MINI-COURSE

Modular Monoliths: CQRS With MongoDB

MJ Tech

Intro

Modular monolith benefits.

Data isolation and polyglot persistence.

Event-driven architecture, CQRS.

Document databases, MongoDB.

Modular Monolith

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Modular Monolith Benefits

- High cohesion
- Loose coupling
- Simplified deployment
- Improved performance
- Lower operational complexity
- Easier transition to microservices

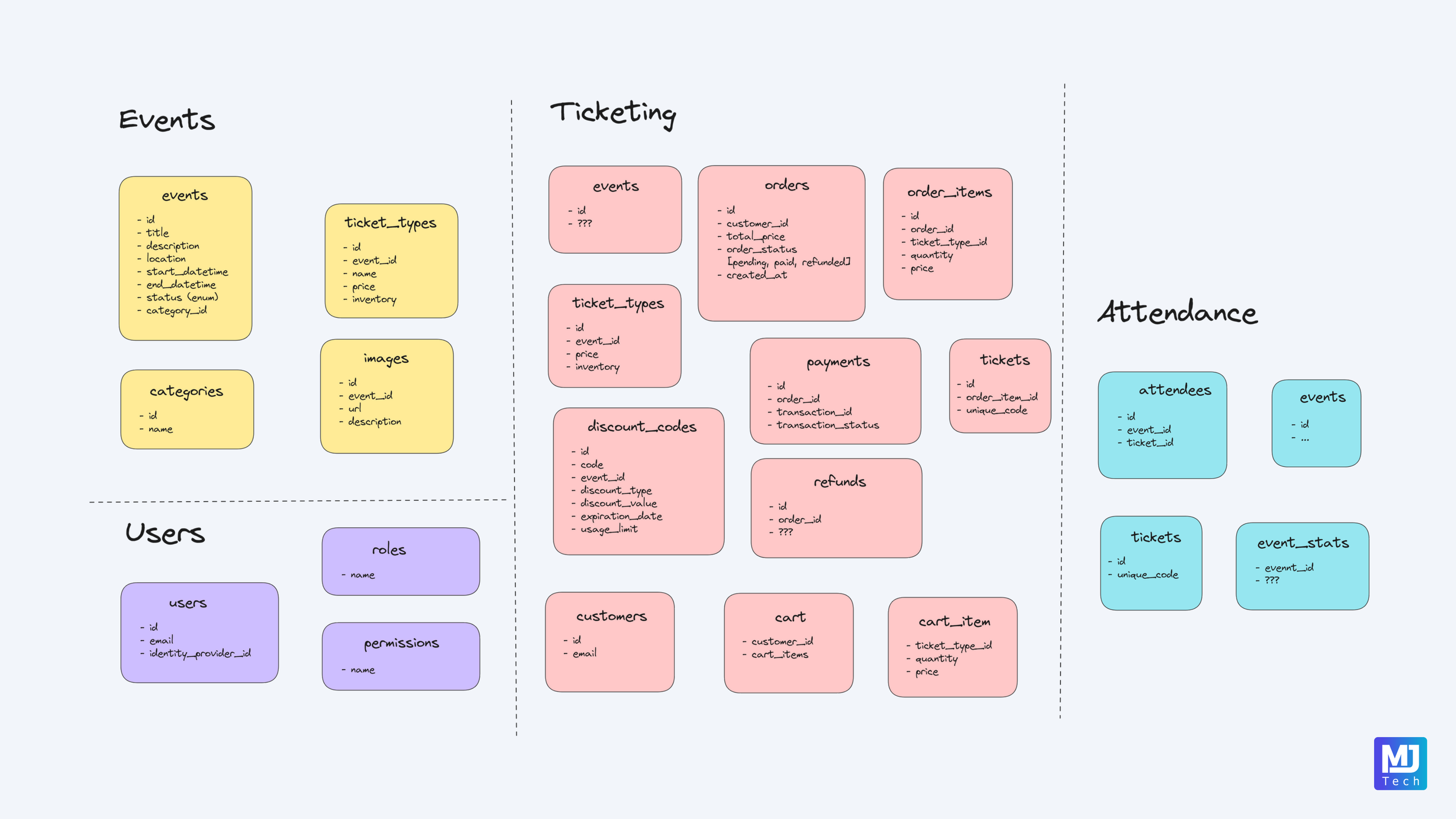
How do we define modules?

