

Sending Data From Sensor Node To Cloud Via Wingz Gateway

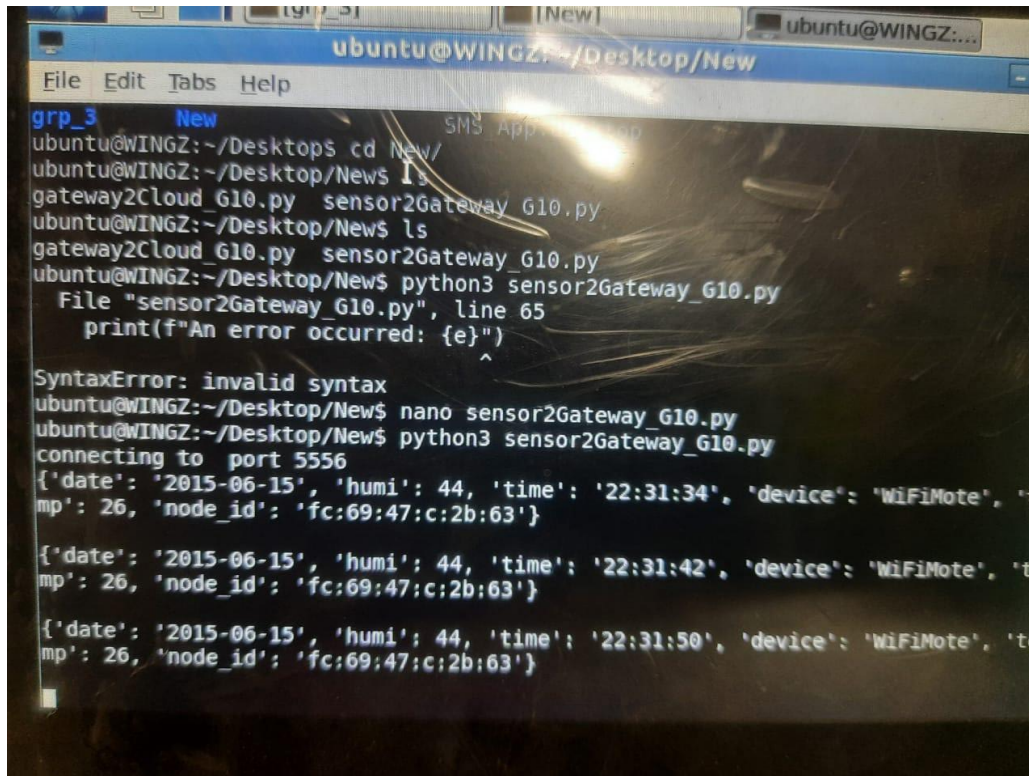
Cec-Lab Assignment

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1. Receive data from sensor nodes on Gateway (specific to your device <Mac_id and Node_id>)

Data is continuously sent to the gateway by the mode, at gateway we will run a server **sensor2Gateway_G10.py** on it which continuously receives the data and writes into the temporary **group_10.txt** which will act as a buffer file.



```
ubuntu@WINGZ: ~/Desktop/New
File Edit Tabs Help
grp_3 New
ubuntu@WINGZ:~/Desktops$ cd New/
ubuntu@WINGZ:~/Desktop/News$ ls
gateway2Cloud_G10.py sensor2Gateway_G10.py
ubuntu@WINGZ:~/Desktop/News$ ls
gateway2Cloud_G10.py sensor2Gateway_G10.py
ubuntu@WINGZ:~/Desktop/News$ python3 sensor2Gateway_G10.py
File "sensor2Gateway_G10.py", line 65
    print(f"An error occurred: {e}")
    ^
SyntaxError: invalid syntax
ubuntu@WINGZ:~/Desktop/New$ nano sensor2Gateway_G10.py
ubuntu@WINGZ:~/Desktop/News$ python3 sensor2Gateway_G10.py
connecting to port 5556
{'date': '2015-06-15', 'humi': 44, 'time': '22:31:34', 'device': 'WiFiMote', 'temp': 26, 'node_id': 'fc:69:47:c:2b:63'}

{'date': '2015-06-15', 'humi': 44, 'time': '22:31:42', 'device': 'WiFiMote', 'temp': 26, 'node_id': 'fc:69:47:c:2b:63'}

{'date': '2015-06-15', 'humi': 44, 'time': '22:31:50', 'device': 'WiFiMote', 'temp': 26, 'node_id': 'fc:69:47:c:2b:63'}
```

