

Microservices and Event-Driven Architecture

Leonardo Piedade, Solutions Architect
Luiz Yanai, Solutions Architect



The background features a complex arrangement of blue cubes of various sizes and orientations, creating a sense of depth and perspective.

A Brief History of Time...

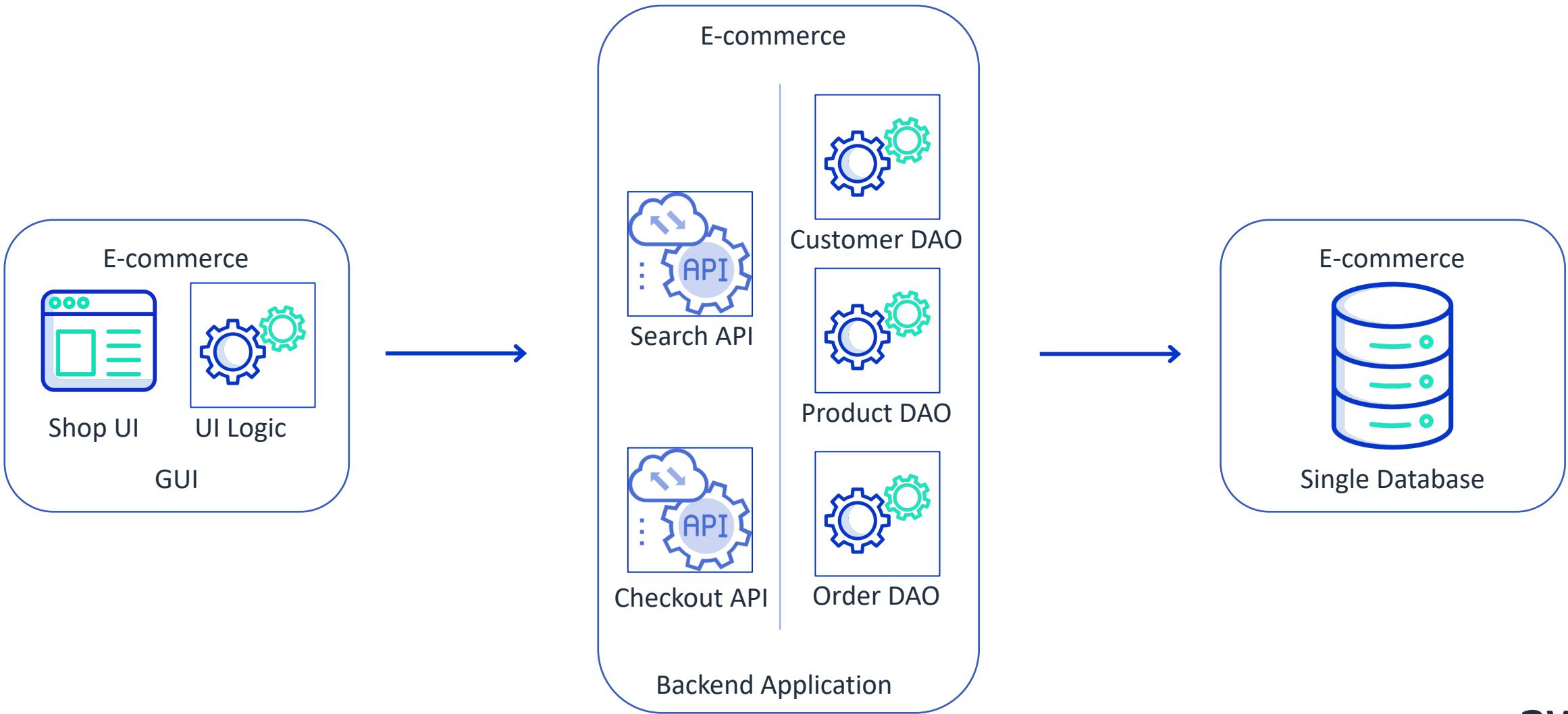


A Brief History of Time...

