



Pykafka Integration with Python/Flask

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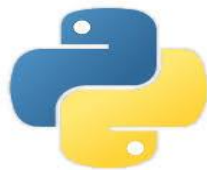
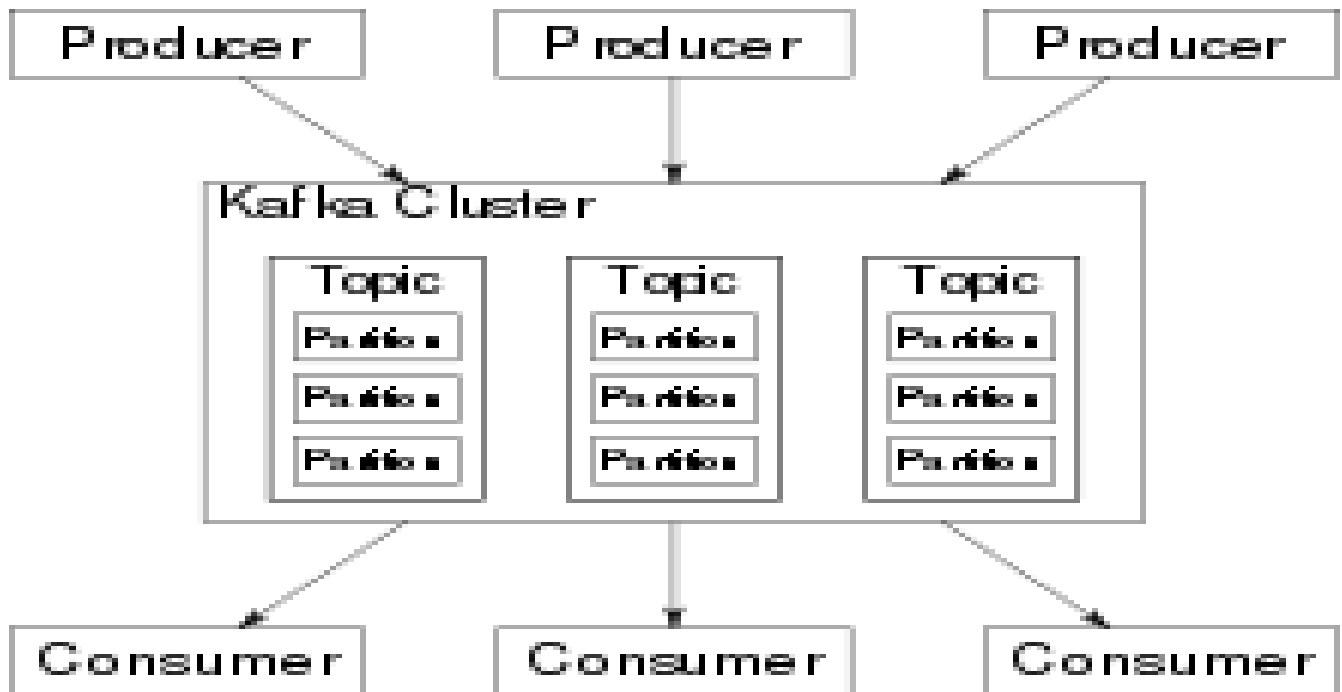
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Pykafka Integraion with Python/flask

PyKafka is a programmer-friendly Kafka client for Python. It includes Python implementations of Kafka producers and consumers, which are optionally backed by a C extension, built on [librdkafka](#).

PyKafka's primary goal is to provide a similar level of abstraction to the [JVM Kafka client](#) using idioms familiar to Python programmers and exposing the most Pythonic API possible..



Business Requirement

The main objective of this project is that to build a live map of London with real-time updates. We will use apache kafka, javascript and python(flask Pykafk and json)

Solutions:

Note: In this document we explained step by step integration between Python/flask and kafka (to show live map) using pykafka.

Steps :

