Distributed Caching & Queueing in the Cloud

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What is a Cache?

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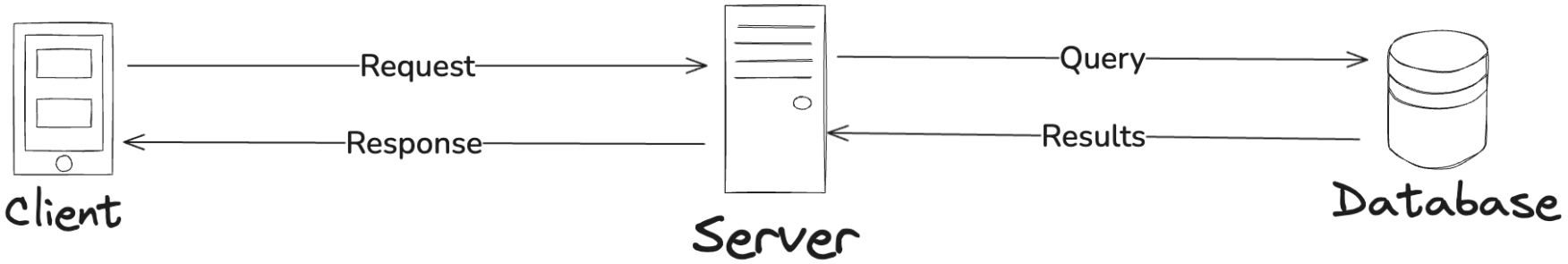
Direct Database Access



