Welcome!

- We'll start in a moment :)
- We are NOT recording tonight's event. We may plan to take screenshots for social media.
    - ***If you want to remain anonymous***, change your name & keep video off.
- We'll introduce the hosts and break in-between for Q/A.
- We will make some time for Q&A at the end of the presentation as well.
- You can come prepared with questions. And, feel free to take notes.
- Online event best practices:
    - Don't multitask. Distractions reduce your ability to remember concepts.
    - Mute yourself when you aren't talking.
    - We want the session to be interactive.
    - Feel free to unmute and ask questions in the middle of the presentation.
    - Turn on your video if you feel comfortable.
    - Disclaimer: Speaker doesn't knows everything!

Check out:

- Technical Tracks and Digital Events
- Get updates – join the Digital mailing list
- Give us your feedback – take the Survey

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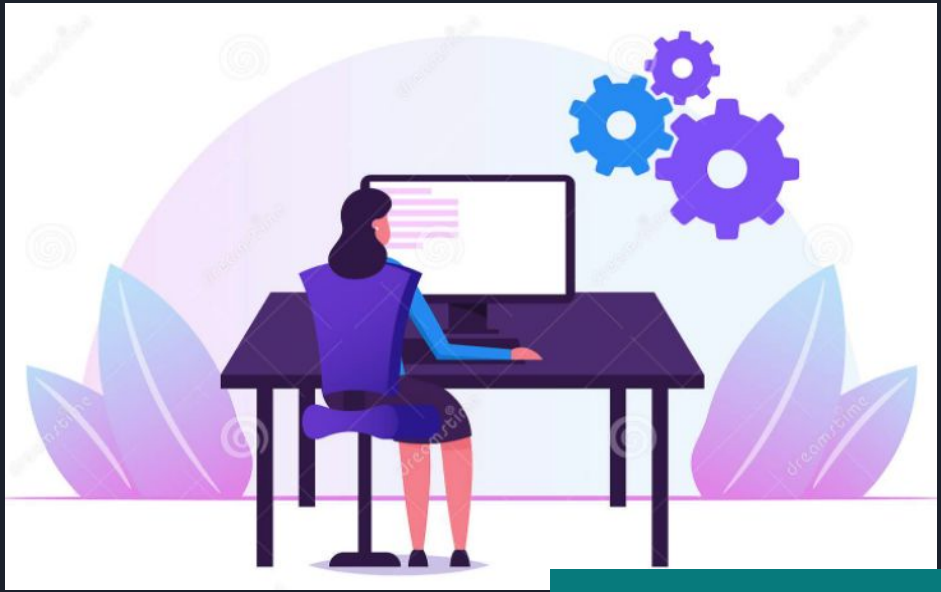

WWCode Digital + **Backend Study Group**

January 20, 2022

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Backend Study Group

- Welcome from WWCode!
- Our mission: Inspiring women to excel in technology careers.
- Our vision: A world where women are representative as technical executives, founders, VCs, board members and software engineers.

Harini Rajendran
Lead, Women Who Code San Francisco
https://www.linkedin.com/in/hrajendran/

Prachi Shah
Director, Women Who Code San Francisco
https://www.linkedin.com/in/prachisshah/

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Introduction to Apache Kafka