Defining Module Boundaries

Domain-Driven Design.

Bounded contexts.

Event Storming.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Modules shouldn’t be coupled at the database level.

Module Data Isolation

There are four levels of data isolation:

- Level 1 - Separate tables
- Level 2 - Separate schemas
- Level 3 - Separate databases
- Level 4 - Different databases

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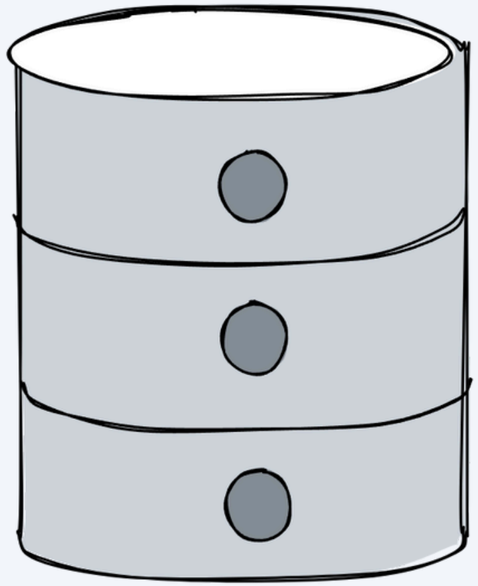
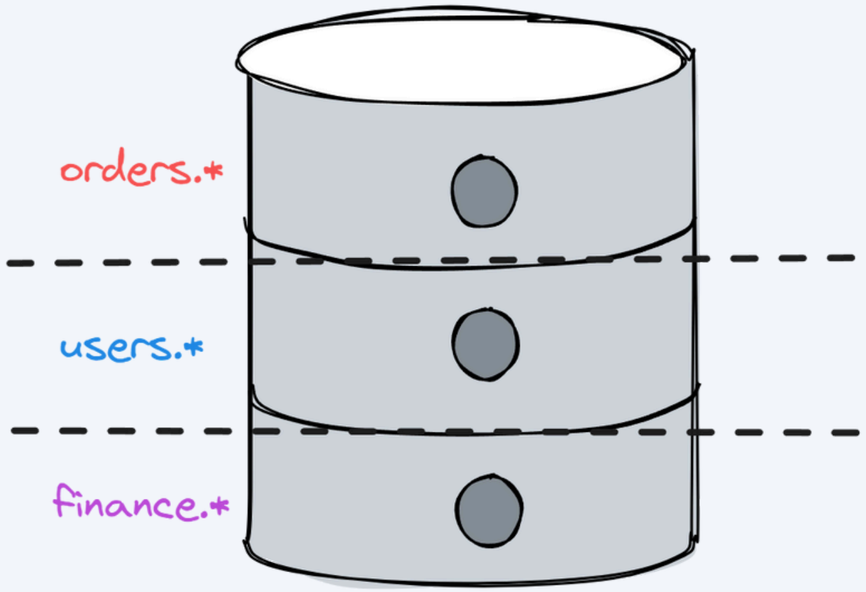


