Technology, Jodhpur

Lab Manual

Sensors and IoT

LAB - 6

Date: 21 Oct, 2024

Lab Objective

To store real-time sensor data in an InfluxDB database and visualize it using Grafana. The objective includes setting up data pipelines from sensors to InfluxDB and configuring Grafana dashboards for effective monitoring.

Part 1 : Installation of Influxdb

- Open a terminal window on Raspberry Pi
- Update all the packages installed on Raspberry Pi and execute :-

```
sudo apt update
sudo apt upgrade
```

- Adding the InfluxDB Repository

```
curl https://repos.influxdata.com/influxdata-archive.key | gpg --dearmor
| sudo tee /usr/share/keyrings/influxdb-archive-keyring.gpg >/dev/null

echo "deb [signed-by=/usr/share/keyrings/influxdb-archive-keyring.gpg]
https://repos.influxdata.com/debian $(lsb_release -cs) stable"
| sudo tee /etc/apt/sources.list.d/influxdb.list
```

- Refresh the available packages

```
sudo apt update
```

- Install InfluxDB

```
sudo apt install influxdb
```

- Start the InfluxDB server

```
sudo systemctl unmask influxdb
sudo systemctl enable influxdb
sudo systemctl start influxdb
```

- Start influxDB by running

```
influx
```

- Create a database

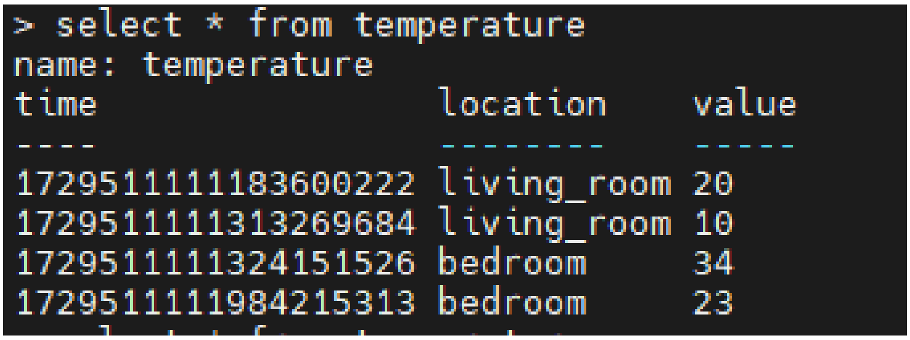
```
CREATE DATABASE <YOUR_DATABASE_NAME>
 USE <YOUR_DATABASE_NAME>
```

- Insert data into the table

```
INSERT temperature,location=living_room value=20
INSERT temperature,location=living_room value=10
INSERT temperature,location=bedroom value=34
INSERT temperature,location=bedroom value=23
```

- Check the inserted data

```
SELECT * FROM temperature
```



```
> select * from temperature
name: temperature
time                location    value
----                --------    -----
1729511111183600222 living_room 20
1729511111313269684 living_room 10
1729511111324151526 bedroom     34
1729511111984215313 bedroom     23
```

Figure 1: output for select query

- Fetching data for specific conditions using WHERE conditions

```
SELECT value FROM temperature WHERE location='bedroom'
```

- Fetching data for specific conditions using WHERE conditions

```
SELECT value FROM temperature WHERE location='bedroom'
```

Part 2 : Installation of grafana

- Open a terminal window on Raspberry Pi
- Add the APT key used to authenticate packages:

```
sudo mkdir -p /etc/apt/keyrings/

wget -q -O - https://apt.grafana.com/gpg.key | gpg --dearmor |
sudo tee /etc/apt/keyrings/grafana.gpg > /dev/null
```

- Add the Grafana APT repository:

```
echo "deb [signed-by=/etc/apt/keyrings/grafana.gpg]
https://apt.grafana.com stable main" |
sudo tee /etc/apt/sources.list.d/grafana.list
```