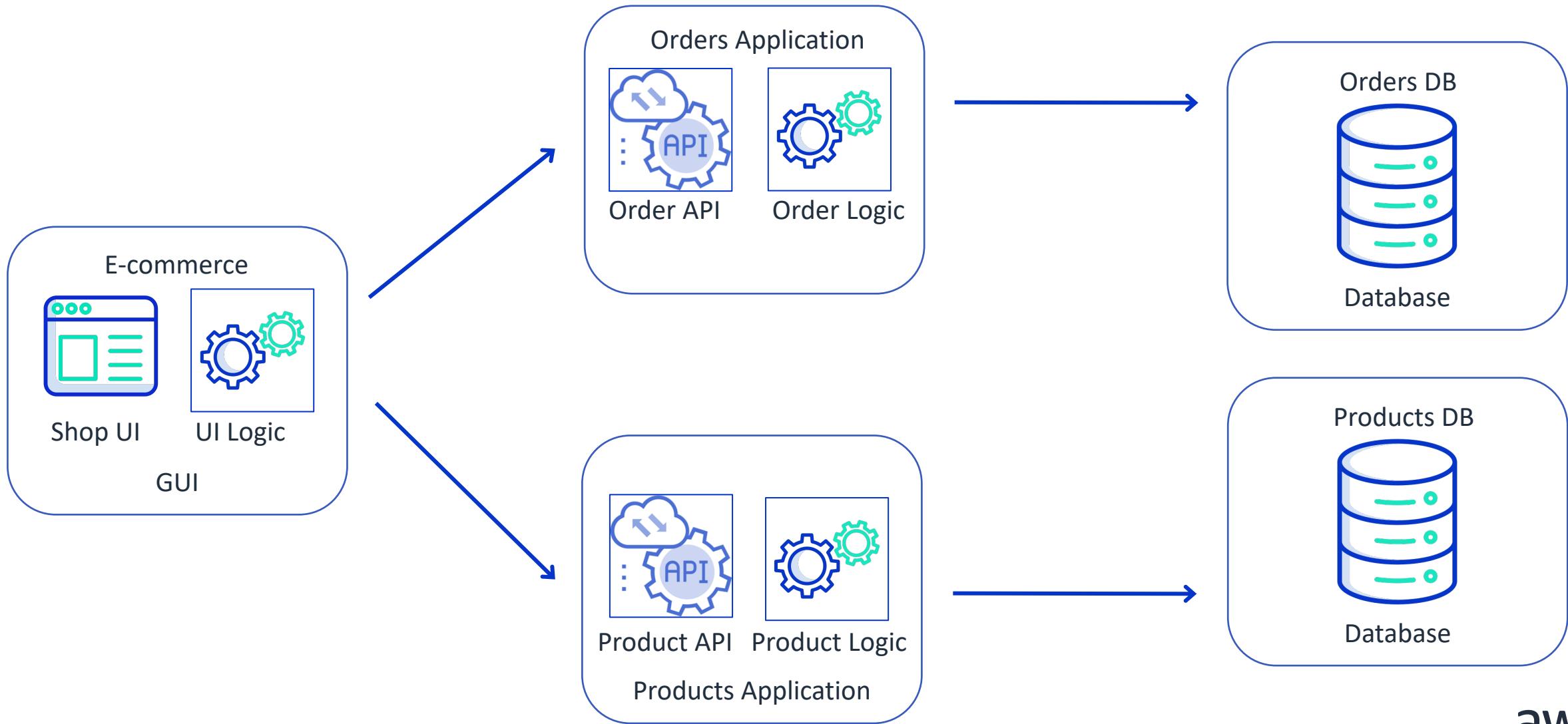


- Traditional App (3 tiers)
- SOA Approach
- Microservices

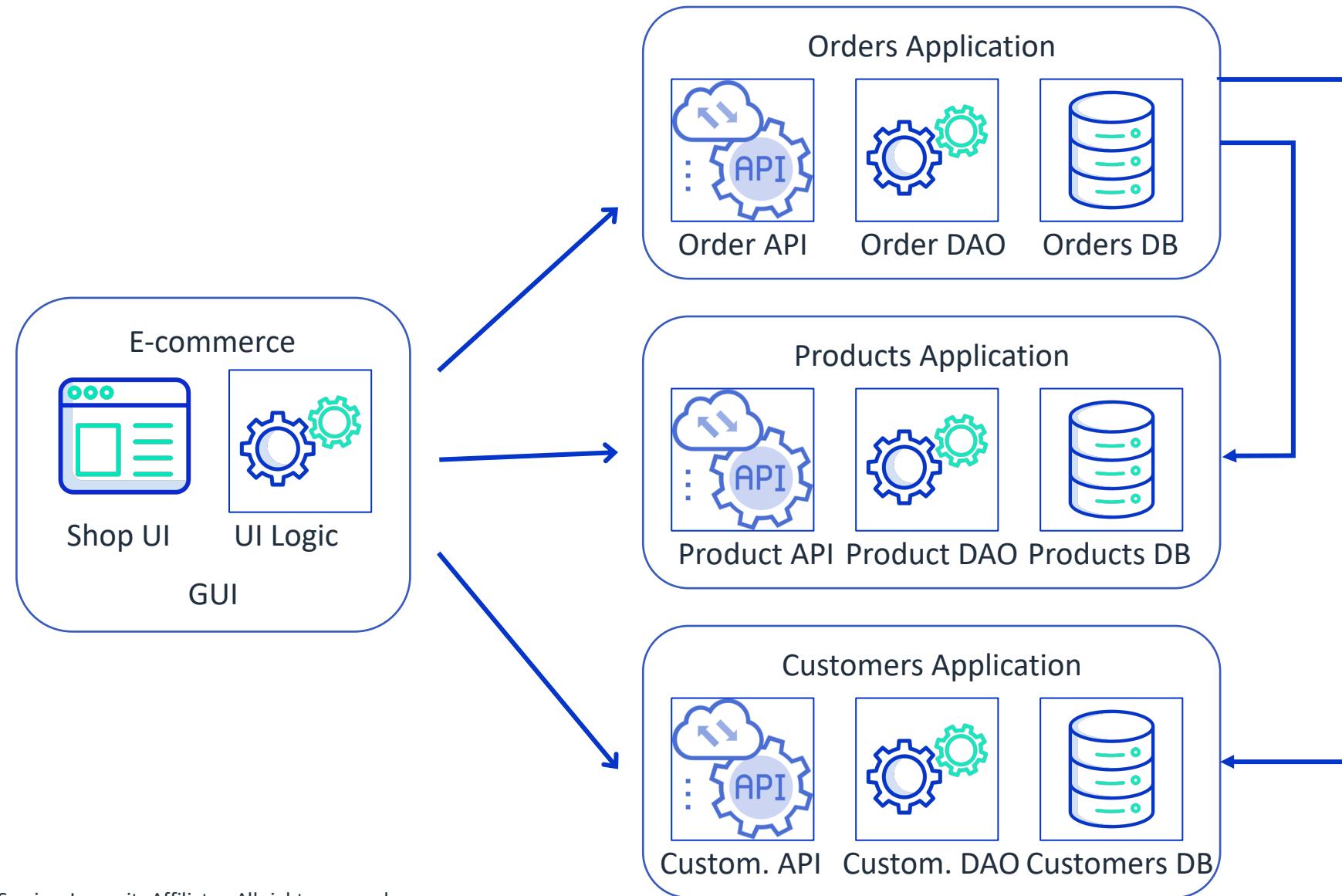
Traditional Application



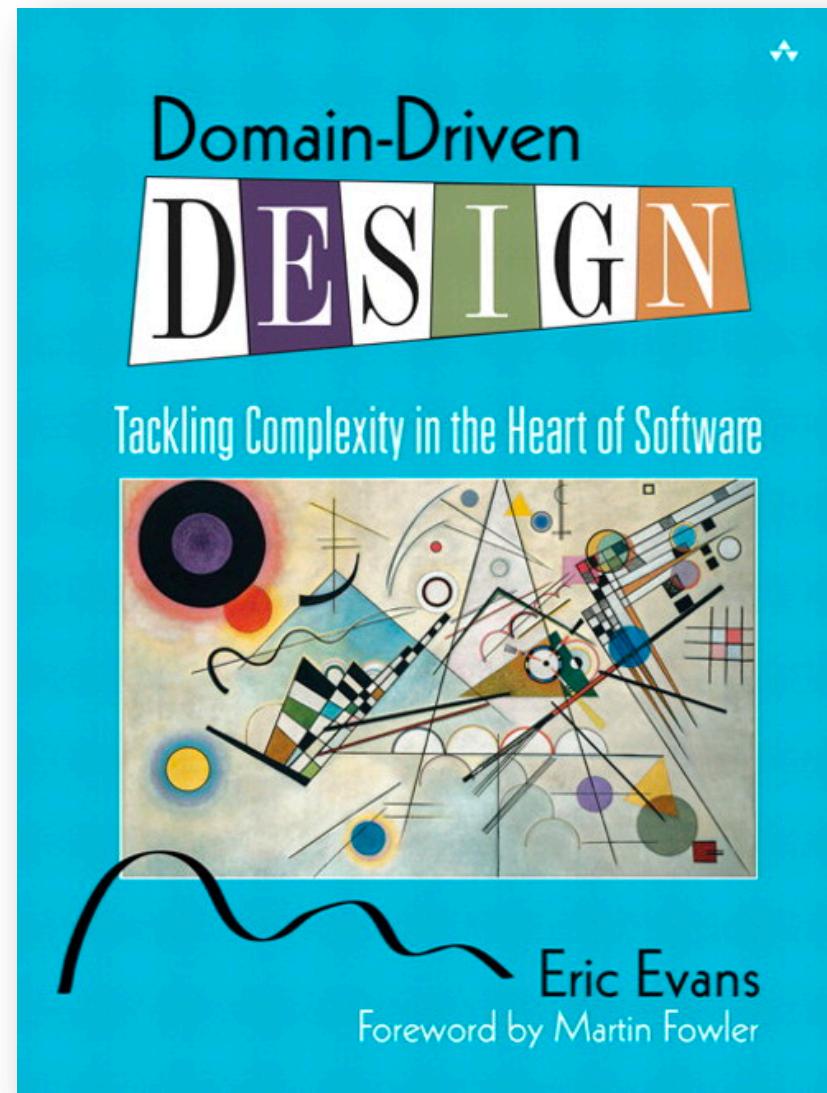
SOA Application



Microservices



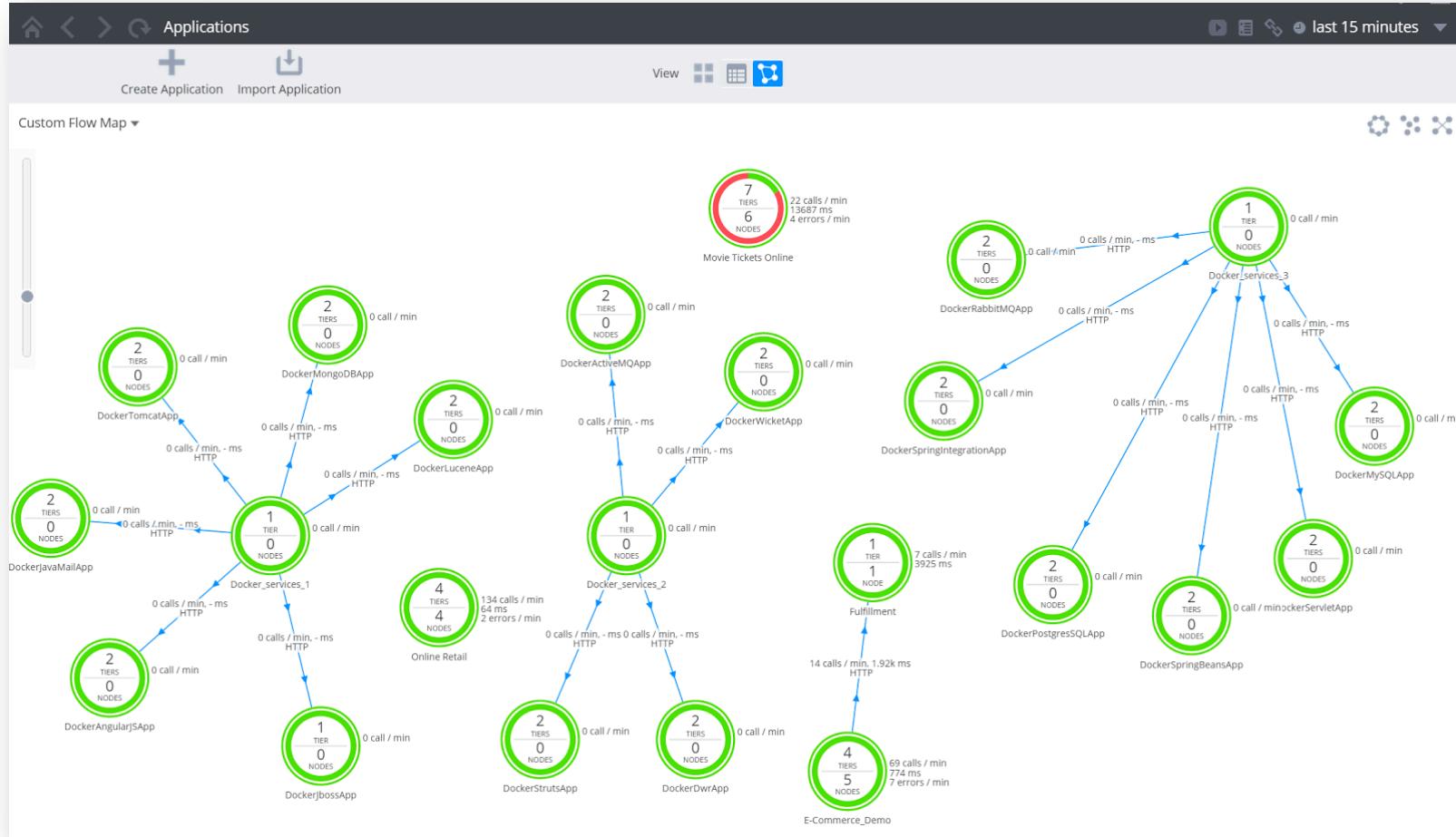
Wait!... And DDD?



