

Assignment 5: Data Streaming with Apache Kafka

Course: Data Acquisition and Management

Instructor: Muhammad Shahin

PGDM PREDICTIVE ANALYTICS

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Due Date: February 23, 2025

1. Executive Summary

In this assignment, I built a **Weather-App** that streams synthetic weather data for two Canadian cities—**Winnipeg** and **Vancouver**—using **Apache Kafka**. The pipeline consists of:

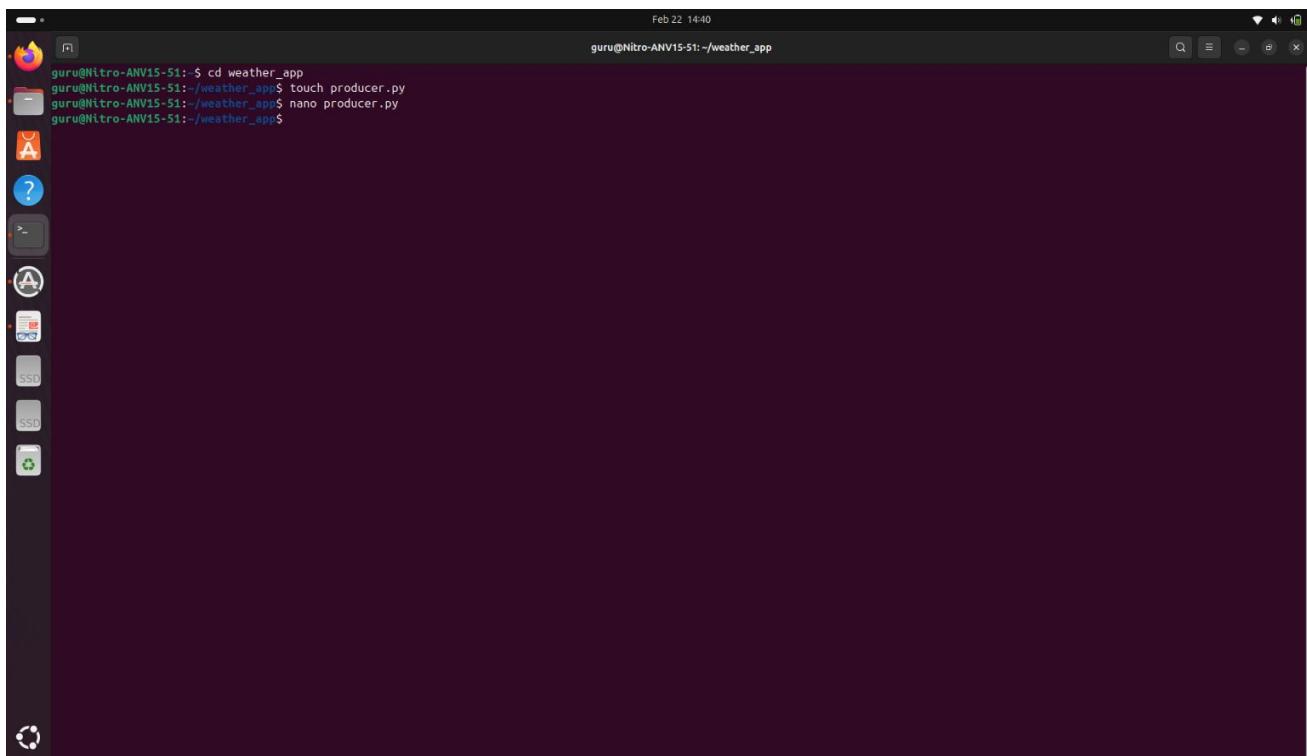
- A **Kafka producer** that sends weather data (temperature, wind speed, humidity) every five seconds to a topic named `weather-data`.
- A **Kafka consumer** that receives each event, appends a “`received_at`” timestamp, and inserts it into a **PostgreSQL** database table named `weather_events`.

By following the instructions, I verified that data was flowing in real time from the producer to Kafka, then to the consumer, and finally into the database.

2. Implementation Steps

2.1 Creating the Python Files in the directory `weather_app`

- **Producer Script (`producer.py`):**
 - Generates synthetic weather data for Winnipeg and Vancouver, each within specified min–max ranges.
 - Sends the data to the Kafka topic (`weather-data`) in JSON format every five seconds.
 - Logs the messages in a producer log file.



The screenshot shows a terminal window on a dark-themed desktop environment. The terminal window has a title bar with the date and time: "Feb 22 14:40". The command line shows the user navigating to a directory and creating a new Python file:

```
guru@Nitro-ANV15-51:~$ cd weather_app
guru@Nitro-ANV15-51:~/weather_app$ touch producer.py
guru@Nitro-ANV15-51:~/weather_app$ nano producer.py
guru@Nitro-ANV15-51:~/weather_app$
```

Feb 22 14:41

guru@Nitro-ANV15-51:~/weather_app

```
GNU nano 7.2
producer.py *
```

```
import json
import random
import time
from kafka import KafkaProducer
import logging

# Configure logging
logging.basicConfig(
    filename='producer.log',
    level=logging.INFO,
    format='%(asctime)s %(levelname)s %(message)s'
)

WEATHER_RANGES = {
    "Winnipeg": {
        "temperature": (-30, 30),
        "wind_speed": (0, 50),
        "humidity": (20, 80)
    },
    "Vancouver": {
        "temperature": (-10, 25),
        "wind_speed": (0, 30),
        "humidity": (30, 99)
    }
}

def generate_weather_data(city):
    """Generate synthetic weather data for a given city."""
    ranges = WEATHER_RANGES[city]
    data = {
        "city": city,
        "temperature": round(random.uniform(*ranges["temperature"]), 2),
        "wind_speed": round(random.uniform(*ranges["wind_speed"]), 2),
        "humidity": round(random.uniform(*ranges["humidity"]), 2)
    }
    return data

def main():
    producer = KafkaProducer(
        bootstrap_servers='localhost:9092',
        value_serializer=lambda v: json.dumps(v).encode('utf-8')

    )
    try:
        while True:
            for city in WEATHER_RANGES:
                weather_data = generate_weather_data(city)
                producer.send('weather-data', weather_data)
                logging.info(f"Sent data: {weather_data}")

            # Wait 5 seconds before next iteration
            time.sleep(5)

    except KeyboardInterrupt:
        logging.info("Producer stopped by user.")
    finally:
        producer.close()

if __name__ == "__main__":
    main()
```

Help Write Out Where Is Cut Execute Location Undo Set Mark To Bracket Previous Back

Exit Read File Replace Paste Justify Go To Line Redo Copy Where Was Next Forward

```
logging.info("Kafka Producer started...")

try:
    while True:
        for city in WEATHER_RANGES:
            weather_data = generate_weather_data(city)
            producer.send('weather-data', weather_data)
            logging.info(f"Sent data: {weather_data}")

        # Wait 5 seconds before next iteration
        time.sleep(5)

except KeyboardInterrupt:
    logging.info("Producer stopped by user.")
finally:
    producer.close()

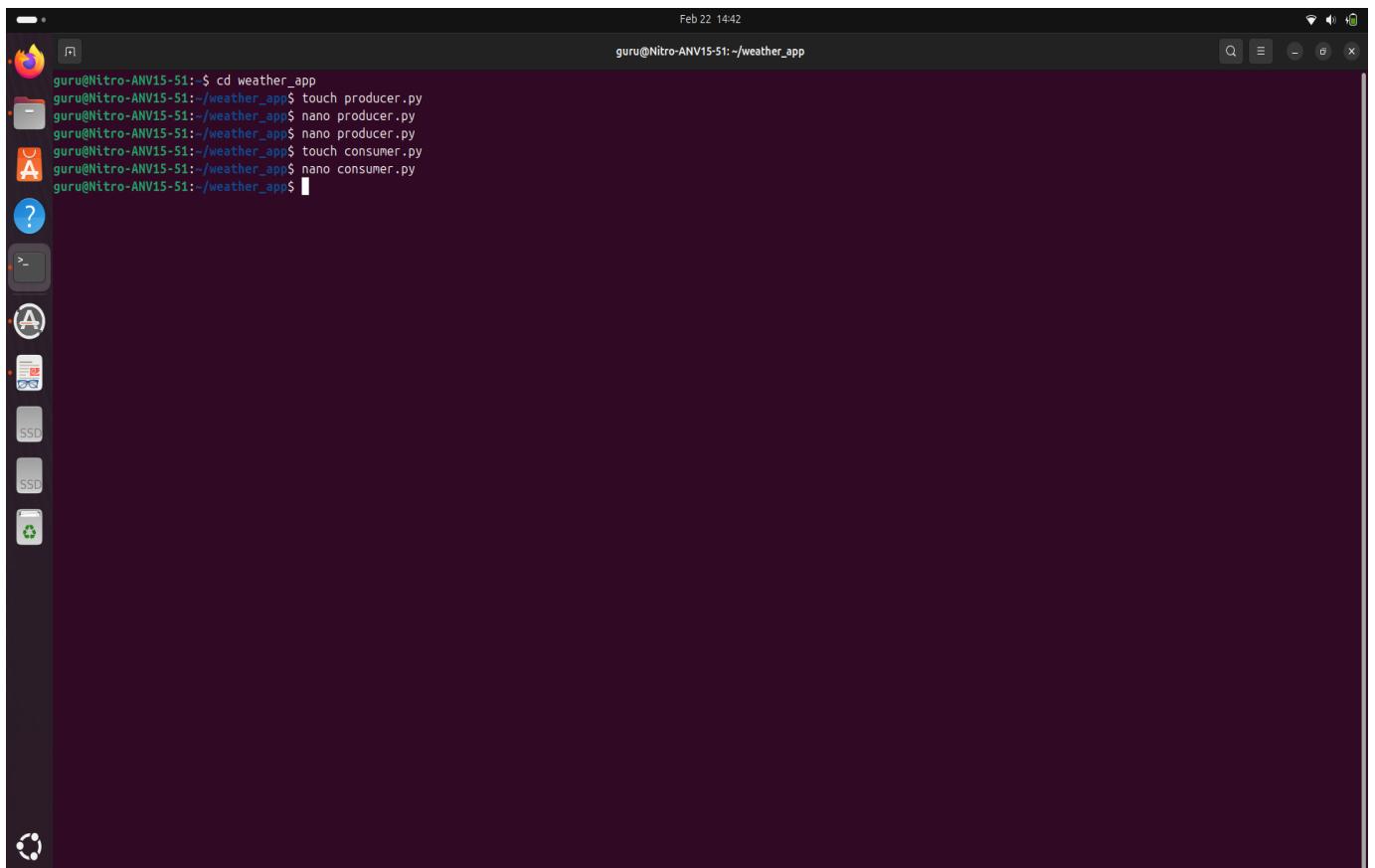
if __name__ == "__main__":
    main()
```

