

KAFKA ASSIGNMENT

-Download restaurant data

Link: https://github.com/shashank-mishra219/Confluent-Kafka-Setup/blob/main/restaurant_orders.csv

1. Setup Confluent Kafka Account
2. Create one kafka topic named as "restaurant-take-away-data" with 3 partitions

Topic 'restaurant-take-away-data' with 3 partitions is created

Stream Catalog

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Topics

Search topics

+ Add topic

Topic name	Partitions	Production (last min)	Consumption (last min)	Schema
restaurant-take-away-data	3	--	--	Set a schema
Test-Topic-1	3	--	0B/s	Edit schema

-Setup key (string) & value (json) schema in the confluent schema registry

Key Schema:

```
"string"
```

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Cluster Overview

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Networking

API Keys

Cluster Settings

Stream Lineage

Stream Designer

Topics

ksqlDB

Connectors

Clients

Schema Registry

Edit schema

Overview Messages Schema Configuration

1

"string"

Value Schema:

```
{
```

```
{
  "$id": "http://example.com/myURI.schema.json",
  "$schema": "http://json-schema.org/draft-07/schema#",
  "additionalProperties": false,
  "description": "Sample schema to help you get started.",
  "properties": { "item_name": {
    "description": "The type(v) type is used.",
    "type": "string"
  },
  "order_date": {
    "description": "The type(v) type is used.",
    "type": "string"
  },
  "order_number": {
    "description": "The type(v) type is used.",
    "type": "number"
  },
  "product_price": {
    "description": "The type(v) type is used.",
    "type": "number"
  },
  "quantity": {
    "description": "The type(v) type is used.",
    "type": "number"
  },
  "total_products": {
    "description": "The type(v) type is used.",
    "type": "number"
  }
  },
  "title": "SampleRecord2",
  "type": "object"
}
```

ValueKey

Type: JSON Schema Compatibility mode: Backward Used by topic: restaurant-take-away-data

Version 3 (current) Schema ID: 100005

Compare versions

Search by keyword

▼ object (7) ⊕

- type: object
- additionalProperties: false
- \$id: http://example.com/myURL.schema.json
- \$schema: http://json-schema.org/draft-07/schema#
- title: SampleRecord2
- description: Sample schema to help you get started.

▼ properties (6)

- ▶ item_name (2) ⊕
- ▶ order_date (2) ⊕
- ▶ order_number (2) ⊕
- ▶ product_price (2) ⊕
- ▶ quantity (2) ⊕
- ▶ total_products (2) ⊕

Description

Add description

Tags

Add tags to this version

⊕ Add business metadata

Schema doc

Sample schema to help you

Date created

Nov. 9 2022 10:15 AM

-Write a kafka producer program (python or any other language) to read data records from restaurant data csv file, make sure schema is not hardcoded in the producer code, read the latest version of schema and schema_str from schema registry and use it for data serialization.

From producer code, publish data in Kafka Topic one by one and use dynamic key while publishing the records into the Kafka Topic