Download java

We can download java from below URL-

Link: <https://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html>

Java SE Development Kit 8u221

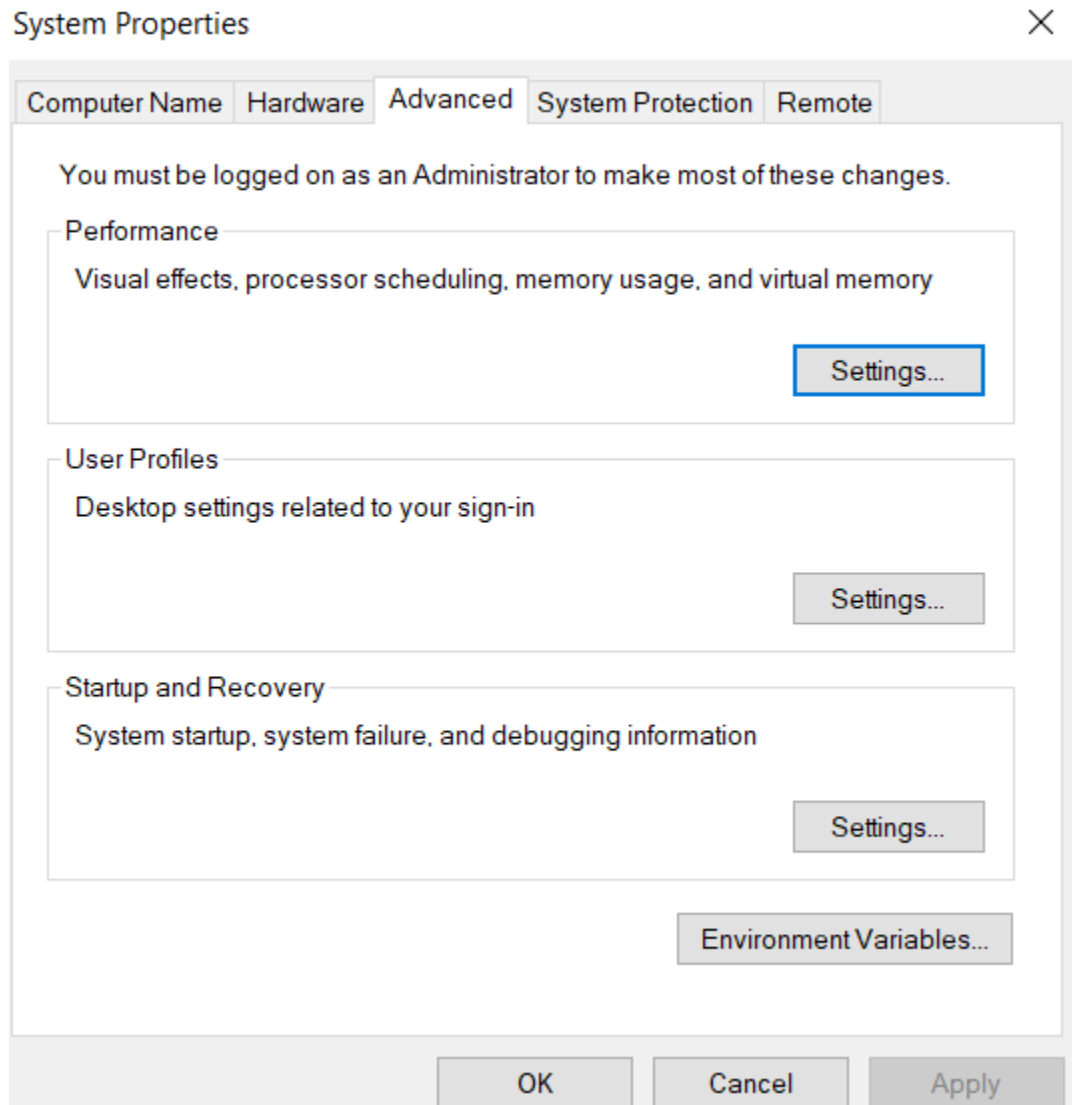
You must accept the [Oracle Technology Network License Agreement for Oracle Java SE](#) to download this software.

Thank you for accepting the Oracle Technology Network License Agreement for Oracle Java SE; you may now download this software.

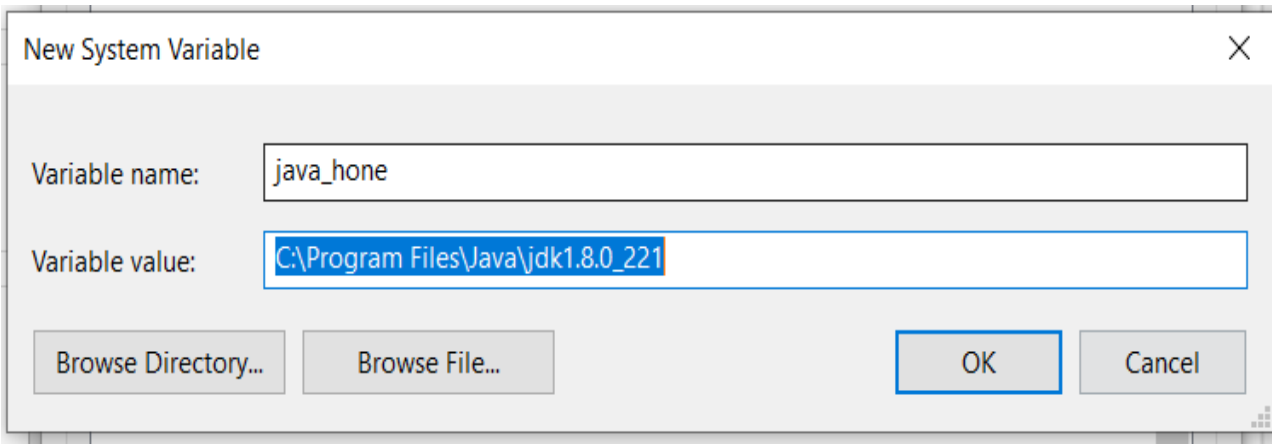
Product / File Description	File Size	Download
Linux ARM 32 Hard Float ABI	72.9 MB	jdk-8u221-linux-arm32-vfp-hflt.tar.gz
Linux ARM 64 Hard Float ABI	69.81 MB	jdk-8u221-linux-arm64-vfp-hflt.tar.gz
Linux x86	174.18 MB	jdk-8u221-linux-i586.rpm
Linux x86	189.03 MB	jdk-8u221-linux-i586.tar.gz
Linux x64	171.19 MB	jdk-8u221-linux-x64.rpm
Linux x64	186.06 MB	jdk-8u221-linux-x64.tar.gz
Mac OS X x64	252.52 MB	jdk-8u221-macosx-x64.dmg
Solaris SPARC 64-bit (SVR4 package)	132.99 MB	jdk-8u221-solaris-sparcv9.tar.Z
Solaris SPARC 64-bit	94.23 MB	jdk-8u221-solaris-sparcv9.tar.gz
Solaris x64 (SVR4 package)	133.66 MB	jdk-8u221-solaris-x64.tar.Z
Solaris x64	91.95 MB	jdk-8u221-solaris-x64.tar.gz
Windows x86	202.73 MB	jdk-8u221-windows-i586.exe
Windows x64	215.35 MB	jdk-8u221-windows-x64.exe

Once java is downloaded need to install it..and set the path in environment variable that is present in advance system settings.