Help Write Out Where Is Cut Execute Location Undo Set Mark To Bracket Previous Back

Exit Read File Replace Paste Justify Go To Line Redo Copy Where Was Next Forward

- **Consumer Script (consumer.py):**

- Subscribes to the weather-data topic.
- Appends a received_at timestamp to each message.
- Inserts each message into a Postgres table named weather_events.
- Logs the consumed records in a consumer log file.



The screenshot shows a terminal window on a Linux desktop environment. The title bar indicates the session is running on a Nitro-ANV15-51 laptop. The date and time, Feb 22 14:42, are shown in the top right corner. The terminal window displays the following command-line history:

```
guru@Nitro-ANV15-51: ~$ cd weather_app
guru@Nitro-ANV15-51:~/weather_app$ touch producer.py
guru@Nitro-ANV15-51:~/weather_app$ nano producer.py
guru@Nitro-ANV15-51:~/weather_app$ touch consumer.py
guru@Nitro-ANV15-51:~/weather_app$ nano consumer.py
guru@Nitro-ANV15-51:~/weather_app$
```

The terminal window has a dark background and light-colored text. A vertical toolbar on the left side contains icons for a terminal, a file browser, a file manager, and system status indicators like battery and signal strength.

Feb 22 15:09

guru@Nitro-ANV15-51:~/weather_app

```
GNU nano 7.2
consumer.py *
```

```
# Configure logging
logging.basicConfig(
    filename='consumer.log',
    level=logging.INFO,
    format='%(asctime)s %(levelname)s %(message)s'
)

# Adjust parameters for your PostgreSQL setup
DB_PARAMS = [
    'dbname': 'weather_data',
    'user': 'postgres',
    'password': '1305',
    'host': 'localhost',
    'port': 5432
]

def connect_db():
    """Connect to PostgreSQL and return the connection."""
    try:
        conn = psycopg2.connect(**DB_PARAMS)
        conn.autocommit = True
        return conn
    except Exception as e:
        logging.error("Error connecting to the database", exc_info=True)
        raise

def create_table(conn):
    """Create weather_events table if it doesn't exist."""
    with conn.cursor() as cur:
        cur.execute("""
            CREATE TABLE IF NOT EXISTS weather_events (
                id SERIAL PRIMARY KEY,
                city VARCHAR(50),
                temperature REAL,
                wind_speed REAL,
        """)
```

[Read 87 lines]

GNU nano 7.2

consumer.py *

```
"""Insert a record into weather_events."""
with conn.cursor() as cur:
    cur.execute("""
        INSERT INTO weather_events (city, temperature, wind_speed, humidity, received_at)
        VALUES (%s, %s, %s, %s, %s);
    """,
    (
        record['city'],
        record['temperature'],
        record['wind_speed'],
        record['humidity'],
        record['received_at']
    ))
```

```
def main():
    # Connect to Postgres and set up table
    conn = connect_db()
    create_table(conn)

    consumer = KafkaConsumer(
        'weather-data',
        bootstrap_servers='localhost:9092',
        auto_offset_reset='earliest',
        value_deserializer=lambda m: json.loads(m.decode('utf-8'))
    )
    logging.info("Kafka Consumer started...")

    try:
        for message in consumer:
            data = message.value
            data['received_at'] = datetime.now()
            logging.info(f'Received data: {data}')
            insert_record(conn, data)
    except KeyboardInterrupt:
        logging.info("Consumer stopped by user.")
    finally:
        consumer.close()
        conn.close()

if __name__ == "__main__":
    main()
```

Feb 22 14:42

guru@Nitro-ANV15-51:~/weather_app

```
GNU nano 7.2
```

```
"""Insert a record into weather_events."""
with conn.cursor() as cur:
    cur.execute("""
        INSERT INTO weather_events (city, temperature, wind_speed, humidity, received_at)
        VALUES (%s, %s, %s, %s, %s);
    """,
    (
        record['city'],
        record['temperature'],
        record['wind_speed'],
        record['humidity'],
        record['received_at']
    ))
```

```
def main():
    # Connect to Postgres and set up table
    conn = connect_db()
    create_table(conn)

    consumer = KafkaConsumer(
        'weather-data',
        bootstrap_servers='localhost:9092',
        auto_offset_reset='earliest',
        value_deserializer=lambda m: json.loads(m.decode('utf-8'))
    )
    logging.info("Kafka Consumer started...")

    try:
        for message in consumer:
            data = message.value
            data['received_at'] = datetime.now()
            logging.info(f'Received data: {data}')
            insert_record(conn, data)
    except KeyboardInterrupt:
        logging.info("Consumer stopped by user.")
    finally:
        consumer.close()
        conn.close()

if __name__ == "__main__":
    main()
```

2.2 Creating a database in postgres of name `weather_data`:

2.3 Start the Zookeeper Service

Once the scripts were ready, I opened the **first terminal** and started the Zookeeper service. I kept that terminal open and running.

2.4 Start the Kafka Service

In a **second terminal**, I started the Kafka broker. This terminal also remained open.

2.5 Create the Kafka Topic & Run Producer

1. **Created** the Kafka topic weather-data.
2. **Ran** the producer script, which generated synthetic weather data and sent it to the weather-data topic every five seconds. The producer also logged each message.

```
Feb 22 14:48 guru@Nitro-ANV15-51:~/weather_app guru@Nitro-ANV15-51:/opt/kafka guru@Nitro-ANV15-51:/opt/kafka guru@Nitro-ANV15-51:/opt/kafka
guru@Nitro-ANV15-51:/opt/kafka$ bin/kafka-topics.sh --create \
--topic weather-data \
--bootstrap-server localhost:9092 \
--partitions 1 \
--replication-factor 1
Created topic weather-data.
guru@Nitro-ANV15-51:/opt/kafka$
```

```
Feb 22 15:00 guru@Nitro-ANV15-51:~/weather_app guru@Nitro-ANV15-51:/opt/kafka guru@Nitro-ANV15-51:/opt/kafka guru@Nitro-ANV15-51:/opt/kafka
guru@Nitro-ANV15-51:/opt/kafka$ python3 /home/guru/weather_app/producer.py
guru@Nitro-ANV15-51:/opt/kafka$
```

