

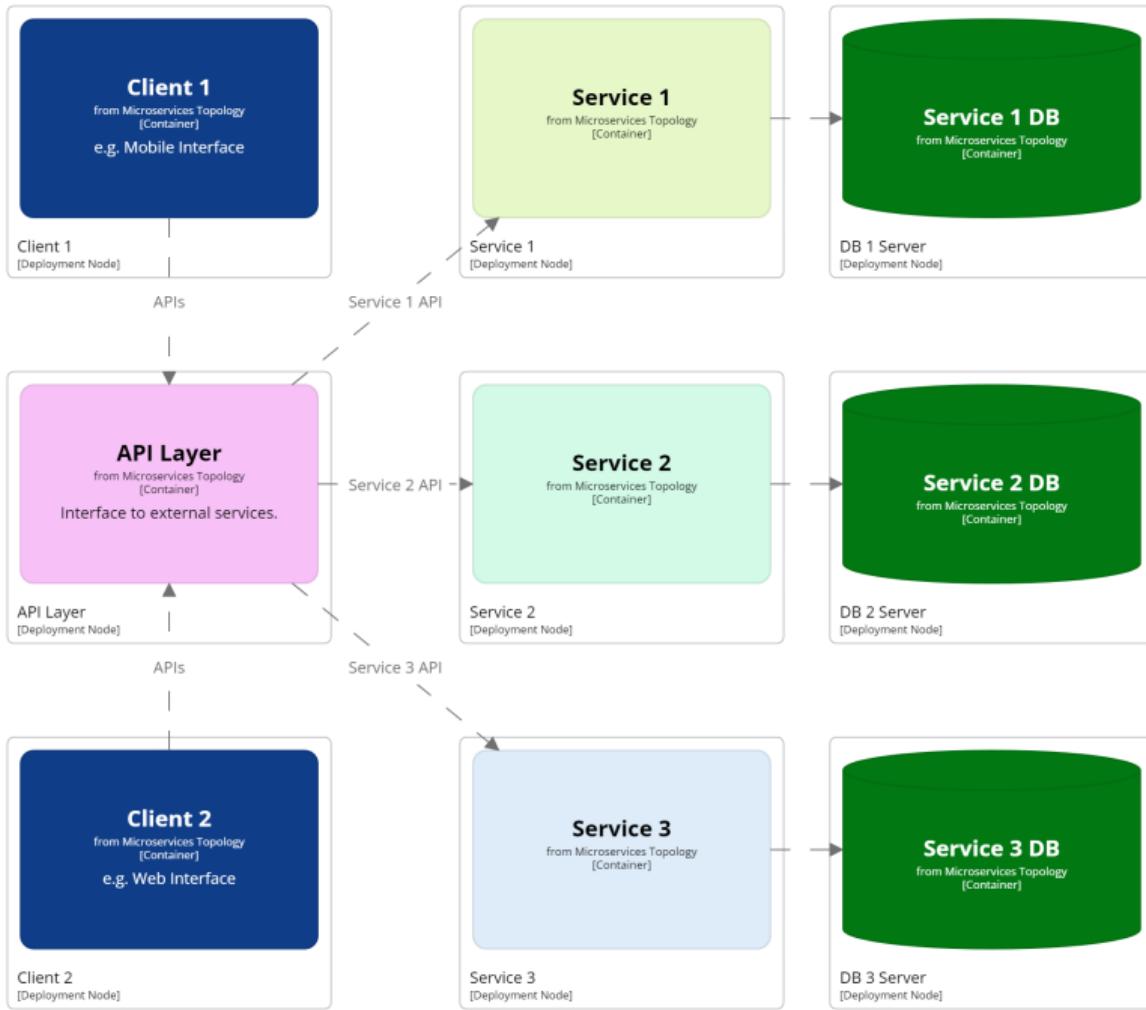
# Microservices Architecture

*Software Architecture*

Richard Thomas

April 7, 2025

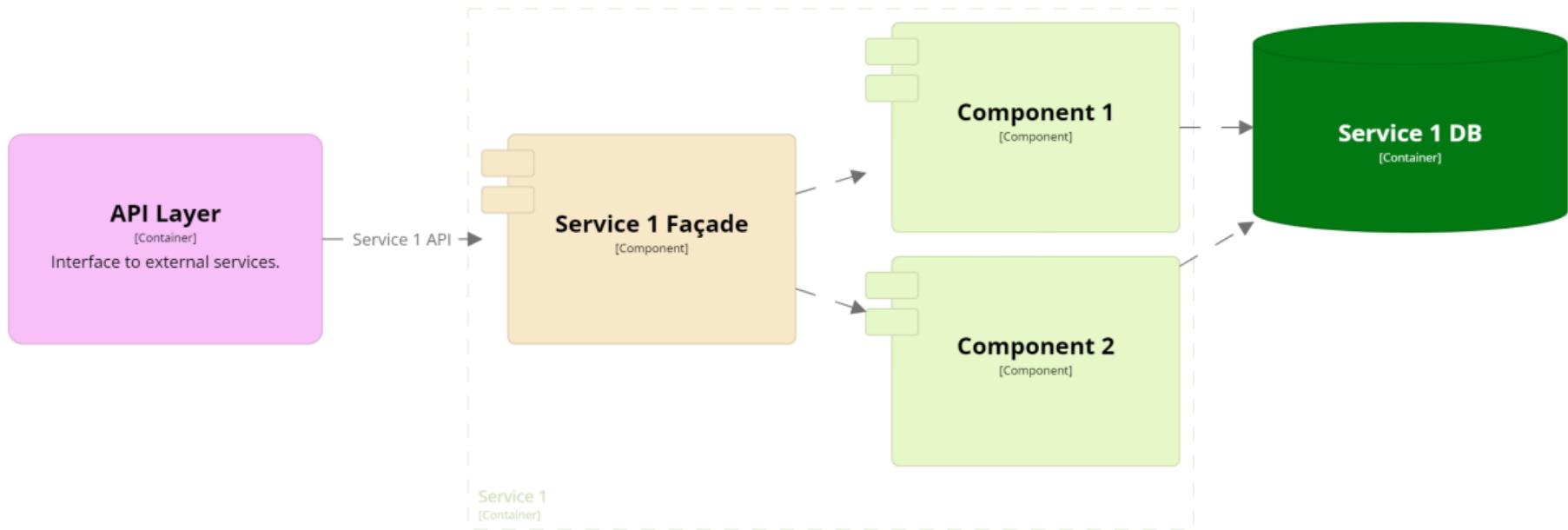
# Microservices General Topology



# API Layer Components



# Service 1 Components



# Client with Monolithic UI



### *DDD Influence*

Services are *bounded contexts*.

Bounded contexts are not necessarily *services*.

### *Definition 0.* Bounded Context

Logical boundary of a domain where particular terms and rules apply consistently.



### *Definition 0.* Service Cohesion Principle

Services are cohesive business processes.

They are a bounded context.

## Large Bounded Contexts

A bounded context may be too large to be a single service.

Split it into services that are *independent* sub-processes.

*Definition 0.* Service Independence Principle

Services should not depend on the implementation of other services.

*Corollary 0.* Low Coupling

There should be minimal coupling between services.

### *Corollary 0.* No Reuse

Avoid dependencies between services.

Do not reuse components between services.

## Bounded Domains Implications

- Duplication
  - Entities specialised for domain
    - Requires mapping of entity data between domains

## Bounded Domains Implications

- Duplication
  - Entities specialised for domain
    - Requires mapping of entity data between domains
  - Should everything be duplicated?