Relational DB

Separate Table

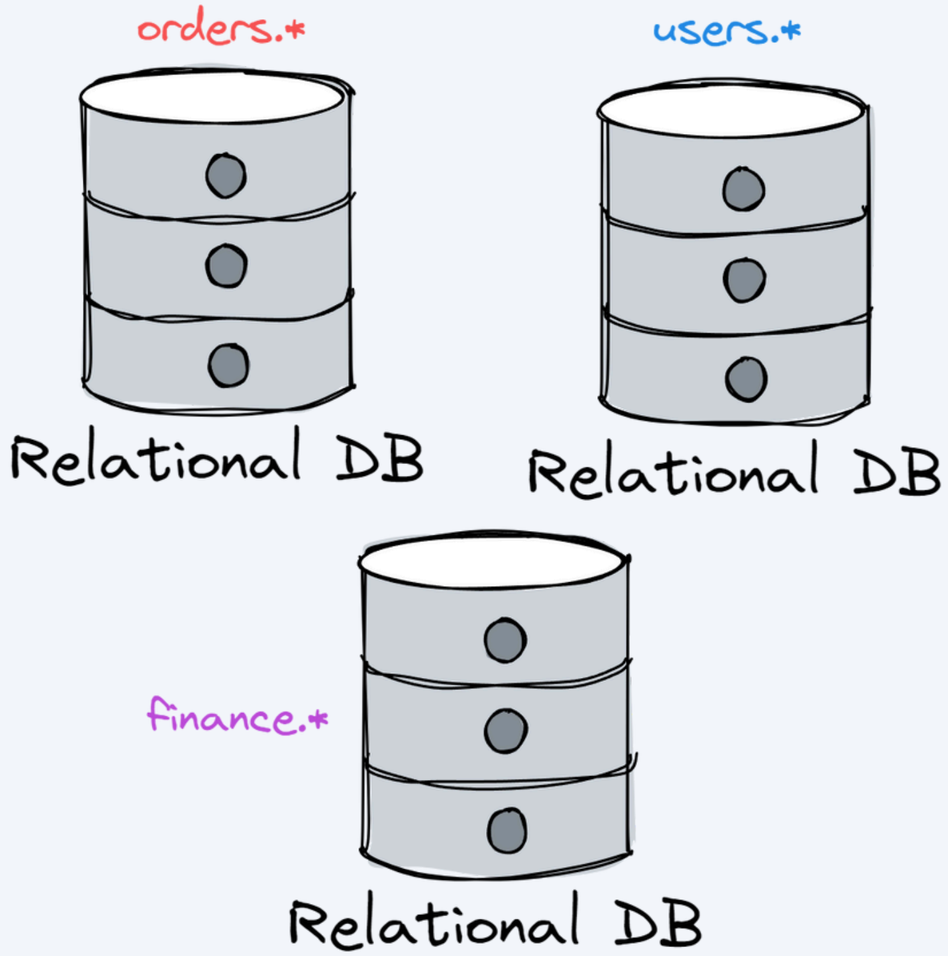
- Same schema
- Same database
- Same DB type