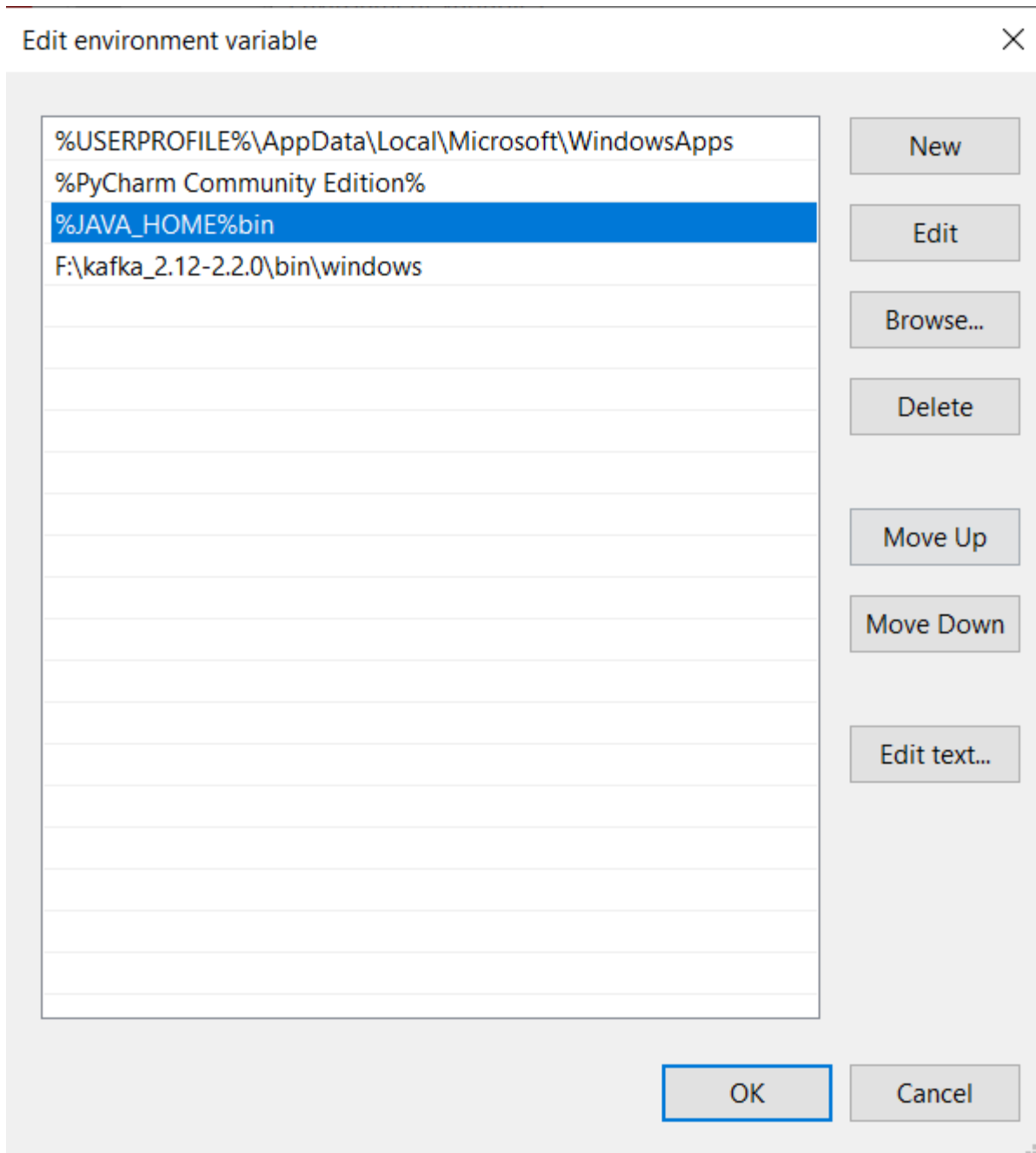
- a) Click on advance system settings.
- b) Click on environment variables.



Click on environment variable, and then click on system variable and set the path of java



And in user variable click on path then edit button and set the java path.



Once the path is set now you can check the java version by enter the cmd

>> java – version in command prompt.

2) Download apache kafka by clicking on the below url.

