Apache Kafka

for Java Developers

Introduction to Apache Kafka

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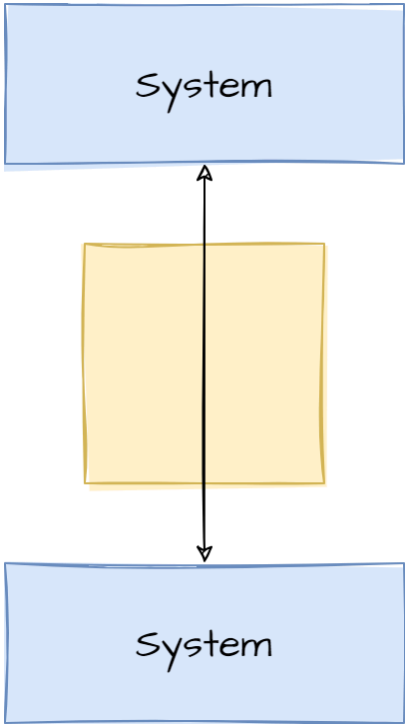
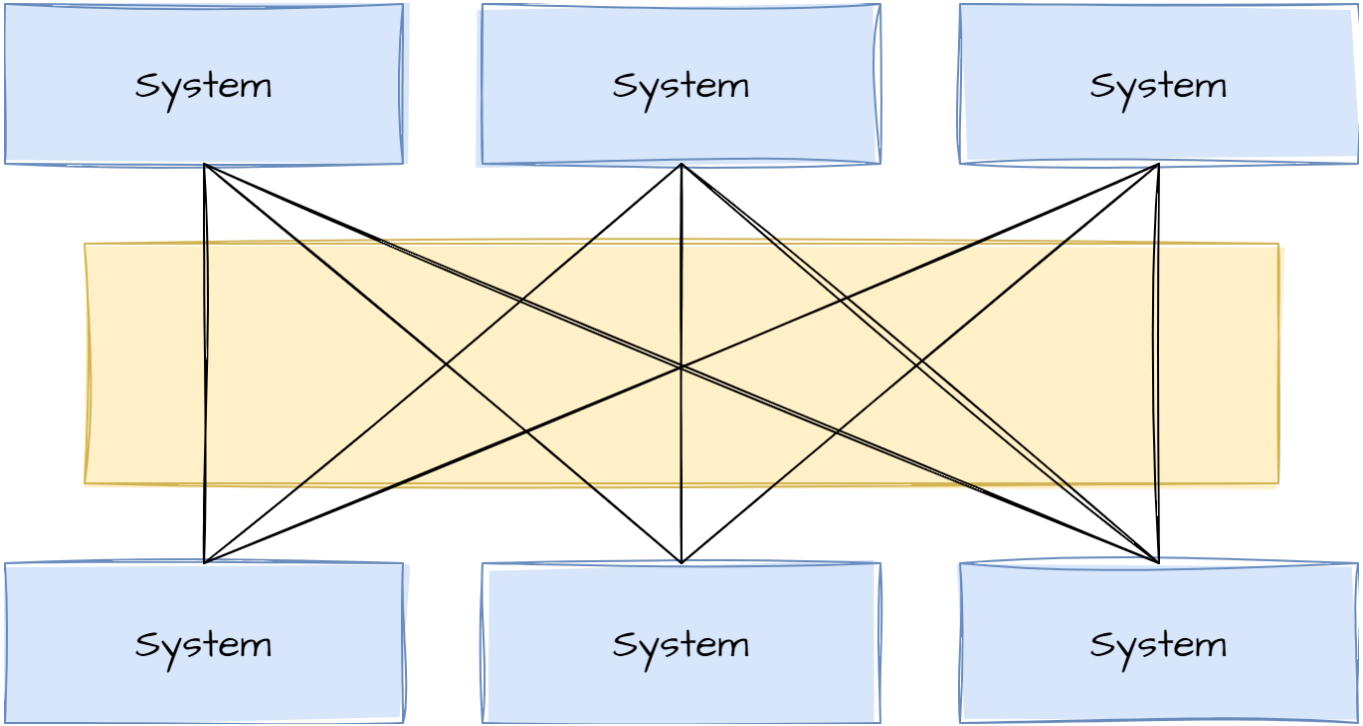
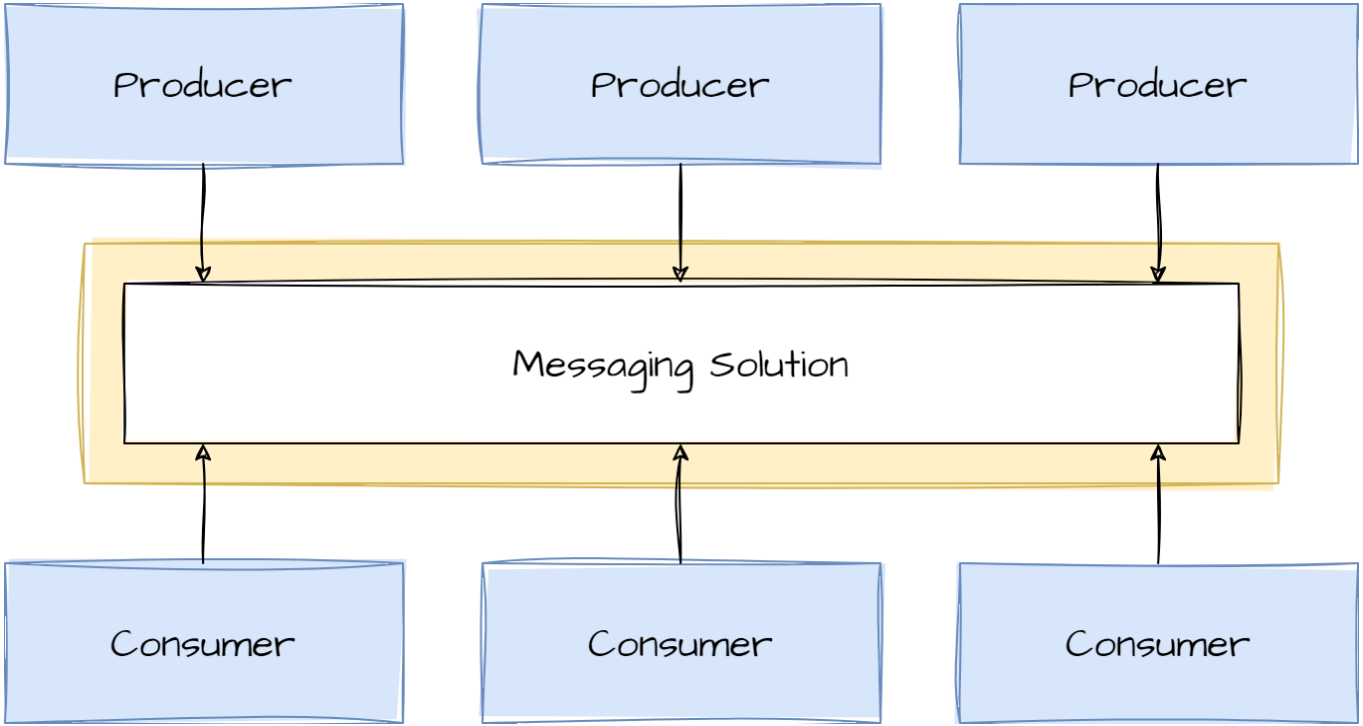
Point-to-point communication is simple to maintain - especially with few systems involved.