Set your data in motion

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Agenda

What is Event Streaming

What is Apache Kafka - Event Streaming Platform

Kafka - Architecture and Concepts

Kafka - Applications

Demo

Q & A

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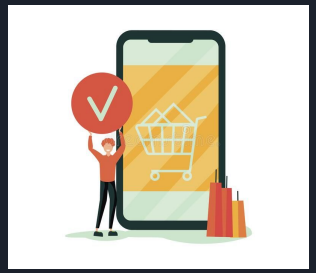
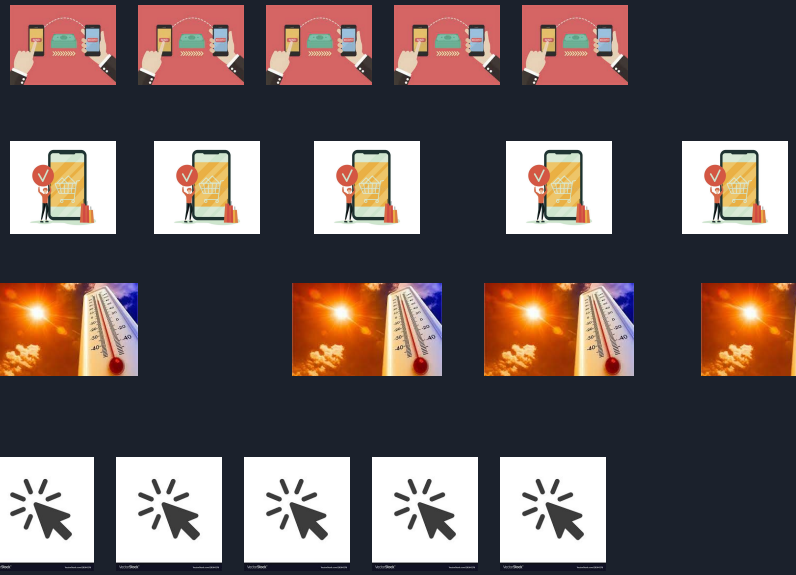
What is an event

Any type of action, incident, or change that happened at a particular time.



Event Streams

Stream of these events.....



Event Streams

Credit

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What is Event Streaming Platform

- Capturing these events in real time from databases, sensors, mobile devices, software applications, etc
- Storing the events
- Processing the events
- Reacting to events
- Continuous flow of information to right place at right time

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Apache Kafka

"Apache Kafka is an open-source distributed event streaming platform used by thousands of companies for high-performance data pipelines, streaming analytics, data integration, and mission-critical applications"

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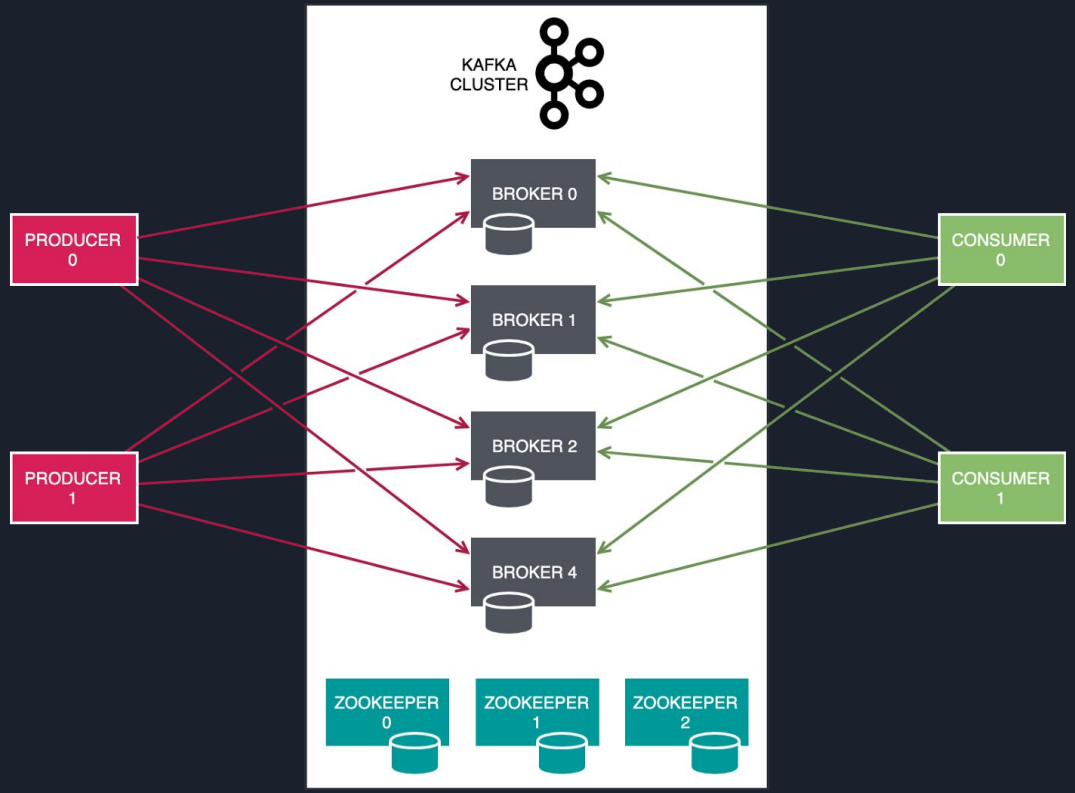
Apache Kafka