DON'T PANIC

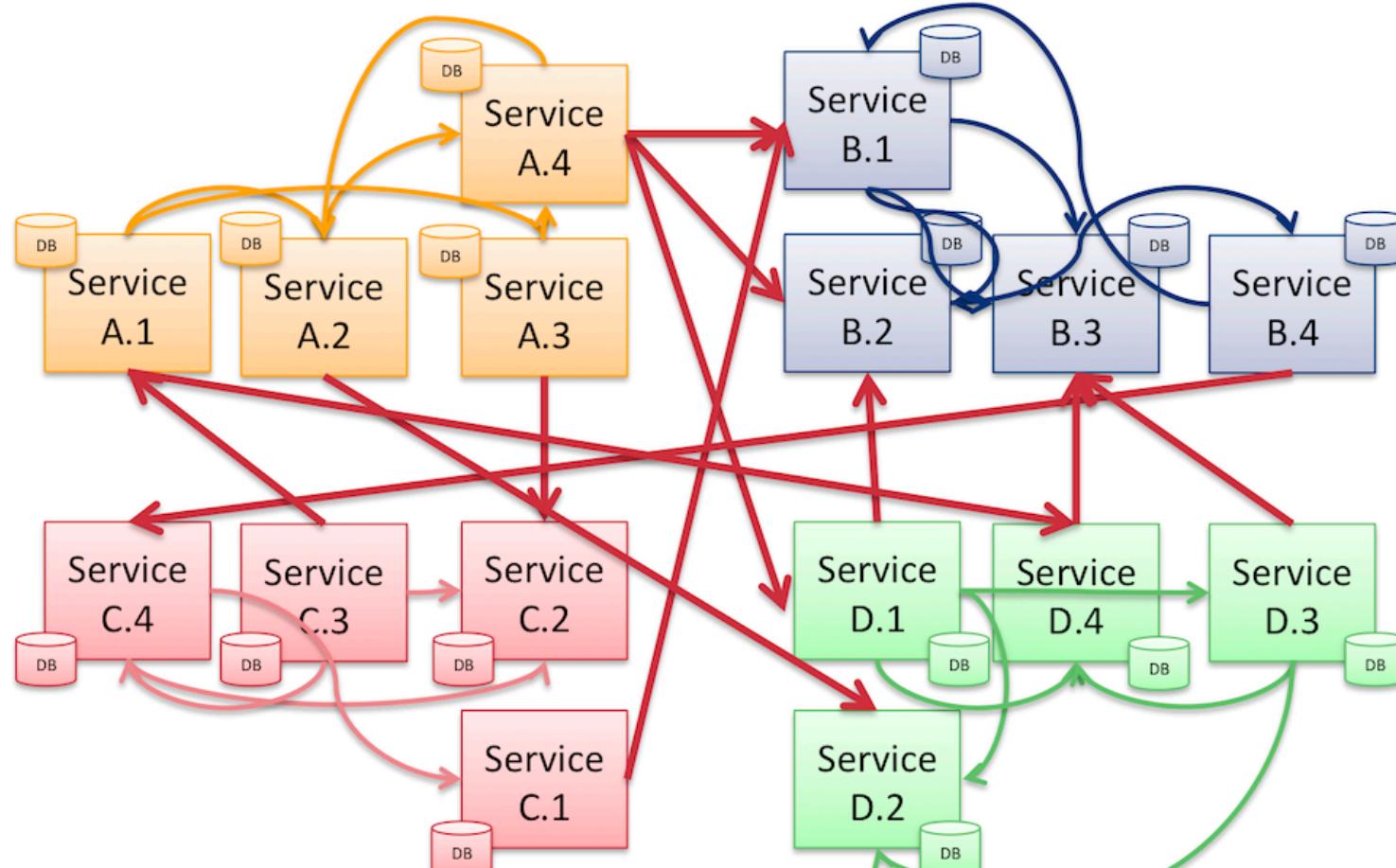


Microservices Communication



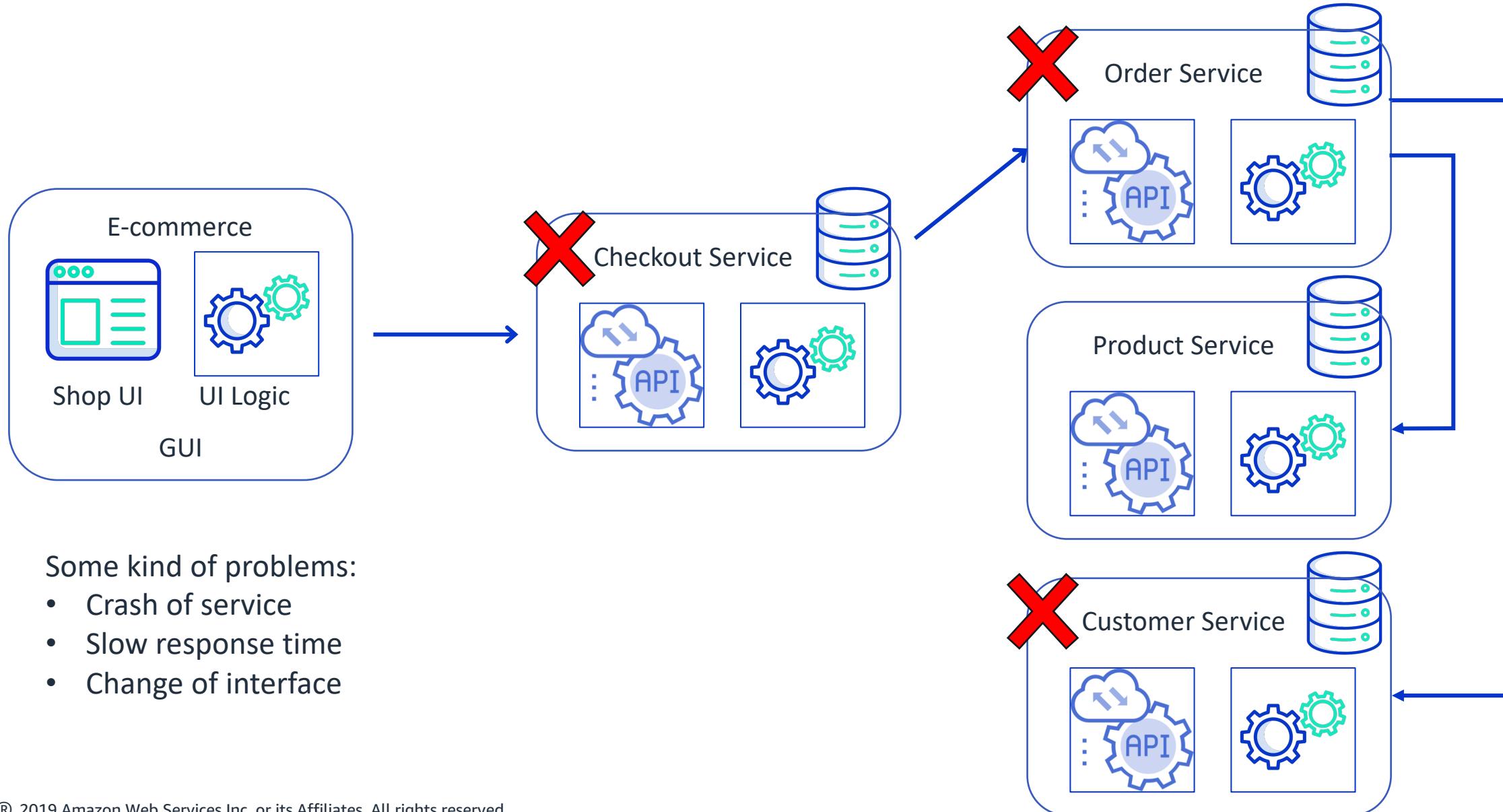
Expectation

Microservices Communication



Reality

Point-to-point Couplings



Some kind of problems:

- Crash of service
- Slow response time
- Change of interface

Sync vs Async

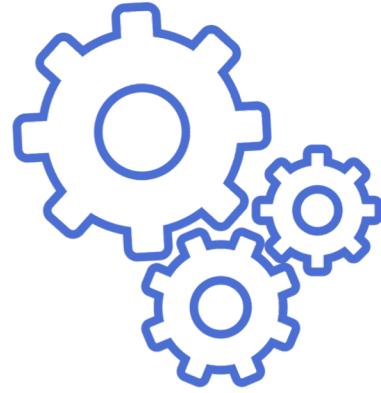


Synchronous



Asynchronous

Reasons to Send a Message



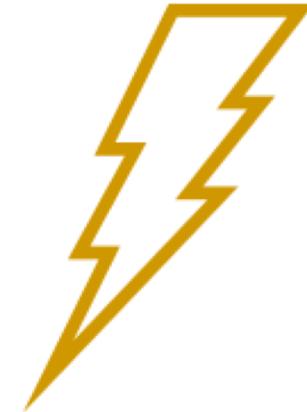
Command

I want to
do something



Query

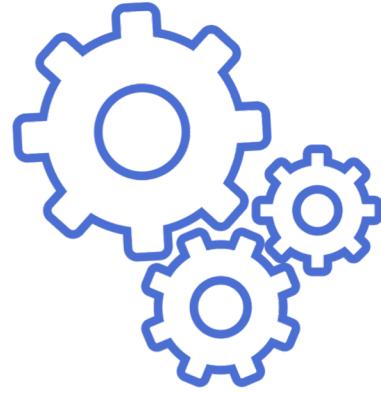
I want to
know something



Event

Something has
happened

Reasons to Send a Message



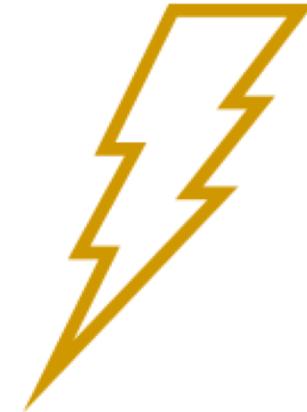
Command

I want a Pizza



Query

Is my pizza ready!?