Relational DB

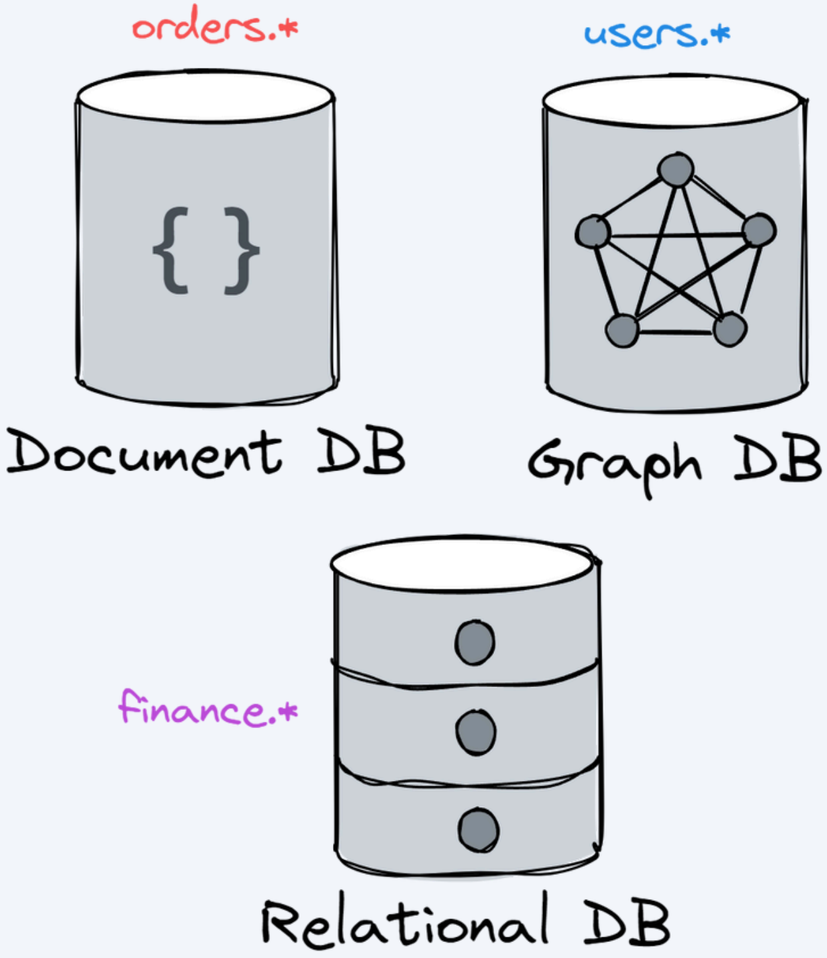
Separate Schema

- Different schema
- Same database
- Same DB type



Separate Database

- Different schema
- Different database
- Same DB type



Different Persistence

- Different schema
- Different database
- Different DB type

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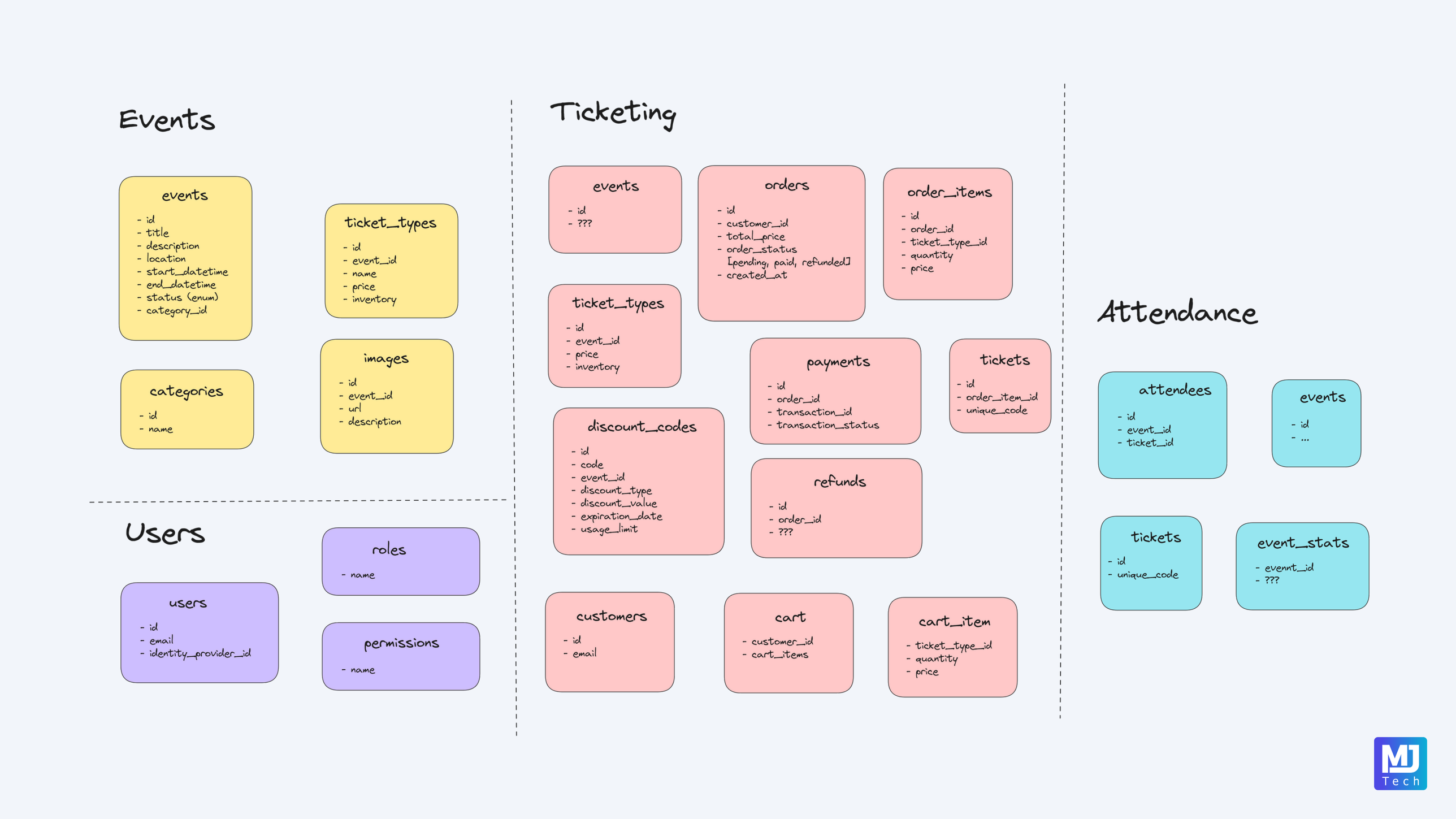