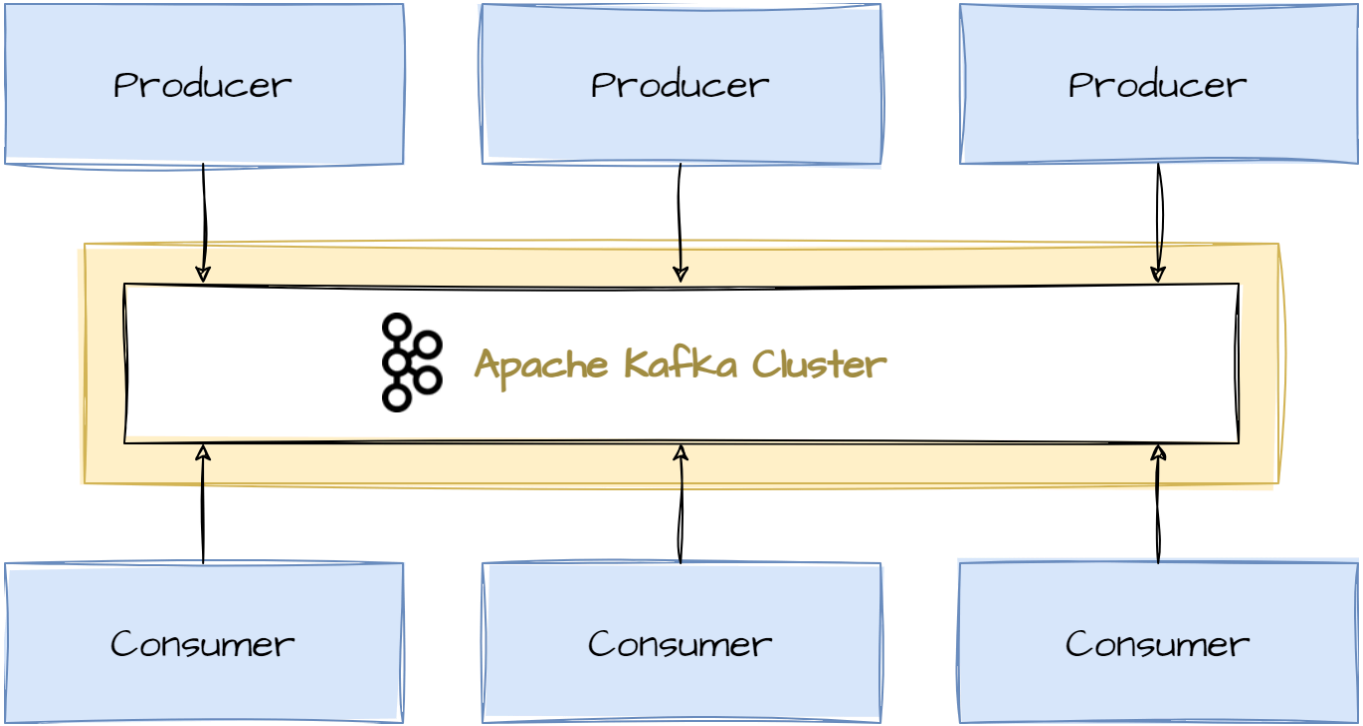
More systems increase the complexity of communication channels in this architecture.