2.6 Run the Consumer

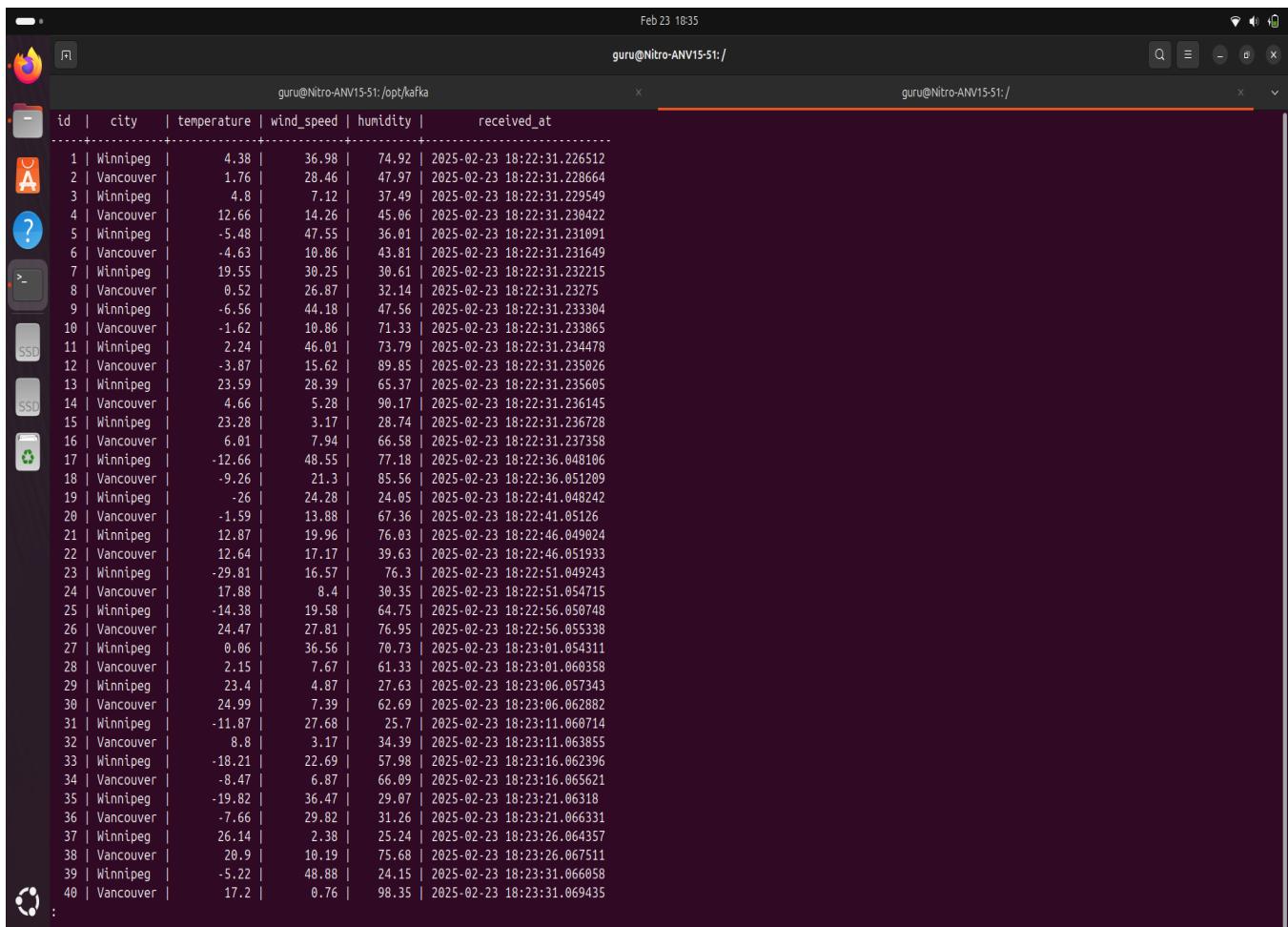
I opened a **fourth terminal** and ran the consumer script. It consumed messages from the weather-data topic, appended timestamps, and inserted records into the weather_events table in Postgres.

2.7 Stop the Producer After 10 minutes

After letting the **producer** run for about 11 to 12 mins, I **stopped** it (Ctrl + C). This ended the continuous flow of weather events.

2.8 Verify Data in the Database

Using a Postgres client (psql or similar), I ran a **SELECT * FROM weather_events;** query and confirmed that 272 rows were inserted for Winnipeg and Vancouver, each with a “received_at” timestamp.



```
Feb 23 18:35
guru@Nitro-ANV15-51:/opt/kafka
guru@Nitro-ANV15-51:/opt/kafka
guru@Nitro-ANV15-51:/
id | city    | temperature | wind_speed | humidity | received_at
--+
1  | Winnipeg |      4.38 |     36.98 |    74.92 | 2025-02-23 18:22:31.226512
2  | Vancouver |     1.76 |     28.46 |    47.97 | 2025-02-23 18:22:31.228664
3  | Winnipeg |      4.8 |      7.12 |    37.49 | 2025-02-23 18:22:31.229549
4  | Vancouver |     12.66 |     14.26 |    45.86 | 2025-02-23 18:22:31.230422
5  | Winnipeg |     -5.48 |     47.55 |    36.81 | 2025-02-23 18:22:31.231891
6  | Vancouver |     -4.63 |     18.86 |    43.81 | 2025-02-23 18:22:31.231649
7  | Winnipeg |     19.55 |     30.25 |    30.61 | 2025-02-23 18:22:31.232215
8  | Vancouver |      0.52 |     26.87 |    32.14 | 2025-02-23 18:22:31.232775
9  | Winnipeg |     -6.56 |     44.18 |    47.56 | 2025-02-23 18:22:31.233304
10 | Vancouver |     -1.62 |     18.86 |    71.33 | 2025-02-23 18:22:31.233865
11 | Winnipeg |      2.24 |     46.01 |    73.79 | 2025-02-23 18:22:31.234478
12 | Vancouver |     -3.87 |     15.62 |    89.85 | 2025-02-23 18:22:31.235026
13 | Winnipeg |     23.59 |     28.39 |    65.37 | 2025-02-23 18:22:31.235605
14 | Vancouver |      4.66 |      5.28 |    90.17 | 2025-02-23 18:22:31.236145
15 | Winnipeg |     23.28 |      3.17 |    28.74 | 2025-02-23 18:22:31.236728
16 | Vancouver |      6.01 |      7.94 |    66.58 | 2025-02-23 18:22:31.237358
17 | Winnipeg |     -12.66 |     48.55 |    77.18 | 2025-02-23 18:22:36.048106
18 | Vancouver |     -9.26 |     21.3 |    85.56 | 2025-02-23 18:22:36.051209
19 | Winnipeg |     -26 |     24.28 |    24.05 | 2025-02-23 18:22:41.048242
20 | Vancouver |     -1.59 |     13.88 |    67.36 | 2025-02-23 18:22:41.05126
21 | Winnipeg |     12.87 |     19.96 |    76.83 | 2025-02-23 18:22:46.049024
22 | Vancouver |     12.64 |     17.17 |    39.63 | 2025-02-23 18:22:46.051933
23 | Winnipeg |     -29.81 |     16.57 |    76.3 | 2025-02-23 18:22:51.049243
24 | Vancouver |     17.88 |      8.4 |    30.35 | 2025-02-23 18:22:51.054715
25 | Winnipeg |     -14.38 |     19.58 |    64.75 | 2025-02-23 18:22:56.050748
26 | Vancouver |     24.47 |     27.81 |    76.95 | 2025-02-23 18:22:56.055338
27 | Winnipeg |      0.06 |     36.56 |    70.73 | 2025-02-23 18:23:01.054311
28 | Vancouver |      2.15 |      7.67 |    61.33 | 2025-02-23 18:23:01.060358
29 | Winnipeg |     23.4 |      4.87 |    27.63 | 2025-02-23 18:23:06.057343
30 | Vancouver |     24.99 |      7.39 |    62.69 | 2025-02-23 18:23:06.062882
31 | Winnipeg |     -11.87 |     27.68 |    25.7 | 2025-02-23 18:23:11.060714
32 | Vancouver |      8.8 |      3.17 |    34.39 | 2025-02-23 18:23:11.063855
33 | Winnipeg |     -18.21 |     22.69 |    57.98 | 2025-02-23 18:23:16.062396
34 | Vancouver |     -8.47 |      6.87 |    66.89 | 2025-02-23 18:23:16.065621
35 | Winnipeg |     -19.82 |     36.47 |    29.87 | 2025-02-23 18:23:21.06318
36 | Vancouver |     -7.66 |     29.82 |    31.26 | 2025-02-23 18:23:21.066331
37 | Winnipeg |     26.14 |      2.38 |    25.24 | 2025-02-23 18:23:26.064357
38 | Vancouver |     20.9 |     10.19 |    75.68 | 2025-02-23 18:23:26.067511
39 | Winnipeg |     -5.22 |     48.88 |    24.15 | 2025-02-23 18:23:31.066098
40 | Vancouver |     17.2 |      0.76 |    98.35 | 2025-02-23 18:23:31.069435
```

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guru@Nitro-ANV15-51:/opt/kafka