- Install Grafana:

```
sudo apt-get update
sudo apt-get install -y grafana
```

- Open localhost:3000 in Raspberry pi and use admin as username and password

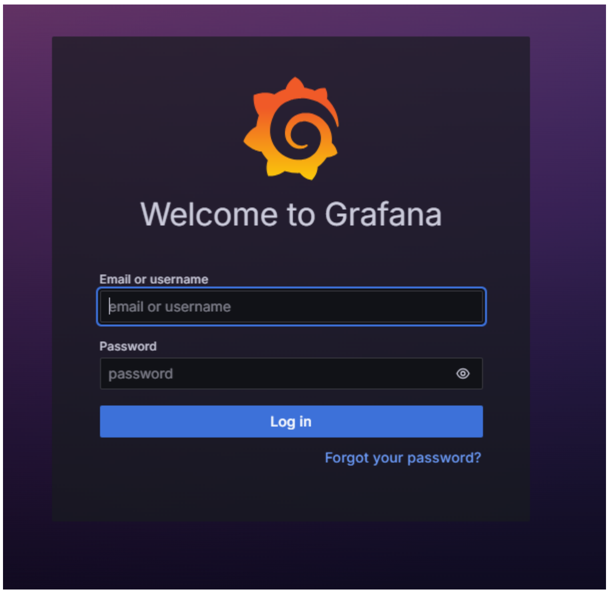


Figure 2: Grafana Login

– Goto datasources

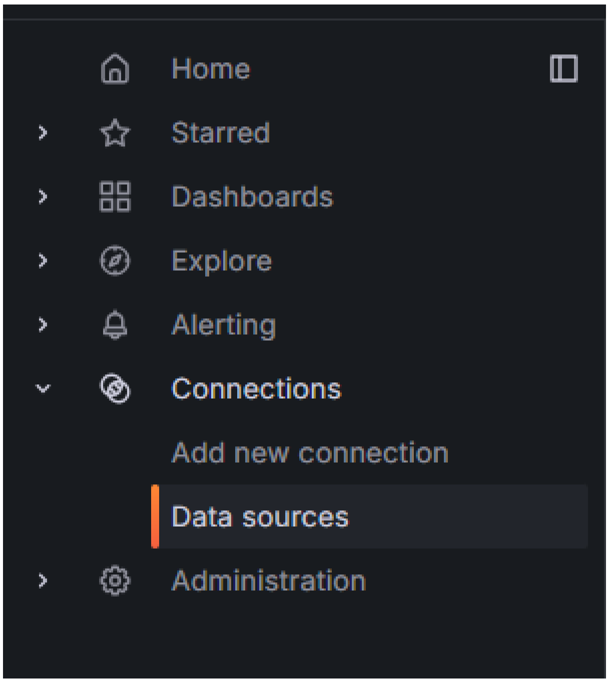


Figure 3: Add Datasource

– Select InfluxDB

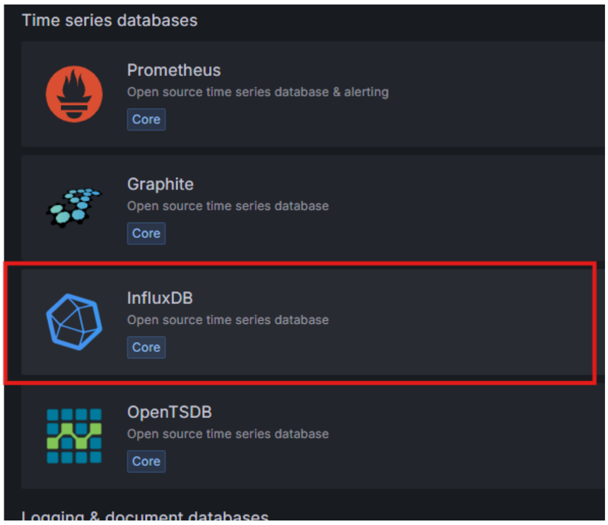
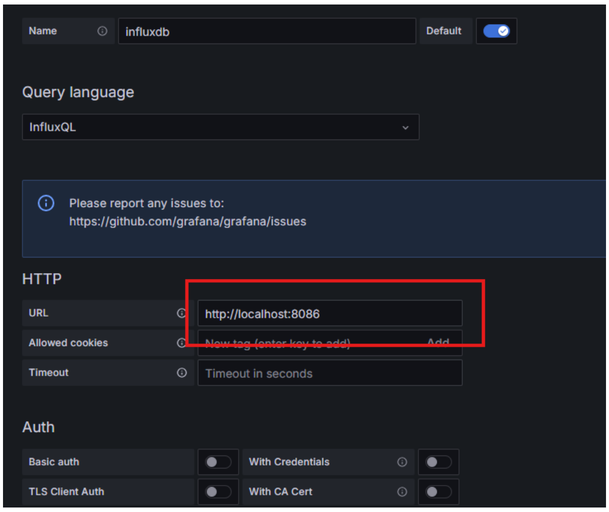

Time series databases
Prometheus
Open source time series database & alerting
Core
Graphite
Open source time series database
Core
InfluxDB
Open source time series database
Core
OpenTSDB
Open source time series database
Core
Logging & document databases