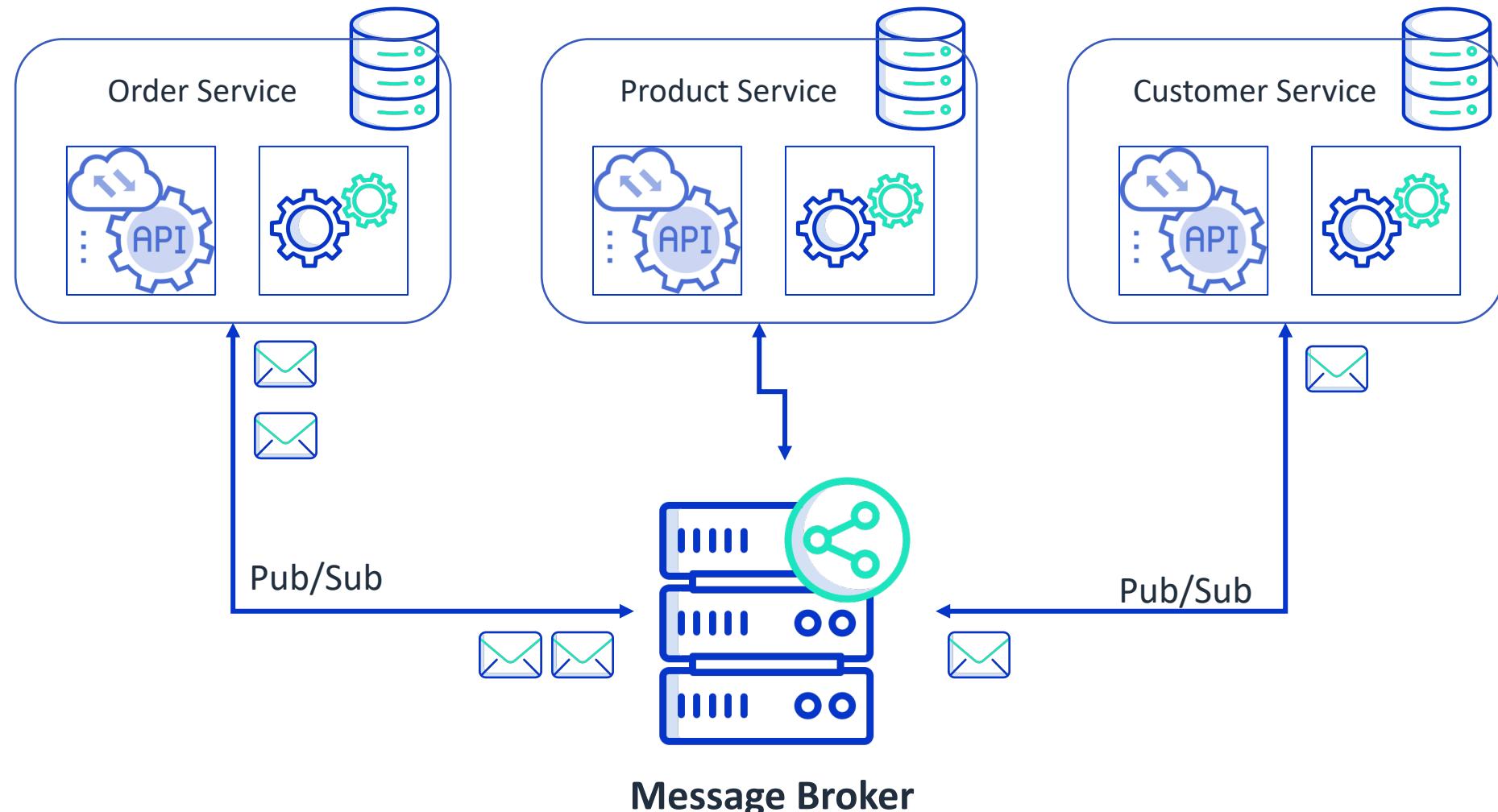


Event

Pizza delivered

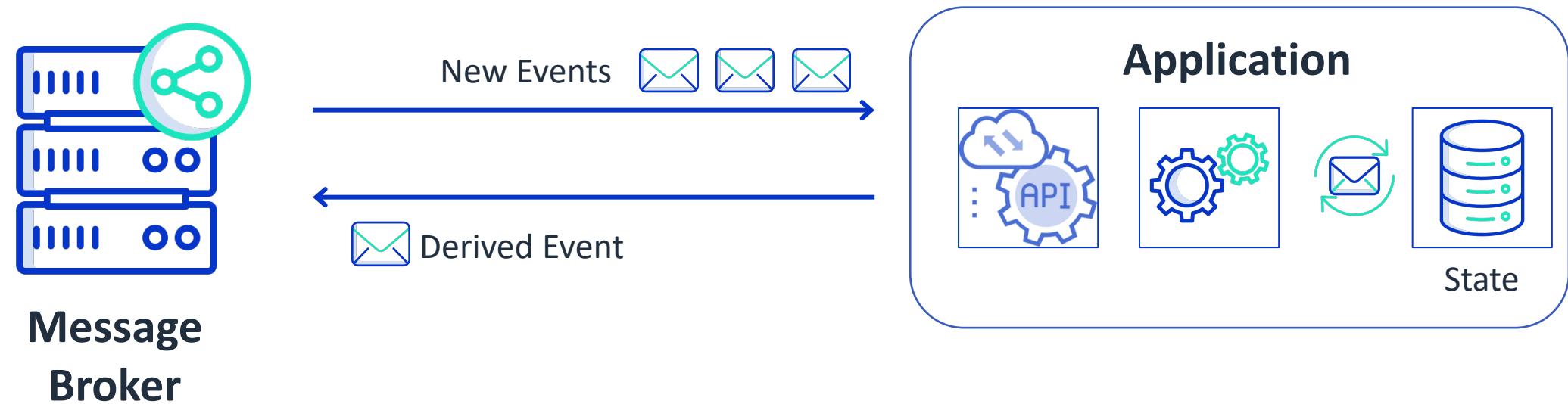
Event-Driven Microservices

Async Communication



Event-Driven Microservices

Async Communication



“We have an amazing API...

...but please subscribe to our event streams instead.”



Event-Driven



Simple Pattern for Streaming Data

Data Producer

Continuously creates data

Continuously writes data to a stream

Can be almost anything

Streaming Service

Durably stores data

Provides temporary buffer that preps data

Supports very high-throughput

Data Consumer

Continuously process data

Cleans, prepares, and Aggregates

Transforms data to information

Streams



Event Stream

2015-10-02	11,Peter,Muster,3010,Berne
2016-10-04	12,Paul,Steffen,8001,Zurich
2016-12-02	21,Lisa,Meier,3043,Ittigen
2017-05-03	11,Peter,Muster, 3015 ,Berne
2017-05-03	21,Lisa,Steffen,8001,Zurich
2017-07-03	11,Peter,Muster,3052,Zollikofen

State Stream (Change Log Stream)

2015-10-02	11,Peter,Muster,3010,Berne
2016-10-04	12,Paul,Steffen,8001,Zurich
2016-12-02	21,Lisa,Meier,3043,Ittigen
2017-05-03	11,Peter,Muster, 3015 ,Berne
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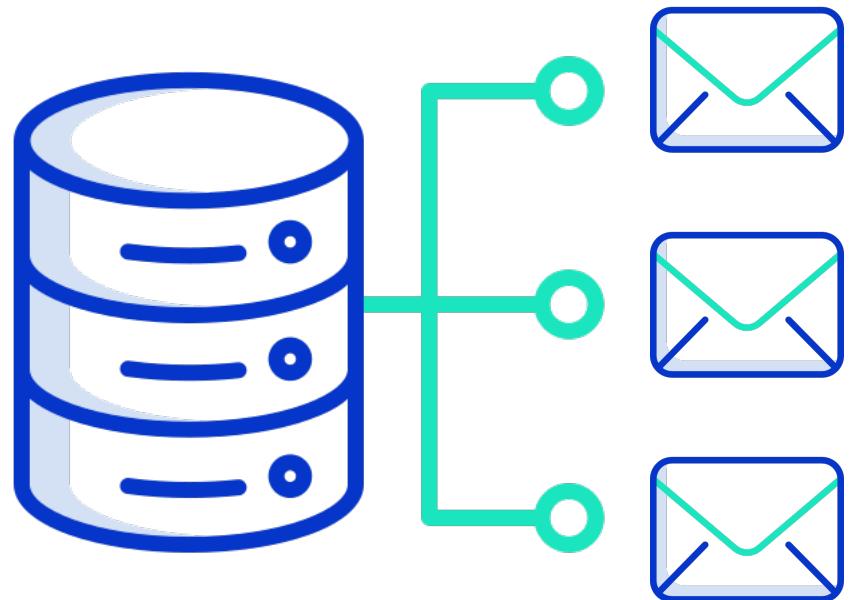
Event Sourcing vs Event Store

Persists the state of a entity as a
sequence of state-changing events

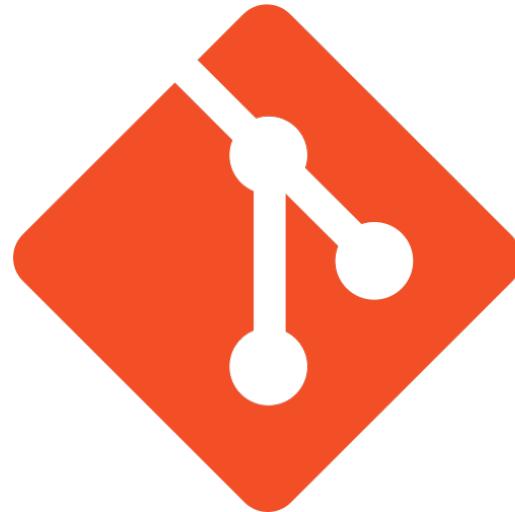
Whenever state of entity changes,
a new event is **appended to the list of
events**