Apache Kafka Architecture



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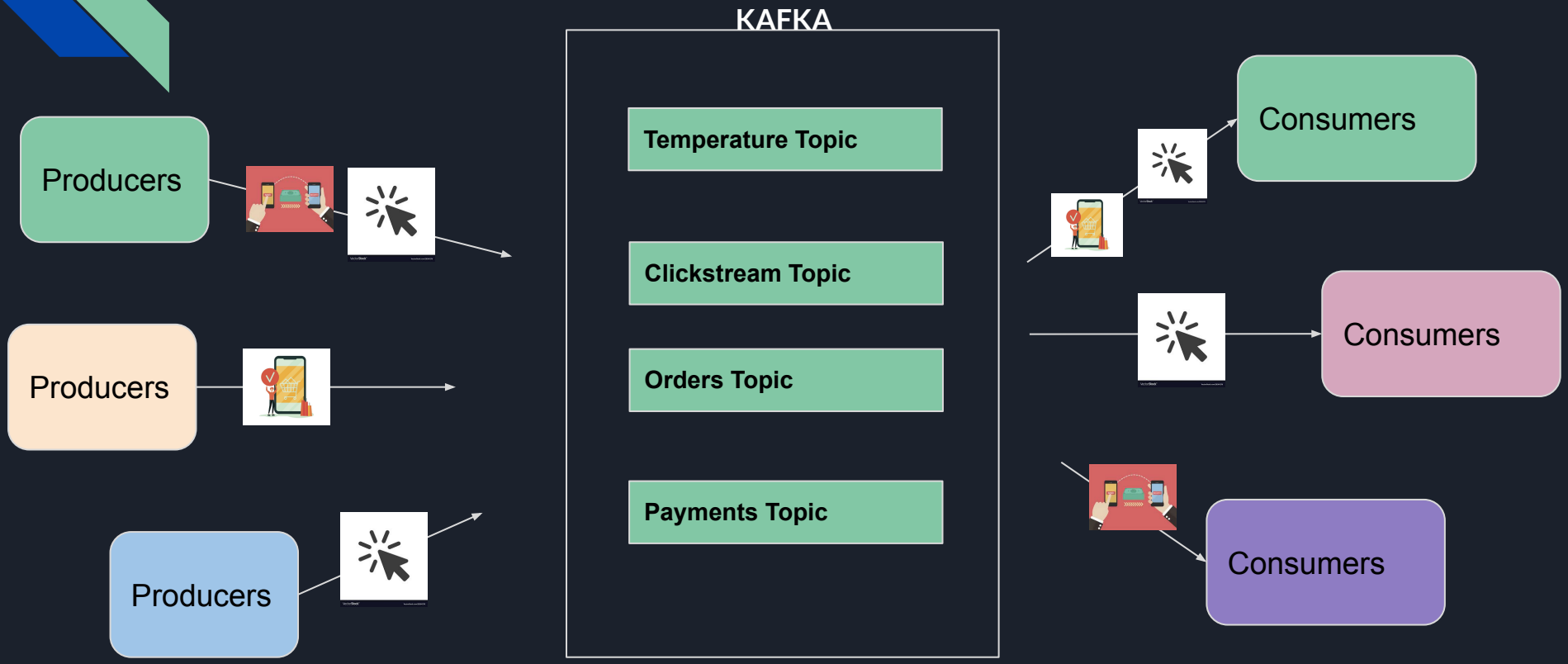
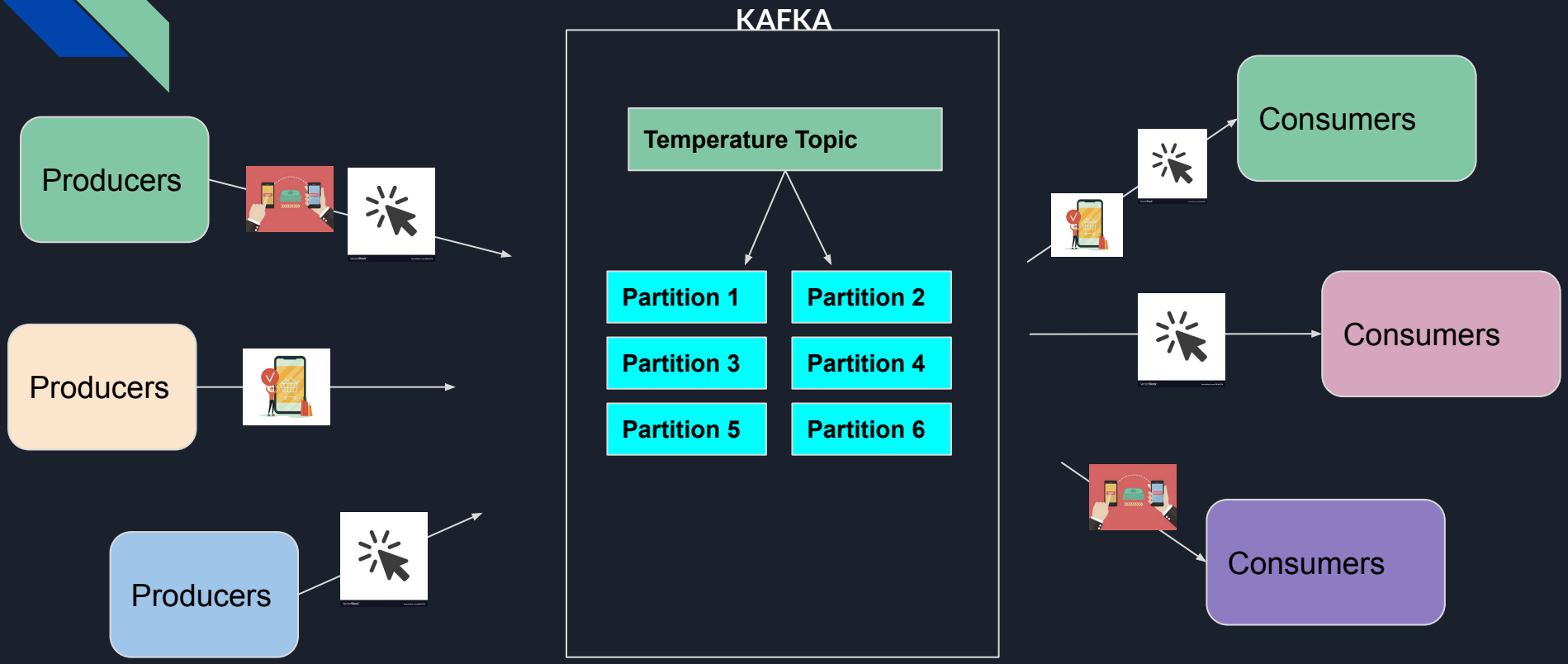