2. Send data from Gateway to VM on OpenStack Cloud.

Now, to send data from gateway to vm we run **gateway2Cloud_G10.py** on gateway which will read each line , send it to the VM then, delete it from the **group_10.txt**

group_10.txt file acting as a buffer storage

ubuntu@WINGZ: ~/Desktop/New

```
File Edit Tabs Help
ubuntu@WINGZ:~/Desktop/New$ cat grp 10.txt
cat: grp 10.txt: No such file or directory
ubuntu@WINGZ:~/Desktop/New$ cat group 10.txt
{'date': '2015-06-15', 'humi': 44, 'time': '22:31:34', 'device': 'Wi-Fi Mote', 'temp': 26, 'node_id': 'fc:69:47:c:2b:63'}
{'date': '2015-06-15', 'humi': 44, 'time': '22:31:42', 'device': 'Wi-Fi Mote', 'temp': 26, 'node_id': 'fc:69:47:c:2b:63'}
{'date': '2015-06-15', 'humi': 44, 'time': '22:31:50', 'device': 'Wi-Fi Mote', 'temp': 26, 'node_id': 'fc:69:47:c:2b:63'}
{'date': '2015-06-15', 'humi': 44, 'time': '22:31:58', 'device': 'Wi-Fi Mote', 'temp': 26, 'node_id': 'fc:69:47:c:2b:63'}
{'date': '2015-06-15', 'humi': 43, 'time': '22:32:06', 'device': 'Wi-Fi Mote', 'temp': 26, 'node_id': 'fc:69:47:c:2b:63'}
{'date': '2015-06-15', 'humi': 43, 'time': '22:32:15', 'device': 'Wi-Fi Mote', 'temp': 26, 'node_id': 'fc:69:47:c:2b:63'}
{'date': '2015-06-15', 'humi': 43, 'time': '22:32:23', 'device': 'Wi-Fi Mote', 'temp': 26, 'node_id': 'fc:69:47:c:2b:63'}
```

Sending data to the cloud.

[illegible]

3. Receive data on VM (OpenStack Cloud) from Gateway.

Now, to receive the data at vm we hosted a server which will receive data on vm and write the data into a database (postgreusql).

a. Receive data (1 entry at a time).

```
es  Terminal  Apr 13 21:10  ubutnu@ubutnu-Inspiron-14-5408: ~/Desktop/final_cec_servers

ubutnu@ubutnu-Inspiron-14-5408:~/Desktop/final_cec_servers$ python3 server2DB.py
Socket successfully created
connecting to port 5555
socket is listening
Got connection from ('172.29.2.177', 50190)
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:36:13'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:36:13'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:36:21'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:36:21'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:36:29'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:36:29'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:36:37'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:36:37'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:36:45'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:36:45'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:36:53'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:36:53'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:37:02'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:37:02'}
{'temp': 27, 'humt': 43, 'node_id': 'fc:69:47:c:2b:63', 'device': 'WiFiMote', 'date': '2023-04-14', 'time': '02:37:10'}
```

b. Store it in the database.

Database output:

ubutnu@ubutnu-Inspiron-14-5408: ~						
temp	humt	node_id	device	date	time	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:34:58	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:35:31	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:36:04	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:36:36	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:37:09	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:37:41	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:38:14	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:38:46	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:39:19	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:39:52	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:40:25	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:40:58	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:41:30	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:42:03	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:42:36	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:43:09	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:43:42	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:44:14	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:44:47	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:45:20	
26	41	fc:69:47:c:2b:63	WiFiMote	2023-04-13	01:45:53	

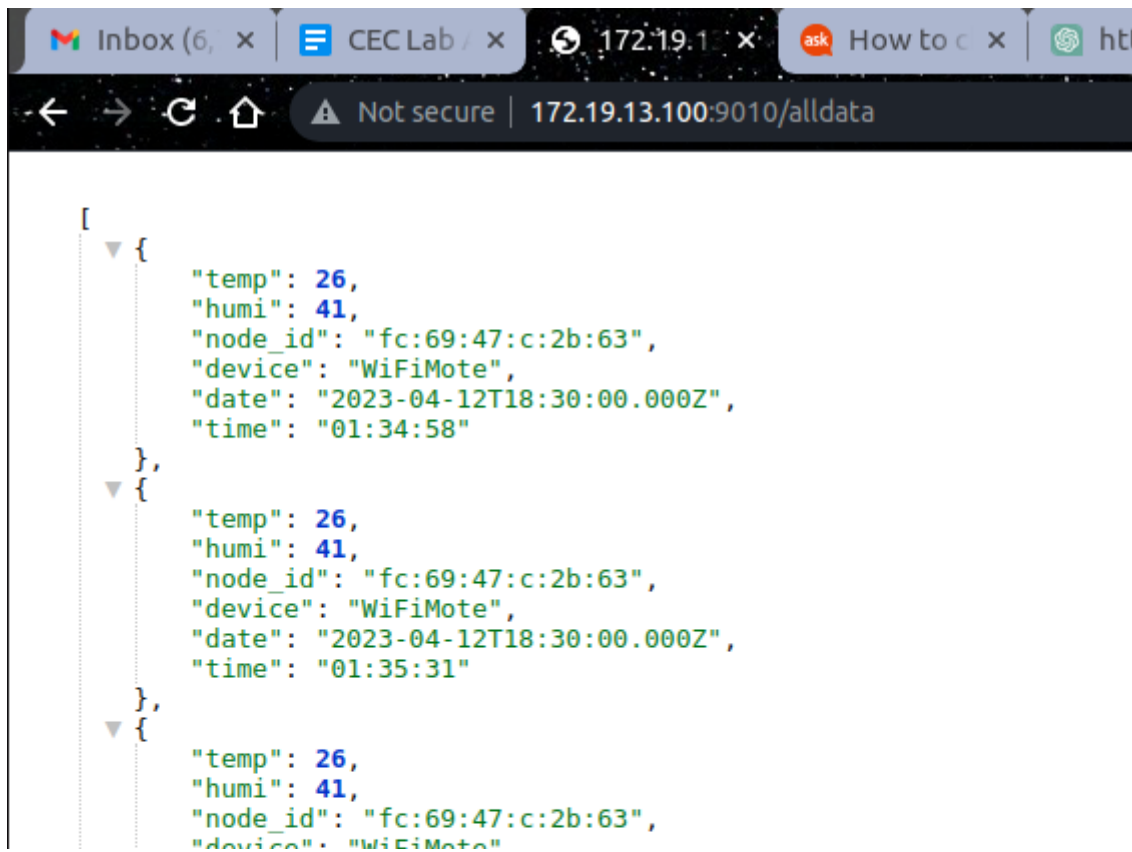
c. Run queries to fetch data:

- Manually running queries on database:

```
ubutnu@ubutnu-Inspiron-14-5408: ~  
ubutnu@ubutnu-Inspiron-14-5408:~$ sudo -u postgres psql  
could not change directory to "/home/ubutnu": Permission denied  
psql (15.2 (Ubuntu 15.2-1.pgdg22.04+1), server 14.7 (Ubuntu 14.7-1.pgdg22.04+1))  
Type "help" for help.  
  
postgres=# \c group_10  
psql (15.2 (Ubuntu 15.2-1.pgdg22.04+1), server 14.7 (Ubuntu 14.7-1.pgdg22.04+1))  
You are now connected to database "group_10" as user "postgres".  
group_10=# select * from group_10_data;  
group_10=# select * from group_10_data;  
group_10=# select * from group_10_data where date='2023-04-13' and time='01:34:58';  
 temp | humi | node_id | device | date | time  
-----+-----+-----+-----+-----+-----  
    26 |   41 | fc:69:47:c:2b:63 | WiFiMote | 2023-04-13 | 01:34:58  
(1 row)
```

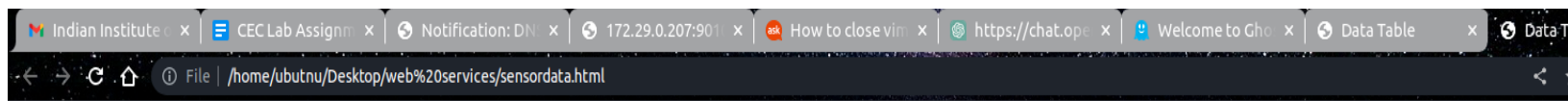
- Query from web server

→ Json format



```
[  
  {  
    "temp": 26,  
    "humi": 41,  
    "node_id": "fc:69:47:c:2b:63",  
    "device": "WiFiMote",  
    "date": "2023-04-12T18:30:00.000Z",  
    "time": "01:34:58"  
  },  
  {  
    "temp": 26,  
    "humi": 41,  
    "node_id": "fc:69:47:c:2b:63",  
    "device": "WiFiMote",  
    "date": "2023-04-12T18:30:00.000Z",  
    "time": "01:35:31"  
  },  
  {  
    "temp": 26,  
    "humi": 41,  
    "node_id": "fc:69:47:c:2b:63",  
    "device": "WiFiMote",  
    "date": "2023-04-12T18:30:00.000Z",  
    "time": "01:35:31"  
  }  
]
```

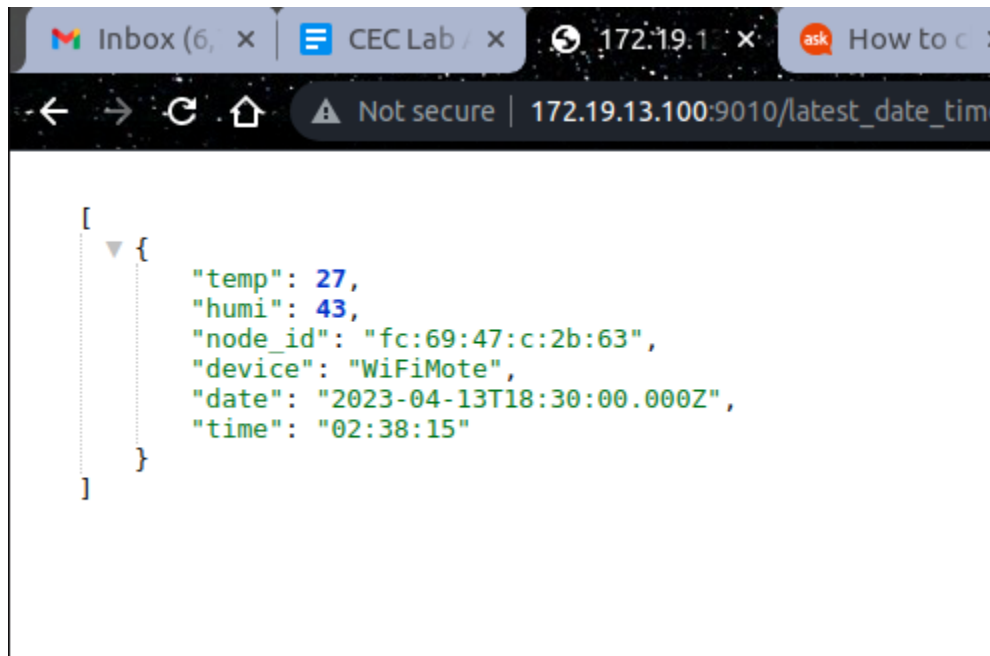
→ Table format



Data Table

ID	Temperature	Humidity	Timestamp
undefined	26	41	01:34:58
undefined	26	41	01:35:31
undefined	26	41	01:36:04