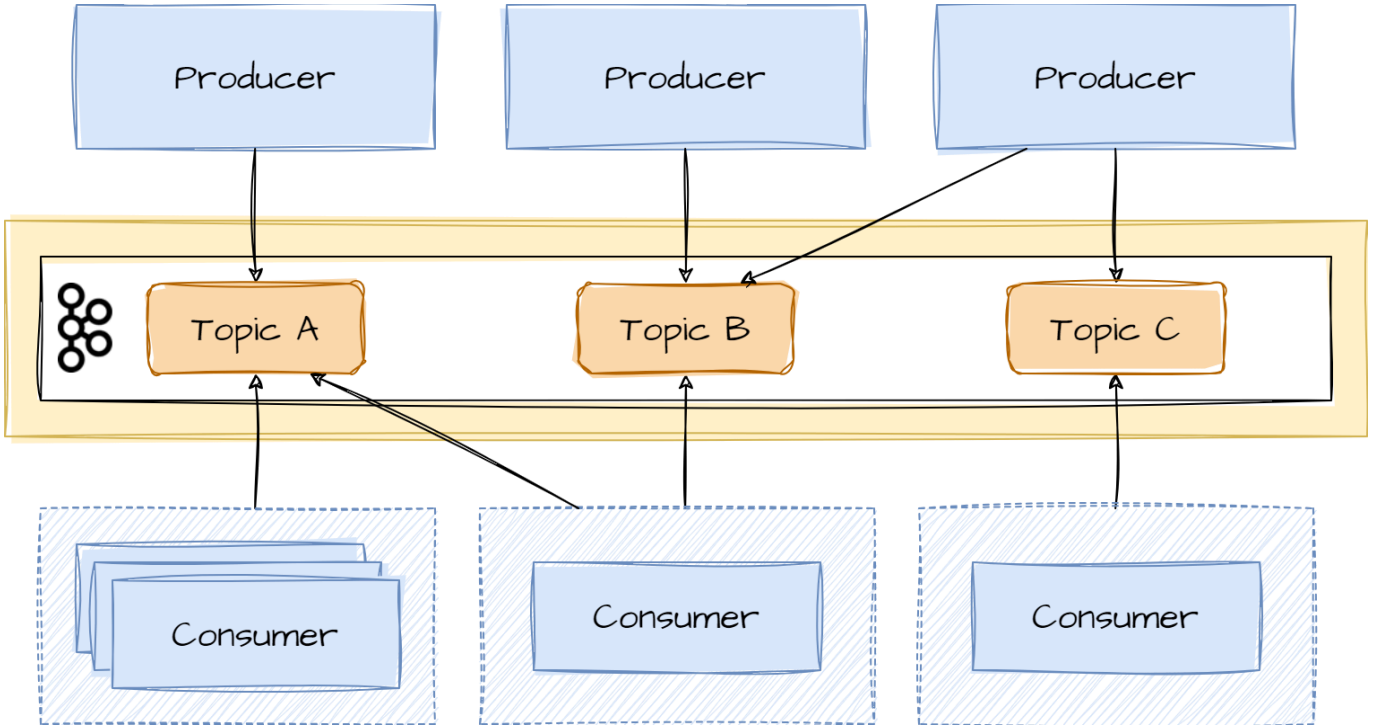
A messaging solution decouples producing from consuming systems.



Apache Kafka supports this communication model.



Producers publish data to topics, consumers subscribe to them and read at their own pace.



Apache Kafka is a distributed pub-sub messaging system with topic access semantics.

History

- Apache Kafka originated at LinkedIn
- Maintained by the Apache Foundation
- Confluent drives further development
- Confluent provides various system components that enrich the Kafka ecosystem

Apache Kafka is a distributed pub-sub messaging system with topic access semantics. (cont.)

Intentions

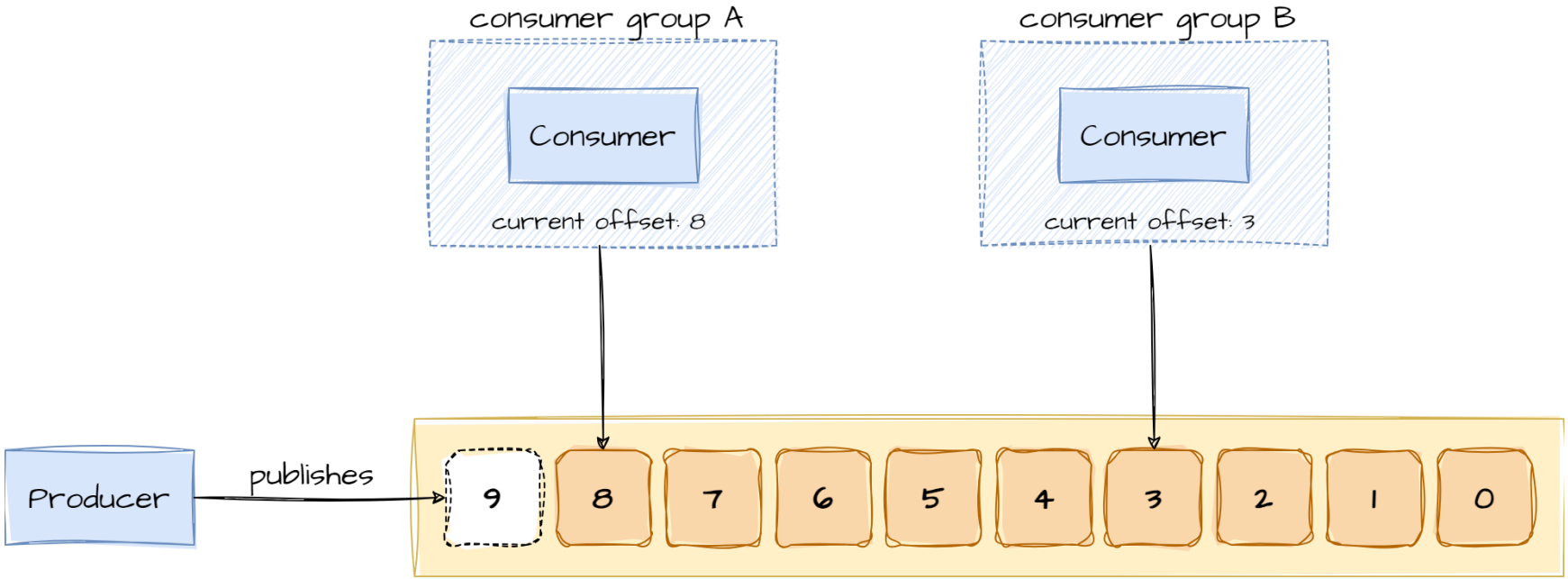
- Designed for near-real-time processing of events
- Supports multiple delivery semantics
  - At-least-once
  - Exactly-once (well, not quite)
- Optimized binary protocol for client-to-broker communication
  - No integration with JMS ...

