Apache Kafka

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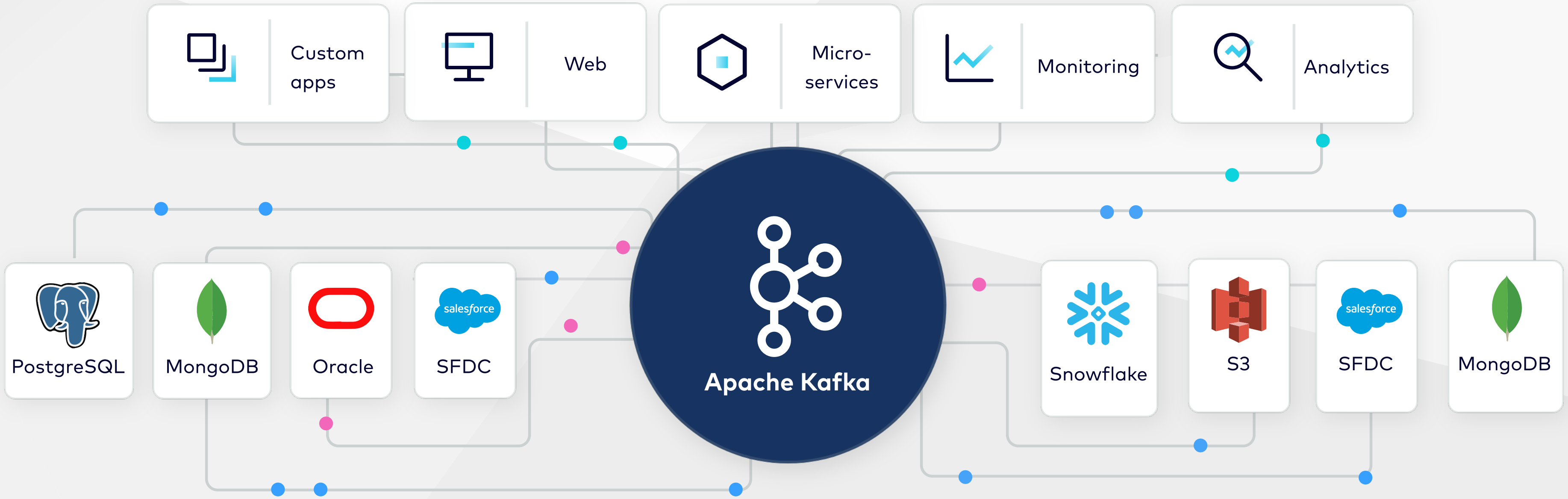
What is Apache Kafka

Apache Kafka is an **open source distributed streaming system** used for **stream processing**, **real-time data pipelines**, and **data integration at scale**.