→ latest date and time query



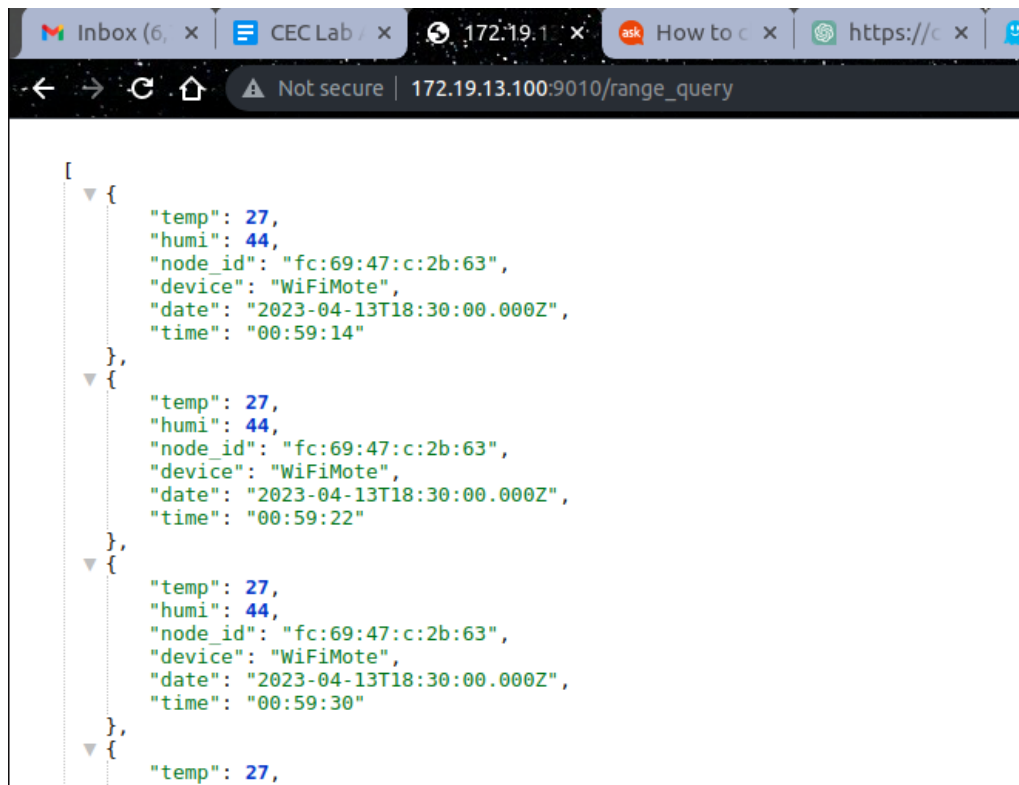
→ specific column value



The screenshot shows a web browser with the address bar displaying "172.19.13.100:9010/humidity". The page content is a JSON array with four objects, each containing a "humi" field with the value 41.

```
[
  {
    "humi": 41
  },
  {
    "humi": 41
  },
  {
    "humi": 41
  },
  {
    "humi": 41
  }
]
```

→ Range query



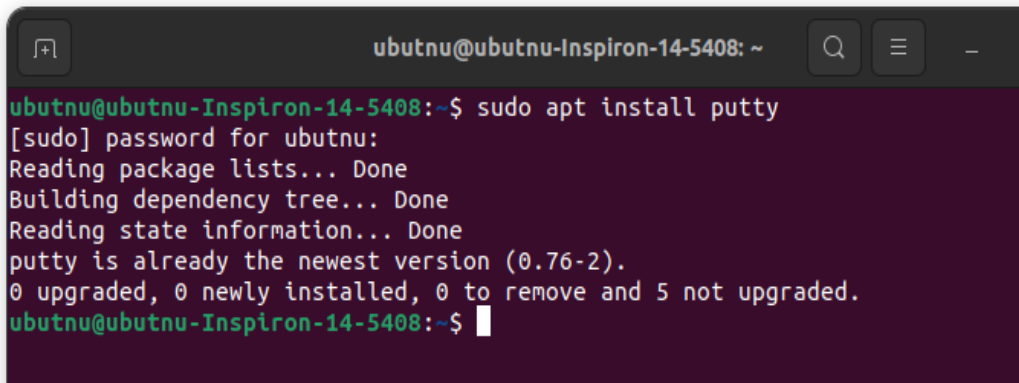
The screenshot shows a web browser with the address bar displaying "172.19.13.100:9010/range_query". The page content is a JSON array with four objects, each containing "temp", "humi", "node_id", "device", "date", and "time" fields.

```
[
  {
    "temp": 27,
    "humi": 44,
    "node_id": "fc:69:47:c:2b:63",
    "device": "WiFiMote",
    "date": "2023-04-13T18:30:00.000Z",
    "time": "00:59:14"
  },
  {
    "temp": 27,
    "humi": 44,
    "node_id": "fc:69:47:c:2b:63",
    "device": "WiFiMote",
    "date": "2023-04-13T18:30:00.000Z",
    "time": "00:59:22"
  },
  {
    "temp": 27,
    "humi": 44,
    "node_id": "fc:69:47:c:2b:63",
    "device": "WiFiMote",
    "date": "2023-04-13T18:30:00.000Z",
    "time": "00:59:30"
  },
  {
    "temp": 27,
    "humi": 44,
    "node_id": "fc:69:47:c:2b:63",
    "device": "WiFiMote",
    "date": "2023-04-13T18:30:00.000Z",
    "time": "00:59:38"
  }
]
```