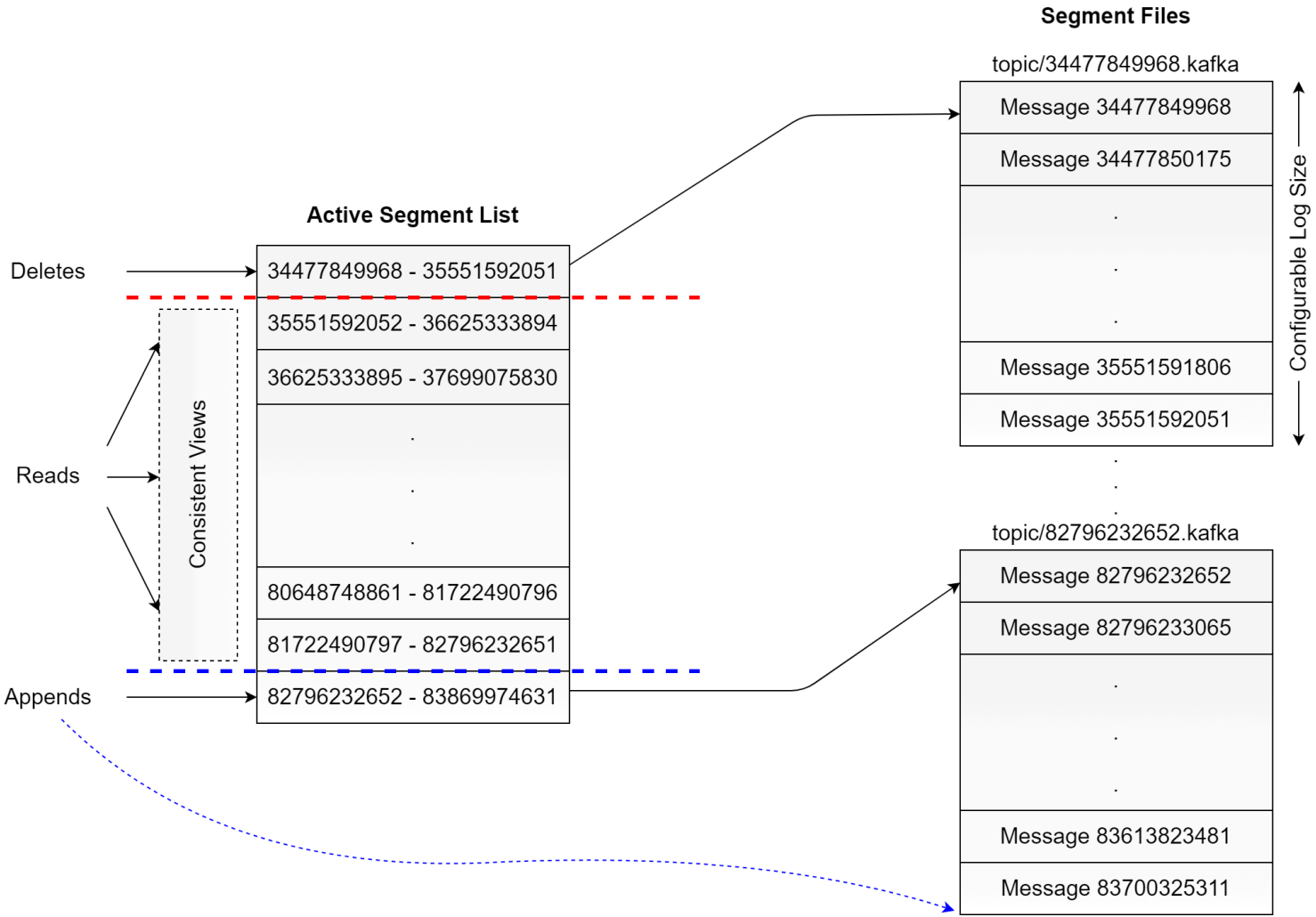
Apache Kafka is a distributed pub-sub messaging system with topic access semantics. (cont.)

Innovations

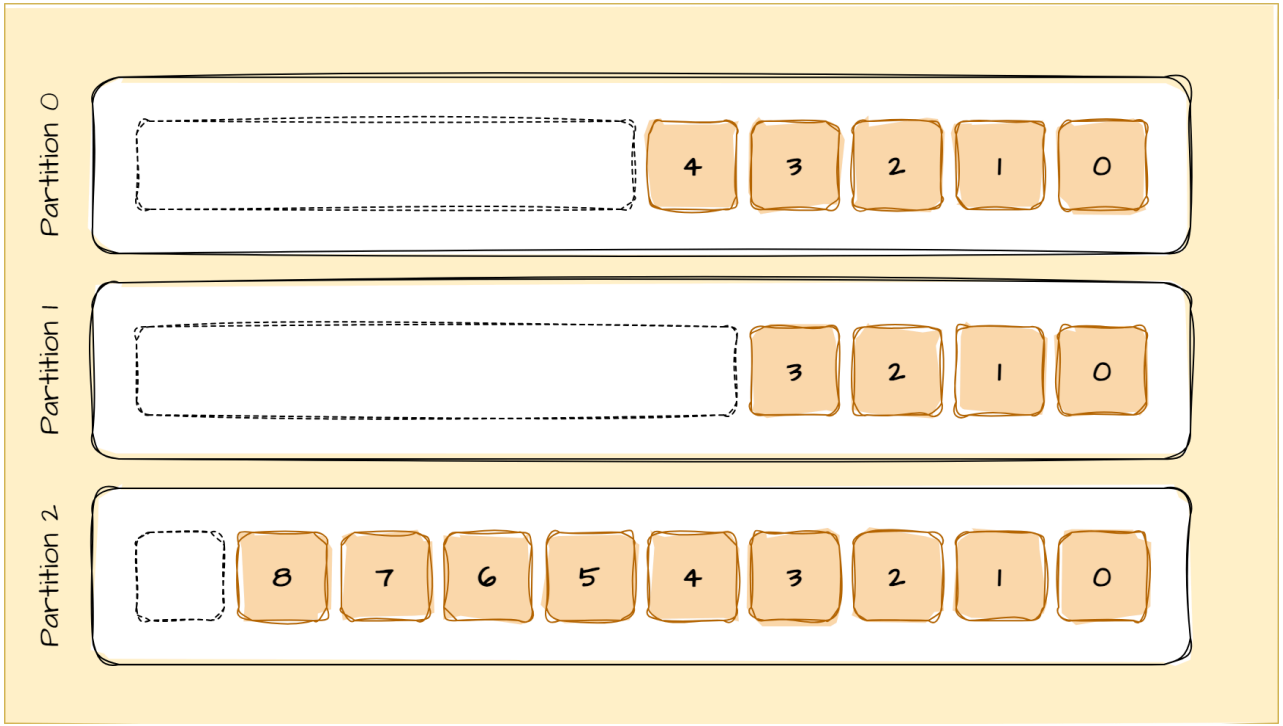
- Messages are acknowledged in order
- Messages are persisted for days / weeks / indefinite
- Consumers manage their offsets
- Very powerful configuration settings allow ...
  - different read/write strategies on the same topic
  - performance tuning on a very low level

