

Name – Surname : Hande Ceren Tekiner

Student ID : 308885

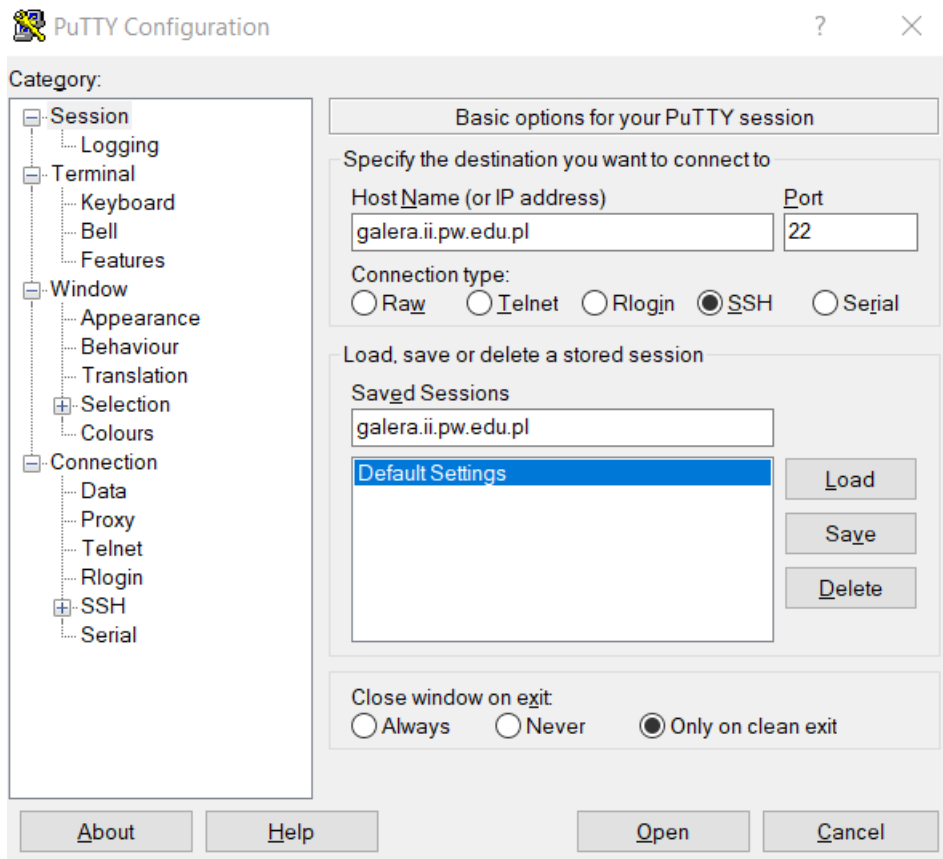
## ESIT PROJECT (SW-13)

### Architecture of Example IoT System

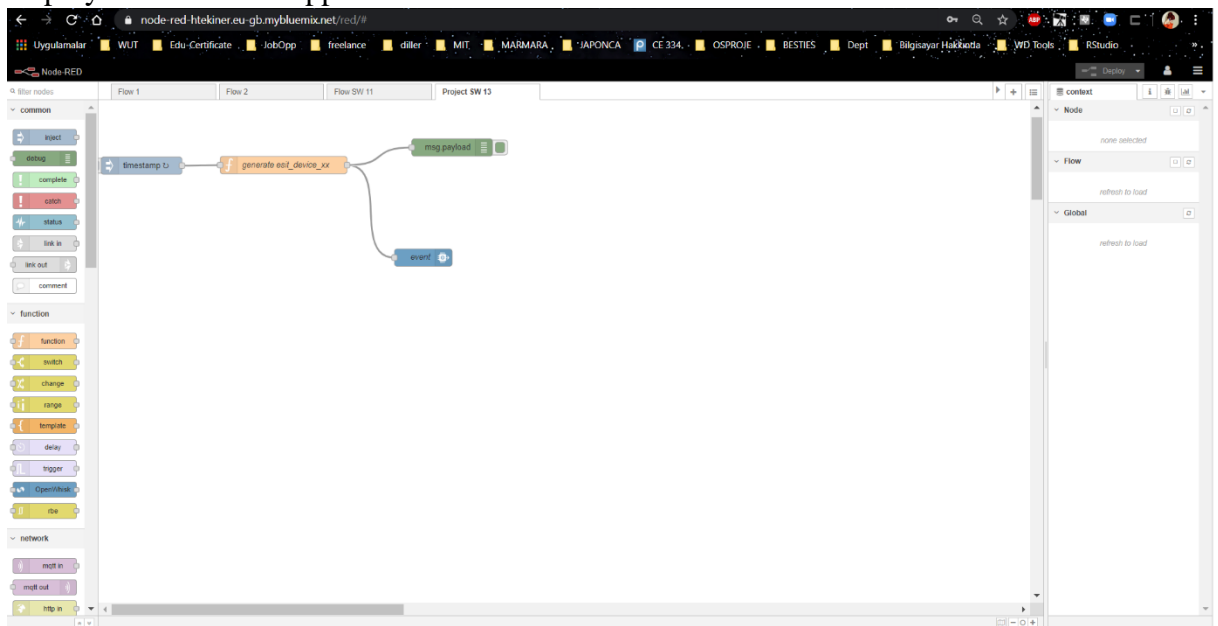
#### IBM Cloud & Python

#### Prerequisites

1. *PUTTY* program was downloaded and connected with *galera.ii.pw.edu.pl*.