Producer Code:

```
import argparse
from uuid import uuid4
from six.moves import input
from confluent_kafka import Producer
from confluent_kafka.serialization import StringSerializer, SerializationContext, MessageField
from confluent_kafka.schema_registry import SchemaRegistryClient
from confluent_kafka.schema_registry.json_schema import JSONSerializer
#from confluent_kafka.schema_registry import *
import pandas as pd
from typing import List

FILE_PATH = "/Users/namrt/OneDrive/Desktop/Kafka/restaurant_orders.csv"
columns=['order_number', 'order_date', 'item_name', 'quantity', 'product_price', 'total_products']

API_KEY = '3DKHZA77TCORTQVM'
```

```

ENDPOINT_SCHEMA_URL = 'https://psrc-zj6ny.us-east-2.aws.confluent.cloud'
API_SECRET_KEY = '0c+PCR+sp1cEL0ns6tBTZl8bA9Z+AmpYEPsgQ4DfnsiwUKPRSR2vZs2Cx6f8Ifol'
BOOTSTRAP_SERVER = 'pkc-ymrq7.us-east-2.aws.confluent.cloud:9092'
SECURITY_PROTOCOL = 'SASL_SSL' # authentication mechanism for encrypted and secured
connection
SSL_MACHENISM = 'PLAIN'
SCHEMA_REGISTRY_API_KEY = 'G6WDT4VOCBSLA4C0'
SCHEMA_REGISTRY_API_SECRET =
'28e5JcKaaXek7dbw6SC0oaX0T0UNnuYUg3wopsPqRHy9LrEfHQGB9pmquUbT1Pqe'

# for kafka cluster connectivity
def sasl_conf():

    sasl_conf = {'sasl.mechanism': SSL_MACHENISM,
                  # Set to SASL_SSL to enable TLS support.
                  # 'security.protocol': 'SASL_PLAINTEXT'}
                  'bootstrap.servers':BOOTSTRAP_SERVER,
                  'security.protocol': SECURITY_PROTOCOL,
                  'sasl.username': API_KEY,
                  'sasl.password': API_SECRET_KEY
                  }

    return sasl_conf

# for schema registry connectivity
def schema_config():
    return {'url':ENDPOINT_SCHEMA_URL,

            'basic.auth.user.info':f"{SCHEMA_REGISTRY_API_KEY}:{SCHEMA_REGISTRY_API_SECRET}"

            }

class Restaurant:
    def __init__(self,record:dict):
        for k,v in record.items():
            setattr(self,k,v)

        self.record=record

    @staticmethod
    def dict_to_restaurant(data:dict,ctx):
        return Restaurant(record=data)

    def __str__(self):
        return f"{self.record}"

def get_restaurant_instance(file_path):

```

```

df=pd.read_csv(file_path)
df=df.iloc[:,:]
restaurants:List[Restaurant]=[]
for data in df.values:
    restaurant=Restaurant(dict(zip(columns,data)))
    restaurants.append(restaurant)
    yield restaurant

def restaurant_to_dict(restaurant:Restaurant, ctx):
    """
    Returns a dict representation of a User instance for serialization.
    Args:
        user (User): User instance.
        ctx (SerializationContext): Metadata pertaining to the serialization
            operation.
    Returns:
        dict: Dict populated with user attributes to be serialized.
    """

    # User._address must not be serialized; omit from dict
    return restaurant.record

def delivery_report(err, msg):
    """
    Reports the success or failure of a message delivery.
    Args:
        err (KafkaError): The error that occurred on None on success.
        msg (Message): The message that was produced or failed.
    """

    if err is not None:
        print("Delivery failed for User record {}: {}".format(msg.key(), err))
        return
    print('User record {} successfully produced to {} [{}] at offset {}'.format(
        msg.key(), msg.topic(), msg.partition(), msg.offset()))

def main(topic):
    schema_registry_conf = schema_config()
    schema_registry_client = SchemaRegistryClient(schema_registry_conf)
    schema_str = schema_registry_client.get_latest_version('restaurant-take-away-data-
value').schema.schema_str # for taking Latest schema
    string_serializer = StringSerializer('utf_8') # utf-8 -> encoding -> to handle all
unique codes in any particular string
    json_serializer = JsonSerializer(schema_str, schema_registry_client,restaurant_to_dict)

    producer = Producer(sasl_conf())

```


-Write kafka consumer code and create two copies of same consumer code and save it with different names (kafka_consumer_1.py & kafka_consumer_2.py), again make sure latest schema version and schema_str is not hardcoded in the consumer code, read it automatically from the schema registry to deserialize the data.