Kafka uses a persistent log. Producers append to it, and consumers read from it sequentially.

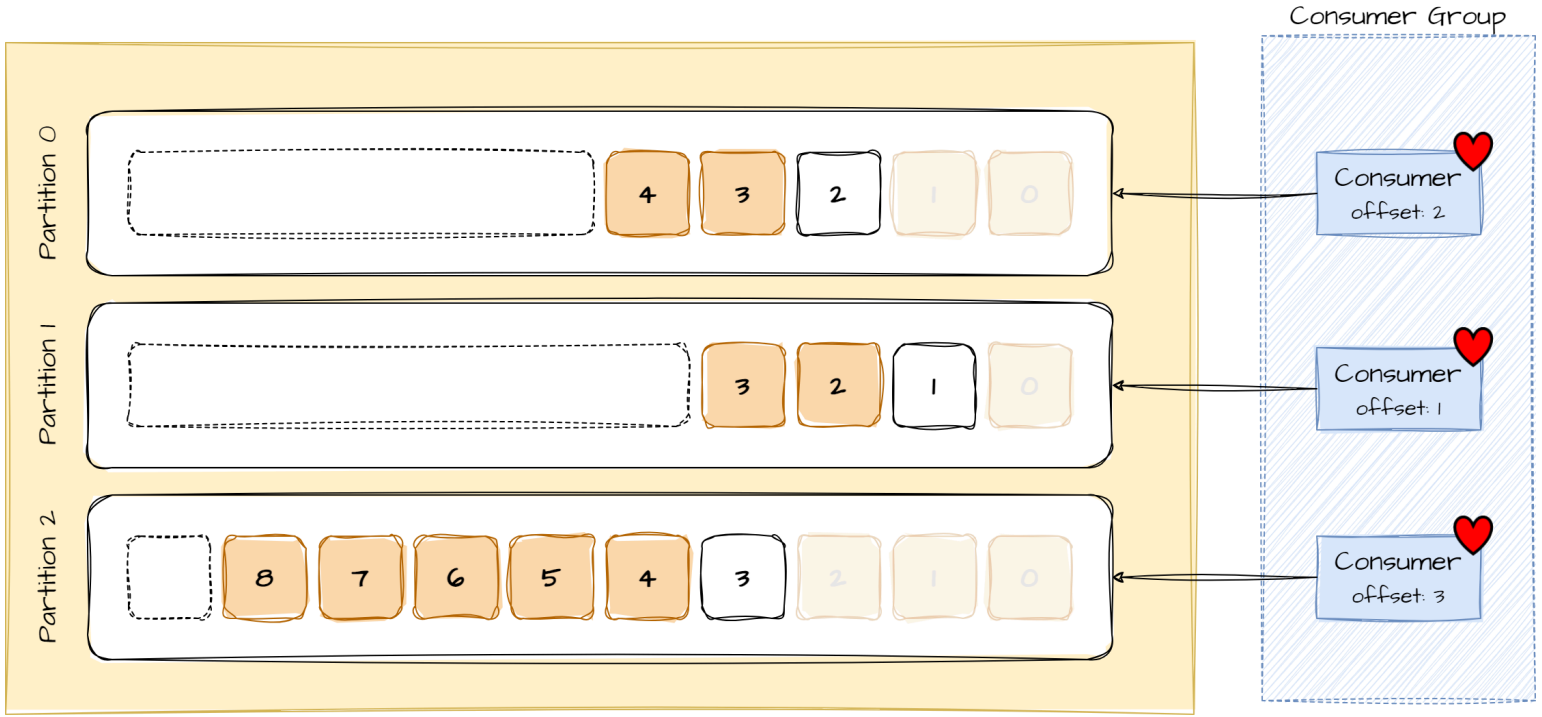



Segment Files
topic/34477849968.kafka
Message 34477849968
Message 34477850175
Message 35551591806
Message 35551592051
Configurable Log Size
topic/82796232652.kafka
Message 82796232652
Message 82796233065
Message 83613823481
Message 83700325311
Active Segment List
Deletes
Reads
Appends
Consistent Views
34477849968 - 35551592051
35551592052 - 36625333894
36625333895 - 37699075830
80648748861 - 81722490796
81722490797 - 82796232651
82796232652 - 83869974631