Saving an event is a **single operation
(atomic)**

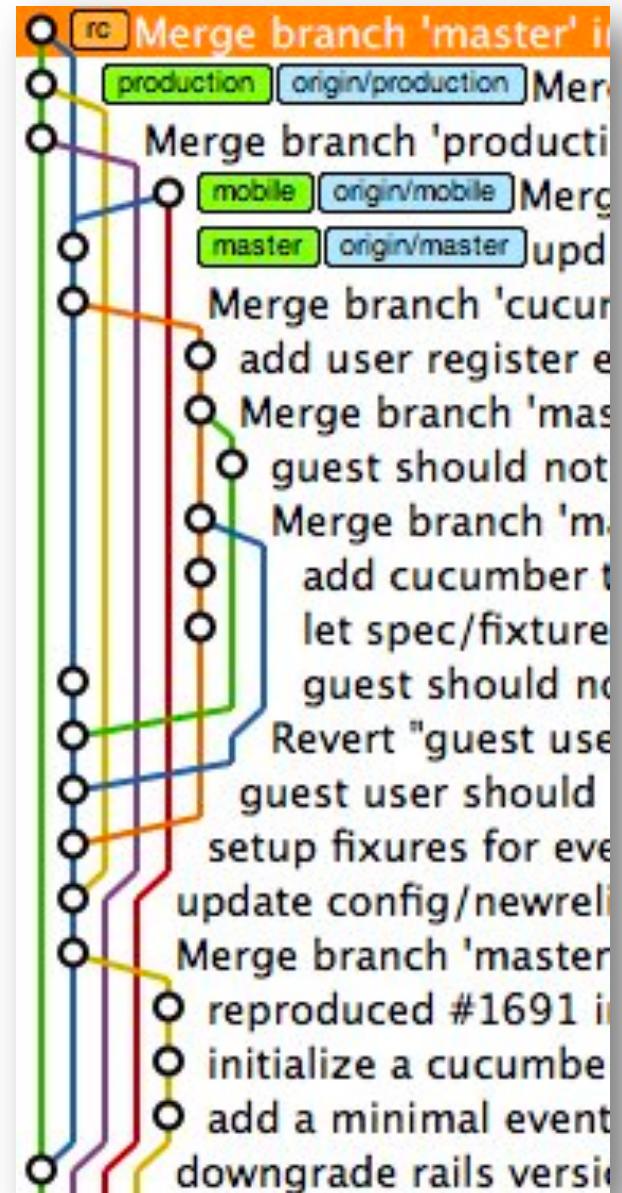
The application reconstructs an entity's
current state by **replaying the events**