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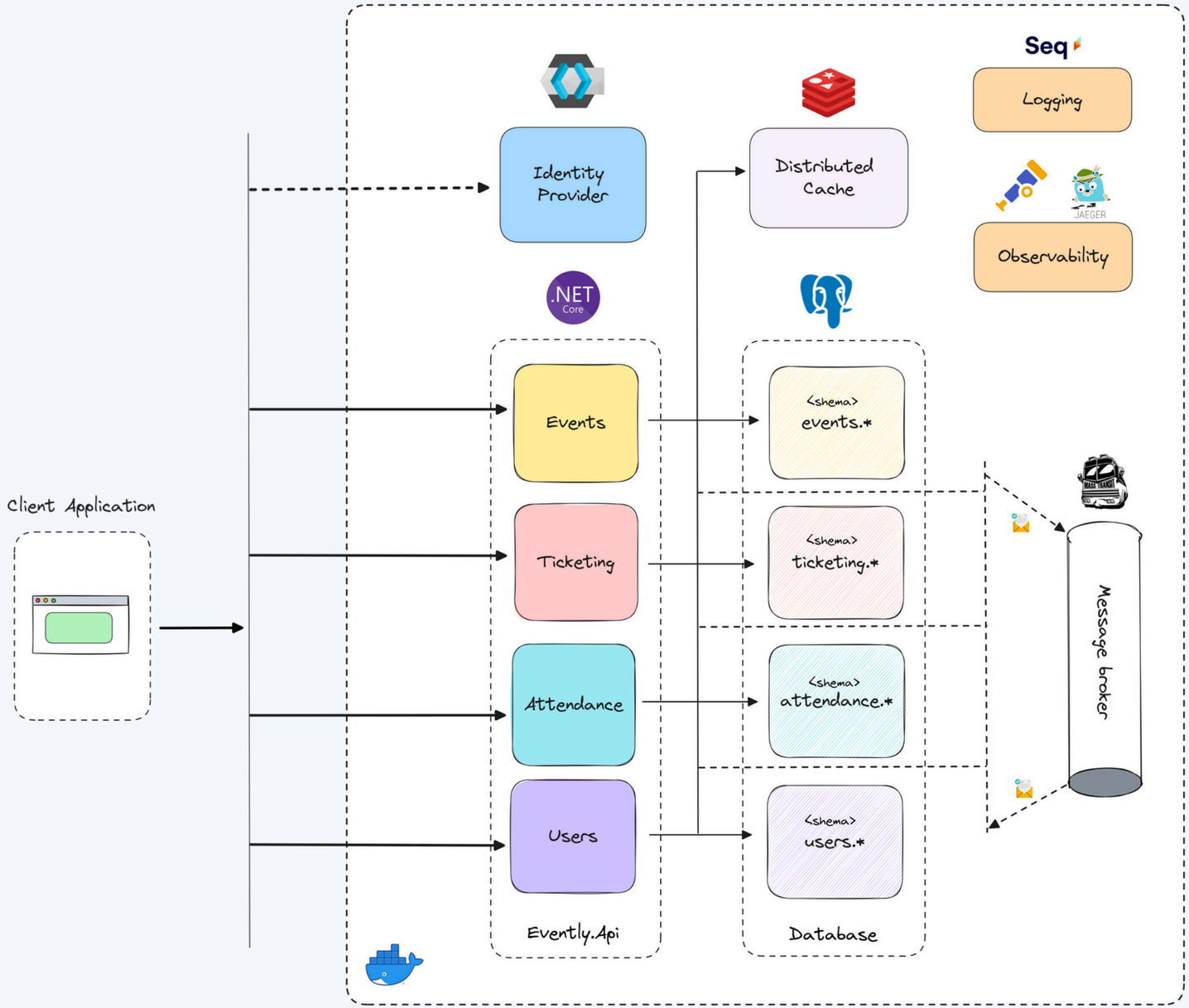
Seq
Logging
Identity Provider
Distributed Cache
JAEGER
Observability
.NET Core
Client Application
Events
Ticketing
Attendance
Users
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<shema> ticketing.*
<shema> attendance.*
<shema> users.*
Message broker
Evently.Api
Database

