Step-by-Step Guide for Sending JSON/Dictionary Objects with Kafka

Introduction

This guide provides a step-by-step approach to configure a Kafka server, write producer and consumer clients in Python (using Google Colab), and send JSON/dictionary objects to a Kafka topic.

Step 1: Configuring Kafka Server, Producer, and Consumer

Before writing Python clients, ensure that the Kafka server, producer, and consumer are configured correctly on your EC2 instance.

1. Start the Kafka server:
```bash
bin/kafka-server-start.sh config/server.properties
```

2. Create a Kafka topic (e.g., `demo_testing2`):
```bash
bin/kafka-topics.sh --create --topic demo_testing2 --bootstrap-server localhost:9092
```

3. Start a console-based producer in a separate terminal:
```bash
bin/kafka-console-producer.sh --topic demo_testing2 --bootstrap-server localhost:9092
```

4. Start a console-based consumer in another terminal:
```bash
bin/kafka-console-consumer.sh --topic demo_testing2 --bootstrap-server localhost:9092
```

Step 2: Writing Clients for Consumer and Producer in Google Colab

In this step, you will write Python scripts to act as the producer and consumer.

Installing Kafka Python package in google collab:

```
!pip install kafka-python
```

Producer Script: (write in separate collab file)

```
from kafka import KafkaProducer
import json

# Configure the producer
producer = KafkaProducer(
   bootstrap_servers='51.20.105.68:9092',  # Kafka broker (EC2 public IP)
   value_serializer=lambda v: json.dumps(v).encode('utf-8')  # Serialize dictionary to JSON
)

# Sending a message
data = {"sensor_id": 1, "temperature": 25.4}
producer.send('demo_testing2', value=data)
producer.flush()
```

Consumer Script: (write in separate collab file)

```
from kafka import KafkaConsumer
import json

# Configure the consumer
consumer = KafkaConsumer(
   'demo_testing2',  # Topic name
   bootstrap_servers='51.20.105.68:9092',  # Kafka broker (EC2 public IP)
   auto_offset_reset='earliest',  # Start reading messages from the beginning
   value_deserializer=lambda v: json.loads(v.decode('utf-8'))  # Deserialize JSON to
dictionary
)

# Listening for messages
```

```
print("Listening for messages on topic 'demo_testing2'...")
for message in consumer:
    print(f"Received message: {message.value}")
```

Step 3: Execute the Producer Script

Run the producer script in Google Colab to send messages to the Kafka topic. Make sure the Kafka server is running and the topic (`demo_testing2`) exists.

Steps to execute:
1. Copy the producer script into a Google Colab code cell.
2. Run the cell to send a JSON/dictionary object to the Kafka topic.

Step 4: Execute the Consumer Script

Run the consumer script in Google Colab to listen for messages from the Kafka topic.

Steps to execute:
1. Copy the consumer script into a Google Colab code cell.
2. Run the cell to start listening for messages.
3. You should see the JSON/dictionary object sent by the producer script.