Setup Required For Above Services.

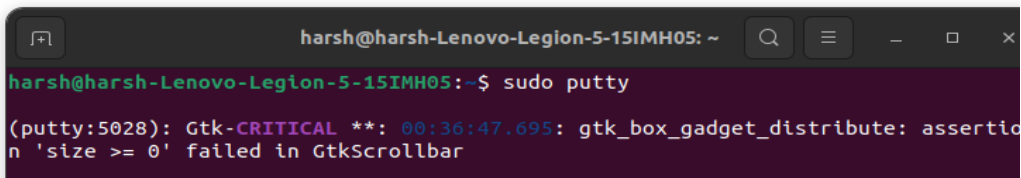
Installation of Putty

1. First install putty to receive data from wifi node: **sudo apt install putty**



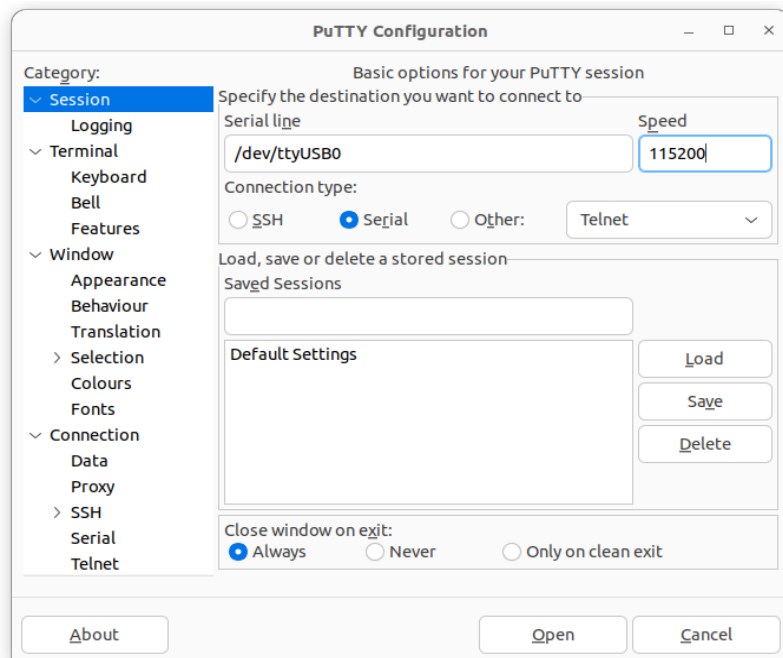
```
ubutnu@ubutnu-Inspiron-14-5408: ~  
ubutnu@ubutnu-Inspiron-14-5408:~$ sudo apt install putty  
[sudo] password for ubutnu:  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
putty is already the newest version (0.76-2).  
0 upgraded, 0 newly installed, 0 to remove and 5 not upgraded.  
ubutnu@ubutnu-Inspiron-14-5408:~$
```

2. Run Putty : **sudo putty**

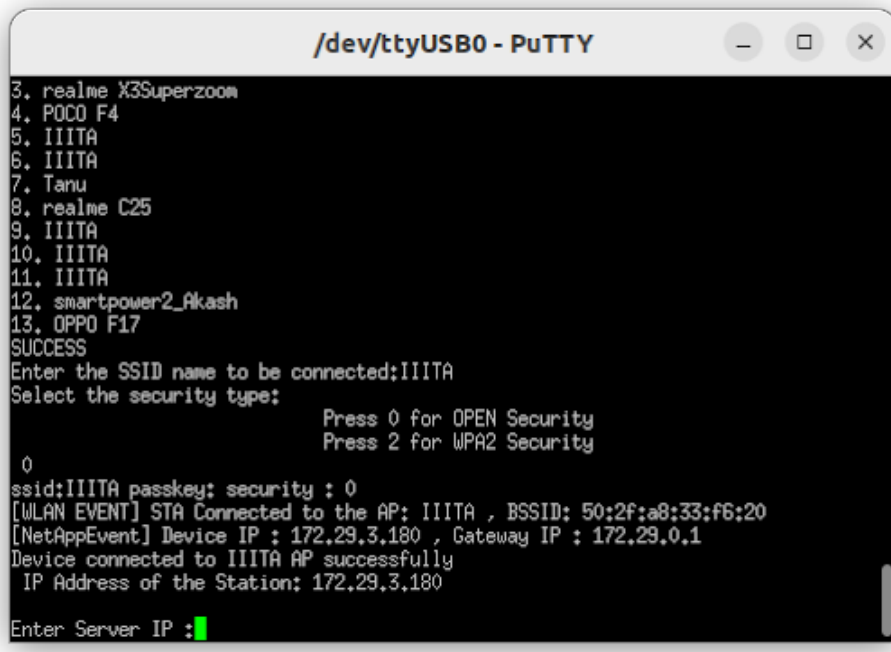


```
harsh@harsh-Lenovo-Legion-5-15IMH05: ~  
harsh@harsh-Lenovo-Legion-5-15IMH05:~$ sudo putty  
(putty:5028): Gtk-CRITICAL **: 00:36:47.695: gtk_box_gadget_distribute: assertion  
n 'size >= 0' failed in GtkScrollbar
```