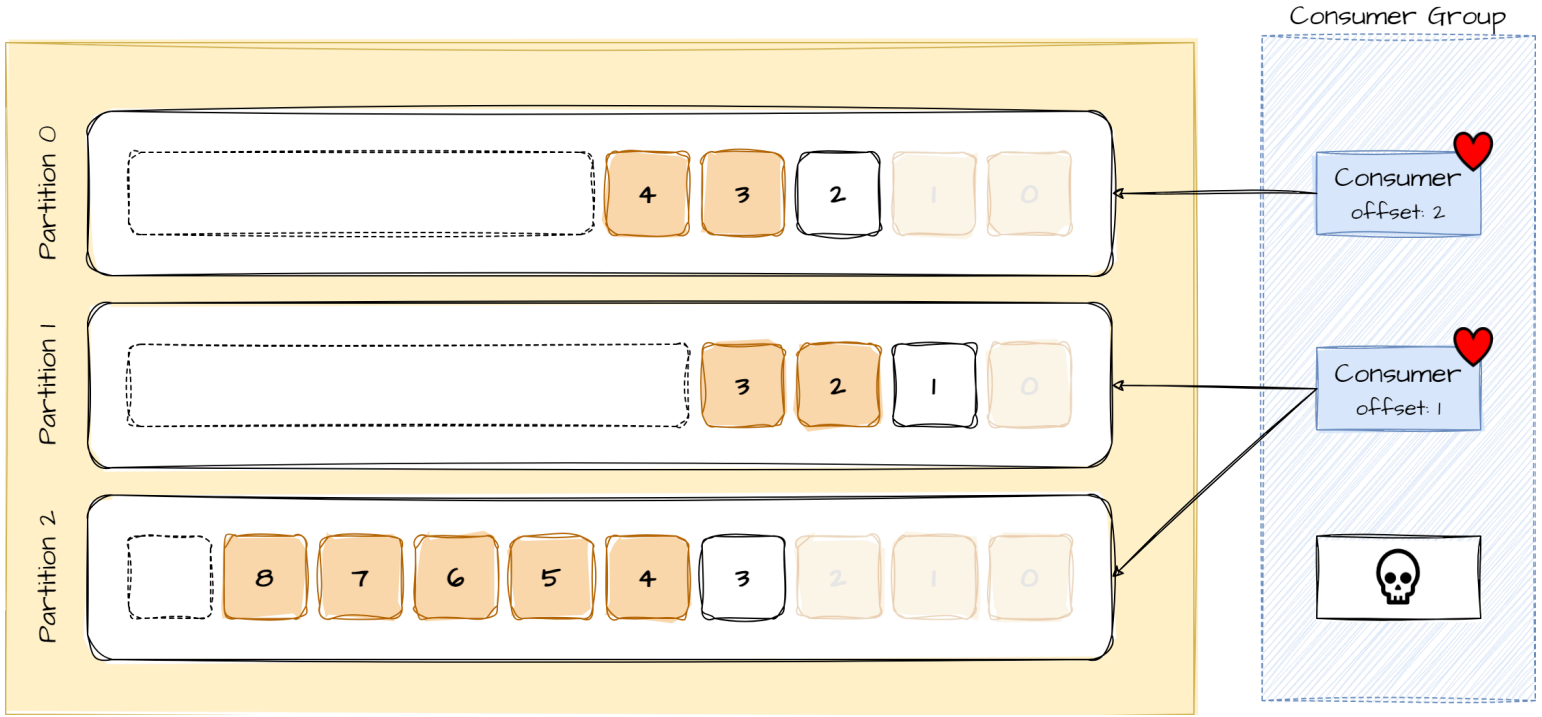
A Kafka topic is comprised of at least one partition.



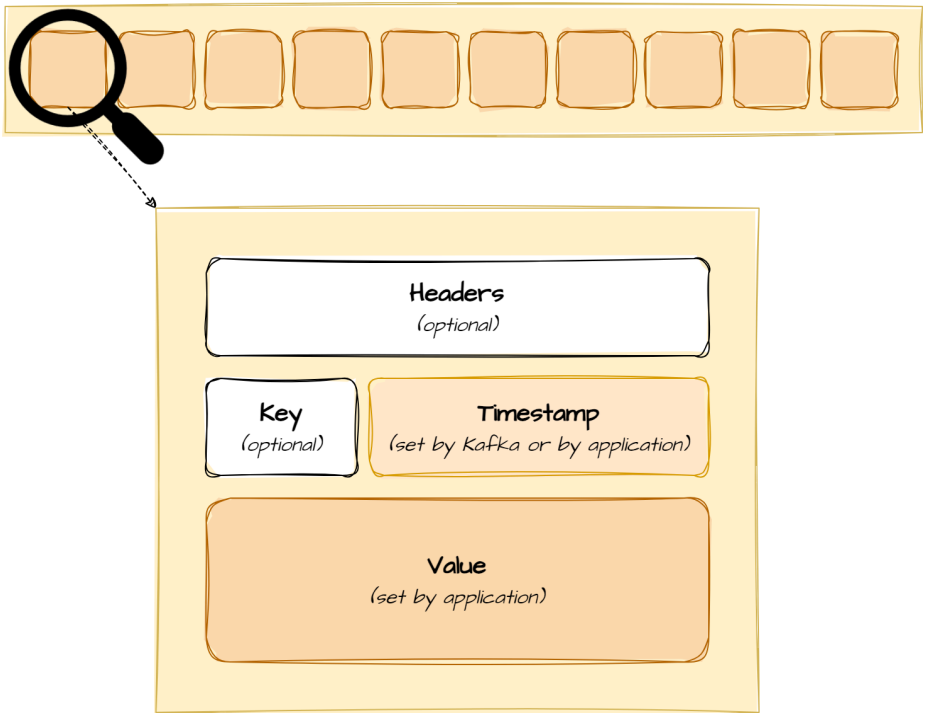
Consumers that participate in the same consumer group share the read workload on a topic.