99	Winnipeg	-16.11	46.84	44.87	2025-02-23	18:26:01.124696
100	Vancouver	12.42	12.18	49.35	2025-02-23	18:26:01.127914
101	Winnipeg	-20.65	39.66	53.98	2025-02-23	18:26:06.125732
102	Vancouver	16.69	14.31	98.09	2025-02-23	18:26:06.128852
103	Winnipeg	15.78	37.04	77.84	2025-02-23	18:26:11.128013
104	Vancouver	1.05	5.85	52.27	2025-02-23	18:26:11.131624
105	Winnipeg	26.27	31.86	62.46	2025-02-23	18:26:16.129475
106	Vancouver	22.21	19.15	33.74	2025-02-23	18:26:16.132737
107	Winnipeg	22.63	6.3	28.4	2025-02-23	18:26:21.1301
108	Vancouver	8.07	29.58	42.29	2025-02-23	18:26:21.136054
109	Winnipeg	-8.96	0.36	43.59	2025-02-23	18:26:26.134007
110	Vancouver	16.36	23.42	74.25	2025-02-23	18:26:26.137266
111	Winnipeg	16.37	3.12	67.77	2025-02-23	18:26:31.135906
112	Vancouver	-3.53	4.42	81.29	2025-02-23	18:26:31.139631
113	Winnipeg	-6	15.89	31.11	2025-02-23	18:26:36.137559
114	Vancouver	16.85	27.24	83.5	2025-02-23	18:26:36.140678
115	Winnipeg	-26.35	34.79	60.78	2025-02-23	18:26:41.140259
116	Vancouver	12.22	24.47	36.54	2025-02-23	18:26:41.143343
117	Winnipeg	22.89	10.82	35.46	2025-02-23	18:26:46.140351
118	Vancouver	3.92	13.21	62.24	2025-02-23	18:26:46.14353
119	Winnipeg	-26.71	1.44	42.18	2025-02-23	18:26:51.141896
120	Vancouver	1.9	1.85	78.41	2025-02-23	18:26:51.145199
121	Winnipeg	5.08	36.24	76.66	2025-02-23	18:26:56.143439
122	Vancouver	-6.38	15.69	90.47	2025-02-23	18:26:56.146798
123	Winnipeg	-13.82	17.32	56.52	2025-02-23	18:27:01.146651
124	Vancouver	-0.2	28.37	67.58	2025-02-23	18:27:01.150064
125	Winnipeg	26.12	11.61	28.64	2025-02-23	18:27:06.147615
126	Vancouver	-9.58	21.44	84.56	2025-02-23	18:27:06.150683
127	Winnipeg	-26.07	30.87	45.5	2025-02-23	18:27:11.148507
128	Vancouver	-4.18	26.32	32.23	2025-02-23	18:27:11.151653
129	Winnipeg	2.68	6.72	25.7	2025-02-23	18:27:16.150185
130	Vancouver	17.78	16.87	37.92	2025-02-23	18:27:16.15342
131	Winnipeg	27.85	1.12	69.8	2025-02-23	18:27:21.151804
132	Vancouver	5.99	22.67	97.64	2025-02-23	18:27:21.155168
133	Winnipeg	-3.78	11.43	57.2	2025-02-23	18:27:26.153684
134	Vancouver	21.89	11.46	64.42	2025-02-23	18:27:26.157025
135	Winnipeg	4.76	29.14	25.4	2025-02-23	18:27:31.149426
136	Vancouver	-0.2	0.96	62.37	2025-02-23	18:27:31.151926
137	Winnipeg	-18.31	36.68	73.85	2025-02-23	18:27:36.150706
138	Vancouver	22.73	16.14	45.58	2025-02-23	18:27:36.153517
139	Winnipeg	13.97	5.83	46.7	2025-02-23	18:27:41.152907
140	Vancouver	19.42	16.64	49.31	2025-02-23	18:27:41.156007

Feb 23 18:35

guru@Nitro-ANV15-51:/opt/kafka

233	Winnipeg	1.97	48.24	77.13	2025-02-23	18:31:36.234567
234	Vancouver	10.33	6.68	44.19	2025-02-23	18:31:36.237594
235	Winnipeg	-13.95	39.51	38.15	2025-02-23	18:31:41.236304
236	Vancouver	-4.29	13.89	94.34	2025-02-23	18:31:41.23949
237	Winnipeg	5.03	30.92	49.68	2025-02-23	18:31:46.237713
238	Vancouver	22.92	19.72	65.79	2025-02-23	18:31:46.240799
239	Winnipeg	6.33	27.93	62.26	2025-02-23	18:31:51.238765
240	Vancouver	20.15	11.39	57.49	2025-02-23	18:31:51.242014
241	Winnipeg	-19.03	36.3	59.76	2025-02-23	18:31:56.239762
242	Vancouver	20.54	22.3	66.05	2025-02-23	18:31:56.243244
243	Winnipeg	-27.55	46.9	56.06	2025-02-23	18:32:01.241815
244	Vancouver	12.02	23.26	36.23	2025-02-23	18:32:01.245044
245	Winnipeg	10.42	41.28	22.53	2025-02-23	18:32:06.243307
246	Vancouver	-7.56	13.89	35.95	2025-02-23	18:32:06.246621
247	Winnipeg	-29.82	8.84	27.08	2025-02-23	18:32:11.245635
248	Vancouver	4.65	7.2	90.01	2025-02-23	18:32:11.248252
249	Winnipeg	5.58	28.92	68.27	2025-02-23	18:32:16.246667
250	Vancouver	8.57	38	86.38	2025-02-23	18:32:16.252063
251	Winnipeg	-6.92	43.47	38	2025-02-23	18:32:21.251008
252	Vancouver	-5.63	8.33	70.15	2025-02-23	18:32:21.254121
253	Winnipeg	-17.98	19.25	53.57	2025-02-23	18:32:26.252234
254	Vancouver	12.84	8.93	72.11	2025-02-23	18:32:26.255684
255	Winnipeg	-18.6	45.61	67.25	2025-02-23	18:32:31.25384
256	Vancouver	0.78	23.9	41.2	2025-02-23	18:32:31.256109
257	Winnipeg	-24.28	27.53	45.37	2025-02-23	18:32:36.255952
258	Vancouver	2.35	28.21	58.52	2025-02-23	18:32:36.259236
259	Winnipeg	-0.32	37.65	75.75	2025-02-23	18:32:41.257748
260	Vancouver	-4.44	15.7	83.69	2025-02-23	18:32:41.261041
261	Winnipeg	-1.44	27.07	76.24	2025-02-23	18:32:46.259201
262	Vancouver	-9.1	0.88	92.41	2025-02-23	18:32:46.262559
263	Winnipeg	-28.74	47.57	41.7	2025-02-23	18:32:51.260189
264	Vancouver	-9.59	12.69	56.16	2025-02-23	18:32:51.266133
265	Winnipeg	-4.42	0.58	37.54	2025-02-23	18:32:56.263859
266	Vancouver	-1.96	10.99	95.52	2025-02-23	18:32:56.267416
267	Winnipeg	10.72	19.3	31.4	2025-02-23	18:33:01.264979
268	Vancouver	15.91	27.65	86.94	2025-02-23	18:33:01.271019
269	Winnipeg	21.18	15.12	58.49	2025-02-23	18:33:06.268785
270	Vancouver	-8.34	5.77	54.68	2025-02-23	18:33:06.271749
271	Winnipeg	29.11	10.9	51.85	2025-02-23	18:33:11.27085
272	Vancouver	-5.97	21.47	52.07	2025-02-23	18:33:11.273931

(272 rows)

[END]

2.9 Stop All Services

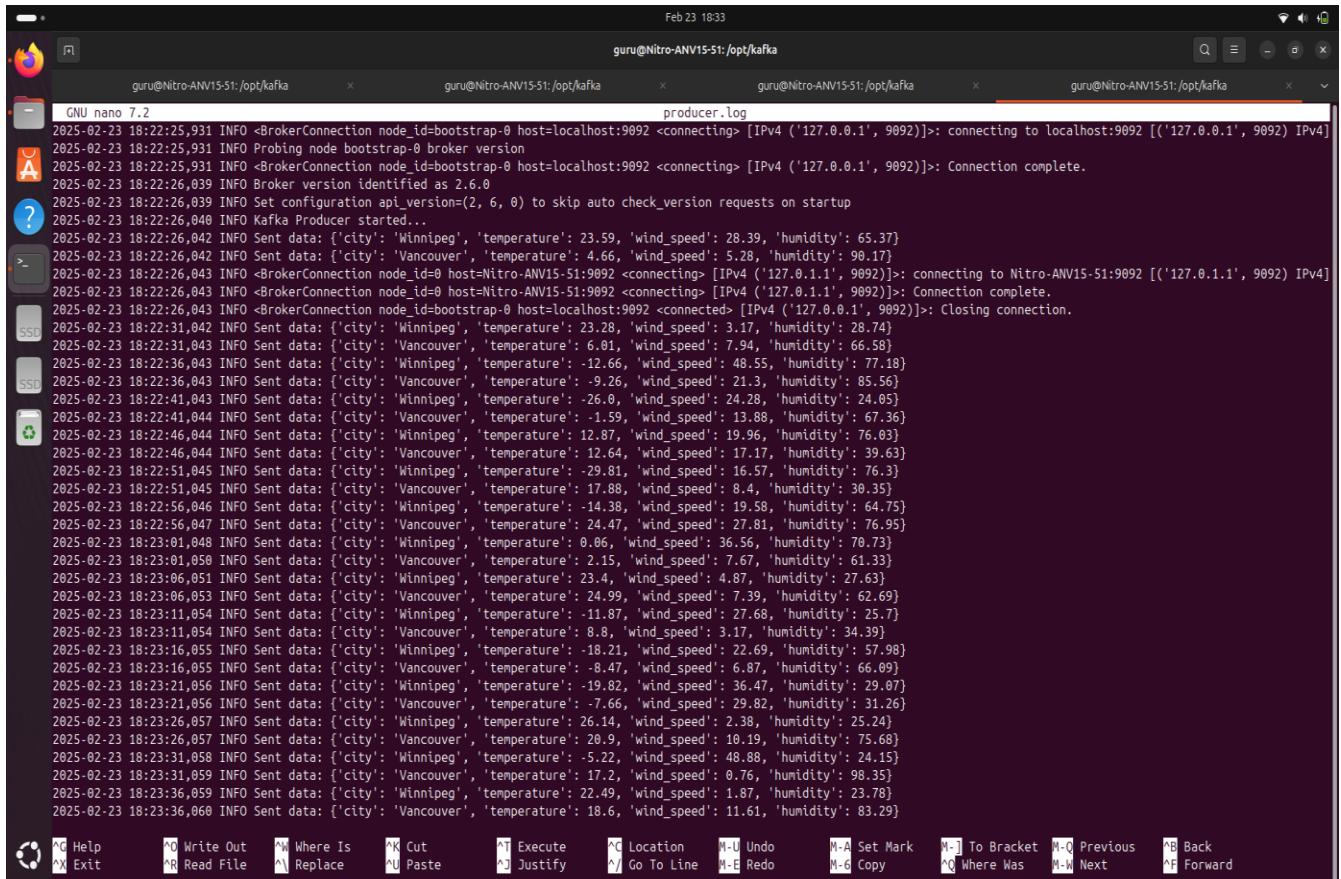
Finally, I:

1. Stopped the consumer (Ctrl + C).
2. Stopped Kafka.
3. Stopped Zookeeper.

This concluded the assignment steps.

3. Results & Observations

- **Producer Logs:** Confirmed that weather data messages were being generated every five seconds.



The screenshot shows a terminal window with four tabs open, all titled "guru@Nitro-ANV15-51:/opt/kafka". The active tab displays a log file named "producer.log". The log output is as follows:

```
Feb 23 18:33
guru@Nitro-ANV15-51:/opt/kafka
producer.log

2025-02-23 18:22:25,931 INFO <BrokerConnection node_id=bootstrap-0 host=localhost:9092 <connecting> [IPv4 ('127.0.0.1', 9092)]:>: connecting to localhost:9092 [('127.0.0.1', 9092) IPv4]
2025-02-23 18:22:25,931 INFO Probing node bootstrap-0 broker version
2025-02-23 18:22:25,931 INFO <BrokerConnection node_id=bootstrap-0 host=localhost:9092 <connecting> [IPv4 ('127.0.0.1', 9092)]:>: Connection complete.
2025-02-23 18:22:26,039 INFO Broker version identified as 2.6.0
2025-02-23 18:22:26,039 INFO Set configuration api_version=(2, 6, 0) to skip auto check_version requests on startup
2025-02-23 18:22:26,040 INFO Kafka Producer started...
2025-02-23 18:22:26,042 INFO Sent data: {'city': 'Winnipeg', 'temperature': 23.59, 'wind_speed': 28.39, 'humidity': 65.37}
2025-02-23 18:22:26,042 INFO Sent data: {'city': 'Vancouver', 'temperature': 4.66, 'wind_speed': 5.28, 'humidity': 90.17}
2025-02-23 18:22:26,043 INFO <BrokerConnection node_id=0 host=Nitro-ANV15-51:9092 <connecting> [IPv4 ('127.0.1.1', 9092)]:>: connecting to Nitro-ANV15-51:9092 [('127.0.1.1', 9092) IPv4]
2025-02-23 18:22:26,043 INFO <BrokerConnection node_id=0 host=Nitro-ANV15-51:9092 <connecting> [IPv4 ('127.0.1.1', 9092)]:>: Connection complete.
2025-02-23 18:22:26,043 INFO <BrokerConnection node_id=bootstrap-0 host=localhost:9091 <connected> [IPv4 ('127.0.0.1', 9092)]:>: Closing connection.
2025-02-23 18:22:31,042 INFO Sent data: {'city': 'Vancouver', 'temperature': 23.28, 'wind_speed': 3.17, 'humidity': 28.74}
2025-02-23 18:22:31,043 INFO Sent data: {'city': 'Vancouver', 'temperature': 6.81, 'wind_speed': 7.94, 'humidity': 66.58}
2025-02-23 18:22:36,043 INFO Sent data: {'city': 'Winnipeg', 'temperature': -12.66, 'wind_speed': 48.55, 'humidity': 77.16}
2025-02-23 18:22:36,043 INFO Sent data: {'city': 'Vancouver', 'temperature': -9.26, 'wind_speed': 21.3, 'humidity': 85.56}
2025-02-23 18:22:41,043 INFO Sent data: {'city': 'Winnipeg', 'temperature': -26.0, 'wind_speed': 24.28, 'humidity': 24.05}
2025-02-23 18:22:41,044 INFO Sent data: {'city': 'Vancouver', 'temperature': -1.59, 'wind_speed': 13.88, 'humidity': 67.36}
2025-02-23 18:22:46,044 INFO Sent data: {'city': 'Winnipeg', 'temperature': 12.87, 'wind_speed': 19.96, 'humidity': 76.03}
2025-02-23 18:22:46,044 INFO Sent data: {'city': 'Vancouver', 'temperature': 12.64, 'wind_speed': 17.17, 'humidity': 39.63}
2025-02-23 18:22:51,045 INFO Sent data: {'city': 'Winnipeg', 'temperature': -29.81, 'wind_speed': 16.57, 'humidity': 76.3}
2025-02-23 18:22:51,045 INFO Sent data: {'city': 'Vancouver', 'temperature': 17.88, 'wind_speed': 8.4, 'humidity': 30.35}
2025-02-23 18:22:56,046 INFO Sent data: {'city': 'Winnipeg', 'temperature': -14.38, 'wind_speed': 19.58, 'humidity': 64.75}
2025-02-23 18:22:56,047 INFO Sent data: {'city': 'Vancouver', 'temperature': 24.47, 'wind_speed': 27.81, 'humidity': 76.95}
2025-02-23 18:23:01,048 INFO Sent data: {'city': 'Winnipeg', 'temperature': 0.66, 'wind_speed': 36.56, 'humidity': 70.73}
2025-02-23 18:23:01,050 INFO Sent data: {'city': 'Vancouver', 'temperature': 2.15, 'wind_speed': 7.67, 'humidity': 61.33}
2025-02-23 18:23:06,051 INFO Sent data: {'city': 'Winnipeg', 'temperature': 23.4, 'wind_speed': 4.87, 'humidity': 27.63}
2025-02-23 18:23:06,053 INFO Sent data: {'city': 'Vancouver', 'temperature': 24.99, 'wind_speed': 7.39, 'humidity': 62.69}
2025-02-23 18:23:11,054 INFO Sent data: {'city': 'Winnipeg', 'temperature': -11.87, 'wind_speed': 27.68, 'humidity': 25.7}
2025-02-23 18:23:11,054 INFO Sent data: {'city': 'Vancouver', 'temperature': 8.8, 'wind_speed': 3.17, 'humidity': 34.39}
2025-02-23 18:23:16,055 INFO Sent data: {'city': 'Winnipeg', 'temperature': -18.21, 'wind_speed': 22.69, 'humidity': 57.98}
2025-02-23 18:23:16,055 INFO Sent data: {'city': 'Vancouver', 'temperature': -8.47, 'wind_speed': 6.87, 'humidity': 66.09}
2025-02-23 18:23:21,056 INFO Sent data: {'city': 'Winnipeg', 'temperature': -19.82, 'wind_speed': 36.47, 'humidity': 29.07}
2025-02-23 18:23:21,056 INFO Sent data: {'city': 'Vancouver', 'temperature': -7.66, 'wind_speed': 29.82, 'humidity': 31.26}
2025-02-23 18:23:26,057 INFO Sent data: {'city': 'Winnipeg', 'temperature': 26.14, 'wind_speed': 2.38, 'humidity': 25.24}
2025-02-23 18:23:26,057 INFO Sent data: {'city': 'Vancouver', 'temperature': 28.9, 'wind_speed': 10.19, 'humidity': 75.68}
2025-02-23 18:23:31,058 INFO Sent data: {'city': 'Winnipeg', 'temperature': -5.22, 'wind_speed': 48.88, 'humidity': 24.15}
2025-02-23 18:23:31,059 INFO Sent data: {'city': 'Vancouver', 'temperature': 17.2, 'wind_speed': 0.76, 'humidity': 98.35}
2025-02-23 18:23:36,059 INFO Sent data: {'city': 'Winnipeg', 'temperature': 22.49, 'wind_speed': 1.87, 'humidity': 23.78}
2025-02-23 18:23:36,060 INFO Sent data: {'city': 'Vancouver', 'temperature': 18.6, 'wind_speed': 11.61, 'humidity': 83.29}
```