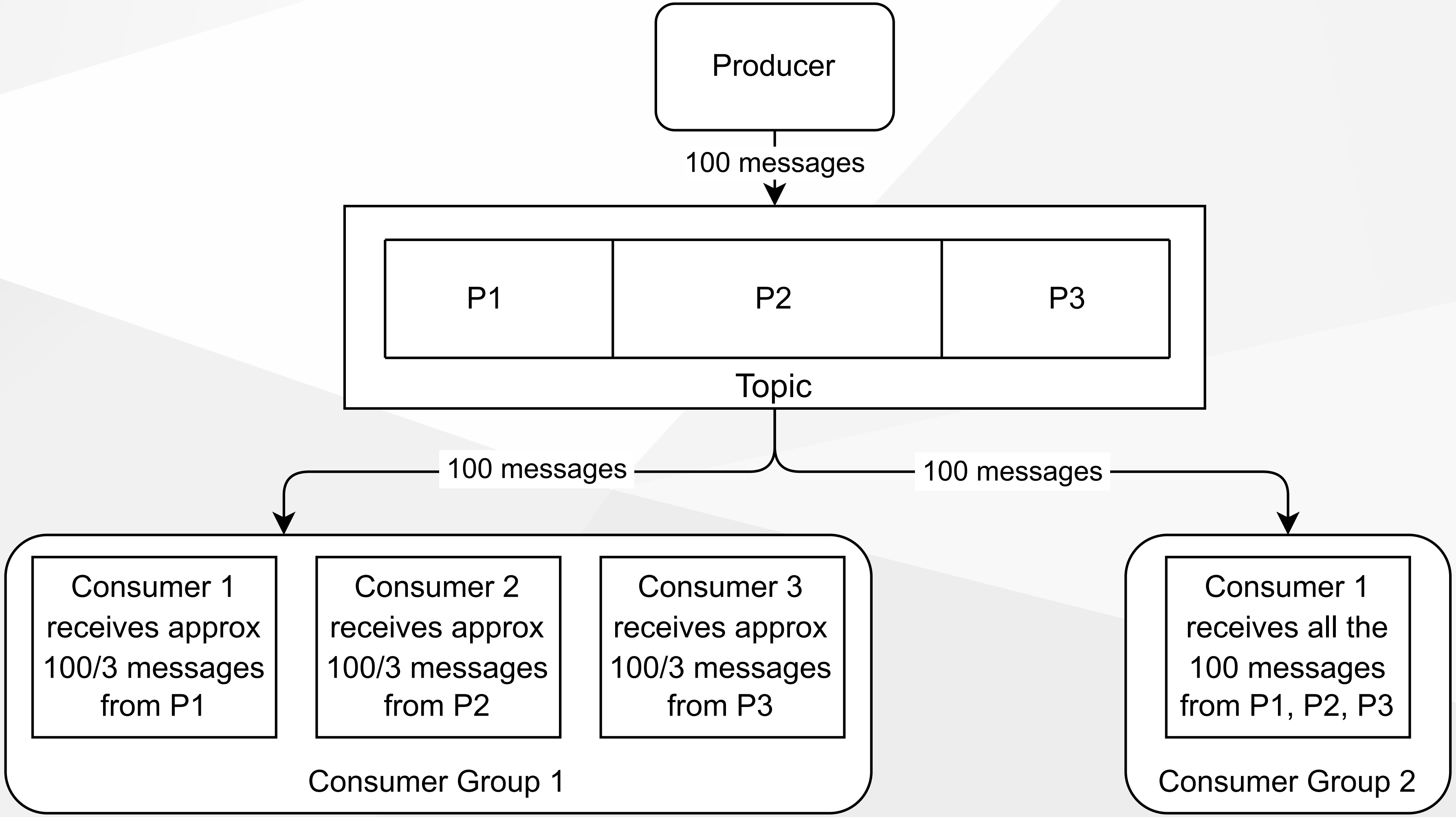
Why use it?

- **Scalable**: Kafka is a distributed system, which can be scaled quickly and easily without incurring any downtime.
- **Fast**: Kafka delivers high throughput for both publishing and subscribing even when dealing with many terabytes of stored messages.
- **Durable**: Kafka persists the messages on the disks, providing intra-cluster replication. This makes for a highly durable messaging system.
- **Reliable**: Kafka replicates data and is able to automatically balance consumers in the event of failure.

When to use Kafka?

- To ***publish*** (write) and ***subscribe*** **to** (read) **streams of events**, including continuous import/export of your data from other systems.
- To **store streams of events** ***durably*** and ***reliably*** for as long as you want.
- To **process streams of events as they occur** or **retrospectively**.
- To use all this functionality in a **distributed**, **highly scalable**, **elastic**, **fault-tolerant**, and **secure** manner.

Partitions


Producer
100 messages
P1
P2
P3
Topic
100 messages
100 messages
Consumer 1 receives approx 100/3 messages from P1
Consumer 2 receives approx 100/3 messages from P2
Consumer 3 receives approx 100/3 messages from P3
Consumer Group 1
Consumer 1 receives all the 100 messages from P1, P2, P3
Consumer Group 2

Important Terminologies

- **Producers** are those client applications that publish (write) events to Kafka.
- **Consumers** are those that subscribe to (read and process) these events.
- **Brokers** are just nodes in the cluster hosting the server for storing and transferring data.
- **Topic** is a category/feed name to which records are stored and published.
- **Messages** are key-value pairs containing useful data/record in the value section.

Some common uses:

- To track and monitor cars, trucks, fleets, and shipments in real-time, such as in logistics and the automotive industry.
- To continuously capture and analyze sensor data from IoT devices or other equipment, such as in factories and wind parks.
- To process payments and financial transactions in real-time, such as in stock exchanges, banks, and insurances.
- To serve as the foundation for data platforms, event-driven architectures, and microservices.

Project demo

Aim

The aim of these small projects is to demonstrate how Kafka can be used in two distinct business environments.

1. **Maching Learning**: Where we have a producer, sending train and test data. The consumer processes the data and stores the accuracy and logs.
2. **Real-Time Data Streaming**: Where a producer sends real-time data and the consumer processes and stores the incoming data.

Thank You