https://www.apache.org/dyn/closer.cgi?path=/kafka/2.2.0/kafka_2.12-2.2.0.tgz

HTTP

http://apachemirror.wuchna.com/kafka/2.2.0/kafka_2.12-2.2.0.tgz

Once kafka has downloaded, unzip it

Open the command prompt and go to the directory where you unzip kafka folder

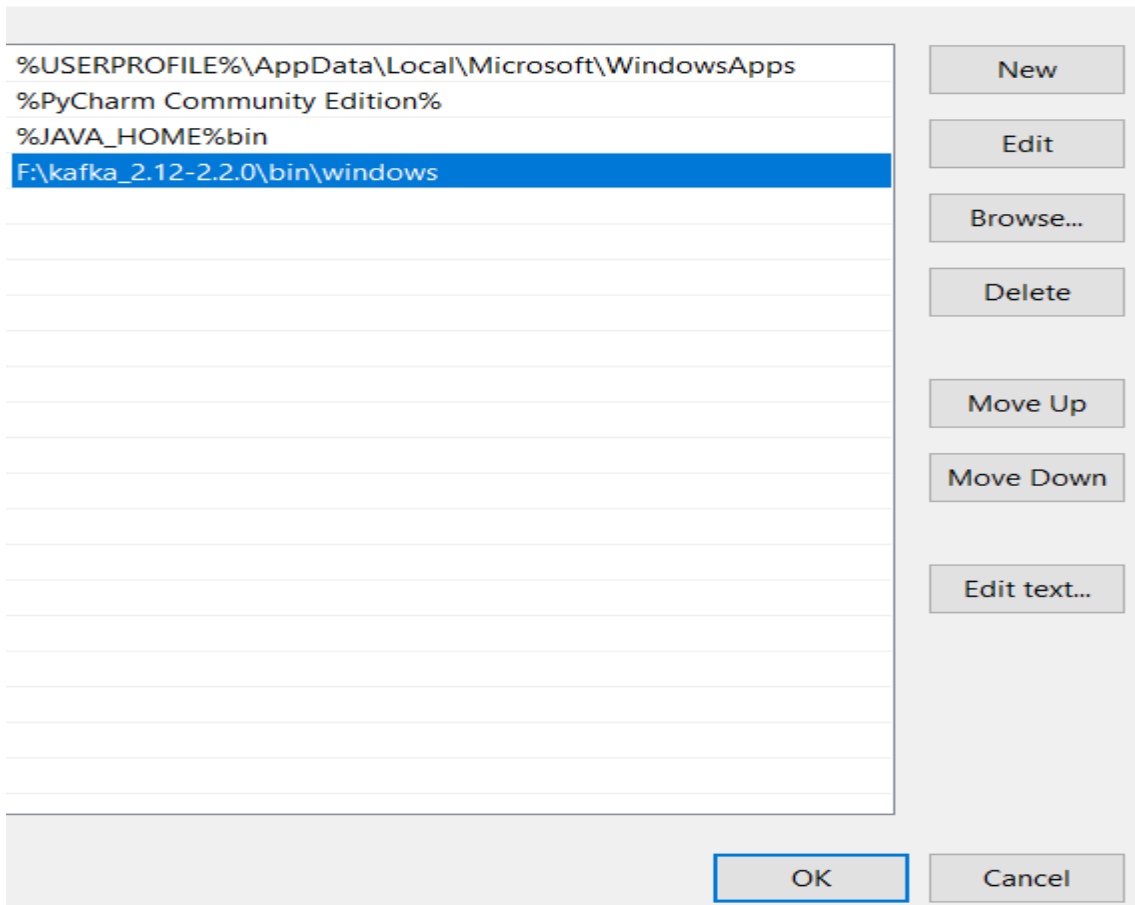
And hit the cmd

```
>>f:\kafka_2.12-2.2.0\bin\windows>kafka-topics.bat
```

Hit enter, if you get something like this.

```
Command Prompt
F:\kafka_2.12-2.2.0\bin>cd windows
F:\kafka_2.12-2.2.0\bin\windows>kafka-topics.bat
Create, delete, describe, or change a topic.
Option                Description
-----                -
--alter                Alter the number of partitions,
                        replica assignment, and/or
                        configuration for the topic.
--bootstrap-server <String: server to
connect to>            REQUIRED: The Kafka server to connect
                        to. In case of providing this, a
                        direct Zookeeper connection won't be
                        required.
--command-config <String: command
config property file> Property file containing configs to be
                        passed to Admin Client. This is used
                        only with --bootstrap-server option
                        for describing and altering broker
                        configs.
--config <String: name=value> A topic configuration override for the
                        topic being created or altered. The
                        following is a list of valid
                        configurations:
                        cleanup.policy
                        compression.type
                        delete.retention.ms
                        file.delete.delay.ms
                        flush.messages
                        flush.ms
                        follower.replication.throttled.
                        replicas
                        index.interval.bytes
                        leader.replication.throttled.replicas
                        max.message.bytes
                        message.downconversion.enable
                        message.format.version
                        message.timestamp.difference.max.ms
                        message.timestamp.type
                        min.cleanable.dirty.ratio
                        min.compaction.lag.ms
                        min.insync.replicas
                        preallocate
                        retention.bytes
                        retention.ms
                        segment.bytes
                        segment.index.bytes
                        segment.jitter.ms
                        segment.ms
                        unclean.leader.election.enable
                        See the Kafka documentation for full
                        details on the topic configs. It is
```

Congrats you have successfully installed kafka in your windows.



We need to set the kafka path in environment variable for proper use of kafka server

How to start kafka in windows:

Step1: Go to the directory where kafka is installed.