Now test two scenarios with your consumer code:

a.) Use "group.id" property in consumer config for both consumers and mention different group_ids in kafka_consumer_1.py & kafka_consumer_2.py,

apply "earliest" offset property in both consumers and run these two consumers from two different terminals. Calculate how many records each consumer consumed and printed on the terminal

b.) Use "group.id" property in consumer config for both consumers and mention same group_ids in kafka_consumer_1.py & kafka_consumer_2.py,

apply "earliest" offset property in both consumers and run these two consumers from two different terminals. Calculate how many records each consumer consumed and printed on the terminal

Consumer Code:

```
import argparse
from confluent_kafka import Consumer
from confluent_kafka.serialization import SerializationContext, MessageField
from confluent_kafka.schema_registry.json_schema import JSONDeserializer
from confluent_kafka.schema_registry import SchemaRegistryClient

API_KEY = '3DKHZA77TCORTQVM'
ENDPOINT_SCHEMA_URL = 'https://psrc-zj6ny.us-east-2.aws.confluent.cloud'
API_SECRET_KEY = '0c+PCR+sp1cEL0ns6tBTZl8bA9Z+AmpYEPSgQ4DfnsiwUKPRSR2vZs2Cx6f8Ifol'
BOOTSTRAP_SERVER = 'pkc-ymrq7.us-east-2.aws.confluent.cloud:9092'
SECURITY_PROTOCOL = 'SASL_SSL' # authentication mechanism for encrypted and secured connection
SSL_MACHENISM = 'PLAIN'
SCHEMA_REGISTRY_API_KEY = 'G6WDT4VOCBSLA4C0'
SCHEMA_REGISTRY_API_SECRET = '28e5JcKaaXek7dbw6SCOoaX0T0UNnuYUg3wopsPqRHy9LrEfhhqGB9pmquUbt1Pqe'

def sasl_conf():

    sasl_conf = {'sasl.mechanism': SSL_MACHENISM,
                 # Set to SASL_SSL to enable TLS support.
                 # 'security.protocol': 'SASL_PLAINTEXT'}
                 'bootstrap.servers':BOOTSTRAP_SERVER,
                 'security.protocol': SECURITY_PROTOCOL,
                 'sasl.username': API_KEY,
                 'sasl.password': API_SECRET_KEY
                }

    return sasl_conf
```

```

def schema_config():
    return {'url':ENDPOINT_SCHEMA_URL,

            'basic.auth.user.info':f"{SCHEMA_REGISTRY_API_KEY}:{SCHEMA_REGISTRY_API_SECRET}"

            }

class Restaurant:
    def __init__(self,record:dict):
        for k,v in record.items():
            setattr(self,k,v)

        self.record=record

    @staticmethod
    def dict_to_restaurant(data:dict,ctx):
        return Restaurant(record=data)

    def __str__(self):
        return f"{self.record}"

def main(topic):
    count = 0
    schema_registry_conf = schema_config()
    schema_registry_client = SchemaRegistryClient(schema_registry_conf)
    schema_str = schema_registry_client.get_latest_version('restaurant-take-away-data-
value').schema.schema_str # for taking latest schema
    json_deserializer = JSONDeserializer(schema_str,
                                         from_dict=Restaurant.dict_to_restaurant)

    consumer_conf = sasl_conf()
    consumer_conf.update({
        'group.id': 'group1',
        'auto.offset.reset': "earliest"})

    consumer = Consumer(consumer_conf)
    consumer.subscribe([topic])

    while True:
        try:
            # SIGINT can't be handled when polling, limit timeout to 1 second.
            msg = consumer.poll(1.0)
            if msg is None:

```



```

        continue

    restaurant = json_deserializer(msg.value(), SerializationContext(msg.topic(),
MessageField.VALUE))

    if restaurant is not None:
        count+=1
        print("User record {}: restaurant: {}\n"
              .format(msg.key(), restaurant))
        print(f"{count} messages consumed")
    except KeyboardInterrupt:
        break
    consumer.close()

main("restaurant-take-away-data")

```

For testing, we need to change group id only, rest code will remain same.

```

consumer_conf.update({
    'group.id': 'group1',
    'auto.offset.reset': "earliest"})

```

- a) group id for consumer1 and consumer2 is same.
 Task gets distributed among the number of consumers we have. Load sharing
 results in fast processing.