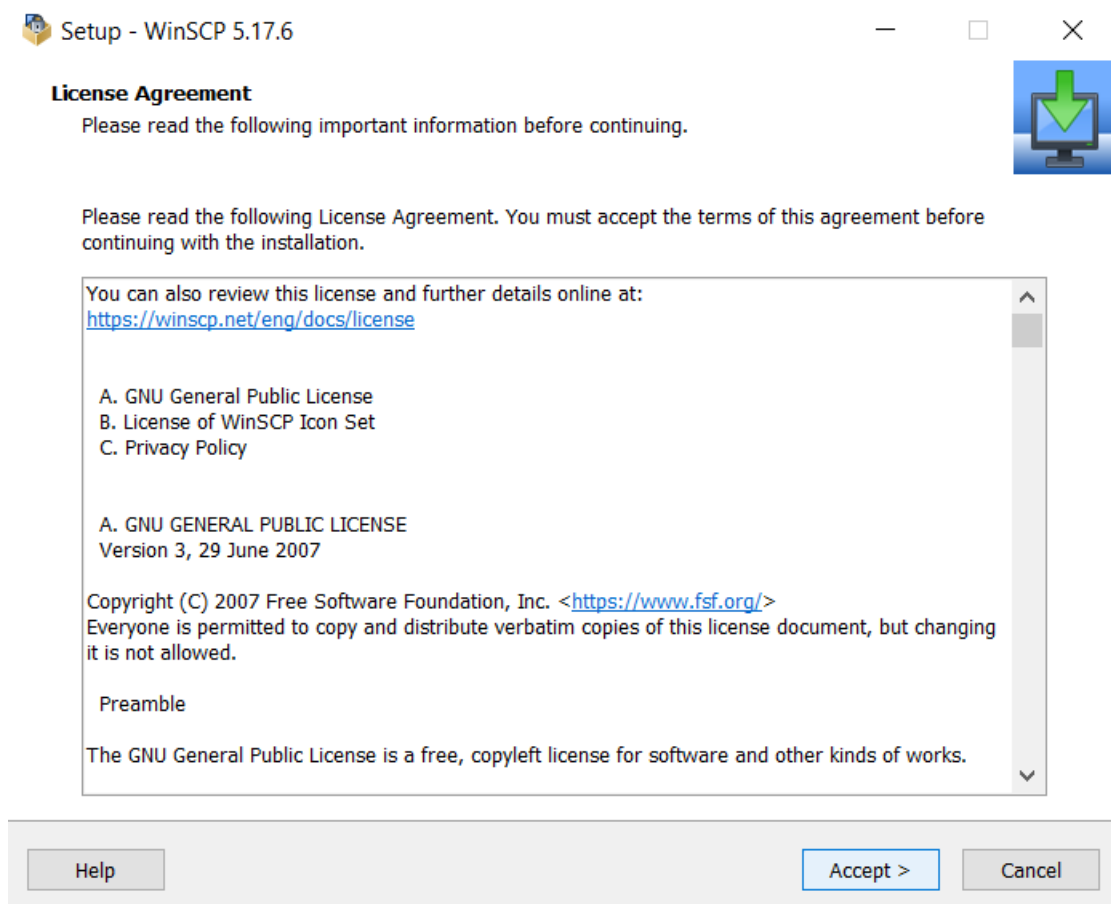
2. Deployed Node-RED application.



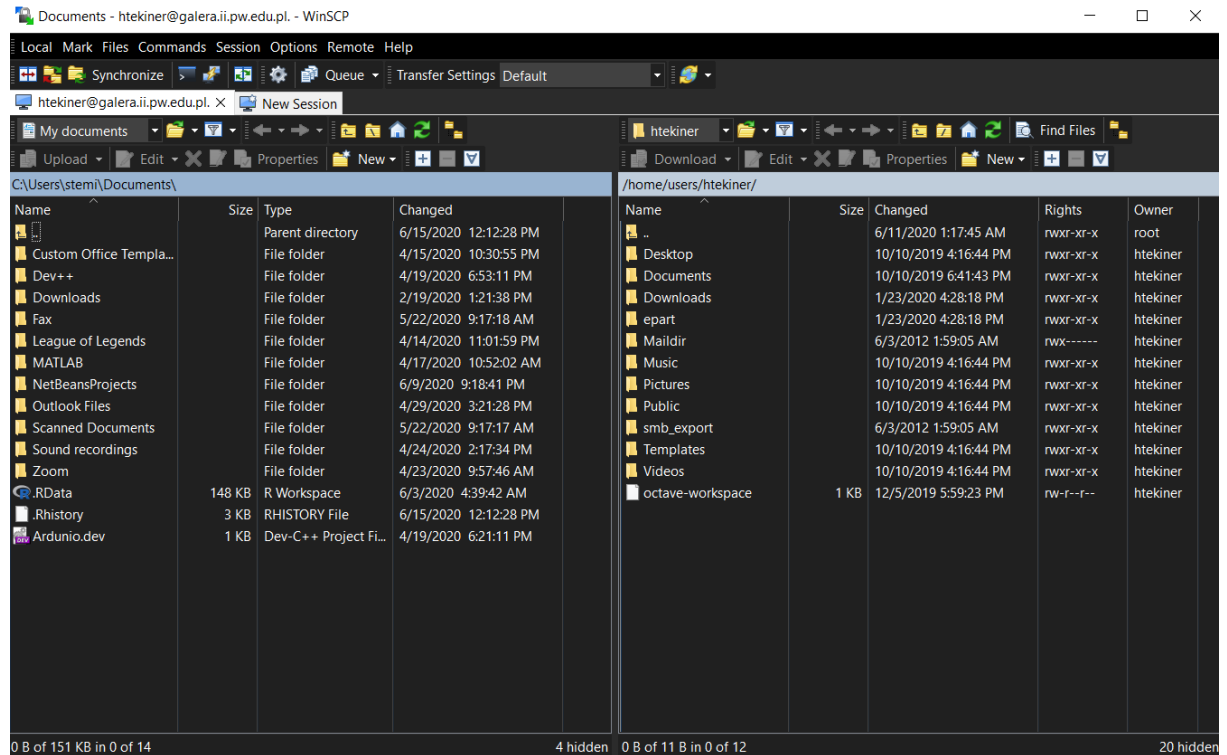
3. Log in the *PuTTY* using galera server account information.