Step2: make a folder called data

Step3: under data again create two folder kafka and the another one is zookeeper..we need to this folder for storing logs

Step4: we need to modify the zookeeper path in zookeeper.py file

F:\kafka_2.12-2.2.0\config under this directory

```
dataDir=F:/kafka_2.12-2.2.0/data/zookeeper
# the port at which the clients will connect
clientPort=2181
# disable the per-ip limit on the number of connections since this is a non-production config
maxClientCnxns=0
```

Step5: need to modify the kafka server path

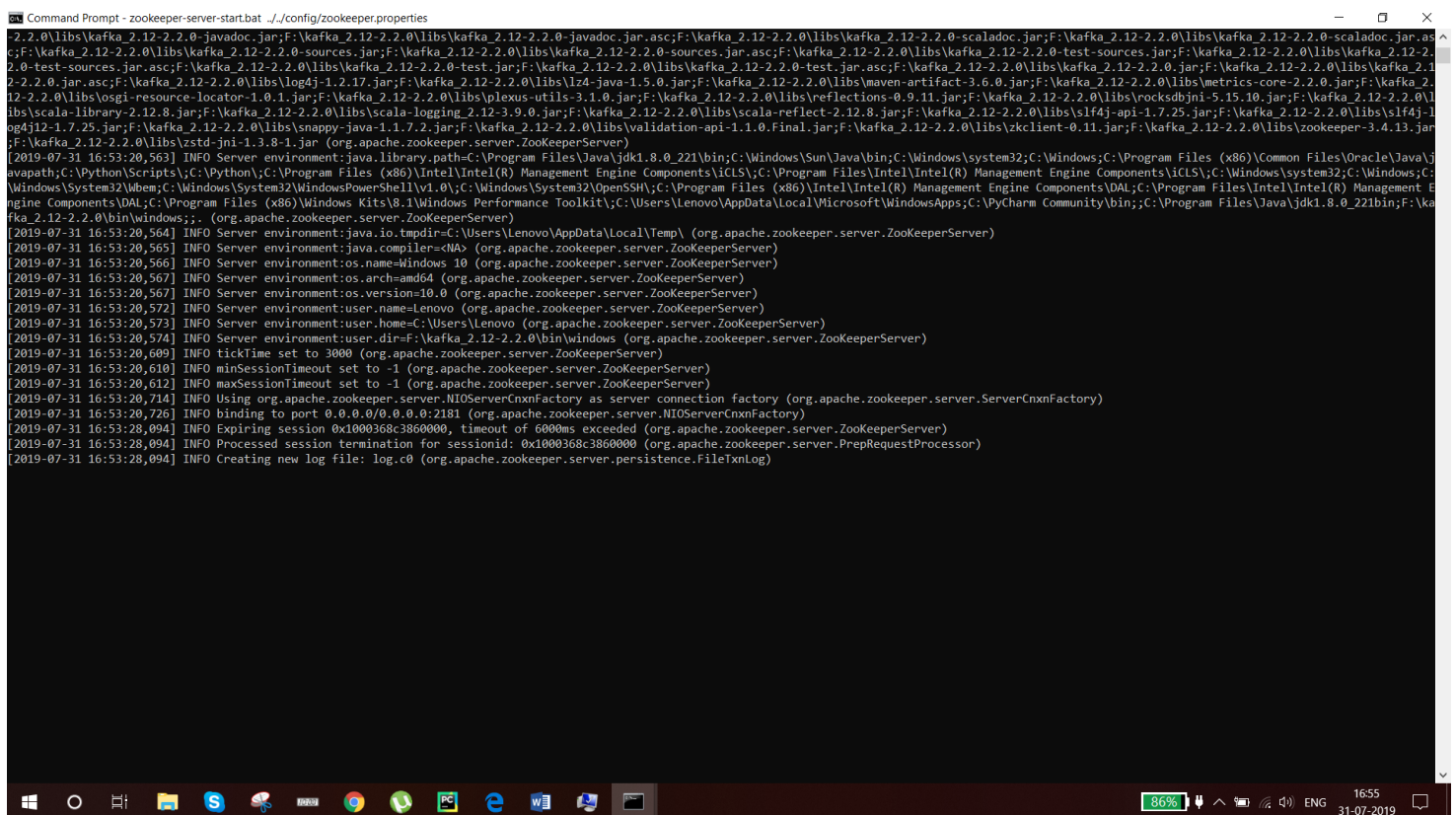
F:\kafka_2.12-2.2.0\config under server properties.

```
##### Log Basics #####  
  
# A comma separated list of directories under which to store log files  
log.dirs=F:/kafka_2.12-2.2.0/data/kafka  
  
# The default number of log partitions per topic. More partitions allow greater  
# parallelism for consumption, but this will also result in more files across  
# the brokers.  
num.partitions=1  
zookeeper.connect=0.0.0.0:2181
```

Step6: need to start zookeeper server by entering the following cmd in cmd prompt

>>F:\kafka_2.12-2.2.0\bin\windows>zookeeper-server-start.bat ../../config/zookeeper.properties