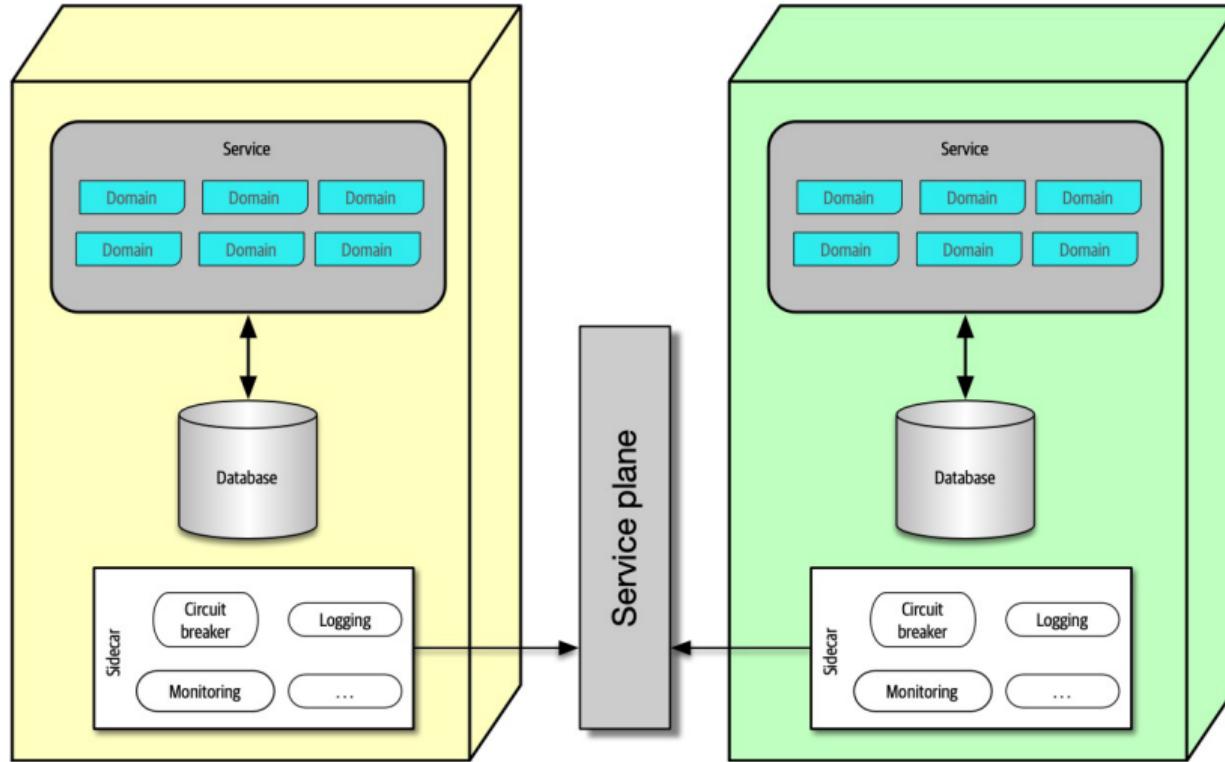
## Bounded Domains Implications

- Duplication
  - Entities specialised for domain
    - Requires mapping of entity data between domains
  - Should everything be duplicated?
    - What about common services (e.g. logging, ...)?

## Bounded Domains Implications

- Duplication
  - Entities specialised for domain
    - Requires mapping of entity data between domains
  - Should everything be duplicated?
    - What about common services (e.g. logging, ...)?
- Heterogeneity
  - Services can use different implementation technologies

# Service Plane



# Service Mesh



# Service Mesh



## *Choreography & Orchestration*

Choreography Similar to event-driven *broker*

Orchestration Similar to event-driven *mediator*

# Choreography

"Place an order to purchase a book"