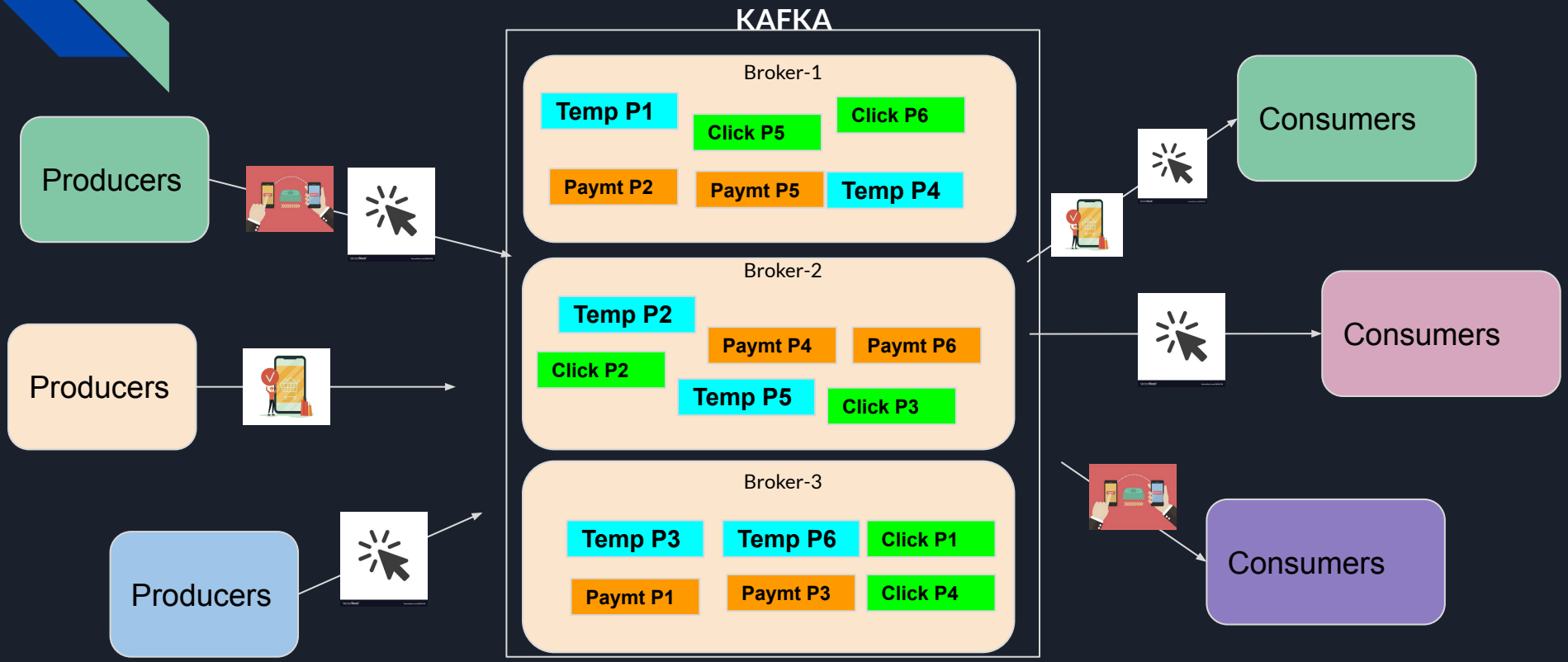
Topics & Partitions