If you see the following screen then your zookeeper server is up to running



```
Command Prompt - zookeeper-server-start.bat ../../config/zookeeper.properties  
-2.2.0\libs\kafka_2.12-2.2.0-javadoc.jar;F:\kafka_2.12-2.2.0\libs\kafka_2.12-2.2.0-javadoc.jar.asc;F:\kafka_2.12-2.2.0\libs\kafka_2.12-2.2.0-scaladoc.jar;F:\kafka_2.12-2.2.0\libs\kafka_2.12-2.2.0-scaladoc.jar.asc;F:\kafka_2.12-2.2.0\libs\kafka_2.12-2.2.0-sources.jar;F:\kafka_2.12-2.2.0\libs\kafka_2.12-2.2.0-sources.jar.asc;F:\kafka_2.12-2.2.0\libs\kafka_2.12-2.2.0-test-sources.jar;F:\kafka_2.12-2.2.0\libs\kafka_2.12-2.2.0-test-sources.jar.asc;F:\kafka_2.12-2.2.0\libs\kafka_2.12-2.2.0-test.jar;F:\kafka_2.12-2.2.0\libs\kafka_2.12-2.2.0-test.jar.asc;F:\kafka_2.12-2.2.0\libs\kafka_2.12-2.2.0\libs\log4j-1.2.17.jar;F:\kafka_2.12-2.2.0\libs\lz4-java-1.5.0.jar;F:\kafka_2.12-2.2.0\libs\maven-artifact-3.6.0.jar;F:\kafka_2.12-2.2.0\libs\metrics-core-2.2.0.jar;F:\kafka_2.12-2.2.0\libs\osgi-resource-locator-1.0.1.jar;F:\kafka_2.12-2.2.0\libs\plexus-utils-3.1.0.jar;F:\kafka_2.12-2.2.0\libs\reflections-0.9.11.jar;F:\kafka_2.12-2.2.0\libs\scala-library-2.12.8.jar;F:\kafka_2.12-2.2.0\libs\scala-logging_2.12-3.9.0.jar;F:\kafka_2.12-2.2.0\libs\scala-reflect-2.12.8.jar;F:\kafka_2.12-2.2.0\libs\slf4j-api-1.7.25.jar;F:\kafka_2.12-2.2.0\libs\slf4j-log4j12-1.7.25.jar;F:\kafka_2.12-2.2.0\libs\snappy-java-1.1.7.2.jar;F:\kafka_2.12-2.2.0\libs\validation-api-1.1.0.Final.jar;F:\kafka_2.12-2.2.0\libs\zkclient-0.11.jar;F:\kafka_2.12-2.2.0\libs\zookeeper-3.4.13.jar;F:\kafka_2.12-2.2.0\libs\zstd-jni-1.3.9-1.jar (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,563] INFO Server environment:java.library.path=C:\Program Files\Java\jdk1.8.0_221\bin;C:\Windows\Sun\Java\bin;C:\Windows\system32;C:\Windows;C:\Program Files (x86)\Common Files\Oracle\Java\javapath;C:\Python\Scripts;C:\Python;C:\Program Files (x86)\Intel\Intel(R) Management Engine Components\iCLS;C:\Program Files\Intel\Intel(R) Management Engine Components\iCLS;C:\Windows\system32;C:\Windows;C:\Windows\System32\Wbem;C:\Windows\System32\WindowsPowerShell\v1.0;C:\Windows\System32\OpenSSH;C:\Program Files (x86)\Intel\Intel(R) Management Engine Components\DAL;C:\Program Files\Intel\Intel(R) Management Engine Components\DAL;C:\Program Files (x86)\Windows Kits\8.1\Windows Performance Toolkit;C:\Users\Lenovo\AppData\Local\Microsoft\WindowsApps;C:\PyCharm Community\bin;C:\Program Files\Java\jdk1.8.0_221\bin;F:\kafka_2.12-2.2.0\bin\windows;. (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,564] INFO Server environment:java.io.tmpdir=C:\Users\Lenovo\AppData\Local\Temp\ (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,565] INFO Server environment:java.compiler=<NA> (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,566] INFO Server environment:os.name=Windows 10 (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,567] INFO Server environment:os.arch=amd64 (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,567] INFO Server environment:os.version=10.0 (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,572] INFO Server environment:user.name=Lenovo (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,573] INFO Server environment:user.home=C:\Users\Lenovo (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,574] INFO Server environment:user.dir=F:\kafka_2.12-2.2.0\bin\windows (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,609] INFO tickTime set to 3000 (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,610] INFO minSessionTimeout set to -1 (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,612] INFO maxSessionTimeout set to -1 (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:20,714] INFO Using org.apache.zookeeper.server.NIOServerCnxnFactory as server connection factory (org.apache.zookeeper.server.ServerCnxnFactory)  
[2019-07-31 16:53:20,726] INFO binding to port 0.0.0.0/0.0.0.0:2181 (org.apache.zookeeper.server.NIOServerCnxnFactory)  
[2019-07-31 16:53:28,094] INFO Expiring session 0x1000360c3860000, timeout of 6000ms exceeded (org.apache.zookeeper.server.ZooKeeperServer)  
[2019-07-31 16:53:28,094] INFO Processed session termination for sessionId: 0x1000360c3860000 (org.apache.zookeeper.server.PrepareRequestProcessor)  
[2019-07-31 16:53:28,094] INFO Creating new log file: log.c0 (org.apache.zookeeper.server.persistence.FileTxnLog)
```

Step7: Need to start kafka server by entering the following cmd in cmd prompt

>>F:\kafka_2.12-2.2.0\bin\windows>kafka-server-start.bat ../../config/server.properties.

If you see the following screen then your kafka server is up to running.


```
Command Prompt - kafka-console-consumer.bat --bootstrap-server localhost:9092 --topic test_topic --from-beginning
C:\Users\Lenovo>f:
F:\>cd kafka_2.12-2.2.0
F:\kafka_2.12-2.2.0>cd bin
F:\kafka_2.12-2.2.0\bin>cd windows
F:\kafka_2.12-2.2.0\bin\windows>kafka-console-consumer.bat --bootstrap-server localhost:9092 --topic test_topic --from-beginning
message1
message2
message3
message4
message5
message6
meaage1
message2
```