Feb 23 18:34

guru@Nitro-ANV15-51:/opt/kafka

guru@Nitro-ANV15-51:/opt/kafka

guru@Nitro-ANV15-51:/opt/kafka

guru@Nitro-ANV15-51:/opt/kafka

```
GNU nano 7.2
2025-02-23 18:31:46,231 INFO Sent data: {'city': 'Vancouver', 'temperature': 22.92, 'wind_speed': 19.72, 'humidity': 65.79}
2025-02-23 18:31:51,232 INFO Sent data: {'city': 'Winnipeg', 'temperature': 6.33, 'wind_speed': 27.93, 'humidity': 62.26}
2025-02-23 18:31:51,233 INFO Sent data: {'city': 'Vancouver', 'temperature': 20.15, 'wind_speed': 11.39, 'humidity': 57.49}
2025-02-23 18:31:56,234 INFO Sent data: {'city': 'Winnipeg', 'temperature': -19.03, 'wind_speed': 30.3, 'humidity': 59.76}
2025-02-23 18:31:56,234 INFO Sent data: {'city': 'Vancouver', 'temperature': 20.54, 'wind_speed': 22.3, 'humidity': 66.05}
2025-02-23 18:32:01,235 INFO Sent data: {'city': 'Winnipeg', 'temperature': -27.55, 'wind_speed': 46.9, 'humidity': 56.06}
2025-02-23 18:32:01,235 INFO Sent data: {'city': 'Vancouver', 'temperature': 12.02, 'wind_speed': 23.26, 'humidity': 36.23}
2025-02-23 18:32:06,236 INFO Sent data: {'city': 'Winnipeg', 'temperature': 10.42, 'wind_speed': 41.28, 'humidity': 22.53}
2025-02-23 18:32:11,238 INFO Sent data: {'city': 'Vancouver', 'temperature': -7.56, 'wind_speed': 13.89, 'humidity': 35.95}
2025-02-23 18:32:11,238 INFO Sent data: {'city': 'Winnipeg', 'temperature': -29.82, 'wind_speed': 8.84, 'humidity': 27.08}
2025-02-23 18:32:11,238 INFO Sent data: {'city': 'Vancouver', 'temperature': 4.65, 'wind_speed': 7.2, 'humidity': 90.01}
2025-02-23 18:32:16,240 INFO Sent data: {'city': 'Winnipeg', 'temperature': 5.58, 'wind_speed': 28.92, 'humidity': 68.27}
2025-02-23 18:32:16,242 INFO Sent data: {'city': 'Vancouver', 'temperature': 8.57, 'wind_speed': 30.0, 'humidity': 86.36}
2025-02-23 18:32:21,244 INFO Sent data: {'city': 'Winnipeg', 'temperature': -6.92, 'wind_speed': 43.47, 'humidity': 36.0}
2025-02-23 18:32:21,245 INFO Sent data: {'city': 'Vancouver', 'temperature': 5.63, 'wind_speed': 8.33, 'humidity': 70.15}
2025-02-23 18:32:26,246 INFO Sent data: {'city': 'Winnipeg', 'temperature': -17.98, 'wind_speed': 19.25, 'humidity': 53.57}
2025-02-23 18:32:26,246 INFO Sent data: {'city': 'Vancouver', 'temperature': 12.84, 'wind_speed': 8.93, 'humidity': 72.11}
2025-02-23 18:32:31,247 INFO Sent data: {'city': 'Winnipeg', 'temperature': -18.6, 'wind_speed': 45.61, 'humidity': 67.25}
2025-02-23 18:32:31,248 INFO Sent data: {'city': 'Vancouver', 'temperature': 0.78, 'wind_speed': 23.9, 'humidity': 41.2}
2025-02-23 18:32:36,249 INFO Sent data: {'city': 'Winnipeg', 'temperature': -24.28, 'wind_speed': 27.53, 'humidity': 45.37}
2025-02-23 18:32:36,249 INFO Sent data: {'city': 'Vancouver', 'temperature': 2.35, 'wind_speed': 28.21, 'humidity': 58.52}
2025-02-23 18:32:41,251 INFO Sent data: {'city': 'Winnipeg', 'temperature': -0.32, 'wind_speed': 37.65, 'humidity': 75.75}
2025-02-23 18:32:41,251 INFO Sent data: {'city': 'Vancouver', 'temperature': -4.44, 'wind_speed': 15.7, 'humidity': 83.69}
2025-02-23 18:32:46,252 INFO Sent data: {'city': 'Winnipeg', 'temperature': -1.44, 'wind_speed': 27.07, 'humidity': 76.24}
2025-02-23 18:32:46,252 INFO Sent data: {'city': 'Vancouver', 'temperature': -9.1, 'wind_speed': 0.08, 'humidity': 92.41}
2025-02-23 18:32:51,253 INFO Sent data: {'city': 'Winnipeg', 'temperature': -28.74, 'wind_speed': 47.57, 'humidity': 41.7}
2025-02-23 18:32:51,253 INFO Sent data: {'city': 'Vancouver', 'temperature': -9.59, 'wind_speed': 12.69, 'humidity': 56.16}
2025-02-23 18:32:56,257 INFO Sent data: {'city': 'Winnipeg', 'temperature': -4.42, 'wind_speed': 0.58, 'humidity': 37.54}
2025-02-23 18:32:56,258 INFO Sent data: {'city': 'Vancouver', 'temperature': -1.96, 'wind_speed': 10.99, 'humidity': 95.52}
2025-02-23 18:33:01,259 INFO Sent data: {'city': 'Winnipeg', 'temperature': 10.72, 'wind_speed': 19.3, 'humidity': 31.4}
2025-02-23 18:33:01,261 INFO Sent data: {'city': 'Vancouver', 'temperature': 15.91, 'wind_speed': 27.65, 'humidity': 86.94}
2025-02-23 18:33:06,261 INFO Sent data: {'city': 'Winnipeg', 'temperature': 21.18, 'wind_speed': 15.12, 'humidity': 58.49}
2025-02-23 18:33:06,263 INFO Sent data: {'city': 'Vancouver', 'temperature': -8.34, 'wind_speed': 5.77, 'humidity': 54.68}
2025-02-23 18:33:11,265 INFO Sent data: {'city': 'Winnipeg', 'temperature': 29.11, 'wind_speed': 10.9, 'humidity': 51.85}
2025-02-23 18:33:11,265 INFO Sent data: {'city': 'Vancouver', 'temperature': -5.97, 'wind_speed': 21.47, 'humidity': 52.07}
2025-02-23 18:33:16,046 INFO Producer stopped by user.
2025-02-23 18:33:16,046 INFO Closing the Kafka producer with 9223372036.0 secs timeout.
2025-02-23 18:33:16,046 INFO <BrokerConnection node_id=0 host=Nitro-ANV15-51:9092 <connected> [IPv4 ('127.0.1.1', 9092)]:>: Closing connection.
```

G Help F Write Out M Where Is K Cut T Execute C Location U Undo A Set Mark J To Bracket N Previous B Back X Exit R Read File ^ Replace P Paste H Justify G Go To Line E Redo M-G Copy Q Where Was M-W Next F Forward

- Consumer Logs:** Confirmed that messages were consumed and inserted into the database, with timestamps appended.