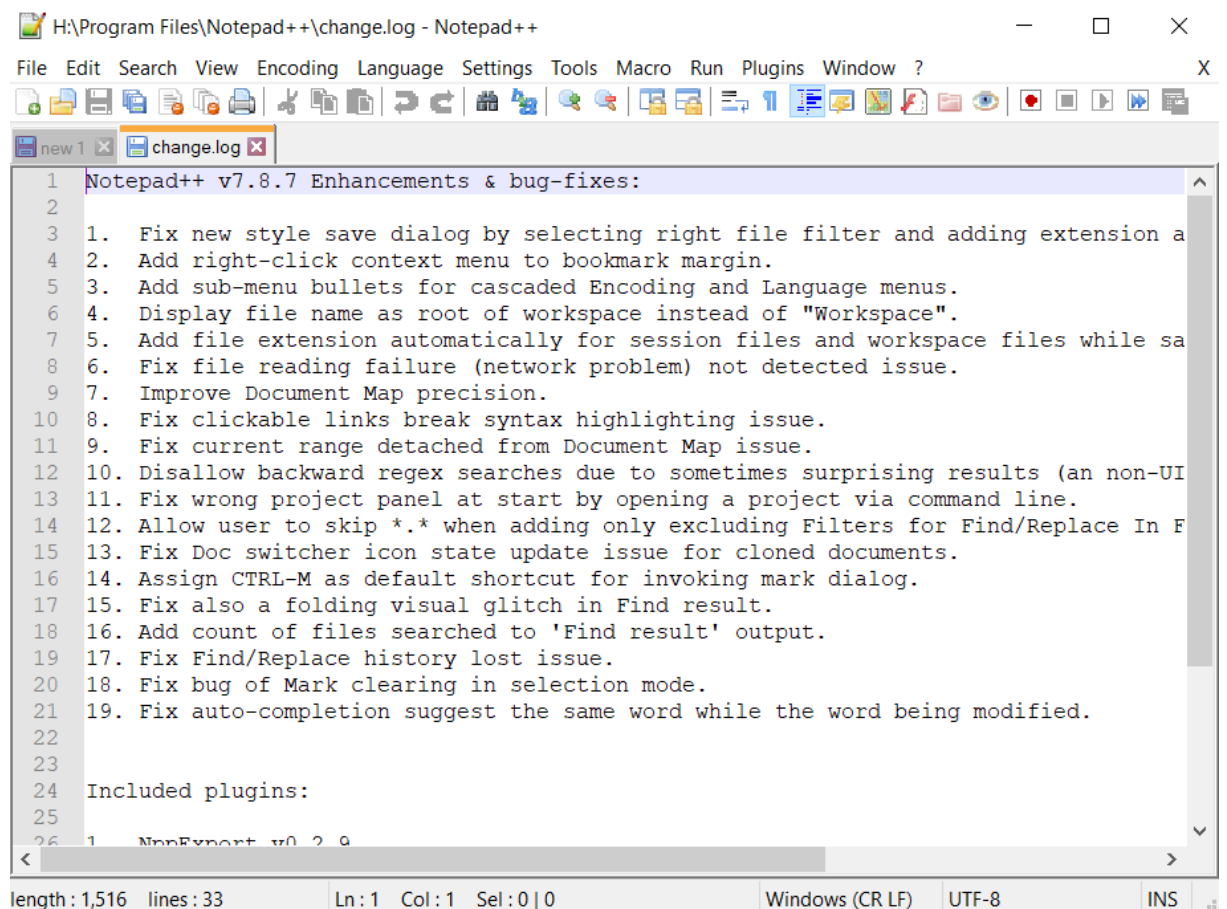
4. WinSCP was downloaded.



Then galera server was connected the with my computer.



