Start zookeeper server.


```
[2024-05-05 08:06:01,092] INFO Configuring NIO connection handler with 10s sessionle
ss connection timeout, 1 selector thread(s), 4 worker threads, and 64 kB direct buff
ers. (org.apache.zookeeper.server.NIOServerCnxnFactory)
[2024-05-05 08:06:01,098] INFO binding to port 0.0.0.0/0.0.0.0:2181 (org.apache.zook
eeper.server.NIOServerCnxnFactory)
[2024-05-05 08:06:01,116] INFO zookeeper.snapshotSizeFactor = 0.33 (org.apache.zooke
eper.server.ZKDatabase)
[2024-05-05 08:06:01,117] INFO Reading snapshot /tmp/zookeeper/version-2/snapshot.0
(org.apache.zookeeper.server.persistence.FileSnap)
[2024-05-05 08:06:01,123] INFO Snapshotting: 0x0 to /tmp/zookeeper/version-2/snapsho
t.0 (org.apache.zookeeper.server.persistence.FileTxnSnapLog)
[2024-05-05 08:06:01,145] INFO PrepRequestProcessor (sid:0) started, reconfigEnabled
=false (org.apache.zookeeper.server.PrepRequestProcessor)
[2024-05-05 08:06:01,155] INFO Using checkIntervalMs=60000 maxPerMinute=10000 (org.a
pache.zookeeper.server.ContainerManager)
```

Start Kafka server


```
theia@theiadocker-hashaammusht:/home/project/kafka_2.12-2.8.0$ bin/kafka-server-start.sh config/server.pr
operties
JVMJ9VM007W Command-line option unrecognised: -Xlog:gc*:file=/home/project/kafka_2.12-2.8.0/bin/../logs/k
afkaServer-gc.log:time,tags:filecount=10,filesize=100M
[2024-05-05 09:16:10,750] INFO Registered kafka:type=kafka.Log4jController MBean (kafka.utils.Log4jContro
llerRegistration$)
[2024-05-05 09:16:11,088] INFO Setting -D jdk.tls.rejectClientInitiatedRenegotiation=true to disable clie
nt-initiated TLS renegotiation (org.apache.zookeeper.common.X509Util)
[2024-05-05 09:16:11,183] INFO Registered signal handlers for TERM, INT, HUP (org.apache.kafka.common.uti
ls.LoggingSignalHandler)
[2024-05-05 09:16:11,188] INFO starting (kafka.server.KafkaServer)
```

3. Create a Kakfa topic named `toll`

```
le/project/kafka_2.12-2.8.0  ⨅    theia@theiadocker-hashaammusht /home/project/kafka_2.12-2.8.0  ×   ◨

    theia@theiadocker-hashaammusht:/home/project/kafka_2.12-2.8.0$ bin/kafka-topic
    s.sh --create --topic toll --bootstrap-server localhost:9092 --replication-fac
    theia@theiadocker-hashaammusht:/home/project$ cd kafka_2.12-2.8.0
    theia@theiadocker-hashaammusht:/home/project/kafka_2.12-2.8.0$ bin/kafka-topic
    s.sh --create --topic toll --bootstrap-server localhost:9092 --replication-fac
    tor 2 --partitions 2
    Error while executing topic command : Replication factor: 2 larger than availa
    ble brokers: 1.
    [2024-05-05 09:12:28,446] ERROR org.apache.kafka.common.errors.InvalidReplicat
    ionFactorException: Replication factor: 2 larger than available brokers: 1.
     (kafka.admin.TopicCommand$)
    theia@theiadocker-hashaammusht:/home/project/kafka_2.12-2.8.0$ bin/kafka-topic
    s.sh --create --topic toll --bootstrap-server localhost:9092 --replication-fac
    tor 1 --partitions 2
    Created topic toll.
    theia@theiadocker-hashaammusht:/home/project/kafka_2.12-2.8.0$ █
```

Open the `toll_traffic_generator.py` and set the topic to `toll`.

```python
kafka_2.12-2.8.0  >  toll_traffic_generator.py  >  ...
 1   """
 2   Top Traffic Simulator
 3   """
 4   from time import sleep, time, ctime
 5   from random import random, randint, choice
 6   from kafka import KafkaProducer
 7   producer = KafkaProducer(bootstrap_servers='localhost:909
 8
 9   TOPIC = 'toll'
10
11   VEHICLE_TYPES = ("car", "car", "car", "car", "car", "car"
12                    "car", "car", "car", "truck", "truck", "
13                    "truck", "van", "van")
14   for   in range(100000):
```

```
kafka_2.12-2.8.0        theia@theiadocker-hashaammusht /home/project/kafka_2.12-2.8.0  ×   ◨

Length: 828 [text/x-python]
Saving to: 'toll_traffic_generator.py'

toll_traffic_generator.    0%[                              ]          0   --
toll_traffic_generator. 100%[=============================>]        828   --
.-KB/s    in 0s

2024-05-05 09:17:27 (171 MB/s) - 'toll_traffic_generator.py' saved [828
/828]

theia@theiadocker-hashaammusht:/home/project/kafka_2.12-2.8.0$ ▯
```