Event-driven Architecture

What does it mean to be event-driven?

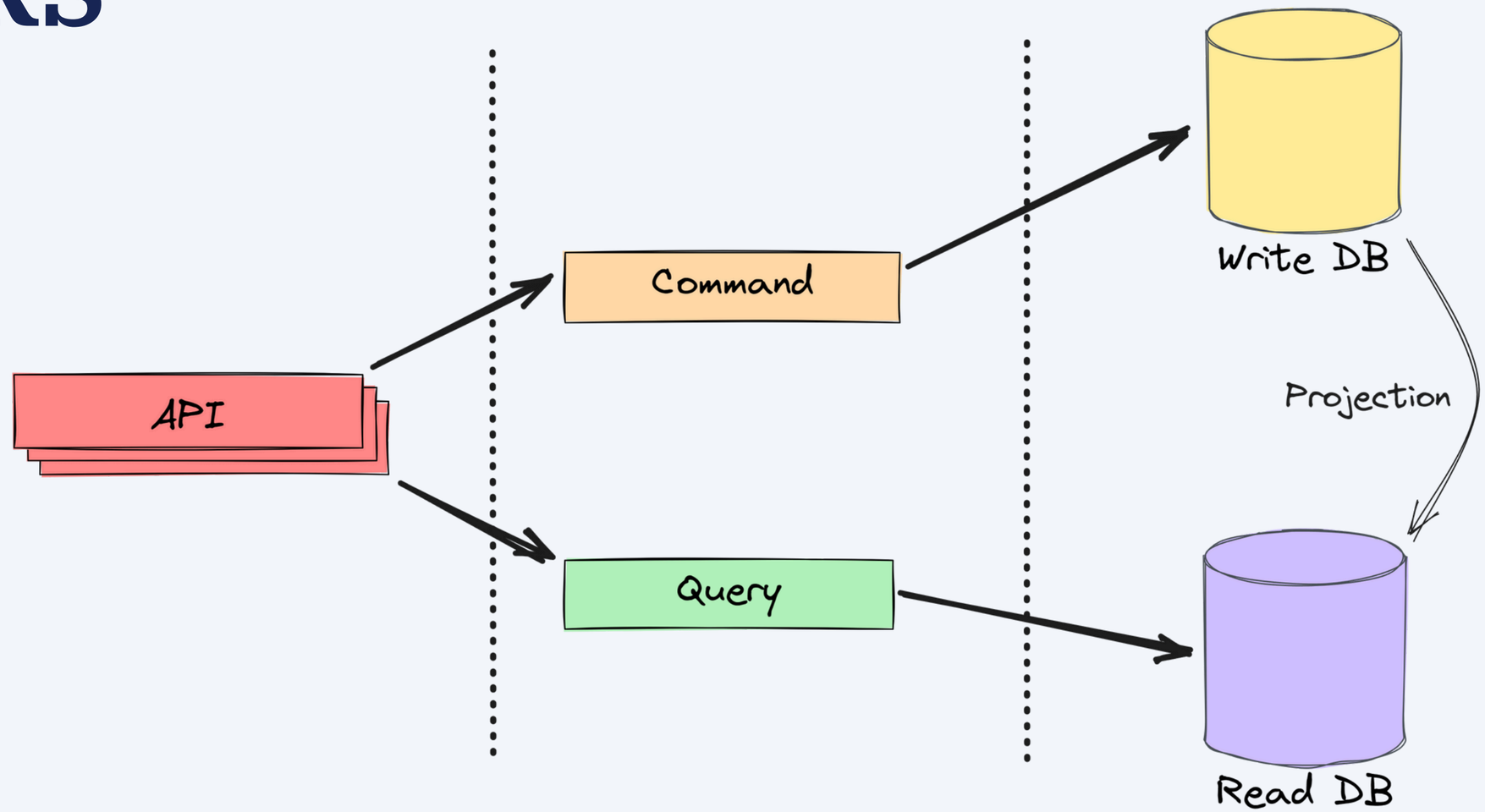
Driven by business events.

