Stream Processing with Kafka Streams

Agenda

01 Stream Processing

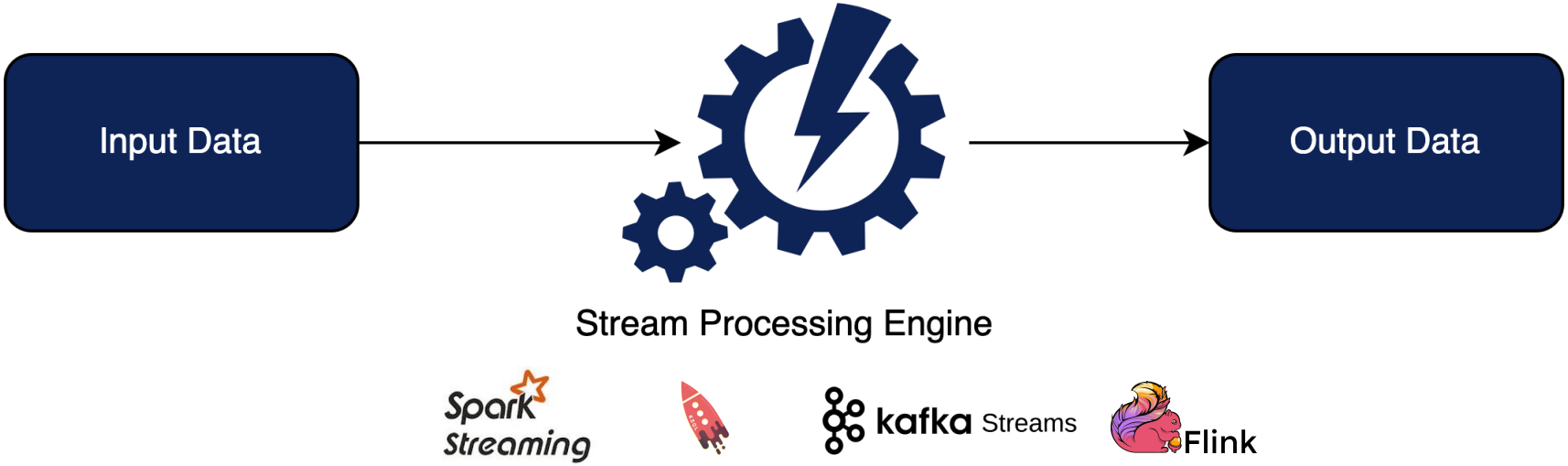
02 What is Kafka Streams?