Feb 23 18:34

guru@Nitro-ANV15-51:/opt/kafka

guru@Nitro-ANV15-51:/opt/kafka

guru@Nitro-ANV15-51:/opt/kafka

guru@Nitro-ANV15-51:/opt/kafka

```
GNU nano 7.2
2025-02-23 18:22:33,977 INFO <BrokerConnection node_id=bootstrap-0 host=localhost:9092 <connecting> [IPv4 ('127.0.0.1', 9092)]:>: connecting to localhost:9092 [('127.0.0.1', 9092) IPv4]
2025-02-23 18:22:33,977 INFO Probing node bootstrap-0 broker version
2025-02-23 18:22:30,977 INFO <BrokerConnection node_id=bootstrap-0 host=localhost:9092 <connecting> [IPv4 ('127.0.0.1', 9092)]:>: Connection complete.
2025-02-23 18:22:31,081 INFO Broker version identified as 2.6.0
2025-02-23 18:22:31,081 INFO Set configuration opt_version=(2, 6, 0) to skip auto check_version requests on startup
2025-02-23 18:22:31,082 WARNING group_id is None: disabling auto-commit.
2025-02-23 18:22:31,082 INFO Updating subscribed topics to: ('weather-data')
2025-02-23 18:22:31,082 INFO Kafka Consumer started...
2025-02-23 18:22:31,087 INFO <BrokerConnection node_id=0 host=Nitro-ANV15-51:9092 <connecting> [IPv4 ('127.0.1.1', 9092)]:>: connecting to Nitro-ANV15-51:9092 [('127.0.1.1', 9092) IPv4]
2025-02-23 18:22:31,087 INFO <BrokerConnection node_id=0 host=Nitro-ANV15-51:9092 <connecting> [IPv4 ('127.0.1.1', 9092)]:>: Connection complete.
2025-02-23 18:22:31,226 INFO Received data: {'city': 'Winnipeg', 'temperature': 4.38, 'wind_speed': 36.98, 'humidity': 74.92, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,228 INFO Received data: {'city': 'Vancouver', 'temperature': 1.76, 'wind_speed': 28.46, 'humidity': 47.97, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,229 INFO Received data: {'city': 'Winnipeg', 'temperature': 4.8, 'wind_speed': 37.49, 'humidity': 45.06, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,230 INFO Received data: {'city': 'Vancouver', 'temperature': 12.66, 'wind_speed': 14.26, 'humidity': 45.06, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,231 INFO Received data: {'city': 'Winnipeg', 'temperature': -5.48, 'wind_speed': 47.55, 'humidity': 30.61, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,232 INFO Received data: {'city': 'Winnipeg', 'temperature': 19.55, 'wind_speed': 30.25, 'humidity': 30.61, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,232 INFO Received data: {'city': 'Vancouver', 'temperature': 0.52, 'wind_speed': 26.87, 'humidity': 32.14, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,233 INFO Received data: {'city': 'Winnipeg', 'temperature': 6.56, 'wind_speed': 44.18, 'humidity': 47.56, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,233 INFO Received data: {'city': 'Vancouver', 'temperature': -1.62, 'wind_speed': 10.86, 'humidity': 71.33, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,234 INFO Received data: {'city': 'Winnipeg', 'temperature': 2.24, 'wind_speed': 46.01, 'humidity': 73.79, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,234 INFO Received data: {'city': 'Vancouver', 'temperature': -3.87, 'wind_speed': 15.62, 'humidity': 89.85, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,235 INFO Received data: {'city': 'Winnipeg', 'temperature': 23.59, 'wind_speed': 28.39, 'humidity': 65.37, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,235 INFO Received data: {'city': 'Vancouver', 'temperature': 4.66, 'wind_speed': 5.28, 'humidity': 99.17, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,236 INFO Received data: {'city': 'Winnipeg', 'temperature': 6.01, 'wind_speed': 7.94, 'humidity': 66.58, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:31,237 INFO Received data: {'city': 'Vancouver', 'temperature': -12.66, 'wind_speed': 48.55, 'humidity': 77.18, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 31)}
2025-02-23 18:22:36,051 INFO Received data: {'city': 'Vancouver', 'temperature': -9.26, 'wind_speed': 21.3, 'humidity': 85.56, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 36)}
2025-02-23 18:22:41,041 INFO Received data: {'city': 'Winnipeg', 'temperature': -26.0, 'wind_speed': 24.28, 'humidity': 24.05, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 41)}
2025-02-23 18:22:41,051 INFO Received data: {'city': 'Vancouver', 'temperature': -1.59, 'wind_speed': 13.88, 'humidity': 67.36, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 41)}
2025-02-23 18:22:46,049 INFO Received data: {'city': 'Winnipeg', 'temperature': 12.87, 'wind_speed': 19.96, 'humidity': 76.03, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 46)}
2025-02-23 18:22:46,052 INFO Received data: {'city': 'Vancouver', 'temperature': 12.64, 'wind_speed': 17.17, 'humidity': 39.63, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 46)}
2025-02-23 18:22:51,049 INFO Received data: {'city': 'Winnipeg', 'temperature': -29.81, 'wind_speed': 16.57, 'humidity': 76.3, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 51)}
2025-02-23 18:22:56,050 INFO Received data: {'city': 'Vancouver', 'temperature': 17.88, 'wind_speed': 8.4, 'humidity': 30.35, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 51)}
2025-02-23 18:22:56,055 INFO Received data: {'city': 'Winnipeg', 'temperature': -14.38, 'wind_speed': 19.58, 'humidity': 64.75, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 55)}
2025-02-23 18:23:01,054 INFO Received data: {'city': 'Vancouver', 'temperature': 24.47, 'wind_speed': 27.81, 'humidity': 76.95, 'received_at': datetime.datetime(2025, 2, 23, 18, 22, 55)}
2025-02-23 18:23:01,054 INFO Received data: {'city': 'Winnipeg', 'temperature': 0.06, 'wind_speed': 36.56, 'humidity': 78.73, 'received_at': datetime.datetime(2025, 2, 23, 18, 23, 1), >
```

[Read 299 lines]

G Help F Write Out M Where Is K Cut T Execute C Location U Undo A Set Mark J To Bracket N Previous B Back X Exit R Read File ^ Replace P Paste H Justify G Go To Line E Redo M-G Copy Q Where Was M-W Next F Forward

```

Feb 23 18:34
guru@Nitro-ANV15-51:/opt/kafka
guru@Nitro-ANV15-51:/opt/kafka
guru@Nitro-ANV15-51:/opt/kafka
guru@Nitro-ANV15-51:/opt/kafka

GNU nano 7.2
2025-02-23 18:31:56,239 INFO Received data: {'city': 'Winnipeg', 'temperature': -19.03, 'wind_speed': 30.3, 'humidity': 59.76, 'received_at': datetime.datetime(2025, 2, 23, 18, 31, 56-07,00)}
2025-02-23 18:31:56,243 INFO Received data: {'city': 'Vancouver', 'temperature': 20.54, 'wind_speed': 22.3, 'humidity': 66.05, 'received_at': datetime.datetime(2025, 2, 23, 18, 31, 56-07,00)}
2025-02-23 18:32:01,241 INFO Received data: {'city': 'Winnipeg', 'temperature': -27.55, 'wind_speed': 46.9, 'humidity': 56.06, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 01-07,00)}
2025-02-23 18:32:01,245 INFO Received data: {'city': 'Vancouver', 'temperature': 12.02, 'wind_speed': 23.26, 'humidity': 36.23, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 01-07,00)}
2025-02-23 18:32:06,243 INFO Received data: {'city': 'Winnipeg', 'temperature': 10.42, 'wind_speed': 41.28, 'humidity': 22.53, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 06-07,00)}
2025-02-23 18:32:11,245 INFO Received data: {'city': 'Winnipeg', 'temperature': -7.56, 'wind_speed': 8.84, 'humidity': 27.08, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 11-07,00)}
2025-02-23 18:32:16,246 INFO Received data: {'city': 'Vancouver', 'temperature': 4.65, 'wind_speed': 7.2, 'humidity': 90.01, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 11-07,00)}
2025-02-23 18:32:16,252 INFO Received data: {'city': 'Winnipeg', 'temperature': 5.58, 'wind_speed': 28.92, 'humidity': 68.27, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 16-07,00)}
2025-02-23 18:32:21,252 INFO Received data: {'city': 'Vancouver', 'temperature': 8.57, 'wind_speed': 30.0, 'humidity': 86.36, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 16-07,00)}
2025-02-23 18:32:21,254 INFO Received data: {'city': 'Winnipeg', 'temperature': -6.92, 'wind_speed': 43.47, 'humidity': 36.0, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 21-07,00)}
2025-02-23 18:32:21,258 INFO Received data: {'city': 'Vancouver', 'temperature': -5.63, 'wind_speed': 8.33, 'humidity': 70.15, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 21-07,00)}
2025-02-23 18:32:26,252 INFO Received data: {'city': 'Winnipeg', 'temperature': -17.98, 'wind_speed': 19.25, 'humidity': 53.57, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 26-07,00)}
2025-02-23 18:32:26,255 INFO Received data: {'city': 'Vancouver', 'temperature': 12.84, 'wind_speed': 8.93, 'humidity': 72.11, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 26-07,00)}
2025-02-23 18:32:31,253 INFO Received data: {'city': 'Winnipeg', 'temperature': 5.03, 'wind_speed': 45.61, 'humidity': 67.25, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 31-07,00)}
2025-02-23 18:32:31,254 INFO Received data: {'city': 'Vancouver', 'temperature': 0.78, 'wind_speed': 23.9, 'humidity': 41.2, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 31-07,00)}
2025-02-23 18:32:36,254 INFO Received data: {'city': 'Winnipeg', 'temperature': -24.28, 'wind_speed': 27.53, 'humidity': 45.37, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 36-07,00)}
2025-02-23 18:32:36,258 INFO Received data: {'city': 'Vancouver', 'temperature': 2.35, 'wind_speed': 28.21, 'humidity': 58.52, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 36-07,00)}
2025-02-23 18:32:41,257 INFO Received data: {'city': 'Winnipeg', 'temperature': -0.32, 'wind_speed': 37.65, 'humidity': 75.75, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 41-07,00)}
2025-02-23 18:32:41,261 INFO Received data: {'city': 'Vancouver', 'temperature': -4.44, 'wind_speed': 15.7, 'humidity': 83.69, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 41-07,00)}
2025-02-23 18:32:46,259 INFO Received data: {'city': 'Winnipeg', 'temperature': -1.44, 'wind_speed': 27.07, 'humidity': 76.24, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 46-07,00)}
2025-02-23 18:32:46,262 INFO Received data: {'city': 'Vancouver', 'temperature': -9.1, 'wind_speed': 0.08, 'humidity': 92.41, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 46-07,00)}
2025-02-23 18:32:51,260 INFO Received data: {'city': 'Winnipeg', 'temperature': -28.74, 'wind_speed': 47.57, 'humidity': 41.7, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 51-07,00)}
2025-02-23 18:32:51,266 INFO Received data: {'city': 'Vancouver', 'temperature': -9.59, 'wind_speed': 12.69, 'humidity': 56.16, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 56-07,00)}
2025-02-23 18:32:56,263 INFO Received data: {'city': 'Winnipeg', 'temperature': -4.42, 'wind_speed': 0.58, 'humidity': 37.54, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 56-07,00)}
2025-02-23 18:32:56,267 INFO Received data: {'city': 'Vancouver', 'temperature': -1.96, 'wind_speed': 18.99, 'humidity': 95.52, 'received_at': datetime.datetime(2025, 2, 23, 18, 32, 57-07,00)}
2025-02-23 18:33:01,265 INFO Received data: {'city': 'Winnipeg', 'temperature': 10.72, 'wind_speed': 19.3, 'humidity': 31.4, 'received_at': datetime.datetime(2025, 2, 23, 18, 33, 1-07,00)}
2025-02-23 18:33:01,271 INFO Received data: {'city': 'Vancouver', 'temperature': 15.91, 'wind_speed': 10.72, 'humidity': 86.94, 'received_at': datetime.datetime(2025, 2, 23, 18, 33, 1-07,00)}
2025-02-23 18:33:06,268 INFO Received data: {'city': 'Winnipeg', 'temperature': 21.18, 'wind_speed': 15.12, 'humidity': 58.49, 'received_at': datetime.datetime(2025, 2, 23, 18, 33, 6-07,00)}
2025-02-23 18:33:06,271 INFO Received data: {'city': 'Vancouver', 'temperature': 8.34, 'wind_speed': 5.58, 'humidity': 54.68, 'received_at': datetime.datetime(2025, 2, 23, 18, 33, 6-07,00)}
2025-02-23 18:33:11,270 INFO Received data: {'city': 'Winnipeg', 'temperature': 29.11, 'wind_speed': 10.9, 'humidity': 51.85, 'received_at': datetime.datetime(2025, 2, 23, 18, 33, 11-07,00)}
2025-02-23 18:33:11,273 INFO Received data: {'city': 'Vancouver', 'temperature': 5.97, 'wind_speed': 21.47, 'humidity': 52.07, 'received_at': datetime.datetime(2025, 2, 23, 18, 33, 11-07,00)}
2025-02-23 18:33:18,324 WARNING Node 0 connection failed -- refreshing metadata
2025-02-23 18:33:18,324 ERROR <BrokerConnection node_id=0 host=Nitro-ANV15-51:9092 <connecting> [IPv4 ('127.0.1.1', 9092)]: socket disconnected
2025-02-23 18:33:18,324 ERROR <BrokerConnection node_id=0 host=Nitro-ANV15-51:9092 <connected> [IPv4 ('127.0.1.1', 9092)]: Closing connection. KafkaConnectionError: socket disconnecte
2025-02-23 18:33:18,325 ERROR Fetch to node 0 failed: KafkaConnectionError: socket disconnected
2025-02-23 18:33:18,325 INFO <BrokerConnection node_id=0 host=Nitro-ANV15-51:9092 <connecting> [IPv4 ('127.0.1.1', 9092)]: connecting to Nitro-ANV15-51:9092 [('127.0.1.1', 9092) IPv4]
2025-02-23 18:33:18,326 INFO <BrokerConnection node_id=0 host=Nitro-ANV15-51:9092 <connecting> [IPv4 ('127.0.1.1', 9092)]: Closing connection,
```

