

# Microservices Architecture

*Software Architecture*

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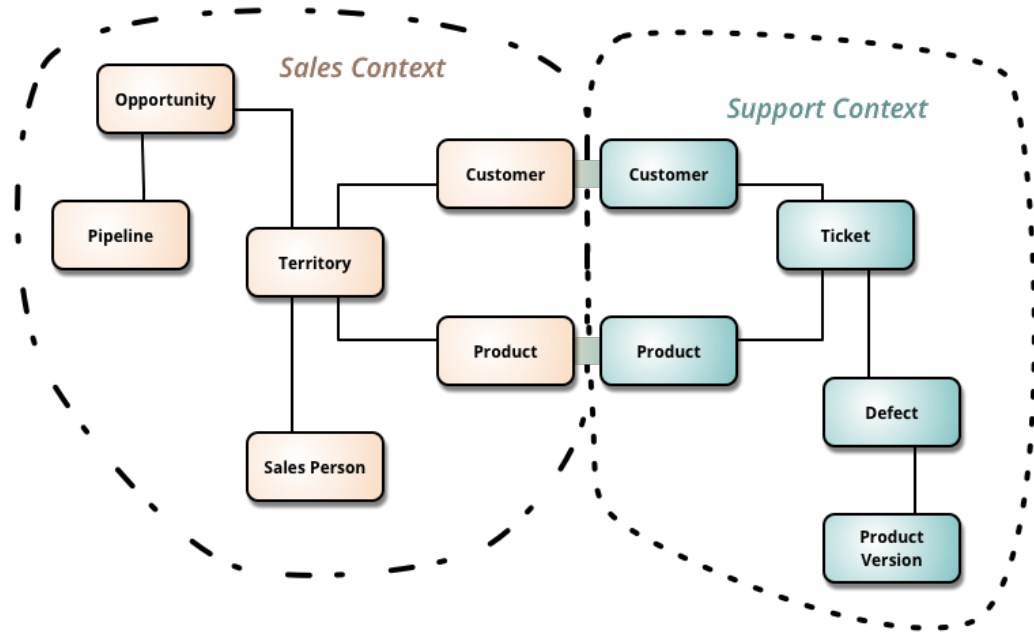
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*Microservices*

Inspired by DDD

*Definition 1.* Bounded Context

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





- Basic structure of a microservices architecture.
- UIs are fairly monolithic to provide a rich interface.
- Fairly common to have multiple UIs, some of which use a different combination of services.



- More like a purist microservices architecture, where each service development team builds the service's UI(s).
- Typically needs some coordinating activity in the UI.
- Can still have multiple UIs (e.g. web, mobile, ...).

*Definition 2.* Service Cohesion Principle

Services are cohesive business processes. They are a bounded context.

*Definition 3.* Service Independence Principle

Services should not depend on the implementation of other services.



*Corollary 1.* Low Coupling

Services should have minimal coupling with other services.

*Corollary 2.* No Reuse

Services do not reuse components from other services,  
to avoid dependencies.

### *Choreography & Orchestration*

Choreography Similar to event-driven *broker*

Orchestration Similar to event-driven *mediator*





*Question*

How bad is the coupling with choreography or orchestration?

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*Answer*

For a very large system, very bad.

In 2017, Uber had over 1400 services ... consider how bad coupling would be with either approach.



- Use the tried and true Observer pattern, with the event-driven architecture pattern.
- Services publish events indicating what they have been done.
- Services listen for events to decide what to coordinate system behaviour.





- Sahara eCommerce system as a simple microservices architecture, using event-driven messaging between services.
- Services publish events indicating what they have been done.
- Also an example of a multi-tenanted system built across in-house servers, AWS and OCI.

*Question*

Are *browsing* and *purchasing* separate contexts?

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*Answer*

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

- Probably different business processes, but possibly the same context.
- If separate services, browse needs to send an event for every change to the shopping cart, and purchase needs to listen for these.
- Possibly merge into one service, as one context.

*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	🤔