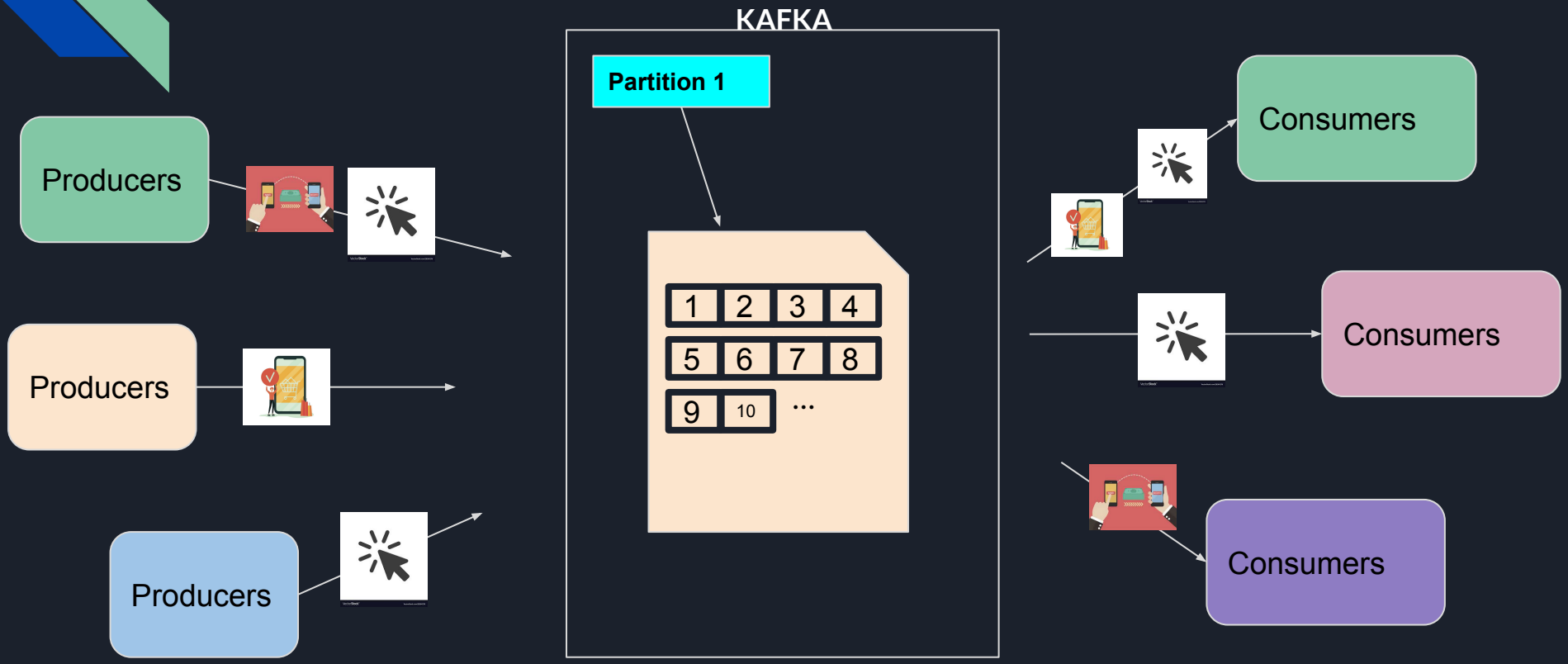
Topics & Partitions



Topics & Partitions



Partitions



Summary

Step 0 : Start Zookeeper and Kafka

Step 1 : Create topic with partition counts and replicas

Step 2: Create producers who produces messages into topic

Step 3: Create consumers who consumes messages from topic

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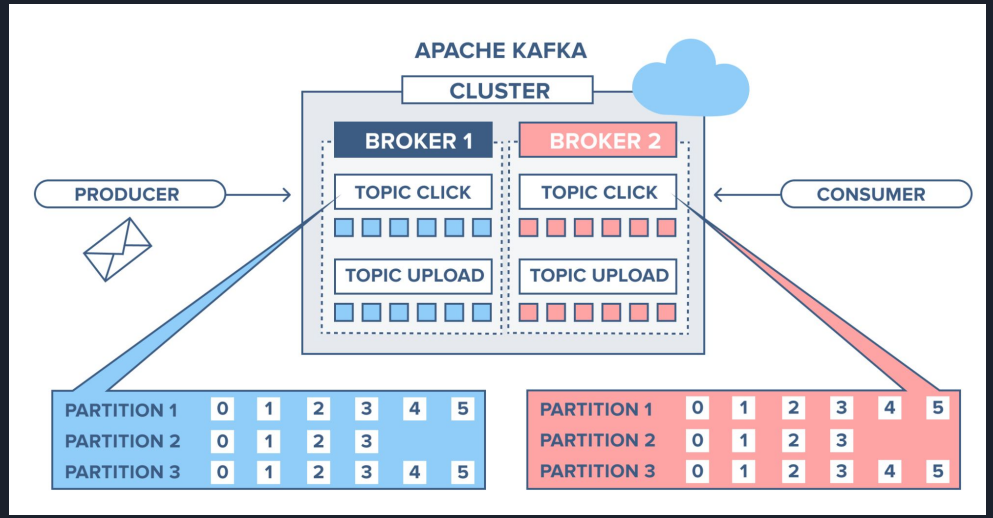
Website Activity Tracking



Goal

Track user-actions on a website (i.e. clicks, uploads, page views, searches, etc.)