Figure 4: Select InflixDB datasource

– Configure Grafana to access influxDB



Name: influxdb
Default

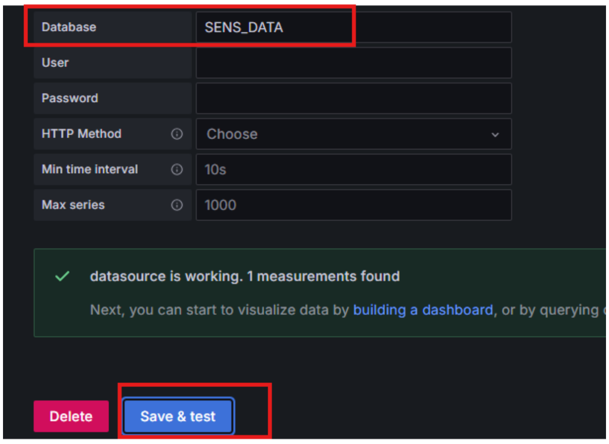
Query language
InfluxQL

Please report any issues to:
https://github.com/grafana/grafana/issues

HTTP
URL: http://localhost:8086
Allowed cookies: New tag (enter key to add) Add
Timeout: Timeout in seconds

Auth
Basic auth
With Credentials
TLS Client Auth
With CA Cert

Figure 5: Set netowrk configuration



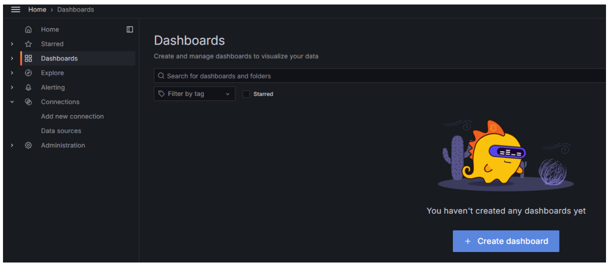
Database: SENS_DATA
User
Password
HTTP Method: Choose
Min time interval: 10s
Max series: 1000

datasource is working. 1 measurements found

Next, you can start to visualize data by building a dashboard, or by querying

Figure 6: Set Database name and save it

– Goto dashboard and create a new dashboard

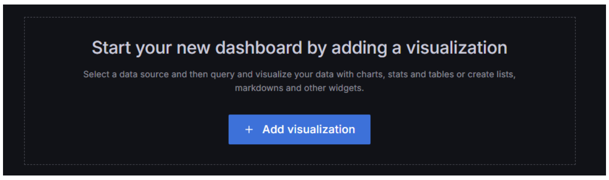


Dashboards

Create and manage dashboards to visualize your data

You haven't created any dashboards yet

Figure 7: Add Grafana dashboard



Start your new dashboard by adding a visualization

Select a data source and then query and visualize your data with charts, stats and tables or create lists, markdowns and other widgets.

Figure 8: Add Visualiztaion

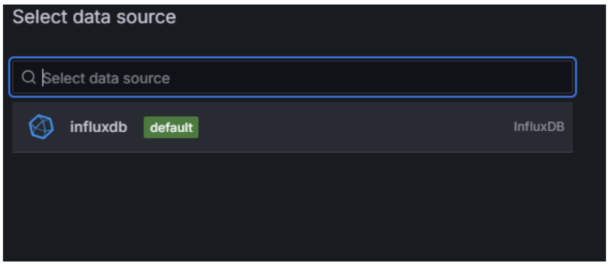
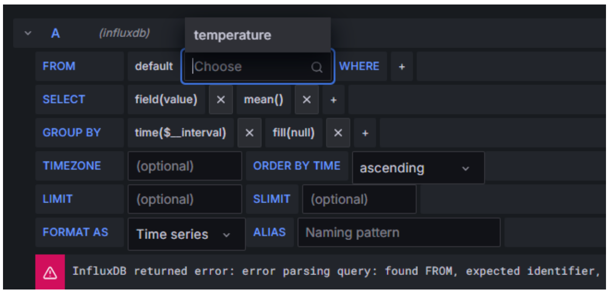


Figure 9: Select InflixDB datasource



```
InfluxDB returned error: error parsing query: found FROM, expected identifier,
```

Figure 10: Select datasource

Part 3 : Writing using python

- ∗ Open a new terminal
- ∗ activate virtal environment ”IOT_LAB”
- ∗ install influxDB library

```
python3 -m pip install influxdb
```

- ∗ use the provided python file to write to the database.

Assignment : Show Lidar data on Grafana dashboard

- ∗ Use the provided python file to write to a database
- ∗ The Table name should be your respective roll number
- ∗ show the graph of the data on graphana