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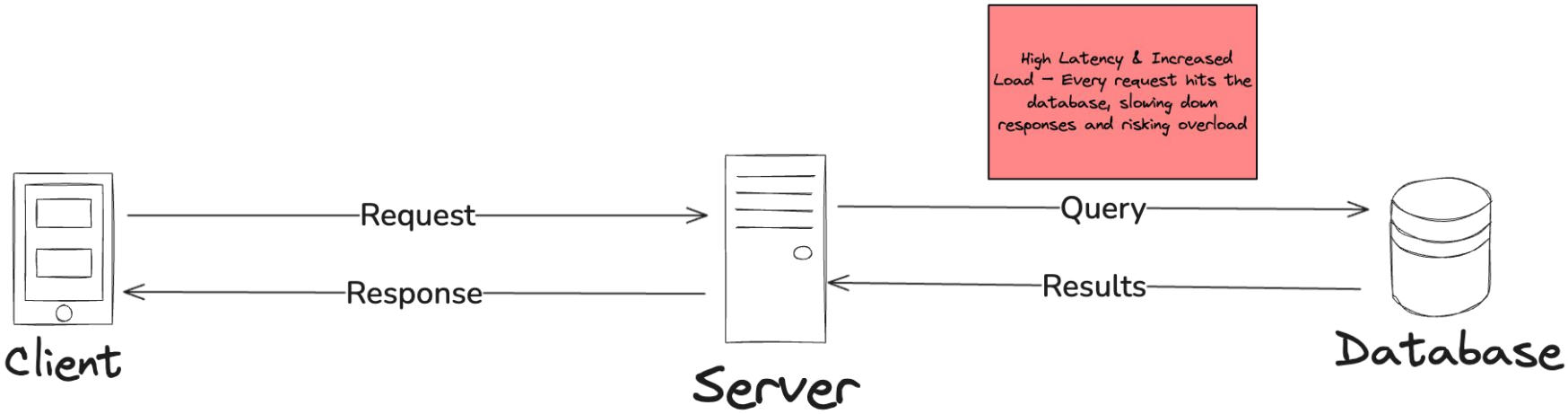
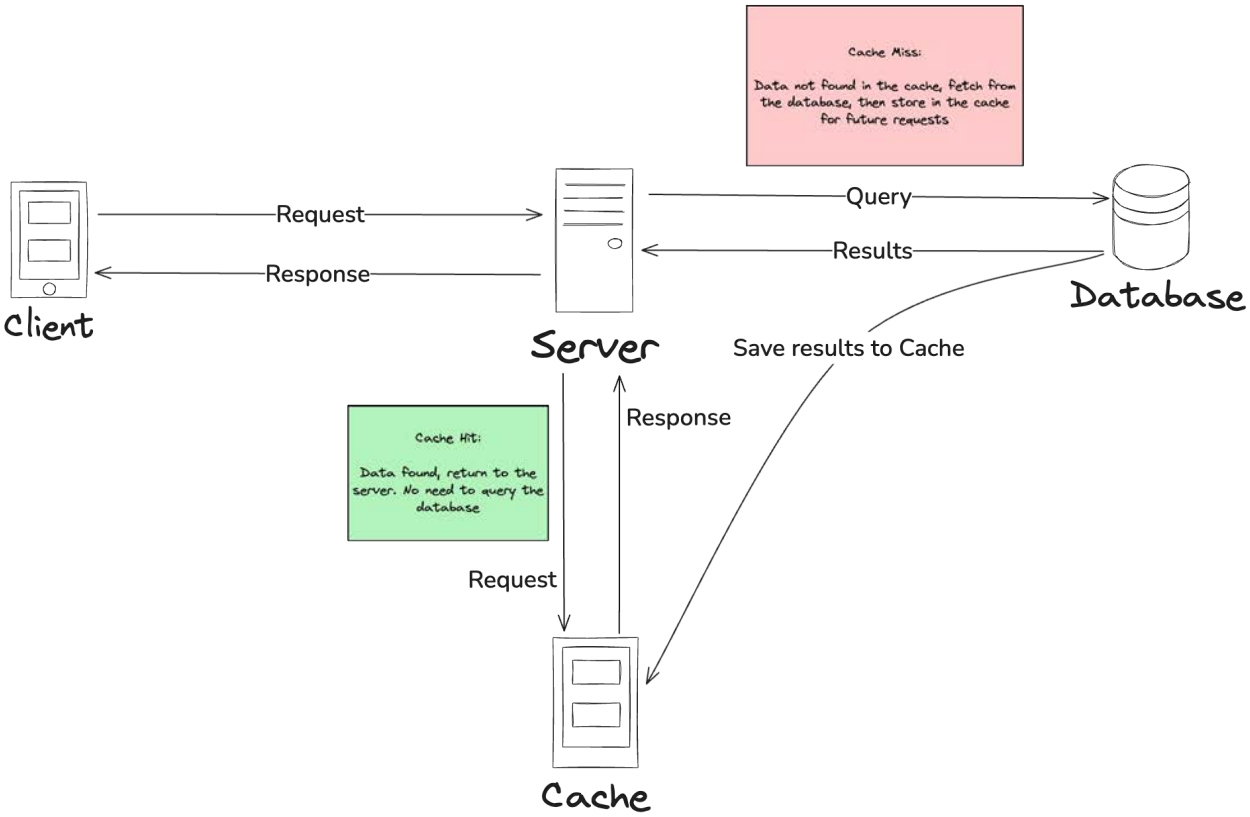
Database Bottleneck



Leveraging Caching for Scale



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What is Distributed Caching?

🗂️ Spreads cache data across multiple nodes instead of storing it on a single machine.

🛡️ Ensures scalability, fault tolerance, and high performance by preventing cache overload.