Event Sourcing - Example

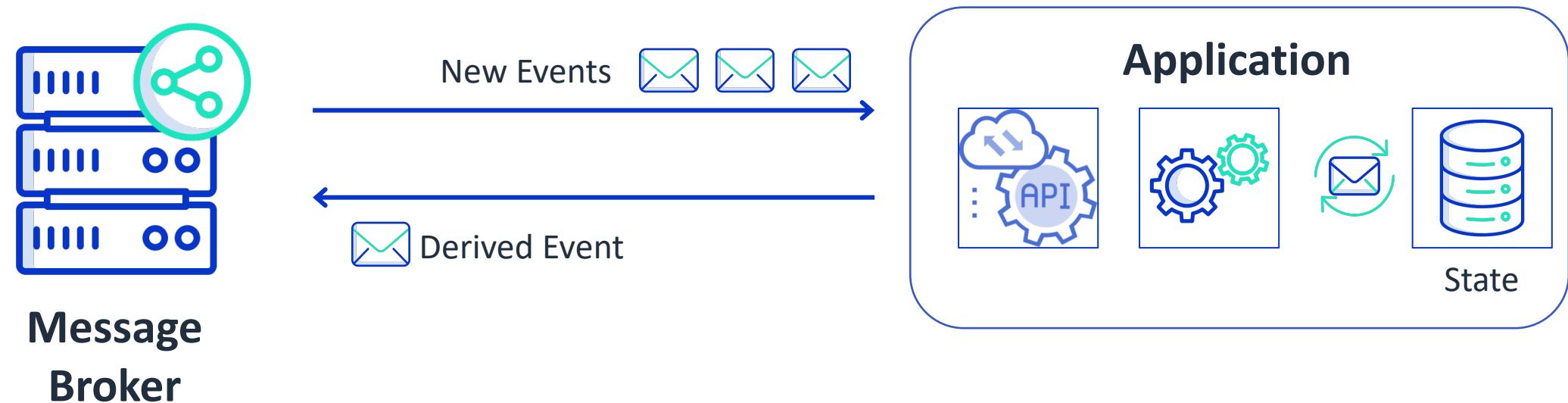


git

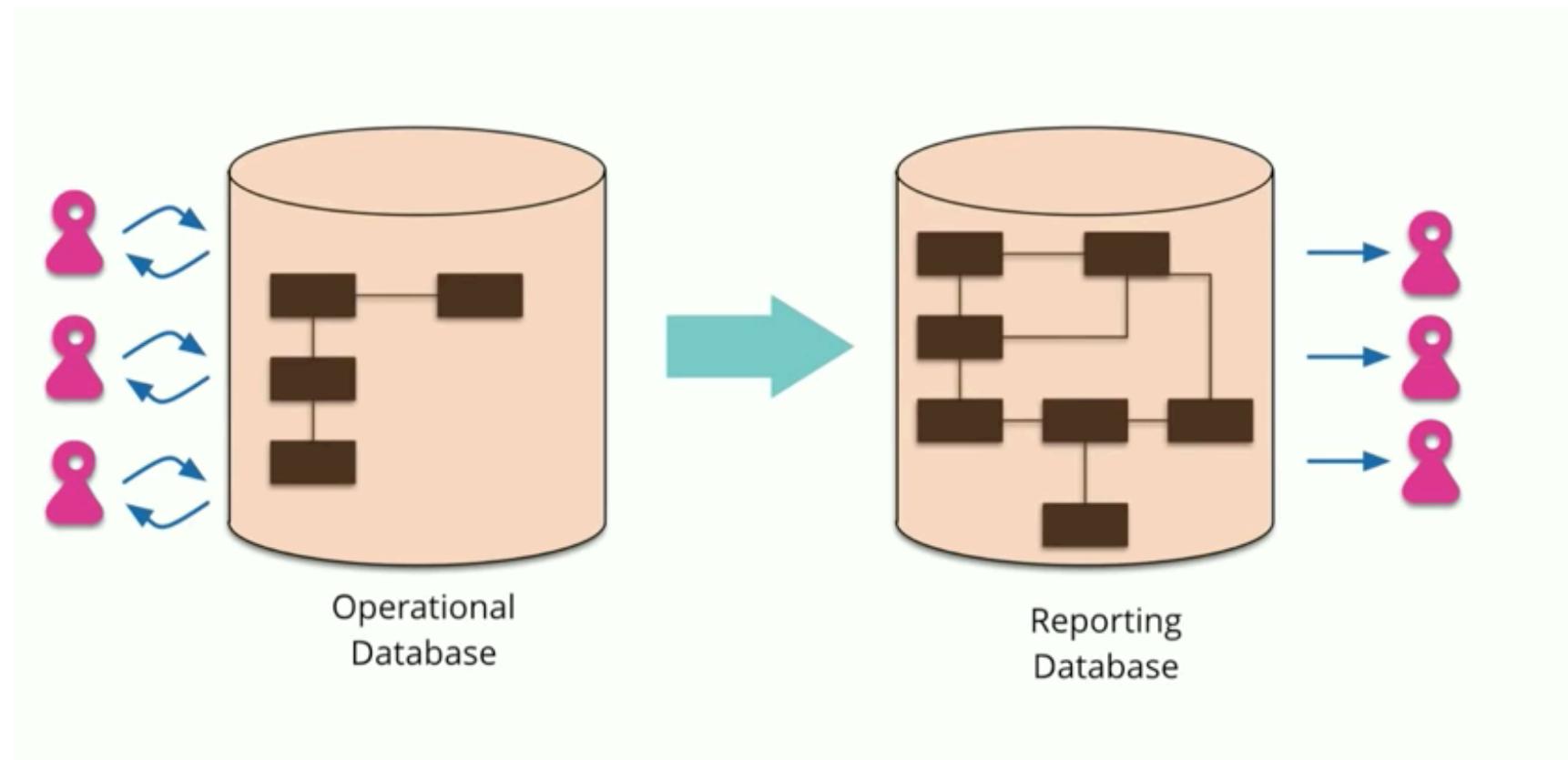


Event-Driven Microservices

Async Communication

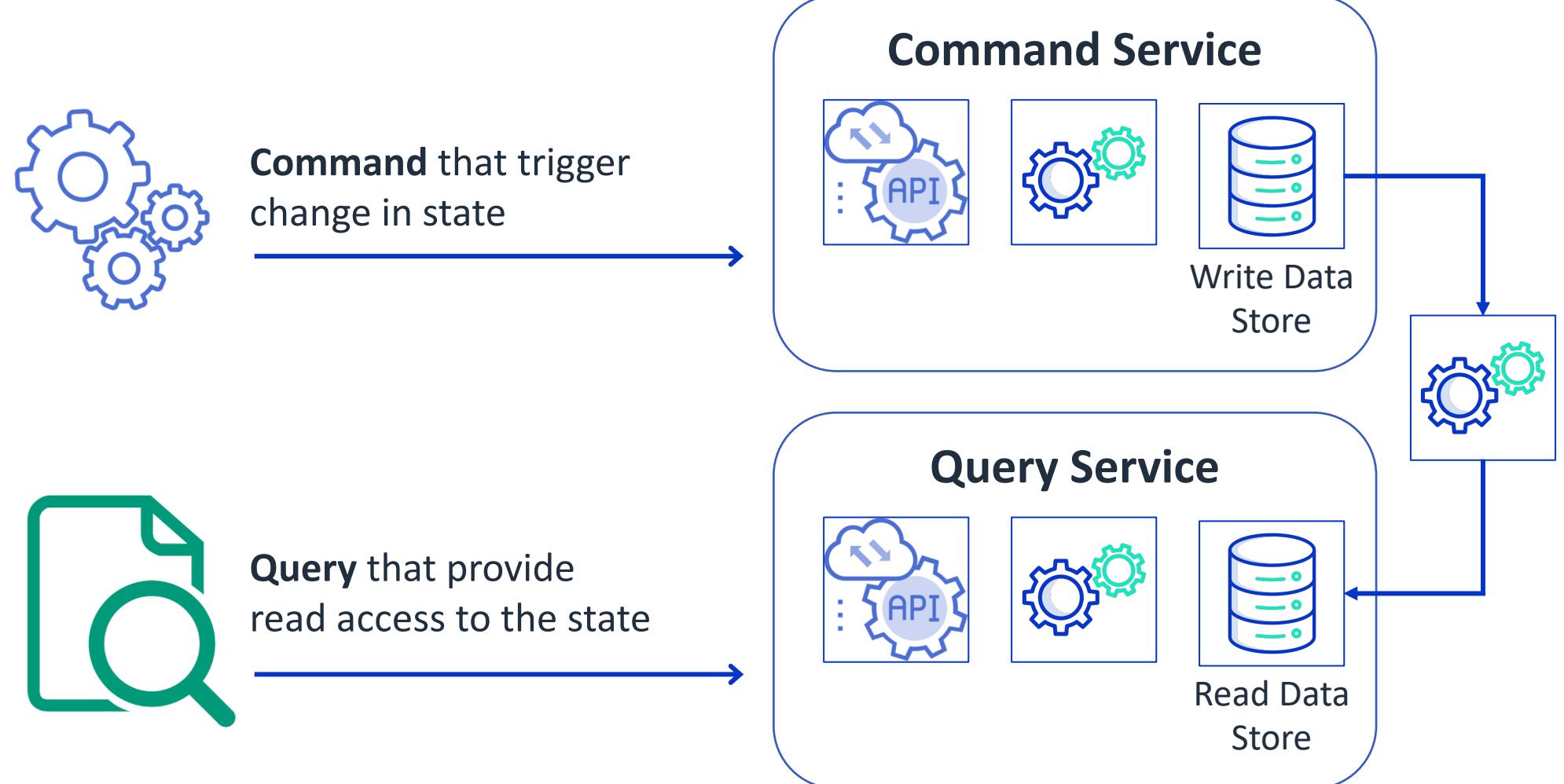


Old Idea? OLTP vs OLAP



Operational/Transactional Database vs Reporting/Analytical Database

CQRS – Command Query Responsibility Segregation



*One alternative for CQRS implementation

<https://martinfowler.com/bliki/CQRS.html> - 2011



Event Sourcing & CQRS

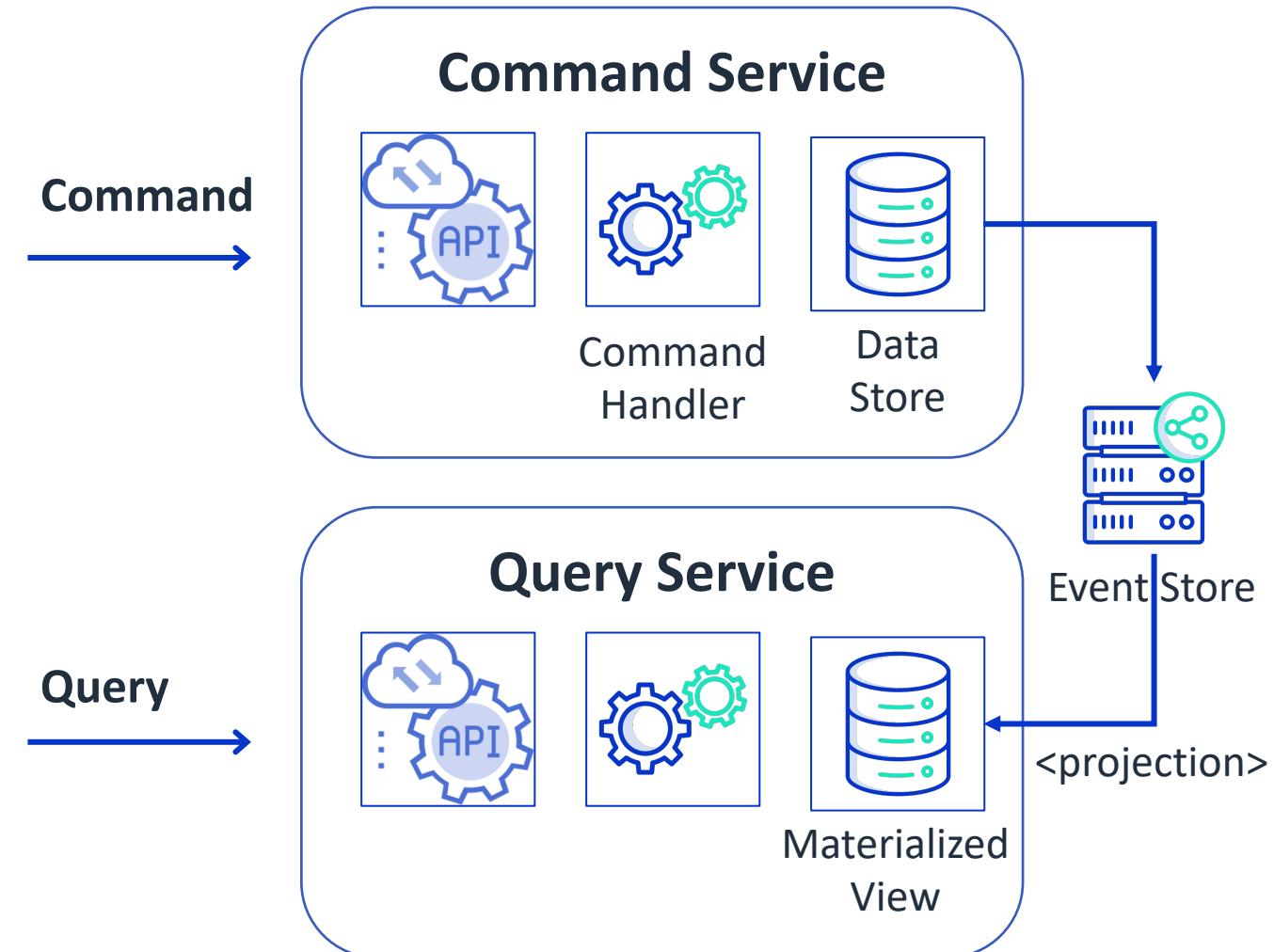
Optimize different nonfunctional requirements for **read and write**

Write Delay

Eventual Consistency

Database as event publisher (optional)

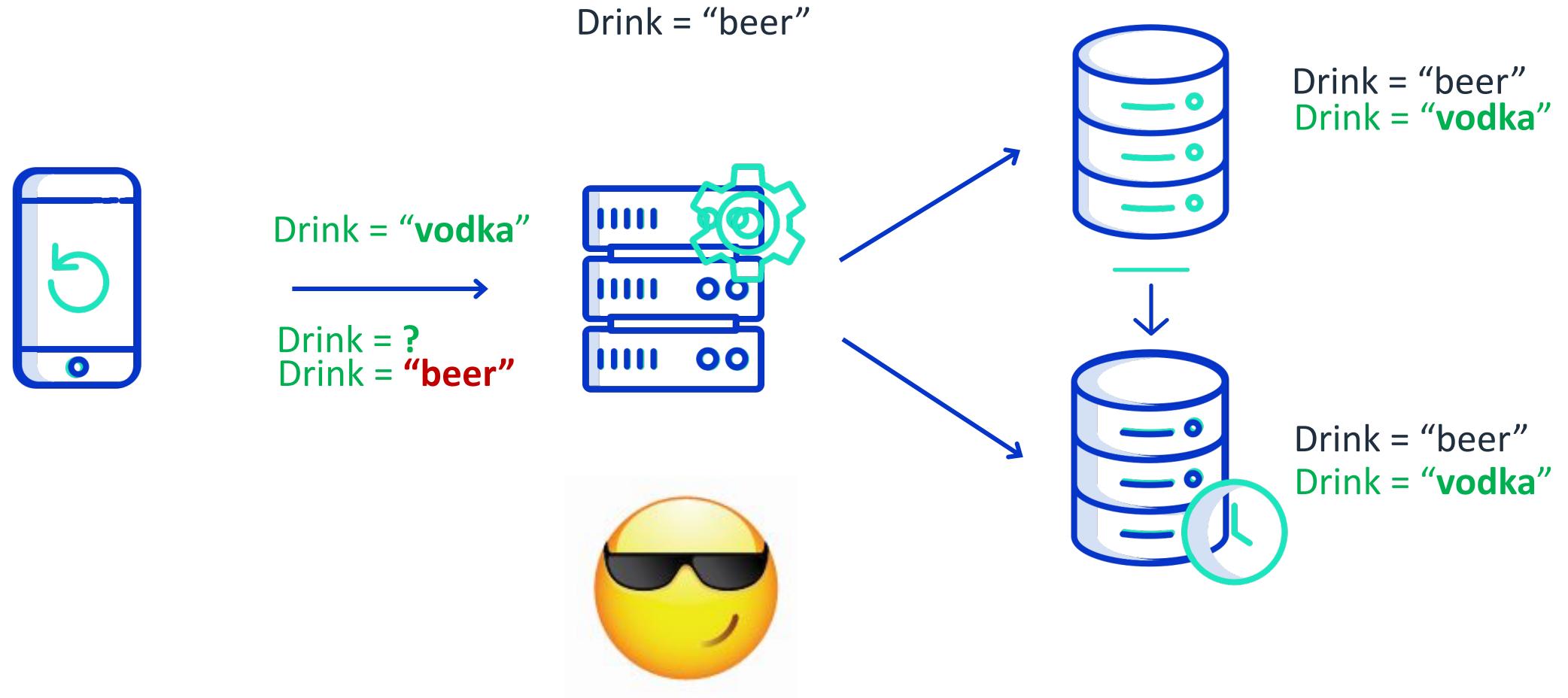
Data Projection and Materialized View



*Another alternative for CQRS implementation



Eventual Consistency





Credits: <http://pjousselin.free.fr/>

Event Ordering



Expectation



Reality

Event Ordering



“Don’t do it, if you can avoid it.”