The screenshot displays two side-by-side IDE windows. The left window, titled 'Restaurant_consumer1.py', shows the following code:

```

59 schema_str = schema_registry_client.get_latest_version(
60 json_deserializer = JSONDeserializer(schema_str,
61                                     from_dict=Restauran
62
63 consumer_conf = sasl_conf()
64 consumer_conf.update({
65     'group.id': 'group1',
66     'auto.offset.reset': "earliest"})
67
68 consumer = Consumer(consumer_conf)
69 consumer.subscribe([topic])
70

```

The right window, titled 'Restaurant_consumer2.py', shows identical code:

```

58 schema_registry_client = SchemaRegistryClient(schema_reg
59 schema_str = schema_registry_client.get_latest_version(
60 json_deserializer = JSONDeserializer(schema_str,
61                                     from_dict=Restauran
62
63 consumer_conf = sasl_conf()
64 consumer_conf.update({
65     'group.id': 'group1',
66     'auto.offset.reset': "earliest"})
67
68 consumer = Consumer(consumer_conf)
69 consumer.subscribe([topic])

```

Below the code, the terminal output for each consumer is shown. The left terminal (Consumer1) displays:

```

49793 messages consumed
User record b'6e42ec93-854c-4f12-a5e8-d92f63bd5c58': restaurant: {'order_nu
mber': 2594, 'order_date': '30/05/2016 10:52', 'item_name': 'House Red wine
75cl', 'quantity': 2, 'product_price': 17.95, 'total_products': 6}
49794 messages consumed

```

The right terminal (Consumer2) displays:

```

25023 messages consumed
User record b'8f78ed13-0504-4d90-87b4-b66ea21ff472': restaurant: {'order_nu
mber': 1403, 'order_date': '02/10/2015 17:29', 'item_name': 'House Red wine
75cl', 'quantity': 1, 'product_price': 17.95, 'total_products': 9}
25024 messages consumed

```

Total messages: 74818
 Consumer1: 49794
 Consumer2: 25024

b) Group if for consumer1 and consumer2 is different.
Both will perform their own task.
Total messages: 74818
Consumer1: 74818
Consumer2: 74818