Patterns of EDA

You are *event-driven* if you are using at least one of these patterns.

- Event sourcing
- Event notifications
- Event-carried state transfer
- CQRS

CQRS



Embrace eventual consistency

Document Databases

A document database is a database that stores information in documents.

Flexible database schema.

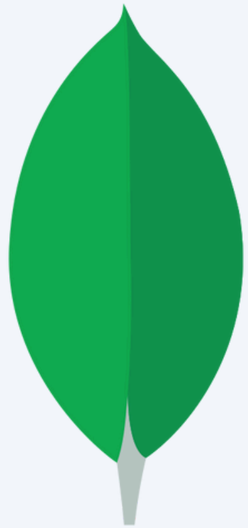
Horizontal scalability.

```
{
  "_id": "5cf0029caff5056591b0ce7d",
  "firstname": "Jane",
  "lastname": "Wu",
  "address": {
    "street": "1 Circle Rd",
    "city": "Los Angeles",
    "state": "CA",
    "zip": "90404"
  }
  "hobbies": ["surfing", "coding"]
}
```

Source: https://www.mongodb.com/document-databases

MongoDB

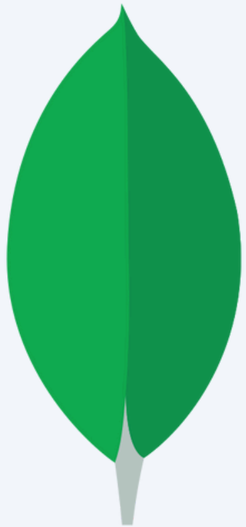
NoSQL document database.



MongoDB

NoSQL document database.

Documents are stored using JSONB.

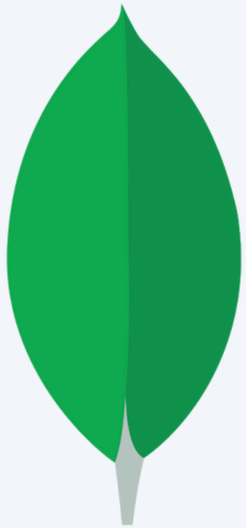


MongoDB

NoSQL document database.

Documents are stored using JSONB.

Collections instead of tables.