5. NotePad++ was downloaded and edited the *cloudApp.py*.

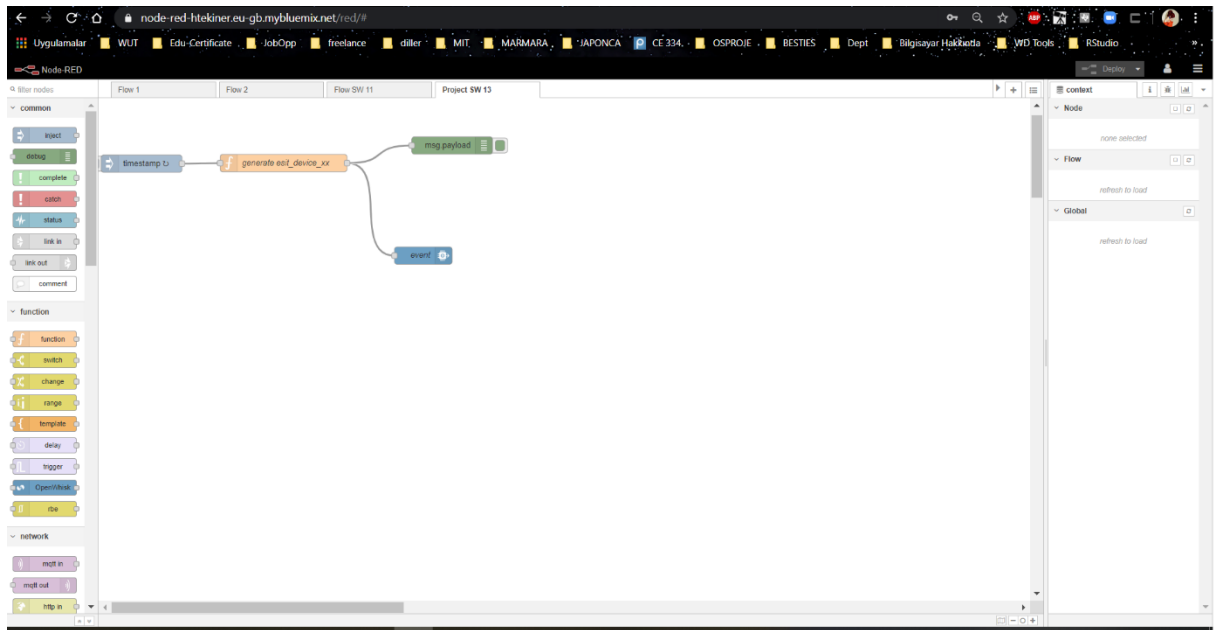


Some python libraries were downloaded.

```
Command Prompt
--no-color          Suppress colored output

C:\Python38\Scripts>pip install ibmiotf
Collecting ibmiotf
  Downloading https://files.pythonhosted.org/packages/78/05/029ca6f78b788a3c55157fd11bb63922d002d75df982ffb8243f450a750e/ibmiotf-0.4.0.tar.gz (71kB)
    | 81kB 476kB/s
Collecting iso8601>=0.1.12 (from ibmiotf)
  Downloading https://files.pythonhosted.org/packages/ef/57/7162609dab394d38bbc7077b7ba0a6f10fb09d8b7701ea56faedc0c4345/iso8601-0.1.12-py2.py3-none-any.whl
Collecting pytz>=2017.3 (from ibmiotf)
  Downloading https://files.pythonhosted.org/packages/4f/a4/879454d49688e2fad93e59d74defda580b783c745fd2ec2a3adf87b0808d/pytz-2020.1-py2.py3-none-any.whl (510kB)
    | 512kB 1.3MB/s
Collecting paho-mqtt>=1.3.1 (from ibmiotf)
  Downloading https://files.pythonhosted.org/packages/59/11/1dd5c70f0f27a88a3a05772cd95f6087ac479fac66d9c7752ee5e16ddbbc/paho-mqtt-1.5.0.tar.gz (99kB)
    | 102kB 2.2MB/s
Collecting requests>=2.18.4 (from ibmiotf)
  Downloading https://files.pythonhosted.org/packages/45/1e/0c169c6a5381e241ba7404532c16a21d86ab872c9bed8bdc4c423954103/requests-2.24.0-py2.py3-none-any.whl (61kB)
    | 71kB 4.8MB/s
Collecting requests_toolbelt>=0.8.0 (from ibmiotf)
  Downloading https://files.pythonhosted.org/packages/60/ef/7681134338fc097acef8d9b2f8abe0458e4d87559c689a8c306d0957ece5/requests_toolbelt-0.9.1-py2.py3-none-any.whl (54kB)
    | 61kB 2.0MB/s
Collecting idna<3,>=2.5 (from requests>=2.18.4->ibmiotf)
  Downloading https://files.pythonhosted.org/packages/89/e3/afebe61c546d18fb1709a61bee788254b40e736cf7271c7de5de2dc4128/idna-2.9-py2.py3-none-any.whl (58kB)
    | 61kB 1.9MB/s
Collecting chardet<4,>=3.0.2 (from requests>=2.18.4->ibmiotf)
  Downloading https://files.pythonhosted.org/packages/bc/a9/01ffebfb562e4274b6487b4bb1dded7ca55ec7510b22e4c51f14098443b8/chardet-3.0.4-py2.py3-none-any.whl (133kB)
    | 143kB 2.2MB/s
Collecting certifi=2017.4.17 (from requests>=2.18.4->ibmiotf)
  Downloading https://files.pythonhosted.org/packages/5e/c4/6c4fe722df534c33226f0b4e0bb04e4dc13483228b4718baf286f86d87/certifi-2020.6.20-py2.py3-none-any.whl (156kB)
    | 163kB 2.2MB/s
Collecting urllib3<1.25.0,!1.25.1,<1.26,>=1.21.1 (from requests>=2.18.4->ibmiotf)
  Downloading https://files.pythonhosted.org/packages/e1/e5/df302e8017440f11c1cc41a6b432838672f5a70aa29227bf58149dc72f/urllib3-1.25.9-py2.py3-none-any.whl (126kB)
    | 133kB 2.2MB/s
Installing collected packages: iso8601, pytz, paho-mqtt, idna, chardet, certifi, urllib3, requests, requests-toolbelt, ibmiotf
  Running setup.py install for paho-mqtt ... done
  Running setup.py install for ibmiotf ... done
Successfully installed certifi-2020.6.20 chardet-3.0.4 ibmiotf-0.4.0 idna-2.9 iso8601-0.1.12 paho-mqtt-1.5.0 pytz-2020.1 requests-2.24.0 requests-toolbelt-0.9.1 urllib3-1.25.9
WARNING: You are using pip version 19.2.3, however version 20.1.1 is available.
You should consider upgrading via the 'python -m pip install --upgrade pip' command.
```