Application

Instagram

1. User likes a post by clicking it
2. Web application publishes user's like to topic click, partition xx
3. Web application consumes records from topic click, partition xx updating the number of likes on the post in real-time

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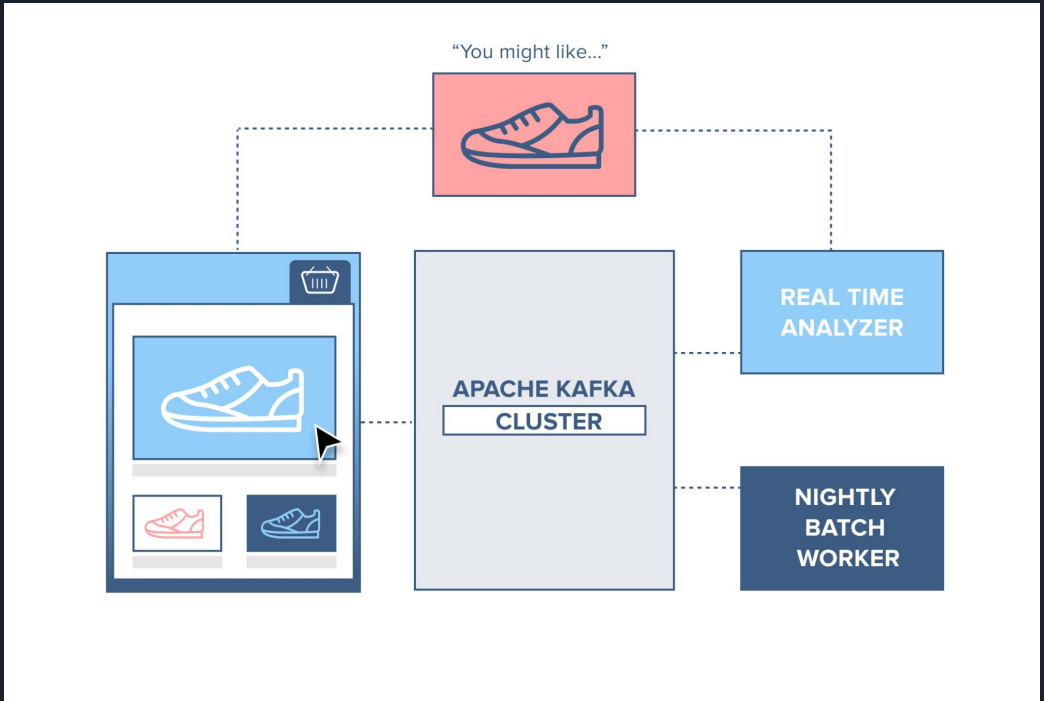
Online Shopping



Goal

Recommend products based on prior clicks

Application

Amazon

1. User searches for sneakers, and clicks on a pair of Adidas fashion sneakers. This event is sent to Kafka cluster.
2. Real Time Analyzer consumes this event and suggests a different pair of fashion sneakers.
3. Nightly Batch Worker consumes this event and sends an email with suggested products.

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Demo

Step 1 : Download Kafka [This has zookeeper as well]

Prerequisite: Install Java in your machine

```
wget https://dlcdn.apache.org/kafka/3.1.0/kafka_2.13-3.1.0.tgz
tar -xzf kafka_2.13-3.1.0.tgz
mv kafka_2.13-3.1.0 kafka
```

Step 2: Start zookeeper and kafka

```
kafka/bin/zookeeper-server-start.sh config/zookeeper.properties
For 1 broker kafka cluster:
kafka/bin/kafka-server-start.sh config/server.properties
For 3 brokers kafka cluster:
Create 3 config files and start all 3 of them separately
Reference link to start multiple brokers on same laptop
```

Step 3: Create topic with partition counts and replicas

```
kafka/bin/kafka-topics.sh --create --partitions 6 --replication-factor 2 --topic demo-topic
--bootstrap-server localhost:9092
```


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Demo

Step 4: Explore topic

```
kafka/bin/kafka-topics.sh --list --bootstrap-server localhost:9092
kafka/bin/kafka-topics.sh --describe --topic demo-topic --bootstrap-server localhost:9092
```