How Distributed Caching Works

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Distributed Caching Strategies

🔀 Sharding

🔄 Replication

⚖️ Load Balancing

🔗 Consistent Hashing

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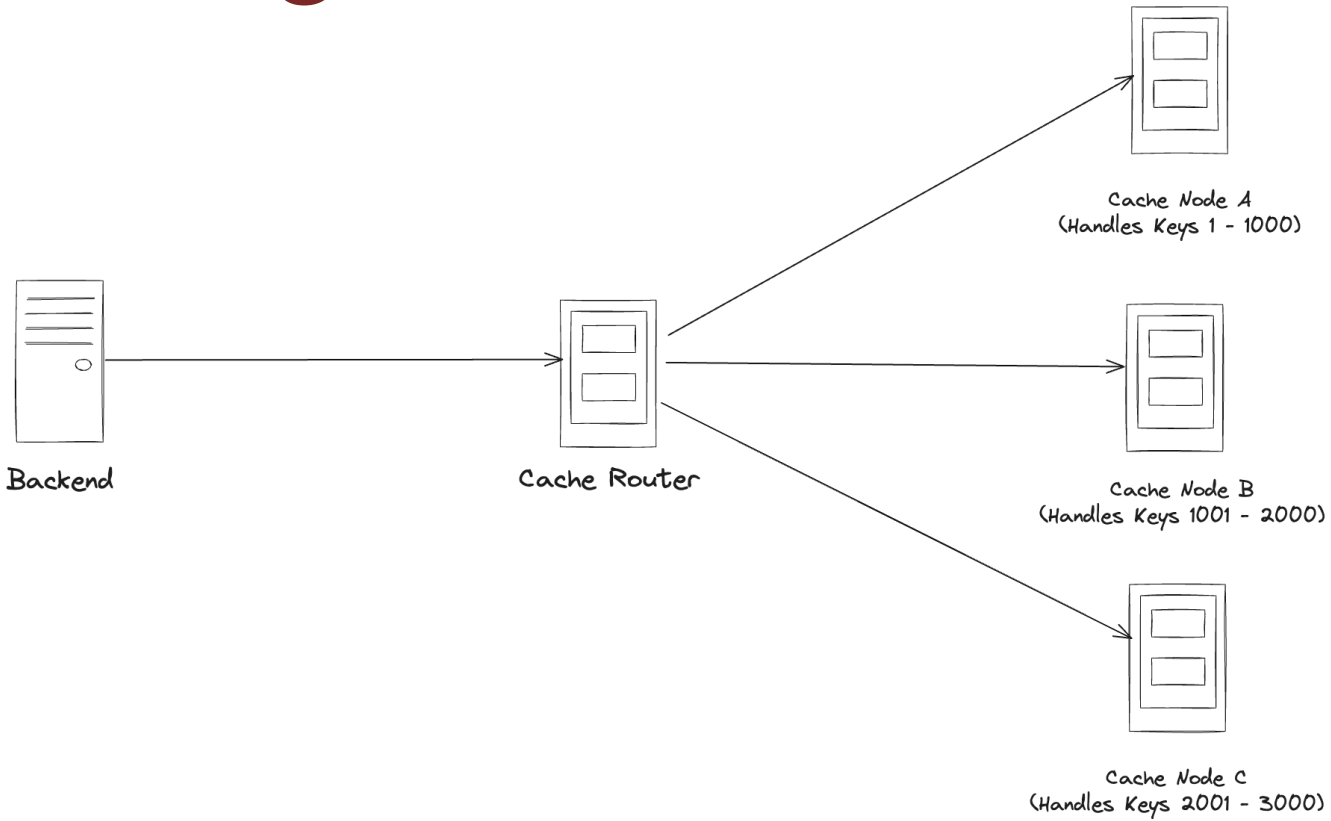
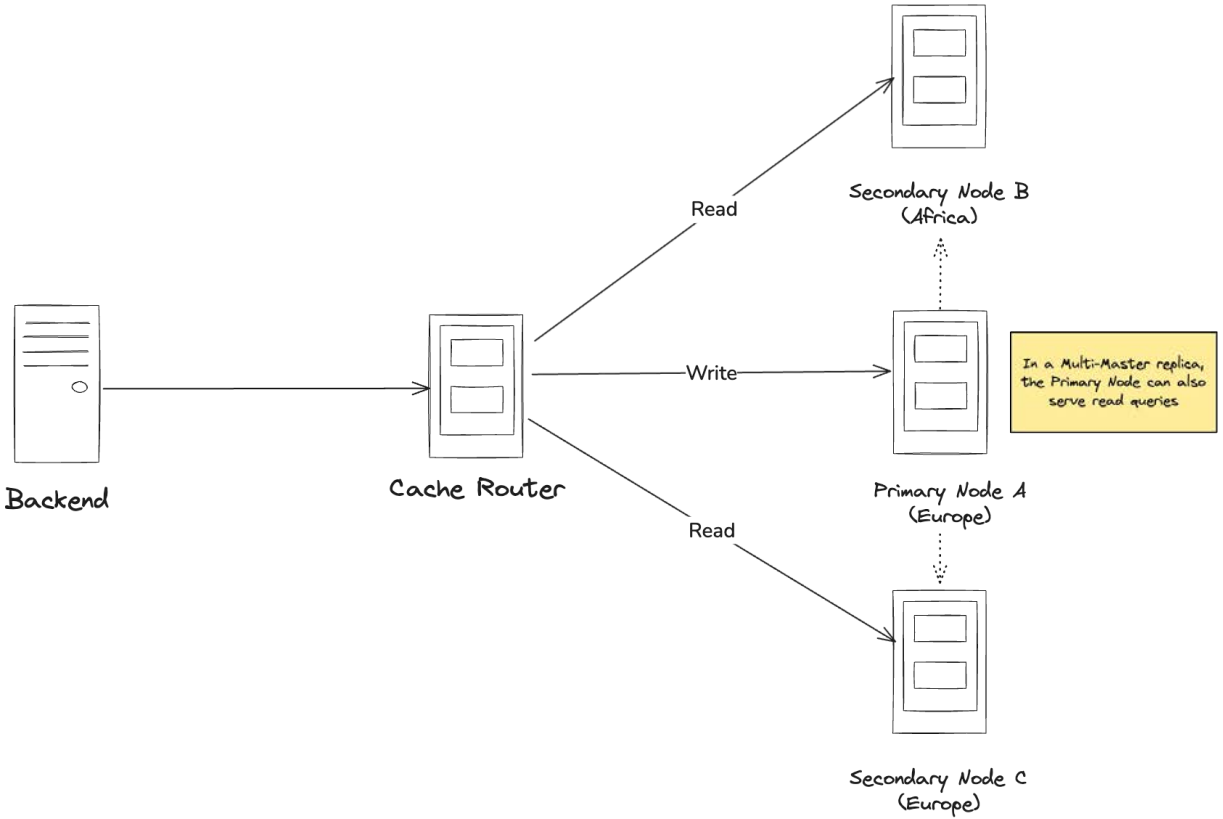
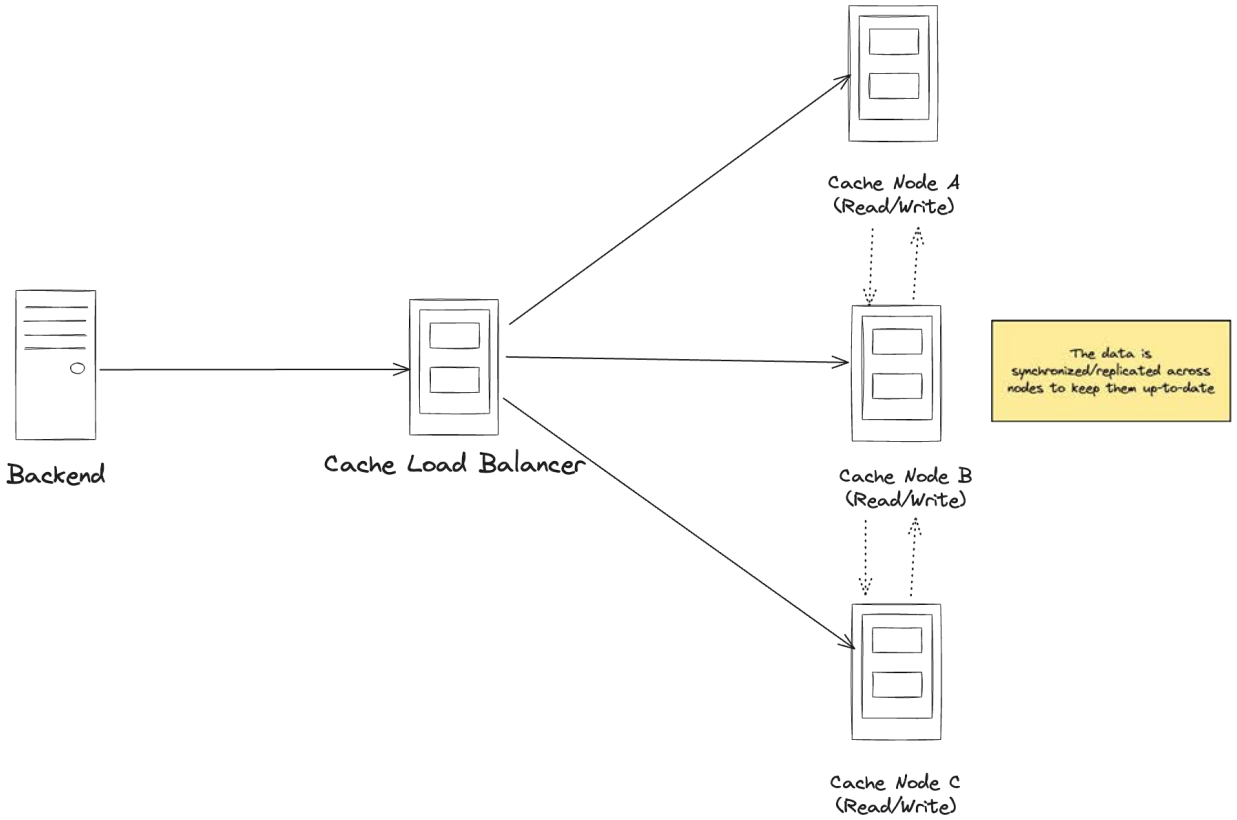
Sharding