03 Architecture

04 Spring Boot Integration

05 Demo

Stream Processing



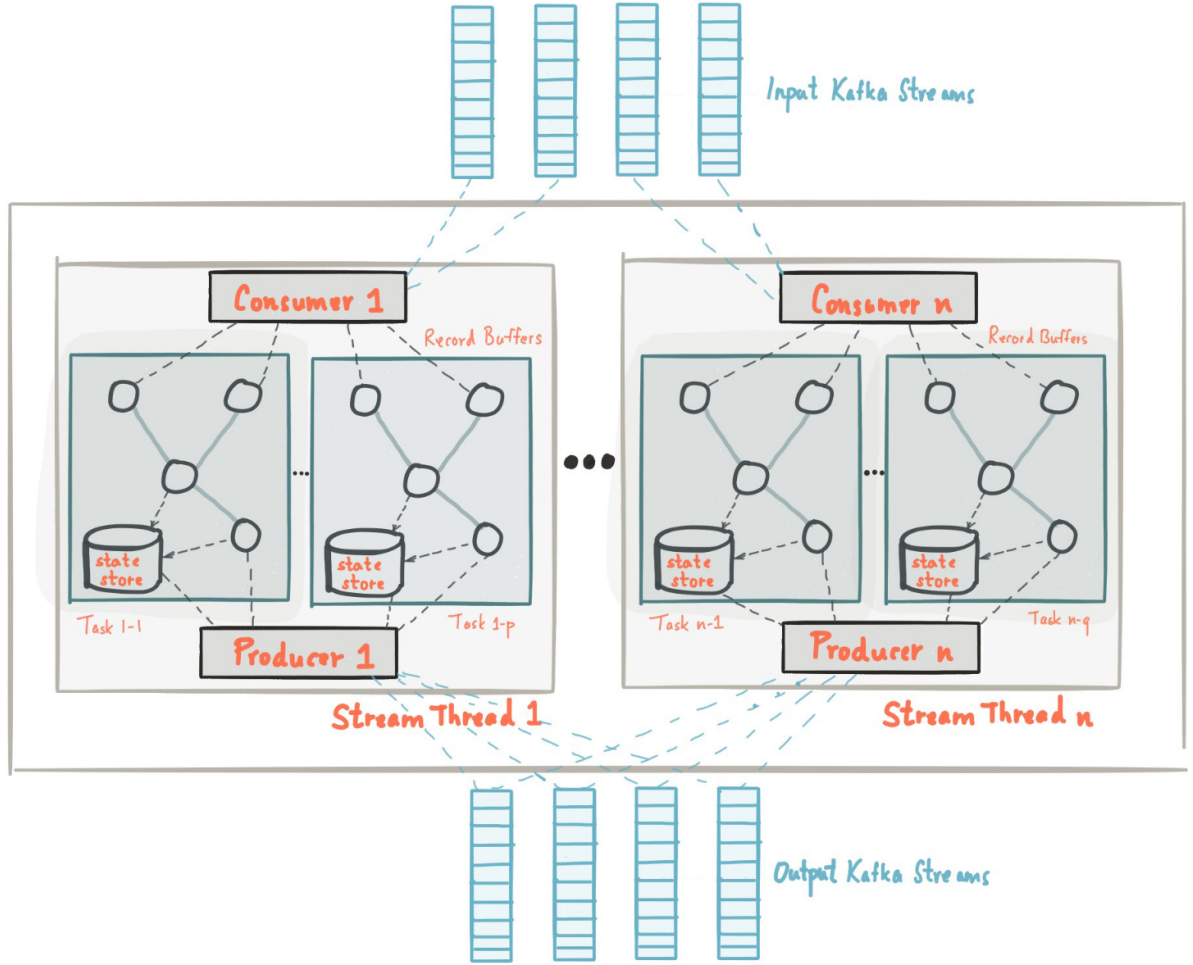
Kafka Streams

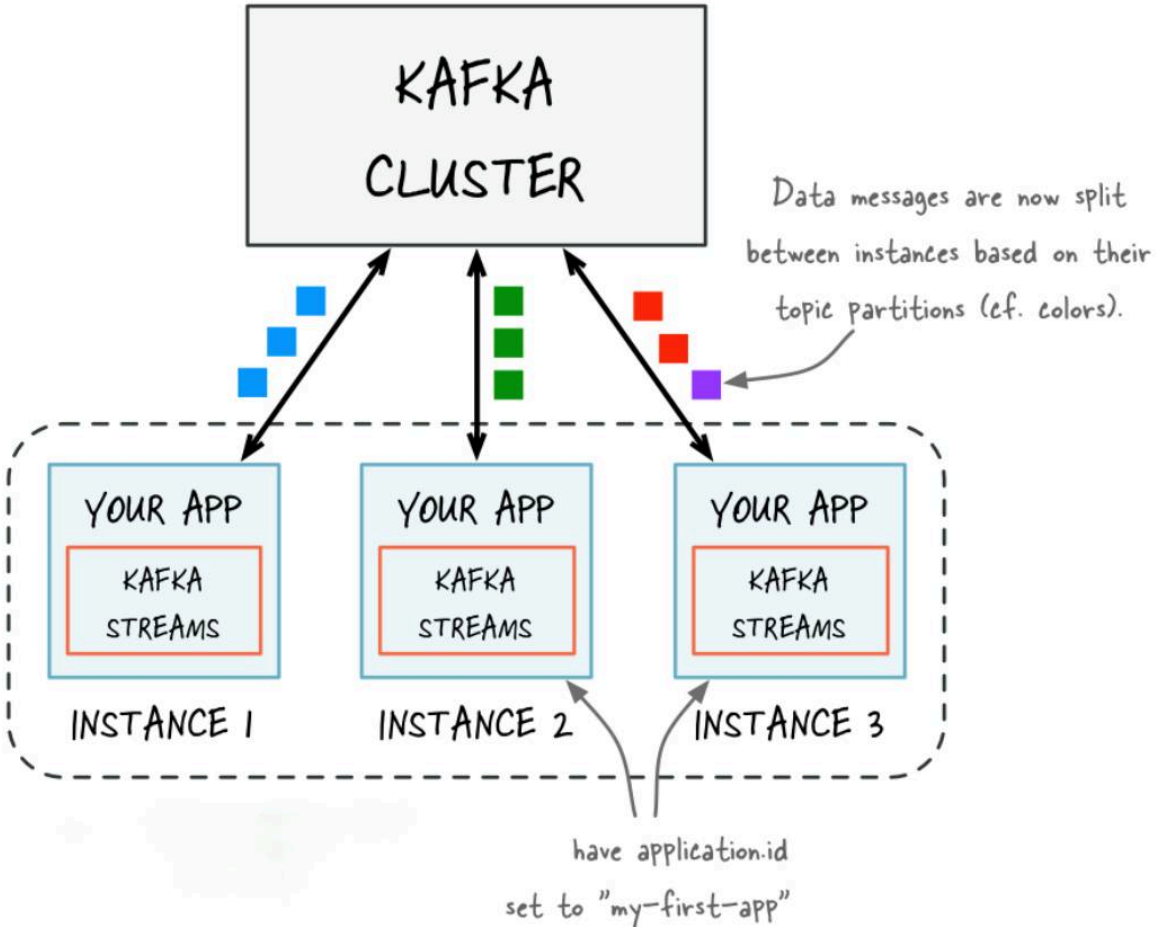
- A Java library (No separate processing cluster required)
- Elastic, highly scalable, fault-tolerant(We'll see how)
- Built upon producer and consumer API
- Provides a high-level Streams DSL

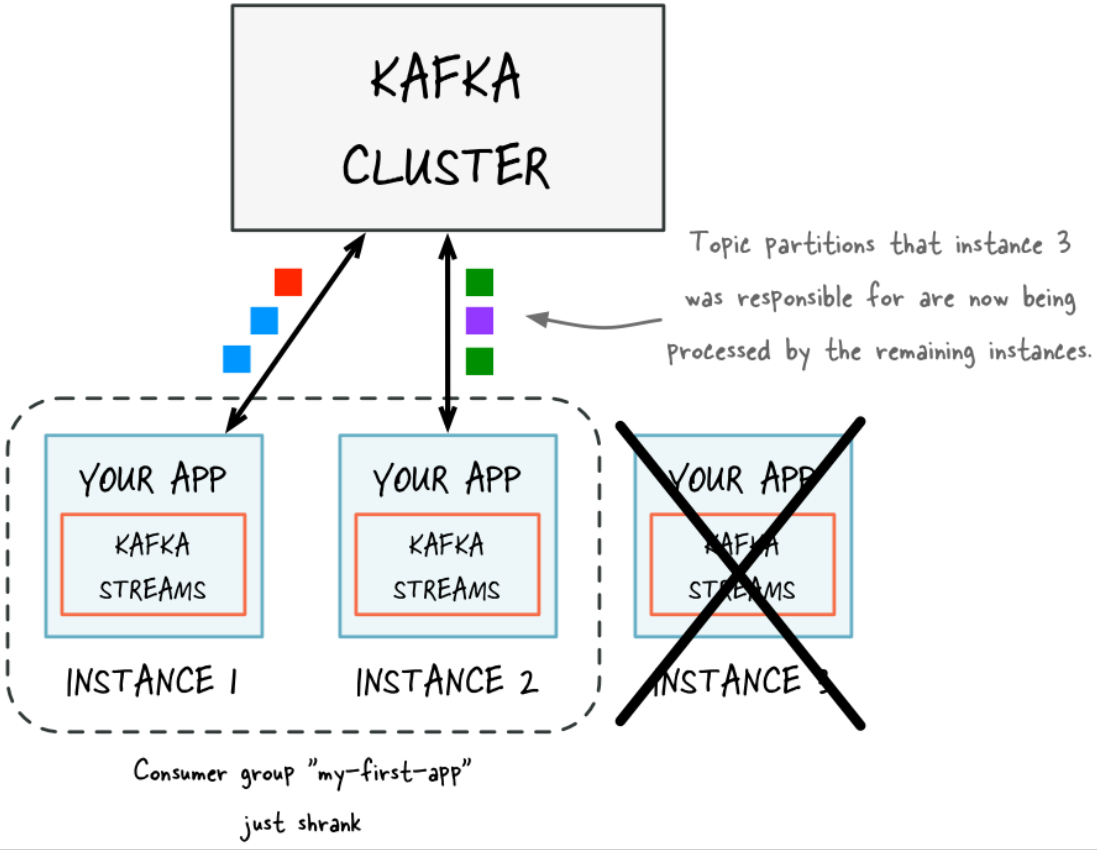
```
StreamsBuilder builder = new StreamsBuilder();

// Read the input stream
KStream<String, String> inputStream = builder.stream("input-topic");

// Perform a windowed aggregation on the input stream
KTable<Windowed<String>, Long> windowedCounts = inputStream
    .mapValues(value -> value.toLowerCase())
    .groupBy((key, value) -> value)
    .windowedBy(TimeWindows.of(Duration.ofMillis(5000)))
    .count();

// Write the results of the windowed aggregation to an output topic
windowedCounts.toStream((key, value) -> key.key())
    .to("output-topic");
```