MongoDB

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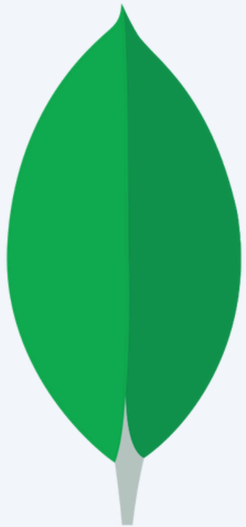
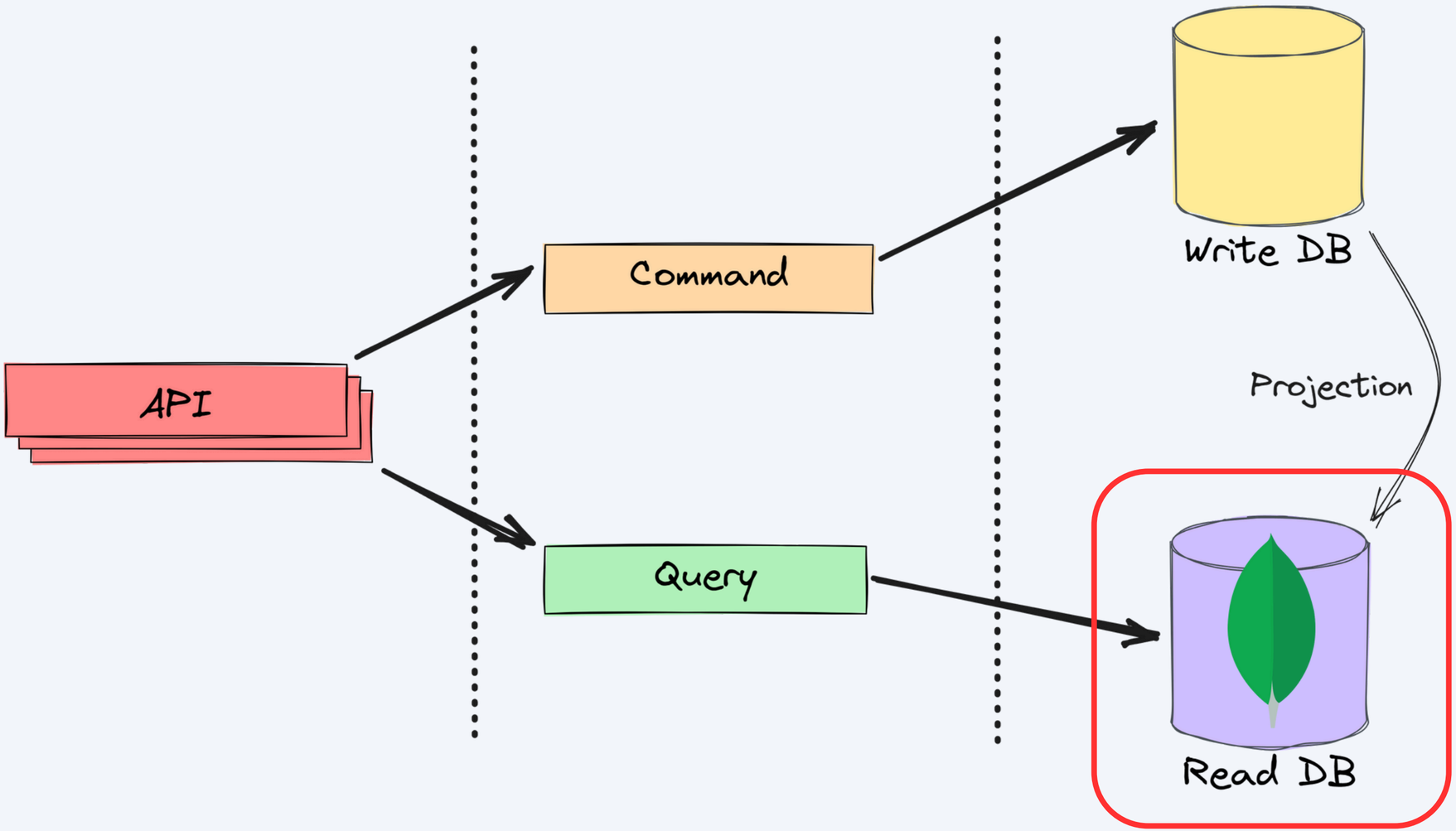
Schemaless.




API
Command
Query
Write DB
Projection
Read DB

MINI-COURSE

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Intro

Set up MongoDB using Docker.

OpenTelemetry, Health checks.

Use MongoDB to implement projections.

RECAP

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