Connect to flask:

```
>>pip install pykafka
```

Here we are generating live bus location

So we need to generate a map api by hit the below url

<https://account.mapbox.com/>

once you successfully logged in. you see a access token in your map box dashboard copy it

busdata1.py:

```
from pykafka import KafkaClient
import json
from datetime import datetime
import uuid
import time

#READ COORDINATES FROM GEOJSON
input_file = open('bus1.json')
json_array = json.load(input_file)
coordinates = json_array['features'][0]['geometry']['coordinates']

#GENERATE UUID
def generate_uuid():
    return uuid.uuid4()
```

```

#KAFKA PRODUCER
client = KafkaClient(hosts="localhost:9092")
topic = client.topics['geodata_final123']
producer = topic.get_sync_producer()

#CONSTRUCT MESSAGE AND SEND IT TO KAFKA
data = {}
data['busline'] = '00001'

def generate_checkpoint(coordinates):
    i = 0
    while i < len(coordinates):
        data['key'] = data['busline'] + '_' + str(generate_uuid())
        data['timestamp'] = str(datetime.utcnow())
        data['latitude'] = coordinates[i][1]
        data['longitude'] = coordinates[i][0]
        message = json.dumps(data)
        print(message)
        producer.produce(message.encode('ascii'))
        time.sleep(1)

        #if bus reaches last coordinate, start from beginning
        if i == len(coordinates)-1:
            i = 0
        else:
            i += 1

generate_checkpoint(coordinates)

```

index.html:

```

<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8">
    <!-- LEAFLET -->
    <link rel="stylesheet" href="https://unpkg.com/leaflet@1.4.0/dist/leaflet.css"
      integrity="sha512-
puBpdR07980ZvTTbP4A8Ix/1+A4dHDD0DGqYW6RQ+9jxkRfClaxxQb/SJAWZfWAKuyeQUyt07+7N4QKrDh+drA=="
      crossorigin="" />
    <script src="https://unpkg.com/leaflet@1.4.0/dist/leaflet.js"
      integrity="sha512-
QVftwZFqvtRNi0ZyCtsznlKSW0StnDORoefr1enyq5mVL4tmKB3S/EnC3rRJcxCPavG10IcrVGSmPh6Qw5lwrg=="
      crossorigin=""></script>
    <!-- END LEAFLET -->
    <title>London Live Map</title>
  </head>
  <body>
    <h1>London Bus Live Map</h1>

    <!-- LEAFLET -->
    <div id="mapid" style = "width:900px; height:580px;"></div>
    <script src="static/leaf.js"></script>
    <!-- END LEAFLET -->
  </body>
</html>

```

Leaf.js:

```
var mymap = L.map('mapid').setView([51.505, -0.09], 13);
L.tileLayer('https://api.tiles.mapbox.com/v4/{id}/{z}/{x}/{y}.png?access_token={accessToken}', {
  attribution: 'Map data &copy; <a href="https://www.openstreetmap.org/">OpenStreetMap</a>
  contributors, <a href="https://creativecommons.org/licenses/by-sa/2.0/">CC-BY-SA</a>, Imagery © <a
href="https://www.mapbox.com/">Mapbox</a>',
  maxZoom: 18,
  id: 'mapbox.streets',
  accessToken:
'pk.eyJ1IjoibmlzaHRoYTAzIiwiaYSI6ImNqeXBuZGxtZdBhdXczbm9mMHkyMHc4cGEifQ.LM0dABNa0v2m-phFTKjtUQ'
//ENTER YOUR ACCESS TOKEN HERE
}).addTo(mymap);

mapMarkers1 = [];
mapMarkers2 = [];
mapMarkers3 = [];

var source = new EventSource('/topic/TOPICNAME'); //ENTER YOUR TOPICNAME HERE
source.addEventListener('message', function(e){

  console.log('Message');
  obj = JSON.parse(e.data);
  console.log(obj);

  if(obj.busline == '00001') {
    for (var i = 0; i < mapMarkers1.length; i++) {
      mymap.removeLayer(mapMarkers1[i]);
    }
    marker1 = L.marker([obj.latitude, obj.longitude]).addTo(mymap);
    mapMarkers1.push(marker1);
  }

  if(obj.busline == '00002') {
    for (var i = 0; i < mapMarkers2.length; i++) {
      mymap.removeLayer(mapMarkers2[i]);
    }
    marker2 = L.marker([obj.latitude, obj.longitude]).addTo(mymap);
    mapMarkers2.push(marker2);
  }

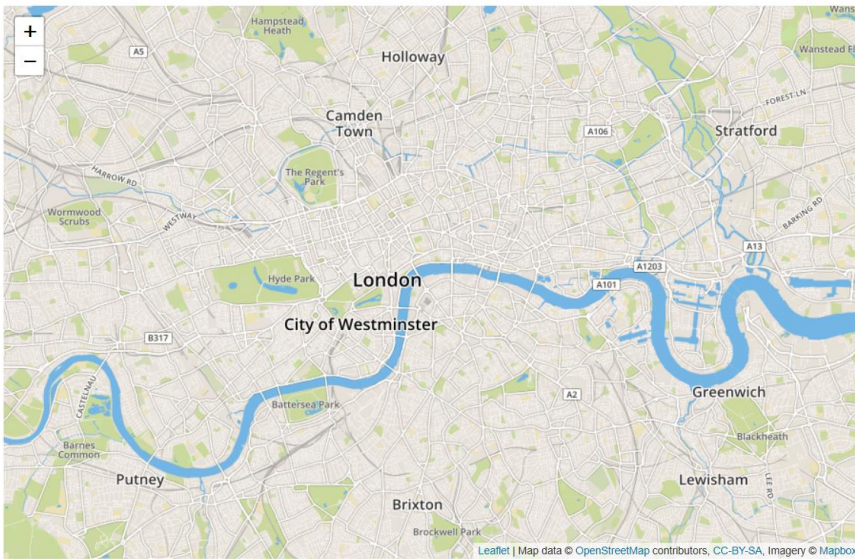
  if(obj.busline == '00003') {
    for (var i = 0; i < mapMarkers3.length; i++) {
      mymap.removeLayer(mapMarkers3[i]);
    }
    marker3 = L.marker([obj.latitude, obj.longitude]).addTo(mymap);
    mapMarkers3.push(marker3);
  }
}, false);
```