Replication



Load Balancing



Popular Caching Systems

 **Redis:** An open-source in-memory data store offering advanced data structures, replication, sharding, and persistence; widely adopted for high-performance caching.

 **Memcached:** A simple, high-speed key-value store known for its ease of use and fast lookups, ideal for stateless caching scenarios.

Distributed Caching on the Cloud

Amazon ElastiCache

Google Cloud Memorystore

Azure Cache for Redis

Redis Cloud

Self-Hosted

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What is a Queue?

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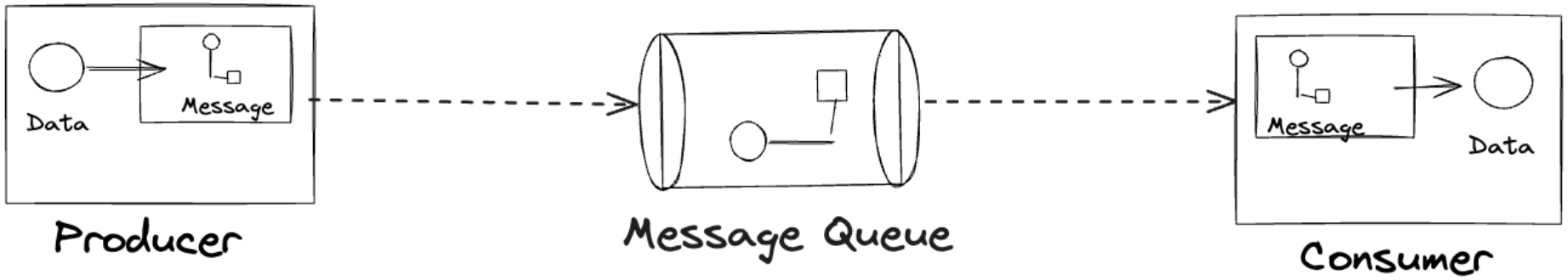
How a Queue Works



What is Distributed Queueing?