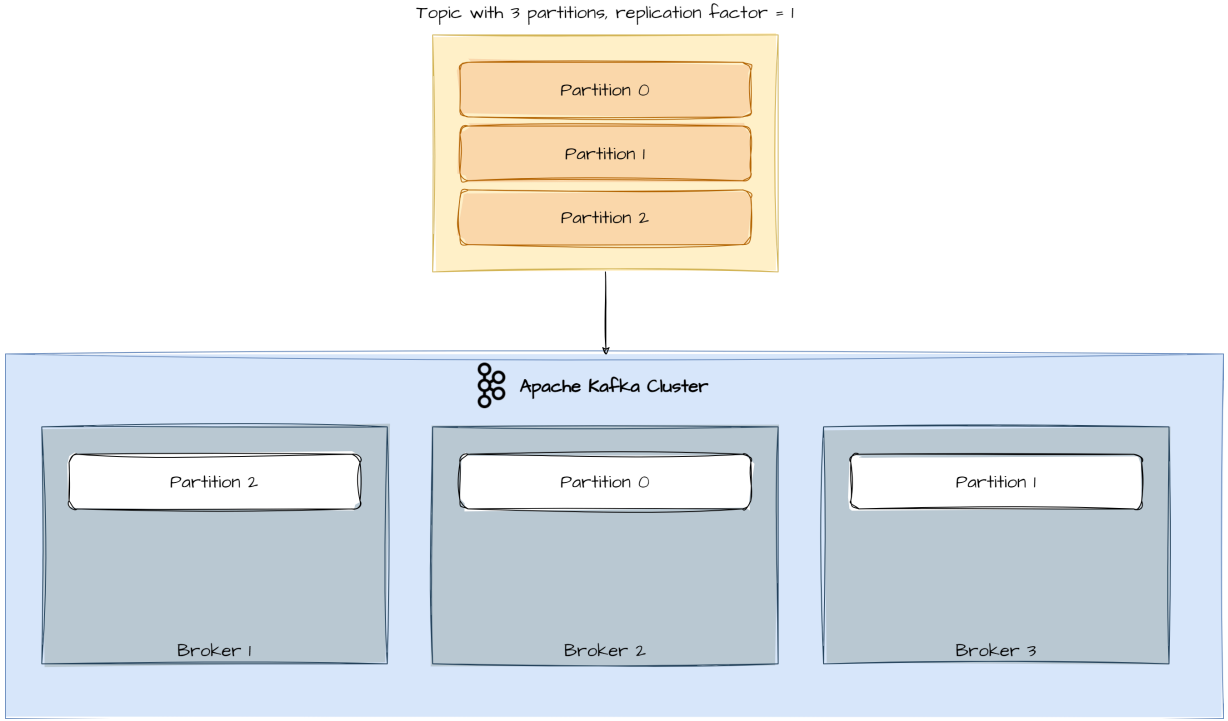
Kafka redistributes work if a consumer fails and is no longer able to process messages.



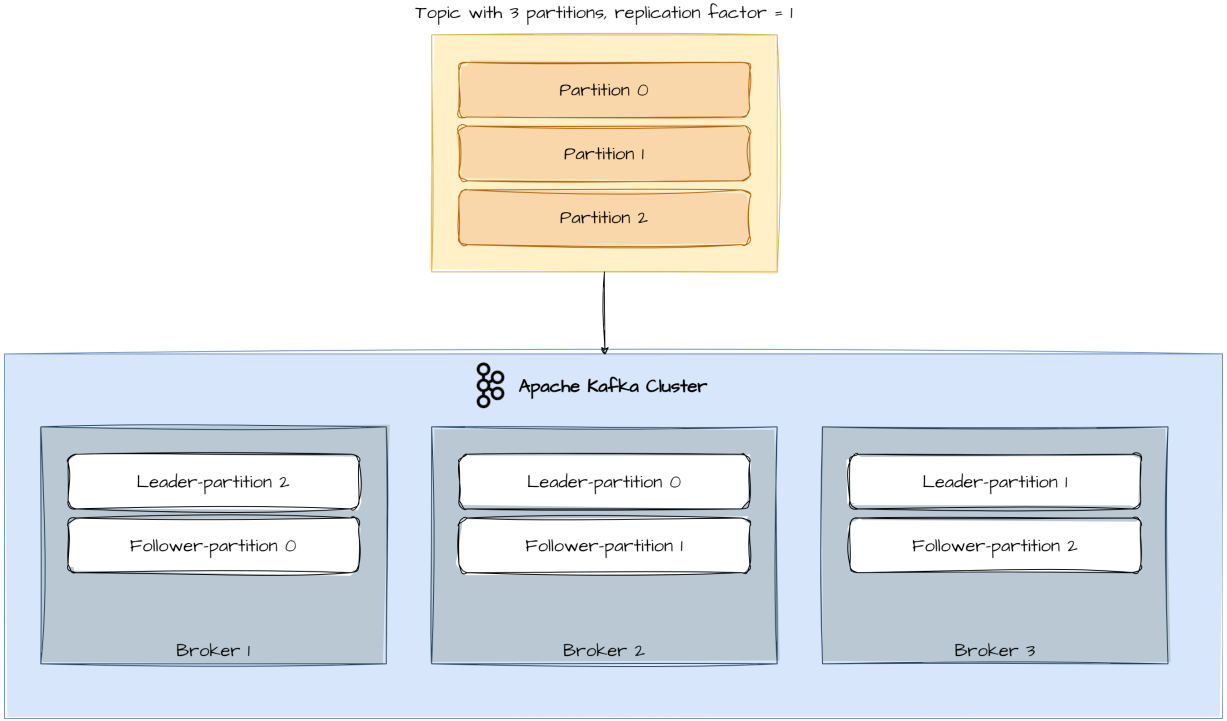
A message (or record, or event) contains metadata alongside the message payload.