final output:

```
File Edit View Navigate Code Refactor Run Tools VCS Window Help kafka_busdata [F:\kafka_busdata] - \_busdata1.py - PyCharm
kafka_busdata busdata1.py
Project
Run app x busdata1 x
F:\kafka_busdata\venv\Scripts\python.exe F:\kafka_busdata\busdata1.py
{"busline": "00001", "key": "00001_e726904-32ef-48a7-a6ec-4846ed6163fc", "timestamp": "2019-07-31 12:21:34.504936", "latitude": 51.51093265116127, "longitude": -0.10479927062988281}
{"busline": "00001", "key": "00001_deaf2440-4a44-44d0-afe9-2ddf153dd45b", "timestamp": "2019-07-31 12:21:35.543409", "latitude": 51.510077954475555, "longitude": -0.1185321807861328}
{"busline": "00001", "key": "00001_ca9655c9-50e7-498f-9706-16676b71010b", "timestamp": "2019-07-31 12:21:36.549348", "latitude": 51.50478916217527, "longitude": -0.11342525482177734}
{"busline": "00001", "key": "00001_2eebe416-ef92-4f3f-ab08-c1b5c2bfeae8", "timestamp": "2019-07-31 12:21:37.549755", "latitude": 51.50713981232172, "longitude": -0.1078033447265625}
{"busline": "00001", "key": "00001_dc39addf-d392-411b-bcdc-fc8ba9d43d3d", "timestamp": "2019-07-31 12:21:38.559391", "latitude": 51.50700625590363, "longitude": -0.10342597961425781}
{"busline": "00001", "key": "00001_e358e0ea-4505-4f3a-9f9d-99df65a50e7e", "timestamp": "2019-07-31 12:21:39.563588", "latitude": 51.511173031715074, "longitude": -0.10342597961425781}
{"busline": "00001", "key": "00001_65d92e80-19ce-4d8e-a904-2a46651e0cc2", "timestamp": "2019-07-31 12:21:40.564092", "latitude": 51.51098666917176, "longitude": -0.10454177856445312}
{"busline": "00001", "key": "00001_e3fd3fef-2c5e-4c33-878a-ef7e537e1736", "timestamp": "2019-07-31 12:21:41.573961", "latitude": 51.509223241755116, "longitude": -0.1059579849243164}
{"busline": "00001", "key": "00001_4d160a1e-191b-44f7-ab00-67a12839c4cb", "timestamp": "2019-07-31 12:21:42.579055", "latitude": 51.51050530482274, "longitude": -0.10544300079345703}
{"busline": "00001", "key": "00001_17cc7cf2-c151-4ea3-ab11-71a5e7dce45", "timestamp": "2019-07-31 12:21:43.579658", "latitude": 51.51093265116127, "longitude": -0.10479927062988281}
{"busline": "00001", "key": "00001_2a9bd865-8d7a-4f6b-b97c-9d30eb3a893c", "timestamp": "2019-07-31 12:21:44.581501", "latitude": 51.510077954475555, "longitude": -0.1185321807861328}
{"busline": "00001", "key": "00001_986f3bc4-2a0a-4f0c-9007-6ad3f7287479", "timestamp": "2019-07-31 12:21:45.597878", "latitude": 51.50478916217527, "longitude": -0.11342525482177734}
{"busline": "00001", "key": "00001_1a85d061-6c11-435c-aaa1-8d825f4c4d93", "timestamp": "2019-07-31 12:21:46.604400", "latitude": 51.50713981232172, "longitude": -0.1078033447265625}
{"busline": "00001", "key": "00001_c2acd011-ac03-4b78-b3b0-2e4017432f2a", "timestamp": "2019-07-31 12:21:47.605339", "latitude": 51.50700625590363, "longitude": -0.10342597961425781}
{"busline": "00001", "key": "00001_f603c71c-2a9b-40b8-b44f-44a0ad3d6d4b", "timestamp": "2019-07-31 12:21:48.608295", "latitude": 51.511173031715074, "longitude": -0.10342597961425781}
{"busline": "00001", "key": "00001_283d9aef-145a-48ac-a401-f74c76da1dfd", "timestamp": "2019-07-31 12:21:49.618456", "latitude": 51.51098666917176, "longitude": -0.10454177856445312}
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Windows Defender might be impacting your build performance. PyCharm checked the following directories:
F:\kafka_busdata
C:\Users\Lenovo\PyCharmC2019.2\system
Fix... Actions
```

```
Windows Defender might be impacting your build performance. PyCharm checked the following directories: (today 12:24) 1899 chars, 11 line breaks 1:2 CRLF UTF-8 4 spaces Python 37 (kafka_busdata)
127.0.0.1:5001/
```

London Bus Live Map



```
Windows Defender might be impacting your build performance. PyCharm checked the following directories: (today 12:24) 1899 chars, 11 line breaks 1:2 CRLF UTF-8 4 spaces Python 37 (kafka_busdata)
100% 17:54 31-07-2019
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