## 6. Deployed IBM Watson IoT Platform



## 7. [zbigniew.szymanski@pw.edu.pl](mailto:zbigniew.szymanski@pw.edu.pl) is added as a member to your organization.

**Browse Members**

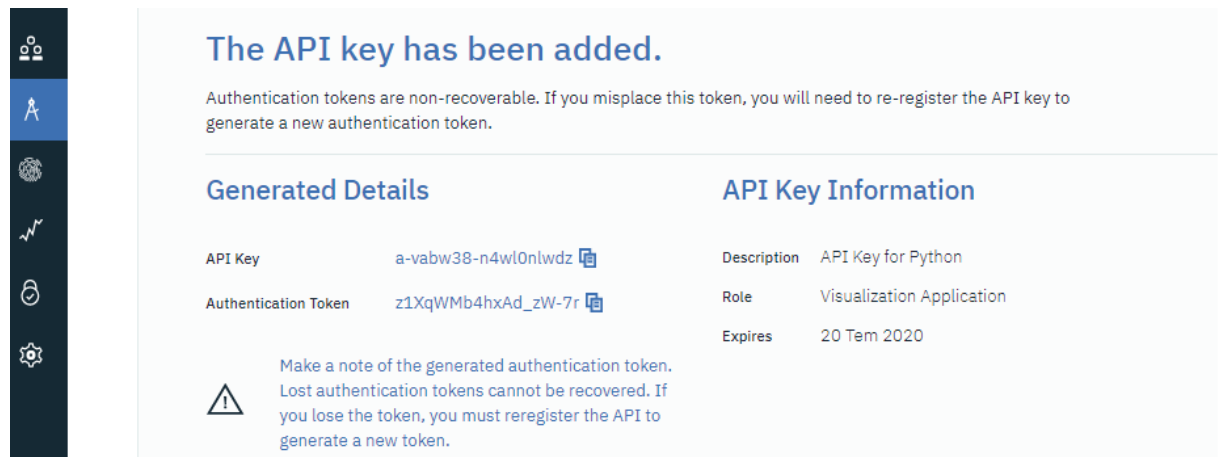
This table shows a summary of the members of the organization. It can be filtered, organized, and search on using different criteria. To get started, you can add members by clicking Add Members, or by using the API. For more information about members, see [Managing user access](#).

Type the member email to search for

<input type="checkbox"/>	Email Address	Name	Role	Added By	Expires	
2 results						
<input type="checkbox"/>	01155126@pw.edu.pl	01155126@pw.edu.pl	Administrator	-	-	
<input type="checkbox"/>	zbigniew.szymanski@pw.edu.pl	-	Analyst	01155126@pw.edu.pl	-	