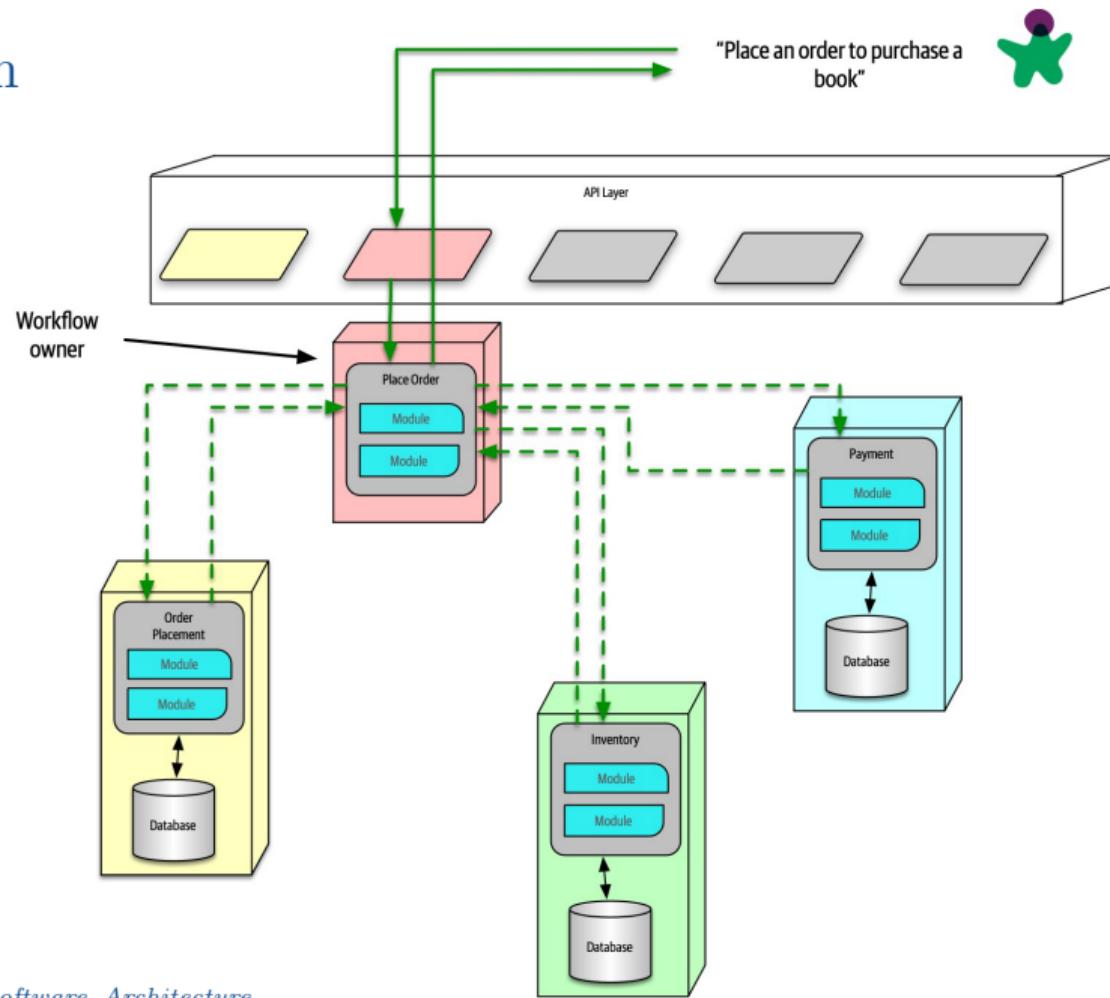
# Sahara using Choreography



# Purchase Product Dynamic Diagram



# Orchestration



*Question*

How bad is the coupling with choreography or orchestration?

*Question*

How bad is the coupling with choreography or orchestration?