- Database Table:** Observed rows in weather_events for both Winnipeg and Vancouver, verifying that the pipeline worked from end to end.

```

Feb 23 18:35
guru@Nitro-ANV15-51:/
guru@Nitro-ANV15-51:/
guru@Nitro-ANV15-51:/

233 | Winnipeg | 1.97 | 48.24 | 77.13 | 2025-02-23 18:31:36.234567
234 | Vancouver | 10.33 | 6.68 | 44.19 | 2025-02-23 18:31:36.237594
235 | Winnipeg | -13.95 | 39.51 | 30.15 | 2025-02-23 18:31:41.236304
236 | Vancouver | -4.29 | 13.89 | 94.34 | 2025-02-23 18:31:41.23949
237 | Winnipeg | 5.03 | 30.92 | 49.68 | 2025-02-23 18:31:46.237713
238 | Vancouver | 22.92 | 19.72 | 65.79 | 2025-02-23 18:31:46.240769
239 | Winnipeg | 6.33 | 27.93 | 62.26 | 2025-02-23 18:31:51.238765
240 | Vancouver | 20.15 | 11.39 | 57.49 | 2025-02-23 18:31:51.242014
241 | Winnipeg | -19.03 | 30.3 | 59.76 | 2025-02-23 18:31:56.239762
242 | Vancouver | 20.54 | 22.3 | 66.05 | 2025-02-23 18:31:56.245244
243 | Winnipeg | -27.55 | 46.9 | 56.06 | 2025-02-23 18:32:01.241815
244 | Vancouver | 12.82 | 23.26 | 36.23 | 2025-02-23 18:32:01.245044
245 | Winnipeg | 10.42 | 41.28 | 22.53 | 2025-02-23 18:32:06.243307
246 | Vancouver | -7.56 | 13.89 | 35.95 | 2025-02-23 18:32:06.246621
247 | Winnipeg | -29.82 | 8.84 | 27.08 | 2025-02-23 18:32:11.245635
248 | Vancouver | 4.65 | 7.2 | 90.01 | 2025-02-23 18:32:11.248252
249 | Winnipeg | 5.58 | 28.92 | 68.27 | 2025-02-23 18:32:16.246667
250 | Vancouver | 8.57 | 30 | 86.36 | 2025-02-23 18:32:16.252063
251 | Winnipeg | -6.92 | 43.47 | 36 | 2025-02-23 18:32:21.251008
252 | Vancouver | -5.63 | 8.33 | 70.15 | 2025-02-23 18:32:21.254121
253 | Winnipeg | -17.98 | 19.25 | 53.57 | 2025-02-23 18:32:26.252234
254 | Vancouver | 12.84 | 8.93 | 72.11 | 2025-02-23 18:32:26.255684
255 | Winnipeg | -18.6 | 45.61 | 67.25 | 2025-02-23 18:32:31.25384
256 | Vancouver | 0.78 | 23.9 | 41.2 | 2025-02-23 18:32:31.256109
257 | Winnipeg | -24.28 | 27.53 | 45.37 | 2025-02-23 18:32:36.255952
258 | Vancouver | 2.35 | 28.21 | 58.52 | 2025-02-23 18:32:36.259236
259 | Winnipeg | -0.32 | 37.65 | 75.75 | 2025-02-23 18:32:41.257748
260 | Vancouver | -4.44 | 15.7 | 83.69 | 2025-02-23 18:32:41.261041
261 | Winnipeg | -1.44 | 27.07 | 76.24 | 2025-02-23 18:32:46.259291
262 | Vancouver | -9.1 | 0.08 | 92.41 | 2025-02-23 18:32:46.262559
263 | Winnipeg | -28.74 | 47.57 | 41.7 | 2025-02-23 18:32:51.260189
264 | Vancouver | -9.59 | 12.69 | 56.16 | 2025-02-23 18:32:51.266133
265 | Winnipeg | -4.42 | 0.58 | 37.54 | 2025-02-23 18:32:56.263859
266 | Vancouver | -1.96 | 10.99 | 95.52 | 2025-02-23 18:32:56.267416
267 | Winnipeg | 10.72 | 19.3 | 31.4 | 2025-02-23 18:33:01.264979
268 | Vancouver | 15.91 | 27.65 | 86.94 | 2025-02-23 18:33:01.270109
269 | Winnipeg | 21.18 | 15.12 | 58.49 | 2025-02-23 18:33:06.268785
270 | Vancouver | -8.34 | 5.77 | 54.68 | 2025-02-23 18:33:06.271749
271 | Winnipeg | 29.11 | 10.9 | 51.85 | 2025-02-23 18:33:11.27085
272 | Vancouver | -5.97 | 21.47 | 52.07 | 2025-02-23 18:33:11.273931
(272 rows)
(END)

```

4. Conclusion

This assignment demonstrated how to build a **complete streaming data pipeline** with Apache Kafka. By creating a **Kafka Producer** to generate and send synthetic weather data and a **Kafka Consumer** to receive, transform, and store that data in **PostgreSQL**, we achieved real-time data flow. The logged events and database queries confirm the solution meets all specified requirements.

For a production environment, additional refinements could be made, such as scaling topics, adding partitions for parallel consumption, or applying further data transformations. However, for this assignment, all objectives have been met.