🔢 Spread across multiple queue partitions, allowing high-volume asynchronous processing.

⚡Enables multiple producers and consumers to operate concurrently, ensuring scalability and resilience under heavy load.

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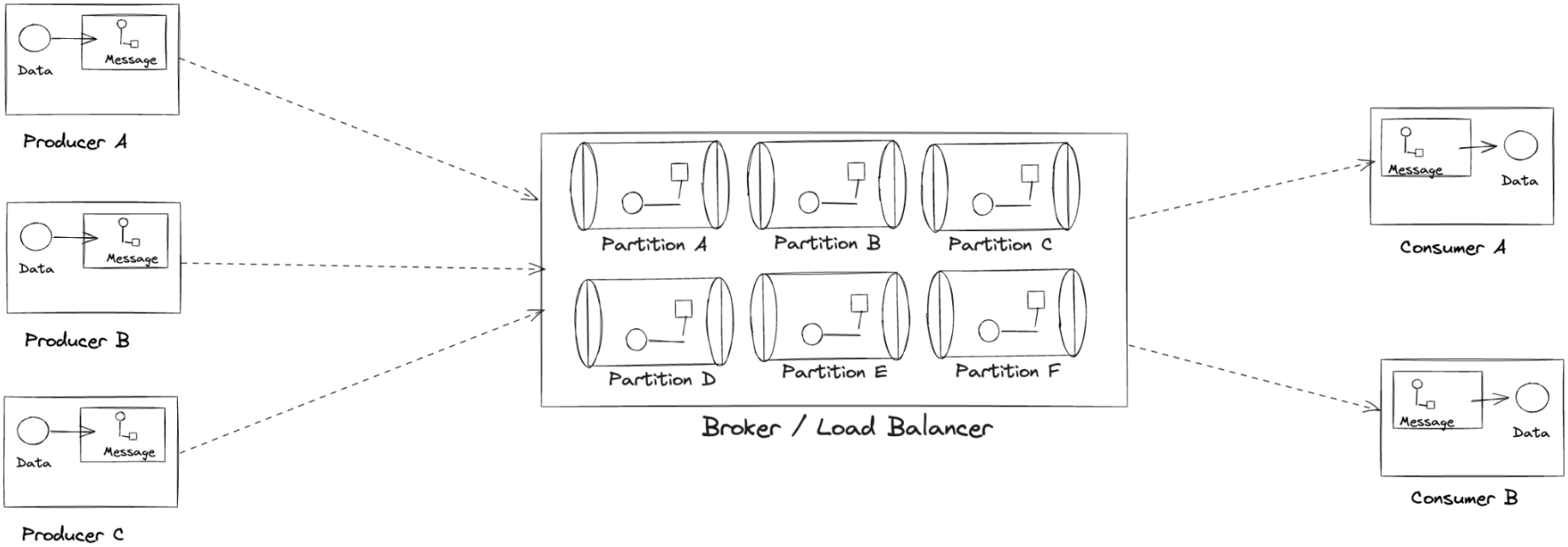
How Distributed Queueing Works



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Popular Queueing Systems

Apache Kafka: A high-throughput, distributed streaming platform designed for real-time event streaming, widely adopted for its scalability and fault tolerance.

RabbitMQ: A versatile and mature message broker that supports complex routing patterns and multiple protocols, making it popular in many enterprise scenarios.

NATS: A lightweight, high-performance messaging system designed for cloud-native applications, offering simplicity and low latency.

Distributed Queueing on the Cloud

Amazon SQS

Google Cloud Pub/Sub

Azure Service Bus

Self-Hosted

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Thank You!

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