## TASK

1. Generated **new** API key for the Python Application.

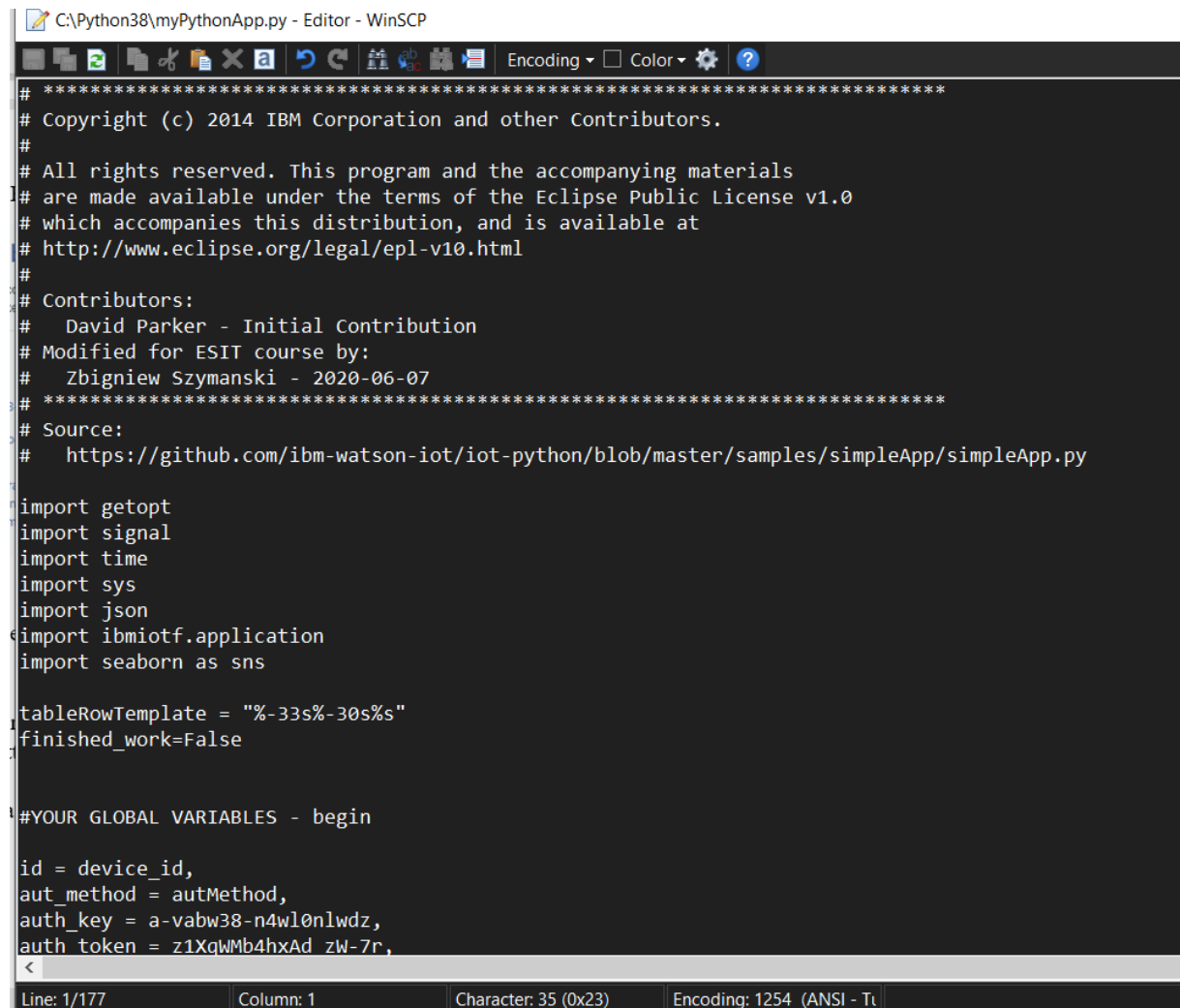


The screenshot shows the IBM Watson IoT Platform interface for managing API keys. A sidebar on the left contains icons for user management, API keys, devices, data, and settings. The main content area has a header stating "The API key has been added." followed by a warning: "Authentication tokens are non-recoverable. If you misplace this token, you will need to re-register the API key to generate a new authentication token." Below this, there are two sections: "Generated Details" and "API Key Information".

Generated Details		API Key Information	
API Key	a-vabw38-n4wl0nlwdz	Description	API Key for Python
Authentication Token	z1XqWMb4hxAd_zW-7r	Role	Visualization Application
		Expires	20 Tem 2020

Make a note of the generated authentication token. Lost authentication tokens cannot be recovered. If you lose the token, you must reregister the API to generate a new token.

2. Python program is written by the help of *cloudApp.py* file.



The screenshot shows a WinSCP editor window titled "C:\Python38\myPythonApp.py - Editor - WinSCP". The editor displays the content of the *cloudApp.py* file, which includes a copyright notice, a list of contributors, and the source code for a Python application. The code imports modules like `getopt`, `signal`, `time`, `sys`, `json`, `ibmiotf.application`, and `seaborn as sns`. It also defines a `tableRowTemplate` and a `finished_work` variable. The code is currently at line 1 of 177.

```
# *****
# Copyright (c) 2014 IBM Corporation and other Contributors.
#
# All rights reserved. This program and the accompanying materials
# are made available under the terms of the Eclipse Public License v1.0
# which accompanies this distribution, and is available at
# http://www.eclipse.org/legal/epl-v10.html
#
# Contributors:
#   David Parker - Initial Contribution
# Modified for ESIT course by:
#   Zbigniew Szymanski - 2020-06-07
# *****
# Source:
#   https://github.com/ibm-watson-iot/iot-python/blob/master/samples/simpleApp/simpleApp.py

import getopt
import signal
import time
import sys
import json
import ibmiotf.application
import seaborn as sns

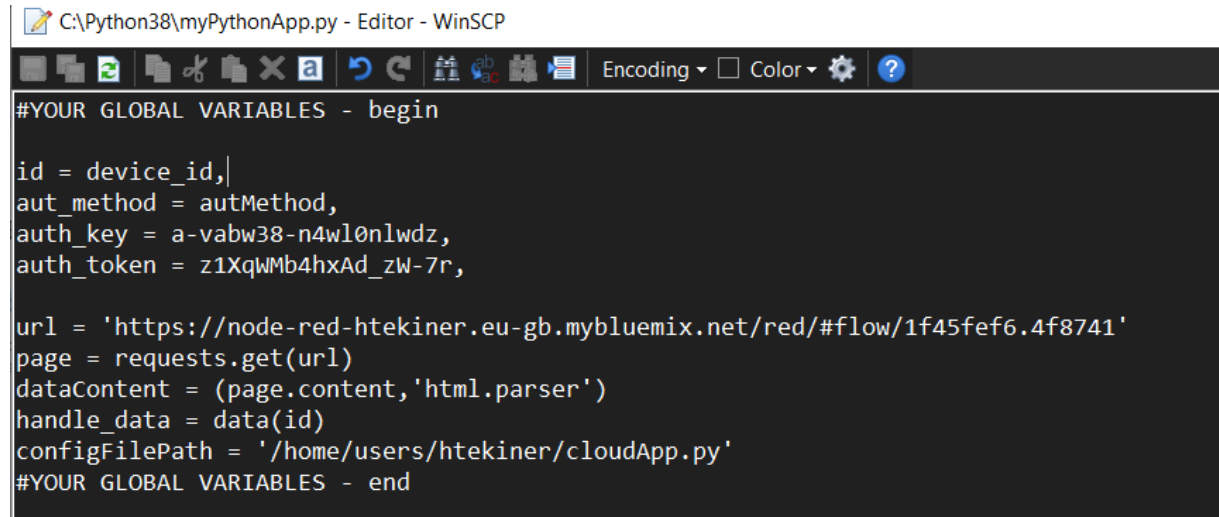
tableRowTemplate = "%-33s%-30s%"
finished_work=False

#YOUR GLOBAL VARIABLES - begin

id = device_id,
aut_method = autMethod,
auth_key = a-vabw38-n4wl0nlwdz,
auth_token = z1XqWMb4hxAd_zW-7r,
```