Event Ordering



Account Created



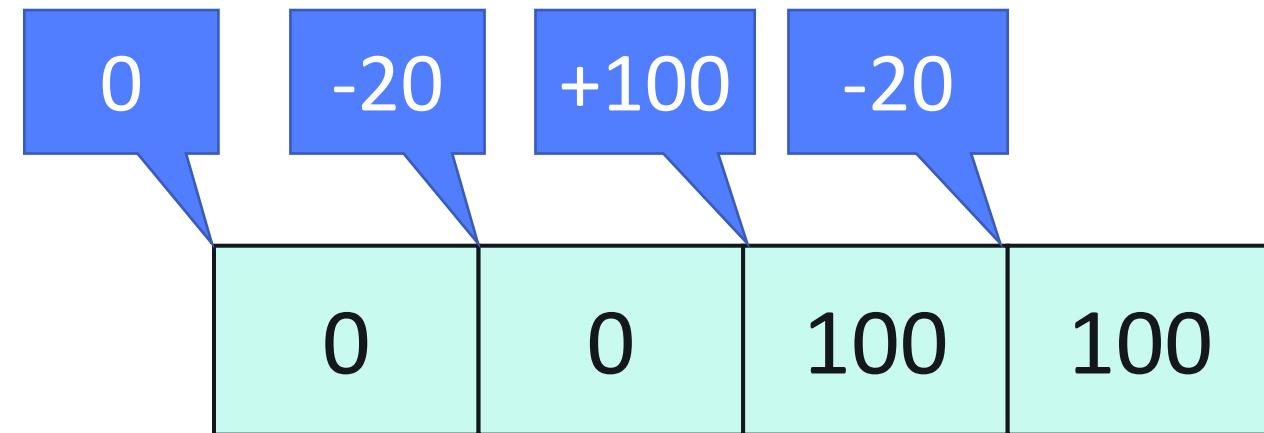
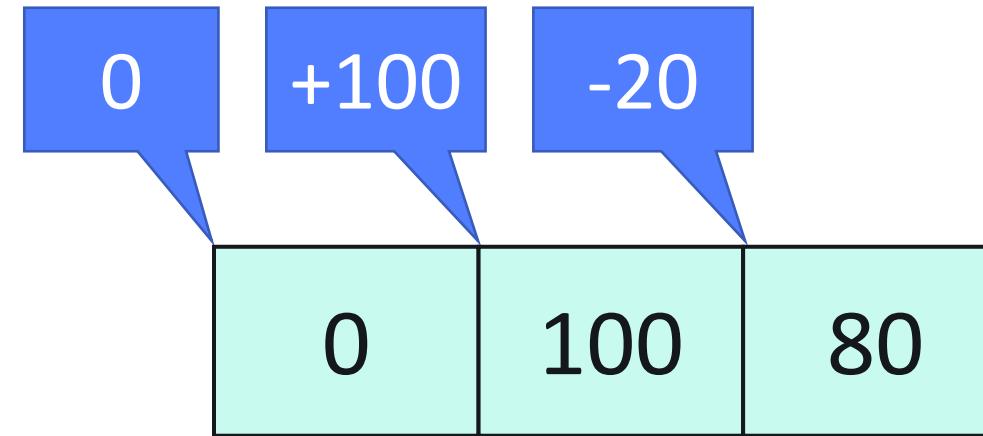
Deposit: 100



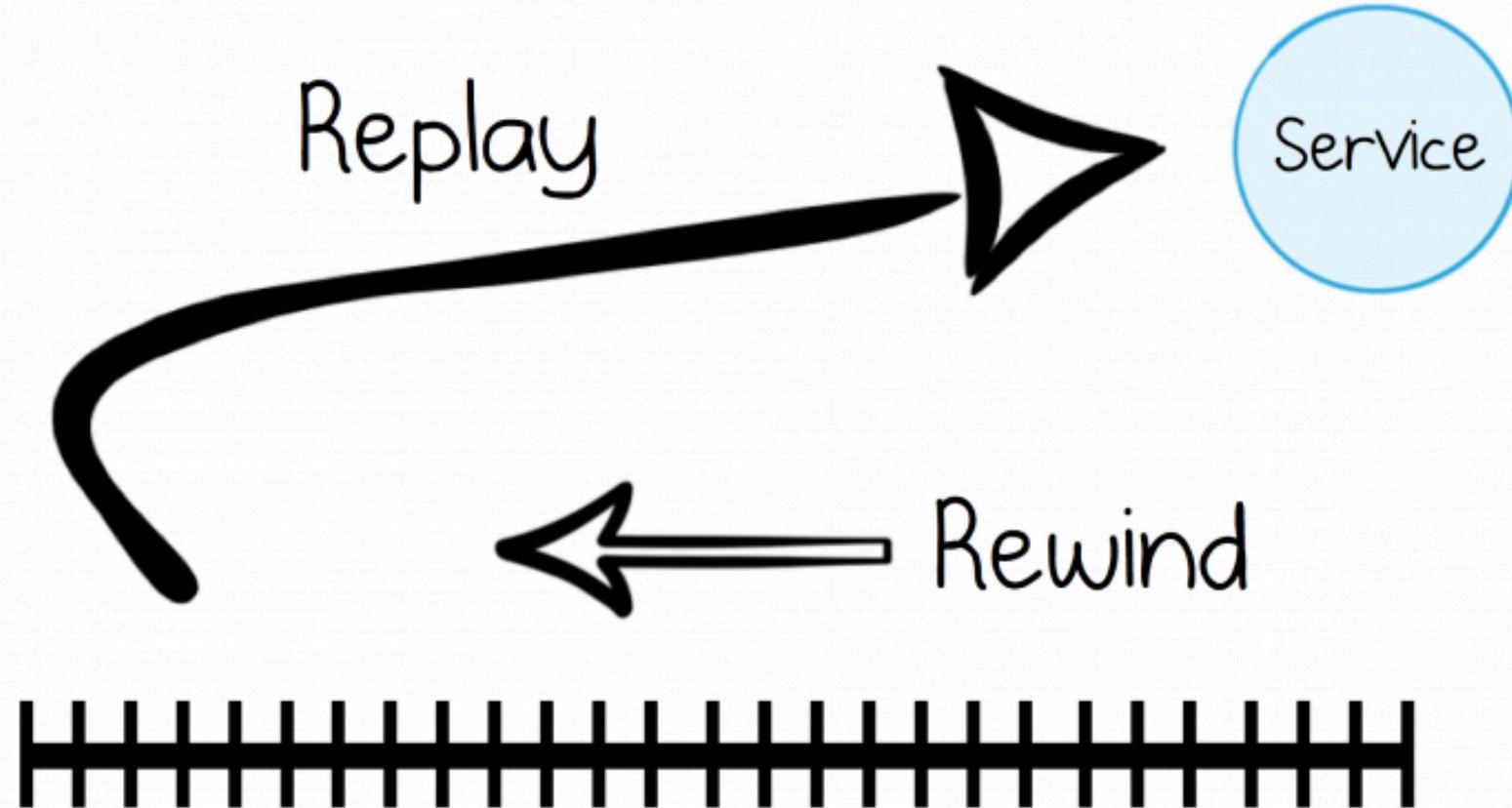
Withdraw: 20



Withdraw: 20



Events are Immutable! Or not!?