-Once above questions are done, write another kafka consumer to read data from kafka topic and from the consumer code create one csv file "output.csv" and append consumed records output.csv file

```
import argparse
import csv
from confluent_kafka import Consumer
from confluent_kafka.serialization import SerializationContext, MessageField
from confluent_kafka.schema_registry.json_schema import JSONDeserializer
from confluent_kafka.schema_registry import SchemaRegistryClient

API_KEY = '3DKHZA77TCORTQVM'
ENDPOINT_SCHEMA_URL = 'https://psrc-zj6ny.us-east-2.aws.confluent.cloud'
API_SECRET_KEY = '0c+PCR+sp1cEL0ns6tBTZl8bA9Z+AmpYEPSgQ4DfnsiwUKPRSR2vZs2Cx6f8IfoL'
BOOTSTRAP_SERVER = 'pkc-ymrq7.us-east-2.aws.confluent.cloud:9092'
SECURITY_PROTOCOL = 'SASL_SSL' # authentication mechanism for encrypted and secured connection
SSL_MACHENISM = 'PLAIN'
SCHEMA_REGISTRY_API_KEY = 'G6WDT4VOCBSLA4C0'
SCHEMA_REGISTRY_API_SECRET = '28e5JcKaaXek7dbw6SCOoaX0T0UNnuYUg3wopsPqRHy9LrEfHqGB9pmquUbT1Pqe'

def sasl_conf():

    sasl_conf = {'sasl.mechanism': SSL_MACHENISM,
                  # Set to SASL_SSL to enable TLS support.
                  # 'security.protocol': 'SASL_PLAINTEXT'}
                  'bootstrap.servers': BOOTSTRAP_SERVER,
                  'security.protocol': SECURITY_PROTOCOL,
                  'sasl.username': API_KEY,
                  'sasl.password': API_SECRET_KEY
                  }

    return sasl_conf

def schema_config():

    return {'url': ENDPOINT_SCHEMA_URL,

            'basic.auth.user.info': f"{SCHEMA_REGISTRY_API_KEY}:{SCHEMA_REGISTRY_API_SECRET}"
```

```

    }

class Restaurant:
    def __init__(self,record:dict):
        for k,v in record.items():
            setattr(self,k,v)

        self.record=record

    @staticmethod
    def dict_to_restaurant(data:dict,ctx):
        return Restaurant(record=data)

    def __str__(self):
        return f"{self.record}"

def main(topic):
    count = 0
    schema_registry_conf = schema_config()
    schema_registry_client = SchemaRegistryClient(schema_registry_conf)
    schema_str = schema_registry_client.get_latest_version('restaurant-take-away-data-
value').schema.schema_str # for taking Latest schema
    json_deserializer = JSONDeserializer(schema_str,
                                         from_dict=Restaurant.dict_to_restaurant)

    consumer_conf = sasl_conf()
    consumer_conf.update({
        'group.id': 'group1',
        'auto.offset.reset': "earliest"})

    consumer = Consumer(consumer_conf)
    consumer.subscribe([topic])
    final = []
    columns=['order_number', 'order_date', 'item_name', 'quantity', 'product_price',
'total_products']

    while True:
        try:
            # SIGINT can't be handled when polling, limit timeout to 1 second.
            msg = consumer.poll(1.0)
            if msg is None:
                with open('output.csv', 'w') as csvfile:
                    writer = csv.DictWriter(csvfile, fieldnames = columns)
                    writer.writeheader()
                    writer.writerows(final)
                continue

```

```

        restaurant = json_deserializer(msg.value(), SerializationContext(msg.topic(),
MessageField.VALUE))

        if restaurant is not None:
            count+=1
            print("User record {}: restaurant: {}".format(msg.key(), restaurant))
            final.append(restaurant.record)
            print(f"{count} messages consumed\n")
        except KeyboardInterrupt:
            break
    consumer.close()

main("restaurant-take-away-data")

```

Restaurant_consumer.py

output.csv

output.csv

```

1  order_number,order_date,item_name,quantity,product_price,total_products
2
3  16118,03/08/2019 20:25,Plain Papadum,2,0.8,6
4
5  16118,03/08/2019 20:25,Mango Chutney,1,0.5,6
6
7  16117,03/08/2019 20:17,Tandoori Chicken (1/4),1,4.95,7
8
9  16117,03/08/2019 20:17,Saag Paneer,1,5.95,7
10
11 16116,03/08/2019 20:09,Aloo Chaat,1,4.95,5
12
13 16116,03/08/2019 20:09,Lamb Biryani,1,9.95,5
14
15 16115,03/08/2019 20:01,Chicken Pakora,1,5.95,7
16
17 16114,03/08/2019 19:44,Special Fried Rice,2,3.95,2
18
19 16113,03/08/2019 19:42,Pilau Rice,1,2.95,5
20
21 16112,03/08/2019 19:41,Plain Papadum,2,0.8,4
22
23 16111,03/08/2019 19:29,Saag Aloo,1,5.95,4
24
25 16110,03/08/2019 19:28,Aloo Gobi,1,5.95,8
26
27 16110,03/08/2019 19:28,Chicken Biryani,1,9.95,8
28
29 16109,03/08/2019 19:26,Plain Papadum,4,0.8,7
30
31 16108,03/08/2019 19:26,Chicken Tikka Masala,1,9.95,7

```

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