Run the `toll_traffic_generator.py`.

```
    sleep(random() * 2)
KeyboardInterrupt
theia@theiadocker-hashaammusht:/home/project/kafka_2.12-2.8.0$ python3
toll_traffic_generator.py
A truck has passed by the toll plaza 4009 at Sun May  5 09:33:54 2024.
A car has passed by the toll plaza 4001 at Sun May  5 09:33:54 2024.
A car has passed by the toll plaza 4002 at Sun May  5 09:33:55 2024.
A car has passed by the toll plaza 4000 at Sun May  5 09:33:56 2024.
A van has passed by the toll plaza 4000 at Sun May  5 09:33:56 2024.
```

Download the `streaming_data_reader.py` from the url below using 'wget.

```
kafka_2.12-2.8.0 > streaming_data_reader.py > ...

    4    from datetime import datetime
    5    from kafka import KafkaConsumer
    6    import mysql.connector
    7
    8    TOPIC='toll'
    9    DATABASE = 'tolldata'
   10    USERNAME = 'root'
   11    PASSWORD = 'MTQxMjQtaGFzaGFh'
   12
   13    print("Connecting to the database")
   14    try:
   15        connection = mysql.connector.connect(host='localhost'
   16    except Exception:
```

```
kafka_2.12-2.8.0        theia@theiadocker-hashaammusht: /home/project/kafka_2.12-2.8.0  ×

+-------------------+
1 row in set (0.00 sec)

mysql> exit
exit
^C
mysql> ^Z
[1]+  Stopped                 mysql --host=127.0.0.1 --port=3306 --user
=root --password=MTQxMjQtaGFzaGFh
theia@theiadocker-hashaammusht:/home/project/kafka_2.12-2.8.0$
theia@theiadocker-hashaammusht:/home/project/kafka_2.12-2.8.0$
```

6. Run the `streaming_data_reader.py`

```python
4   from datetime import datetime
5   from kafka import KafkaConsumer
6   import mysql.connector
7
8   TOPIC='toll'
9   DATABASE = 'tolldata'
10  USERNAME = 'root'
11  PASSWORD = 'MTQxMjQtaGFzaGFh'
12
13  print("Connecting to the database")
14  try:
15      connection = mysql.connector.connect(host='localhost'
16  except Exception:
```

```
afka_2.12-2.8.0          theia@theiadocker-hashaammusht: /home/project/kafka_2.12-2.8.0  ×  ▢

[1]+  Stopped                    mysql --host=127.0.0.1 --port=3306 --user
=root --password=MTQxMjQtaGFzaGFh
theia@theiadocker-hashaammusht:/home/project/kafka_2.12-2.8.0$
theia@theiadocker-hashaammusht:/home/project/kafka_2.12-2.8.0$ python3
streaming_data_reader.py
Connecting to the database
Connected to database
Connecting to Kafka
Connected to Kafka
Reading messages from the topic toll
```

List the top 10 rows in the table `livetolldata`.

```python
4    from datetime import datetime
5    from kafka import KafkaConsumer
6    import mysql.connector
7
8    TOPIC='toll'
9    DATABASE = 'tolldata'
10   USERNAME = 'root'
11   PASSWORD = 'MTQxMjQtaGFzaGFGh'
12
13   print("Connecting to the database")
14 ∨ try:
```

streaming_data_reader.py ✕

kafka_2.12-2.8.0   theia@theiadocker-hashaammusht: /home/project/kafka_2.12-2.8.0 ✕

```
Database changed
mysql> select * from livetolldata limit 10;
+---------------------+------------+--------------+---------------+
| timestamp           | vehicle_id | vehicle_type | toll_plaza_id |
+---------------------+------------+--------------+---------------+
| 2024-05-05 10:43:50 |    4803979 | car          |          4008 |
| 2024-05-05 10:43:51 |    9518063 | car          |          4006 |
| 2024-05-05 10:43:52 |    4691408 | car          |          4007 |
| 2024-05-05 10:43:52 |    8704613 | truck        |          4000 |
| 2024-05-05 10:43:53 |     481657 | car          |          4007 |
| 2024-05-05 10:43:54 |    2003656 | car          |          4008 |
| 2024-05-05 10:43:56 |    5588831 | truck        |          4000 |
| 2024-05-05 10:43:58 |    9615595 | car          |          4004 |
```