Line: 1/177    Column: 1    Character: 35 (0x23)    Encoding: 1254 (ANSI - T)

3. First of all the variables are defined.



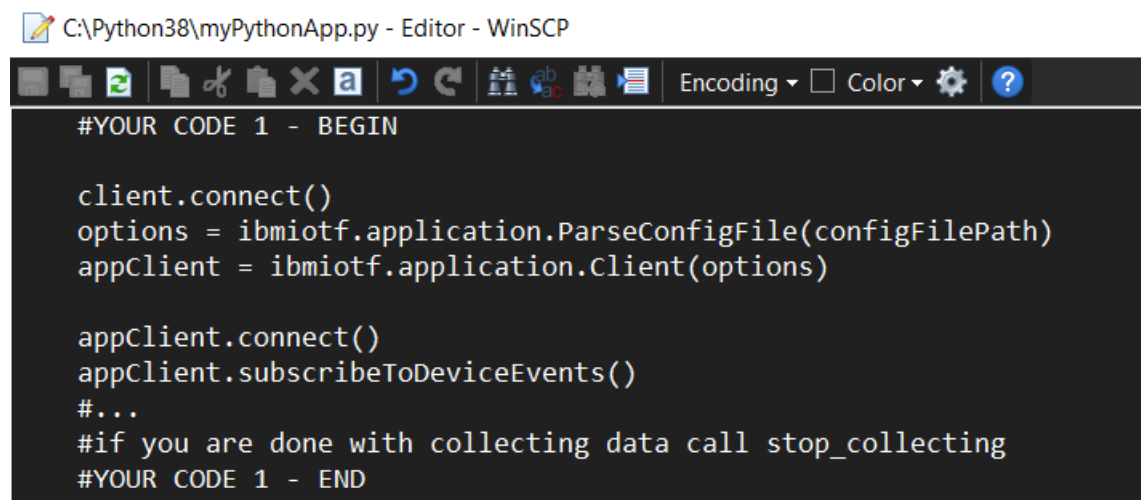
```
C:\Python38\myPythonApp.py - Editor - WinSCP

#YOUR GLOBAL VARIABLES - begin

id = device_id,
aut_method = autMethod,
auth_key = a-vabw38-n4wl0nlwdz,
auth_token = z1XqWMB4hxAd_zW-7r,

url = 'https://node-red-htekiner.eu-gb.mybluemix.net/red/#flow/1f45fef6.4f8741'
page = requests.get(url)
dataContent = (page.content, 'html.parser')
handle_data = data(id)
configFilePath = '/home/users/htekiner/cloudApp.py'
#YOUR GLOBAL VARIABLES - end
```

4. Then data receiving code is written.



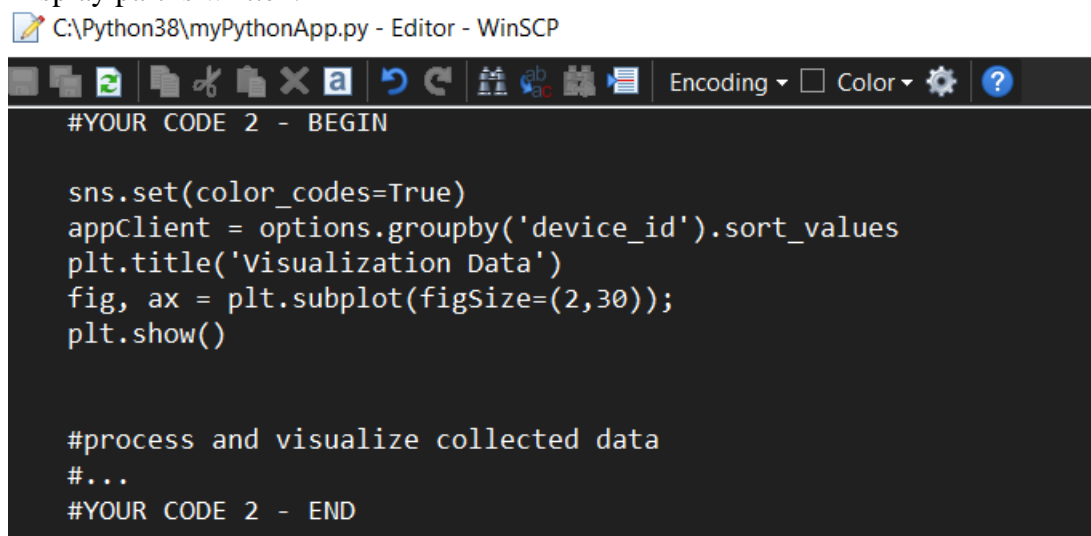
```
C:\Python38\myPythonApp.py - Editor - WinSCP

#YOUR CODE 1 - BEGIN

client.connect()
options = ibmiotf.application.ParseConfigFile(configFilePath)
appClient = ibmiotf.application.Client(options)

appClient.connect()
appClient.subscribeToDeviceEvents()
#...
#if you are done with collecting data call stop_collecting
#YOUR CODE 1 - END
```