Architecture

kafka Streams




KAFKA
CLUSTER
Data messages are now split between instances based on their topic partitions (cf. colors).
YOUR APP
KAFKA STREAMS
INSTANCE 1
YOUR APP
KAFKA STREAMS
INSTANCE 2
YOUR APP
KAFKA STREAMS
INSTANCE 3
have application.id set to "my-first-app"


KAFKA
CLUSTER
Topic partitions that instance 3
was responsible for are now being
processed by the remaining instances.
YOUR APP
KAFKA
STREAMS
INSTANCE 1
YOUR APP
KAFKA
STREAMS
INSTANCE 2
YOUR APP
INSTANCE 3
Consumer group "my-first-app"
just shrank

Spring Boot Integration

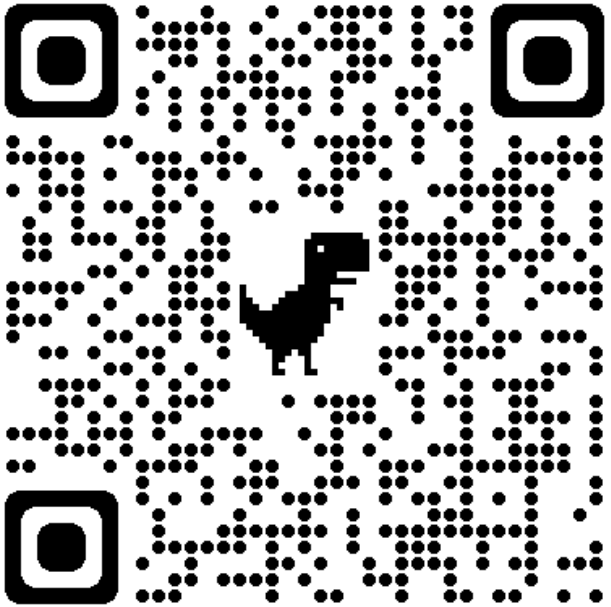
- Productivity
- Opinionated autoconfiguration
- Manages Kafka Streams lifecycle
- Add the starter & @EnableKafkaStreams

Kafka Streams In Action

Resources

- https://kafka.apache.org/documentation/
- https://developer.confluent.io/learn-kafka/
- https://docs.spring.io/spring-kafka/reference/html/#streams-kafka-streams
- https://www.amazon.com/Kafka-Streams-Action-Real-time-microservices-ebook/dp/B09782751D/
- https://www.amazon.com/Kafka-Definitive-Real-Time-Stream-Processing-dp-1492043087/dp/1492043087/

- Scan QR for demo code
- Get in touch: https://hamzablm.com/contact/



Thank you 🫶!