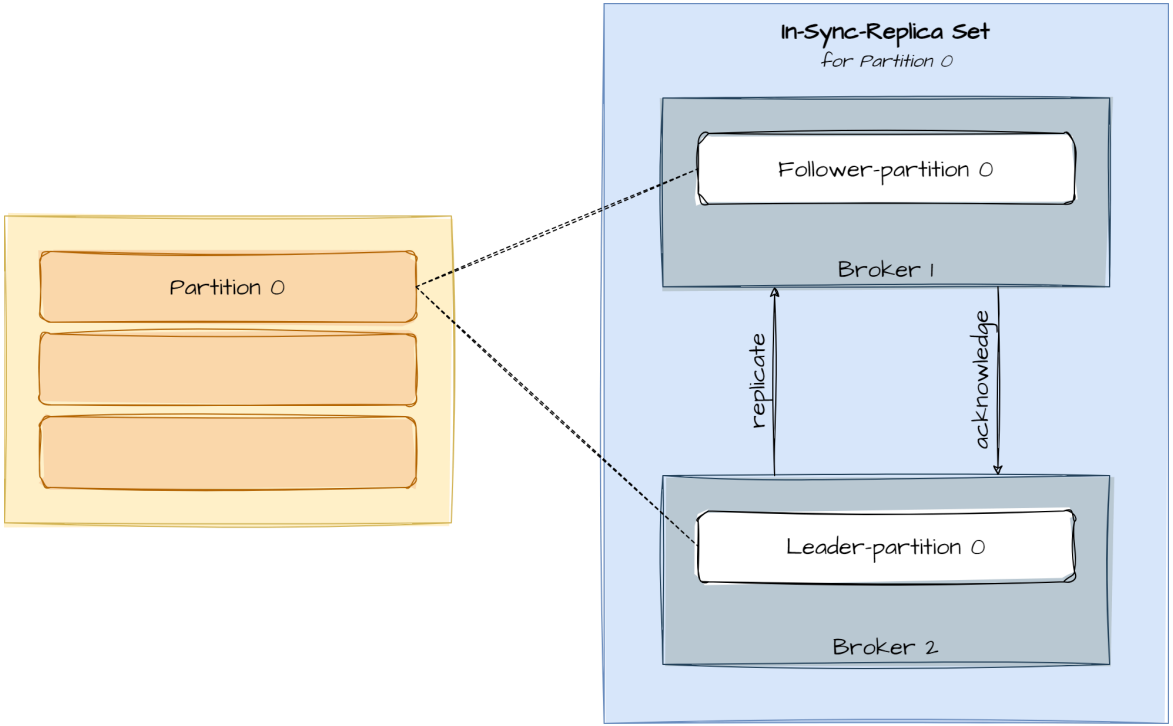
Partitions are spread across brokers and span multiple machines in a Kafka cluster.



Partitions are spread across brokers and span multiple machines in a Kafka cluster. (cont.)



The In-Sync-Replica set contains brokers that are either a leader or follower of a partition.



Let's talk briefly about Kafka versions that you encounter in the wild.

- In the wild you'll find a huge spread of Kafka versions
- Kafka Clients are usually (somewhat) compatible
- The configuration defaults are not
- Be **very** careful to use the same version in dev as in other stages

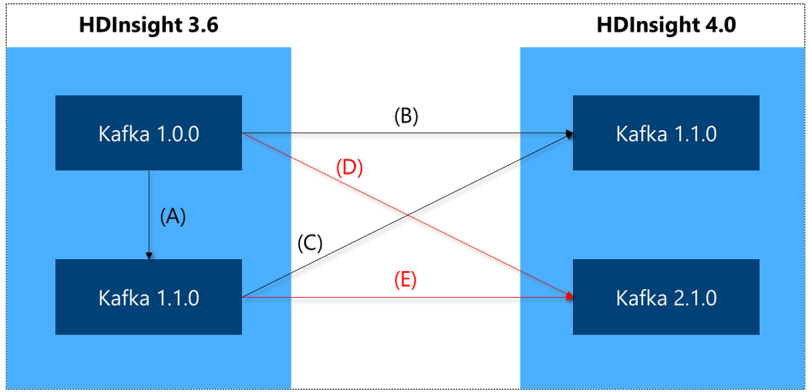
What's the situation on AWS?

Kafka version	MSK release date	End of support date
1.1.1	--	2024-06-05
2.1.0	--	2024-06-05
2.2.1	2019-07-31	2024-06-08
2.3.1	2019-12-19	2024-06-08
2.4.1	2020-04-02	2024-06-08
2.4.1.1	2020-09-09	2024-06-08
2.5.1	2020-09-30	2024-06-08
2.6.0	2020-10-21	2024-09-11
2.6.1	2021-01-19	2024-09-11
2.6.2	2021-04-29	2024-09-11
2.6.3	2021-12-21	2024-09-11
2.7.0	2020-12-29	2024-09-11
2.7.1	2021-05-25	2024-09-11
2.7.2	2021-12-21	2024-09-11
2.8.0	--	2024-09-11
2.8.1	2022-10-28	2024-09-11
2.8.2-tiered	2022-10-28	--
3.1.1	2022-06-22	2024-09-11
3.2.0	2022-06-22	2024-09-11
3.3.1	2022-10-26	2024-09-11
3.3.2	2023-03-02	2024-09-11
3.4.0	2023-05-04	--

What's the situation on Azure?

> ⓘ Note
>
> Event Hubs for Kafka Ecosystems supports Apache Kafka version 1.0 and later.

Component	HDInsight 5.1	HDInsight 5.0
Apache Spark	3.3.1	3.1.3
Apache Hive	3.1.2	3.1.2
Apache Kafka	3.2.0	2.4.1
Apache Hadoop	3.3.4	3.1.1



Questions?