5. Display part is written.



```
C:\Python38\myPythonApp.py - Editor - WinSCP

#YOUR CODE 2 - BEGIN

sns.set(color_codes=True)
appClient = options.groupby('device_id').sort_values
plt.title('Visualization Data')
fig, ax = plt.subplot(figsize=(2,30));
plt.show()

#process and visualize collected data
#...
#YOUR CODE 2 - END
```

```
C:\Python38\myPythonApp.py - Editor - WinSCP

#YOUR CODE 3 - BEGIN

organization = "vabw38"
appId = "myPythonApp"
authKey = "a-vabw38-n4wl0nlwdz"
authToken = "z1XqWMb4hxAd_zW-7r"

#YOUR CODE 3 - END
```

6. Created visualization of the data using IBM Watson IoT Platform dashboard.

The screenshot shows the 'Create a new board' interface in the IBM Watson IoT Platform. The left sidebar contains navigation icons for Information, Members, and other settings. The main content area has a form with the following fields and options:

- Board name:** Data Visualization
- Description:** Visualization of Node-RED generated data
- ☐ Make this board my landing page.
- ☐ Favorite (this also adds this board to your navbar)

A blue 'Next' button is located at the bottom right of the form.

IBM Watson IoT Platform

01155126@pw.edu.pl  
ID: vabw38

Information

Members

Create a new board

Adding viewers allows them to see your dashboard.

Owner  
01155126@pw.edu.pl (YOU)

Members

☐ Share as read-only with everyone?

+ add user ID

NameEditor?

zbigniew.szymanski@pw.edu.pl

BackSubmit

IBM Watson IoT Platform

01155126@pw.edu.pl  
ID: vabw38

Card source data

esit\_device\_01

Card preview

Card information

Create Line chart Card

Specify the data source for the card

Devices

Search for card data sources using the filter:

Device IDDevice Type

☒ esit\_device\_01ESIT\_device\_type

☐ esit\_device\_02ESIT\_device\_type

☐ esit\_gateway\_01ESIT\_gateway\_type

☐ esit\_device\_01ESIT\_gateway\_type

☐ esit\_device\_02ESIT\_gateway\_type

Next



IBM Watson IoT Platform 01155126@pw.e ID: vabw38

Card source data  
esit\_device\_01

Card preview

Card information

## Create Line chart Card

Connect data set

air\_pressure

Event  
event

Property  
air\_pressure

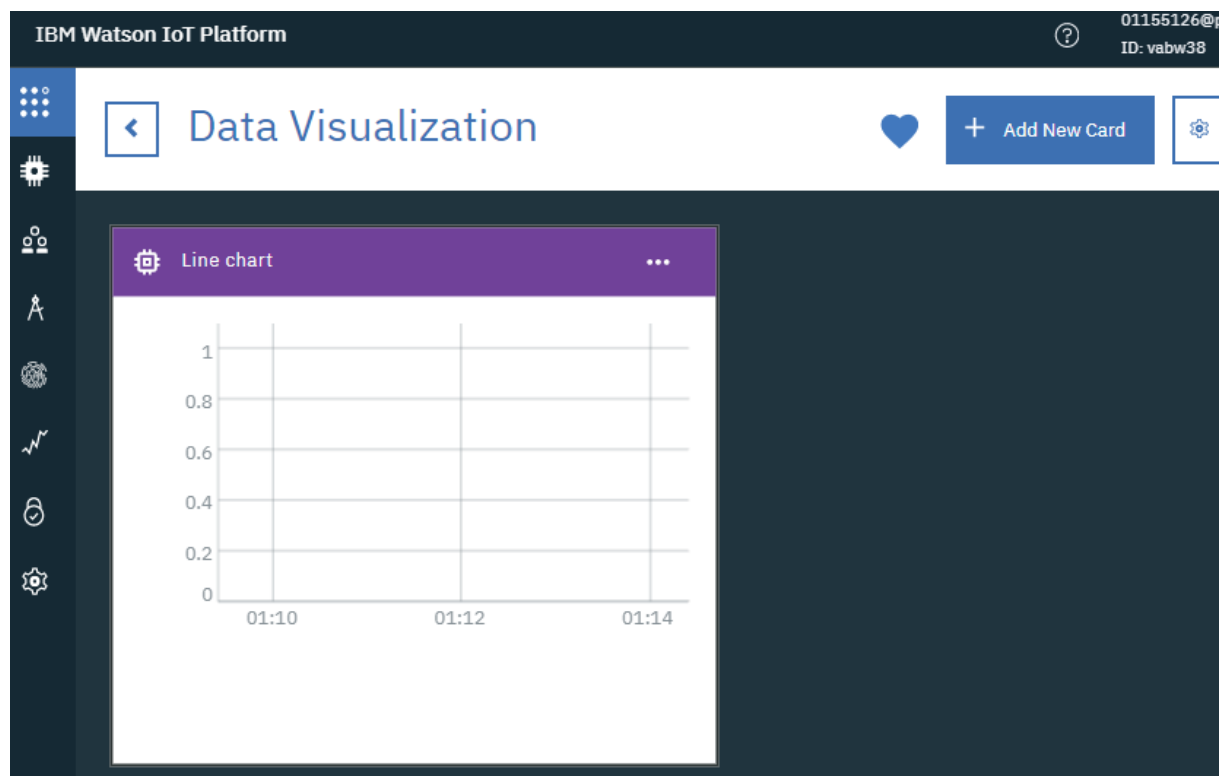
Name  
air\_pressure

Type  
Float

Unit  
hPa

Precision  
1

Back Next



Generated API Key: a-vabw38-n4wl0nlwdz

Authentication Token : z1XqWMb4hxAd\_zW-7r