*Answer*

For a large system, *very bad.*

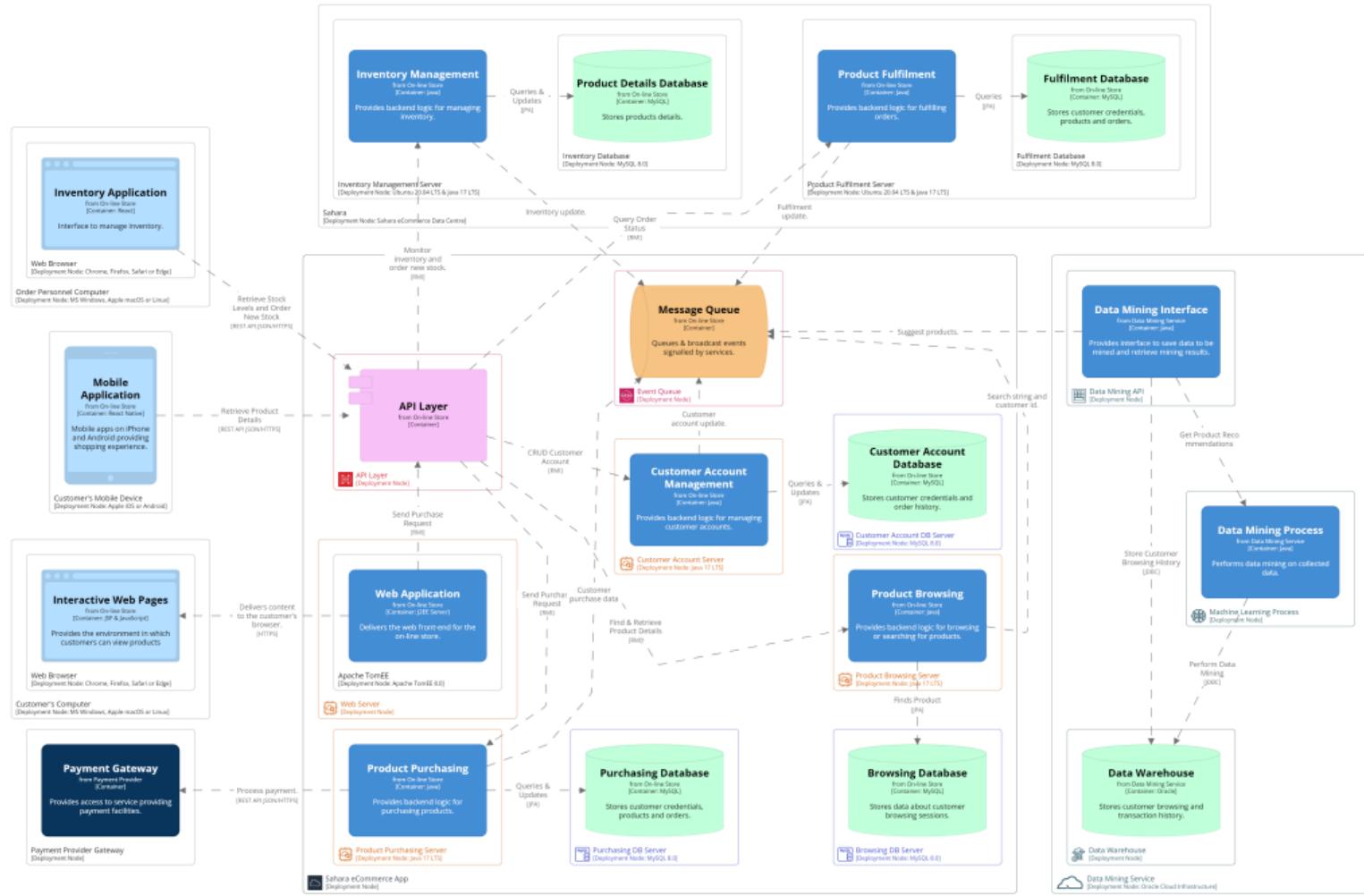
# Microservices with Event Queue



# Service 1 Components with Event Queue



Sahara using an Event Queue



*Question*

Are *browsing* and *purchasing* separate contexts?

*Question*

Are *browsing* and *purchasing* separate contexts?

*Answer*

- Are they a single business process or different processes?
- Do they share much or little data?

*Question*

- What about *inventory management* and *browse*?
- How do they maintain a consistent product database?

## Pros & Cons

Modularity



Extensibility



Reliability



Interoperability



Scalability



Security



Deployability



Testability



Simplicity