Now, an interactive putty terminal is opened, putty as a **serial connection** to receive data from wifi node at **115200** speed, modify the serial line as **/dev/ttyUSB0** then press **open**.



- Now, an interactive putty terminal is opened,
- Enter the SSID name to be connected write : **IIITA**
- Select the security type: **0**
- IP address of the station: **172.20.43.197**[Enter the gateway ip]

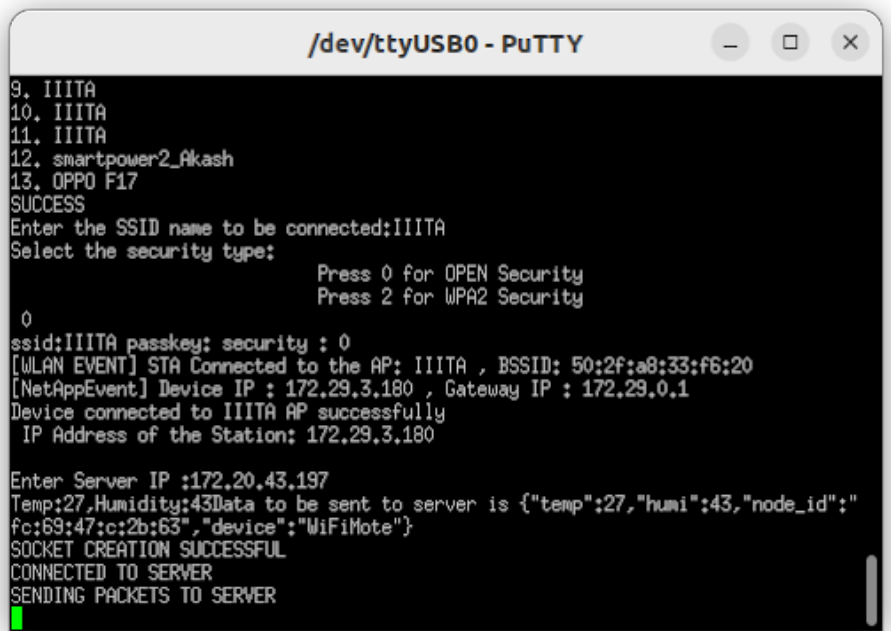


```

/dev/ttyUSB0 - PuTTY
3. realme X3Superzoom
4. POCO F4
5. IIITA
6. IIITA
7. Tanu
8. realme C25
9. IIITA
10. IIITA
11. IIITA
12. smartpower2_Akash
13. OPPO F17
SUCCESS
Enter the SSID name to be connected:IIITA
Select the security type:
                                Press 0 for OPEN Security
                                Press 2 for WPA2 Security
0
ssid:IIITA passkey: security : 0
[WLAN EVENT] STA Connected to the AP: IIITA , BSSID: 50:2f:a8:33:f6:20
[NetAppEvent] Device IP : 172.29.3.180 , Gateway IP : 172.29.0.1
Device connected to IIITA AP successfully
IP Address of the Station: 172.29.3.180
Enter Server IP : █

```

- Final sending of data



```

/dev/ttyUSB0 - PuTTY
9. IIITA
10. IIITA
11. IIITA
12. smartpower2_Akash
13. OPPO F17
SUCCESS
Enter the SSID name to be connected:IIITA
Select the security type:
                                Press 0 for OPEN Security
                                Press 2 for WPA2 Security
0
ssid:IIITA passkey: security : 0
[WLAN EVENT] STA Connected to the AP: IIITA , BSSID: 50:2f:a8:33:f6:20
[NetAppEvent] Device IP : 172.29.3.180 , Gateway IP : 172.29.0.1
Device connected to IIITA AP successfully
IP Address of the Station: 172.29.3.180
Enter Server IP :172.20.43.197
Temp:27,Humidity:43Data to be sent to server is {\"temp\":27,\"humi\":43,\"node_id\":\"
fc:69:47:c:2b:63\",\"device\":\"WiFiMote\"}
SOCKET CREATION SUCCESSFUL
CONNECTED TO SERVER
SENDING PACKETS TO SERVER
█

```

Installation of Postgres:

1. Add Official Repository

Installation of required certificates.

```
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx: ~/...  
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx:~/Desktop$ sudo apt install  
wget ca-certificates  
[sudo] password for ubuntu:  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
wget is already the newest version (1.21.2-2ubuntu1).  
ca-certificates is already the newest version (20211016ubuntu0.22.04.1).  
The following packages were automatically installed and are no longer required:  
  libflashrom1 libftdi1-2 liblvm13  
Use 'sudo apt autoremove' to remove them.  
0 upgraded, 0 newly installed, 0 to remove and 11 not upgraded.  
2 not fully installed or removed.  
After this operation, 0 B of additional disk space will be used.  
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx:~/Desktop$ wget --quiet -O  
- https://www.postgresql.org/media/keys/ACCC4CF8.asc | sudo apt-key add -  
Warning: apt-key is deprecated. Manage keyring files in trusted.gpg.d instead (s  
ee apt-key(8)).  
OK  
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx:~/Desktop$ sudo sh -c 'echo  
"deb http://apt.postgresql.org/pub/repos/apt/ $(lsb_release -cs)-pgdg main" >>  
/etc/apt/sources.list.d/pgdg.list'
```

2. Install PostgreSQL

```
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx: ~/...  
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx:~/Desktop$ sudo apt install  
postgresql postgresql-contrib  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following packages were automatically installed and are no longer required:  
  libflashrom1 libftdi1-2 liblvm13  
Use 'sudo apt autoremove' to remove them.  
The following additional packages will be installed:  
  libcommon-sense-perl libjson-perl libjson-xs-perl liblvm14 libpq5 libtypes-se  
rialiser-perl postgresql-14 postgresql-client-14 postgresql-client-common postgr  
esql-common sysstat  
Suggested packages:  
  postgresql-doc postgresql-doc-14 isag  
The following NEW packages will be installed:
```

3. Check PostgreSQL status

```
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx: ~/...  
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx:~/Desktop$ service postgresql status  
● postgresql.service - PostgreSQL RDBMS  
   Loaded: loaded (/lib/systemd/system/postgresql.service; enabled; vendor preset: enabled)  
   Active: active (exited) since Thu 2023-04-13 22:54:43 IST; 50s ago  
     Process: 12746 ExecStart=/bin/true (code=exited, status=0/SUCCESS)  
    Main PID: 12746 (code=exited, status=0/SUCCESS)  
       CPU: 1ms  
  
Apr 13 22:54:43 ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx systemd[1]: Starting PostgreSQL RDBMS...  
Apr 13 22:54:43 ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx systemd[1]: Finished PostgreSQL RDBMS.  
lines 1-9/9 (END)...skipping...  
● postgresql.service - PostgreSQL RDBMS  
   Loaded: loaded (/lib/systemd/system/postgresql.service; enabled; vendor preset: enabled)  
   Active: active (exited) since Thu 2023-04-13 22:54:43 IST; 50s ago  
     Process: 12746 ExecStart=/bin/true (code=exited, status=0/SUCCESS)  
    Main PID: 12746 (code=exited, status=0/SUCCESS)  
       CPU: 1ms  
  
Apr 13 22:54:43 ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx systemd[1]: Starting PostgreSQL RDBMS...  
Apr 13 22:54:43 ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx systemd[1]: Finished PostgreSQL RDBMS.
```

4. Start Using PostgreSQL Command Line Tool

```
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx: ~/...  
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx:~/Desktop$ sudo -u postgres psql  
could not change directory to "/home/ubuntu/Desktop": Permission denied  
psql (14.7 (Ubuntu 14.7-0ubuntu0.22.04.1))  
Type "help" for help.  
  
postgres=# \conninfo  
You are connected to database "postgres" as user "postgres" via socket in "/var/run/postgresql" at port "5432".  
postgres=# \l  
  
              List of databases  
+-----+-----+-----+-----+-----+-----+  
Name      | Owner  | Encoding | Collate | Ctype  | Access privileges  
+-----+-----+-----+-----+-----+-----+  
postgres  | postgres | UTF8     | en_IN   | en_IN   |  
template0 | postgres | UTF8     | en_IN   | en_IN   | =c/postgres  
          |          |          |          |          | postgres=Ctc/postgres  
template1 | postgres | UTF8     | en_IN   | en_IN   | =c/postgres  
          |          |          |          |          | postgres=Ctc/postgres  
+-----+-----+-----+-----+-----+-----+  
(3 rows)  
  
postgres=# \du  
  
[1]+  Stopped                  sudo -u postgres psql  
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx:~/Desktop$
```