BACK TO THE FUTURE

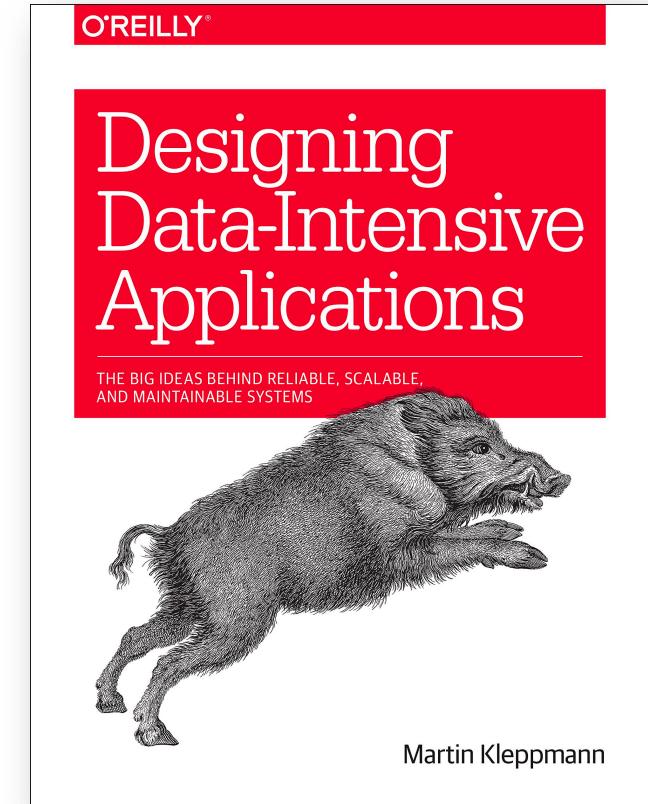
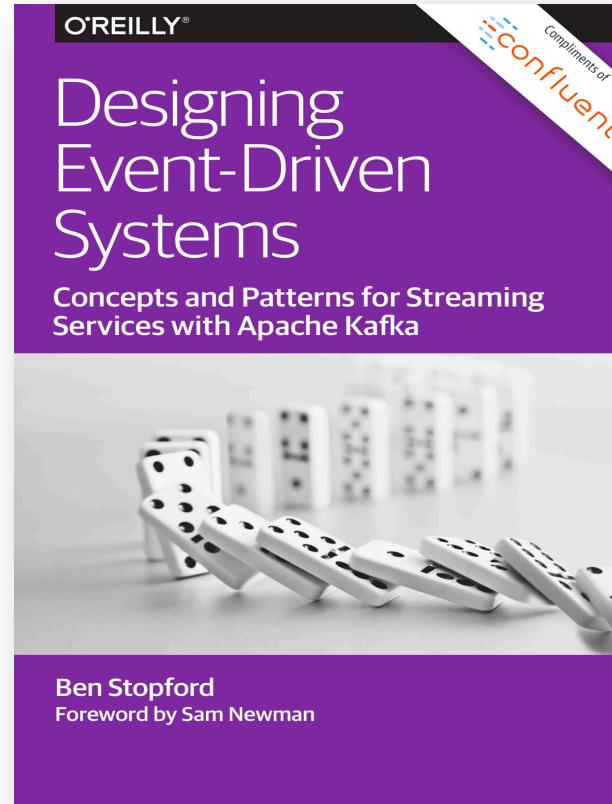
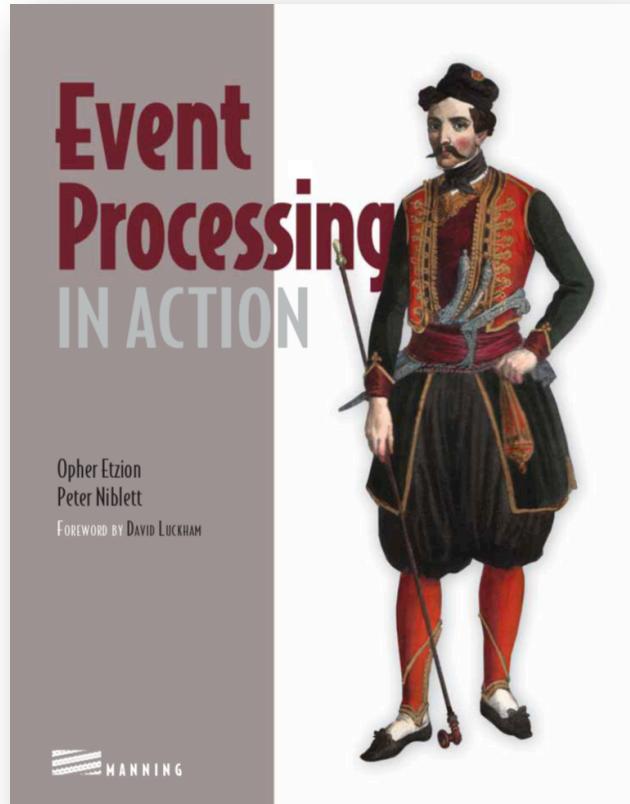




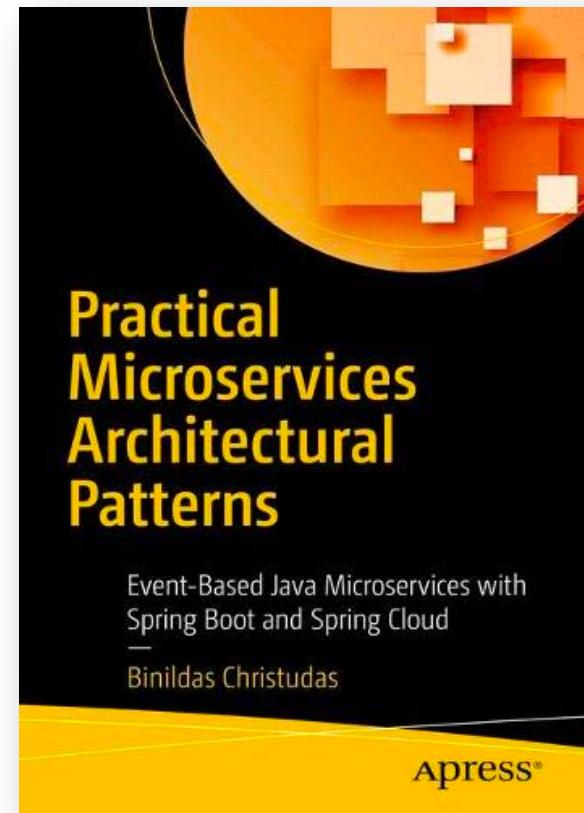
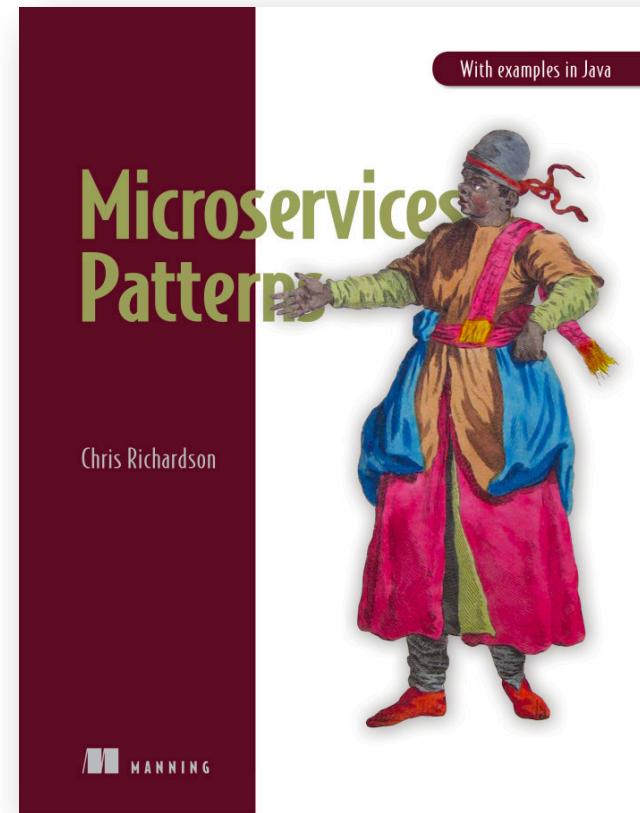
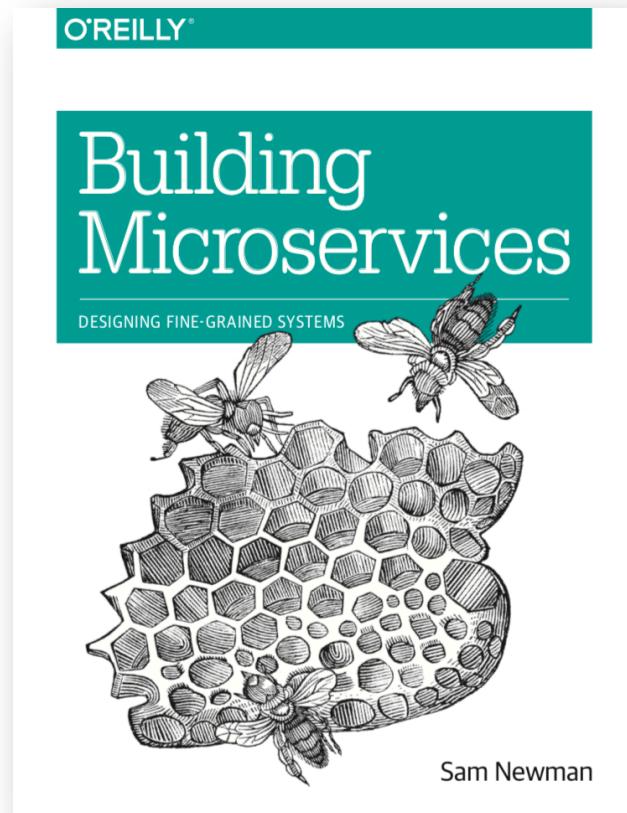
We are here!

- Projections and Aggregates
- Backpressure and Exponential Backoff
- Complex Event Processing
- Monitoring and Fitness Functions for EDA
- Change Data Capture over Streams
- Clustered Event Sourcing and Assured Delivery
- Event Versioning
- Channels and Data Security
- Temporal Semantics
- Governance and Event Catalog

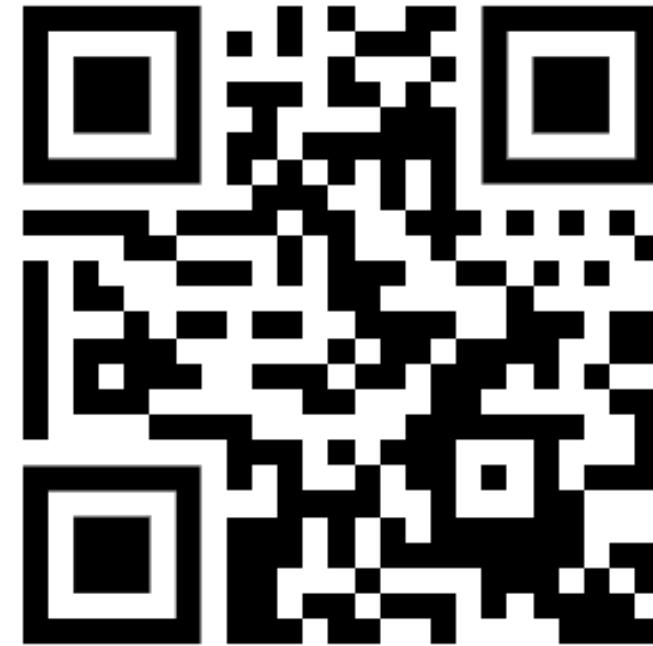
Some books...



...and other books



... or just do this!



bit.ly/tdcpoa-2019

Thank you!

Leonardo Piedade

Luiz Yanai



piedadel@amazon.com

lyanai@amazon.com