Step 5: Create producers who produces messages to topic

Producer 1 - Console producer

```
kafka/bin/kafka-console-producer.sh --topic demo-temperature --bootstrap-server localhost:9092
91
89
21
20
```


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Demo

Producer 2 - Custom producer

Code

```
public class customProducer {

   public static void main(String[] args) throws Exception{

      String topicName = "demo-temperature";

      // setup producer configs
      Properties props = new Properties();
      props.put("bootstrap.servers", "localhost:9092"); // broker address
      props.put("key.serializer", "org.apache.kafka.common.serialization.StringSerializer");
      props.put("value.serializer","org.apache.kafka.common.serialization.StringSerializer");

      // create producer object
      Producer<String, String> producer = new KafkaProducer<String, String>(props);

      // create dummy record to send
      for (int i = 0; i < 10; i++) {
          System.out.println("Producing record...");
          ProducerRecord<String, String> record = new ProducerRecord<String, String>(topicName, "Custom Producer", "100");
          producer.send(record);
          TimeUnit.SECONDS.sleep(1);
      }

      // gracefully close
      producer.close();
   }
}
```

Demo

Build

```
javac -cp "kafka/libs/*" customProducer.java
```

Run

```
java -cp "kafka/libs/*":. customProducer
Producing record...
Producing record...
Producing record...
Producing record...
Producing record...
Producing record...
Producing record...
Producing record...
Producing record...
Producing record...
```


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Demo

Step 6: Create consumers who consumes messages from topic

Consumer 1 - Console consumer

```
kafka/bin/kafka-console-consumer.sh --topic demo-temperature --from-beginning --bootstrap-server
localhost:9092
```

Consumer 2 - Custom consumer

Build

```
javac -cp "kafka/libs/*" customConsumer.java
```

Run

```
java -cp "kafka/libs/*":. customConsumer
```


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Demo

Code

```
public class customConsumer {

   public static void main(String[] args) throws Exception{

      String topicName = "demo-temperature";

      // setup consumer configs
      Properties props = new Properties();
      props.put("bootstrap.servers", "localhost:9092"); // broker address
      props.put("key.deserializer", "org.apache.kafka.common.serialization.StringDeserializer");
      props.put("value.deserializer","org.apache.kafka.common.serialization.StringDeserializer");
      props.put("group.id","customConsumer");

      // create consumer object
      Consumer<String, String> consumer = new KafkaConsumer<String, String>(props);
      consumer.subscribe(Collections.singletonList(topicName));

      while (true) {
            ConsumerRecords<String, String> consumerRecords = consumer.poll(1000);

            consumerRecords.forEach(record -> {
                System.out.printf("Consumer Record:(%s, %s, %d, %d)\n",
                        record.key(), record.value(),
                        record.partition(), record.offset());
            });

            consumer.commitAsync();
        }
   }
}
~
```


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Backend Study Group

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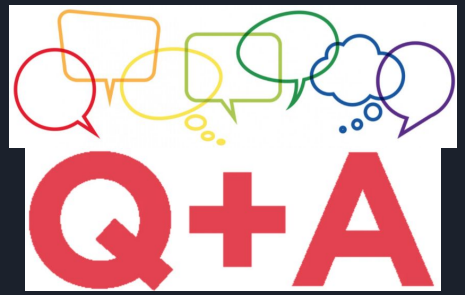
https://www.linkedin.com/in/hrajendran/



Resources and References:

- https://kafka.apache.org/
- https://www.ibm.com/cloud/learn/apache-kafka
- https://docs.confluent.io/5.5.1/kafka/introduction.html#
- https://kafka.apache.org/intro
- https://www.cloudkarafka.com/blog/part1-kafka-for-beginners-what-is-apache-kafka.html
- https://data-flair.training/blogs/advantages-and-disadvantages-of-kafka/
- https://medium.com/swlh/apache-kafka-in-a-nutshell-5782b01d9ffb

Backend Study Group:

• Presentations and session recordings found here: WWCode YouTube channel

You can unmute and talk or use the chat.

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