5. Create and Populate a New Database

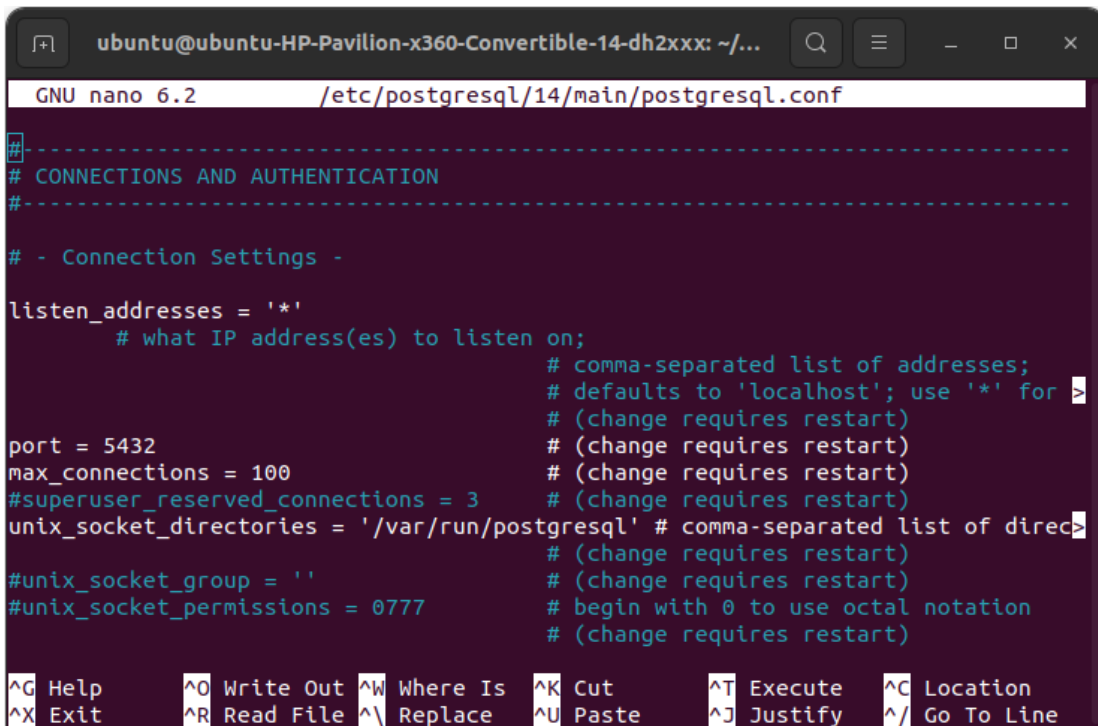
```
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx:~/Desktop$ sudo -u postgres
psql
could not change directory to "/home/ubuntu/Desktop": Permission denied
psql (14.7 (Ubuntu 14.7-0ubuntu0.22.04.1))
Type "help" for help.

postgres=# CREATE DATABASE group_10;
CREATE DATABASE
postgres=# \c group_10
You are now connected to database "group_10" as user "postgres".
group_10=# CREATE TABLE group_10_data(temp int,humi int,node_id VARCHAR,device V
ARCHAR,date DATE,time VARCHAR);
CREATE TABLE
group_10=# SELECT * from group_10_data;
 temp | humi | node_id | device | date | time
-----+-----+-----+-----+-----+-----
(0 rows)

group_10=#
```

6. Setup PostgreSQL server

- Sudo nano /etc/postgresql/14/main/postgresql.conf



```
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx: ~/...
GNU nano 6.2 /etc/postgresql/14/main/postgresql.conf
#-----
# CONNECTIONS AND AUTHENTICATION
#-----
# - Connection Settings -

listen_addresses = '*'
    # what IP address(es) to listen on;
                                # comma-separated list of addresses;
                                # defaults to 'localhost'; use '*' for >
                                # (change requires restart)
port = 5432
                                # (change requires restart)
max_connections = 100
                                # (change requires restart)
#superuser_reserved_connections = 3
                                # (change requires restart)
unix_socket_directories = '/var/run/postgresql' # comma-separated list of direc>
                                # (change requires restart)
#unix_socket_group = ''
                                # (change requires restart)
#unix_socket_permissions = 0777
                                # begin with 0 to use octal notation
                                # (change requires restart)

^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute  ^C Location
^X Exit      ^R Read File ^_ Replace   ^U Paste     ^J Justify  ^_ Go To Line
```

- Sudo nano /etc/postgresql/14/main/pg_hba.conf

```

ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx: ~/...
GNU nano 6.2 /etc/postgresql/14/main/pg_hba.conf
# maintenance (custom daily cronjobs, replication, and similar tasks).
#
# Database administrative login by Unix domain socket
local all postgres peer

# TYPE DATABASE USER ADDRESS METHOD

# "local" is for Unix domain socket connections only
local all all peer
# IPv4 local connections:
host all all 127.0.0.1/32 scram-sha-256
# IPv6 local connections:
host all all ::1/128 scram-sha-256
# Allow replication connections from localhost, by a user with the
# replication privilege.
local replication all peer
host replication all 127.0.0.1/32 scram-sha-256
host replication all ::1/128 scram-sha-256
host all all 0.0.0.0/0 md5

```

- Restart postgresql to save all the changes

```

ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx: ~/Desktop$ systemctl restart postgresql
ubuntu@ubuntu-HP-Pavilion-x360-Convertible-14-dh2xxx: ~/Desktop$

```

Now, our database ready for remote access

Installation of Node js

```
sudo apt install nodejs
```

Installation of NodeMon

```
Sudo apt install npm
```

Installation of NodeMon

```
sudo npm install -g nodemon
```

Installation of Express

```
Sudo npm install express
```

