Modernize without Madness

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Agenda

- What are Microservices?
- Are Microservices better than a Monoliths?
- How do we move from a Monolith to Microservices?

What are Microservices?

Microservices are small, autonomous services that work together

- Sam Newman, Author – Principles of Microservices

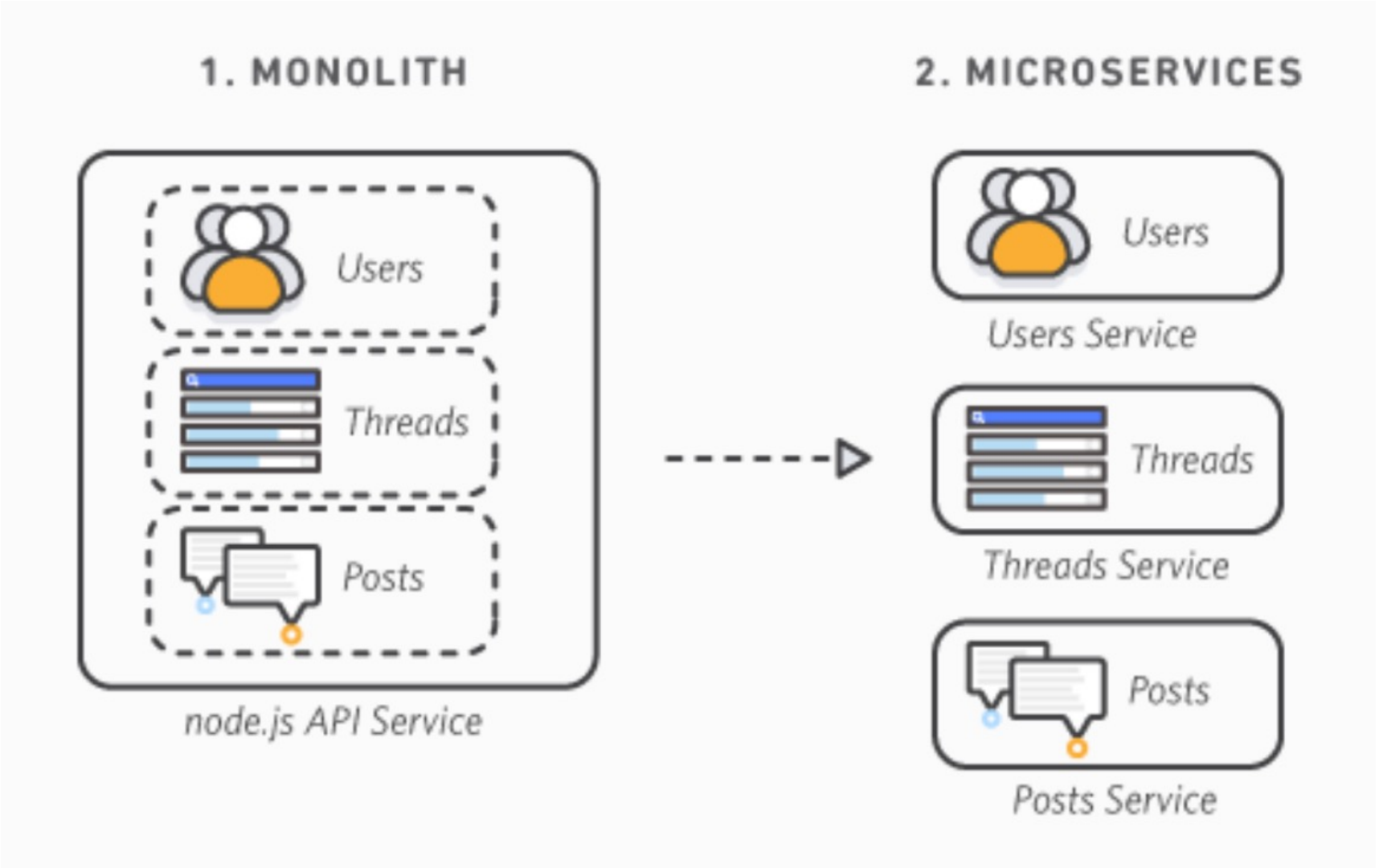
Small enough that a single feature team can build, test, and deploy it

Autonomous: self-contained, independently deployable services, that don’t share data

Work Together through network calls; loosely coupled

Microservices are small, autonomous services that work together

- Sam Newman, Author – Principles of Microservices



https://aws.amazon.com/compare/the-difference-between-monolithic-and-microservices-architecture/

Are Microservices better than a Monoliths?

Microservices vs Monolith:

It depends on your goals and challenges

Microservices can enhance business agility

Microservices can improve application scalability

Microservices can improve fault tolerance

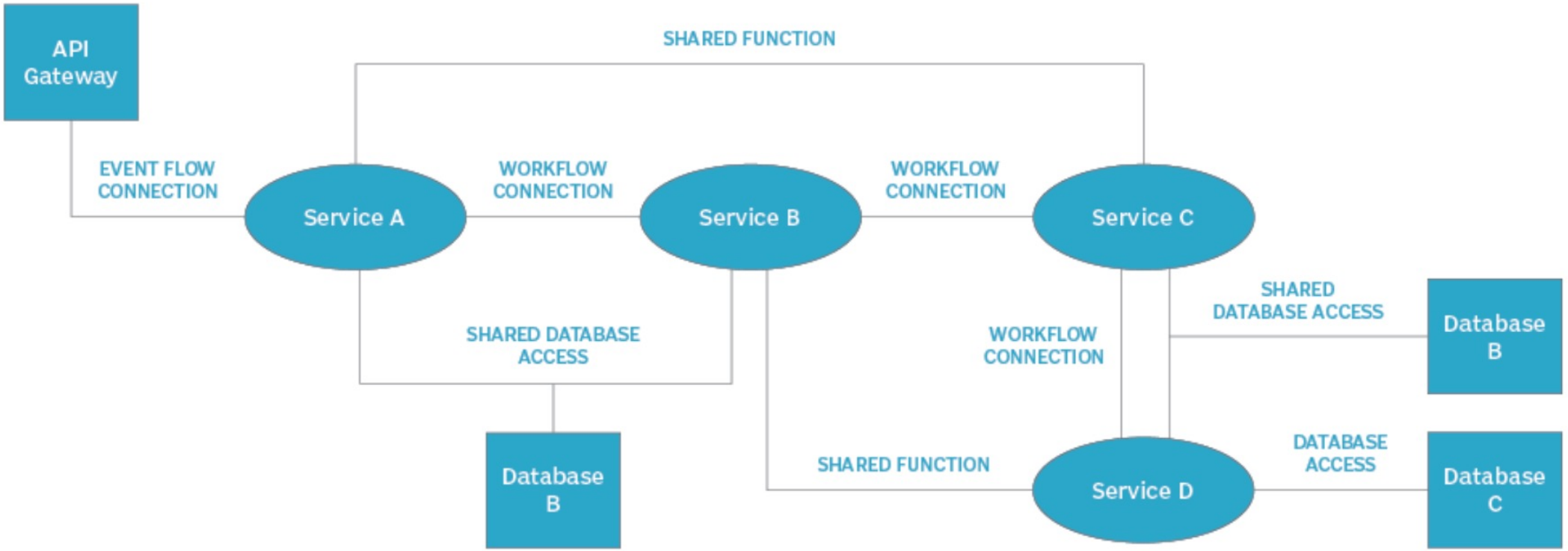
But… understand the complexities that comes with microservices

Need to align teams along with the application refactoring

Overhead of handling data consistency

Hard to debug issues. Needs comprehensive observability approach

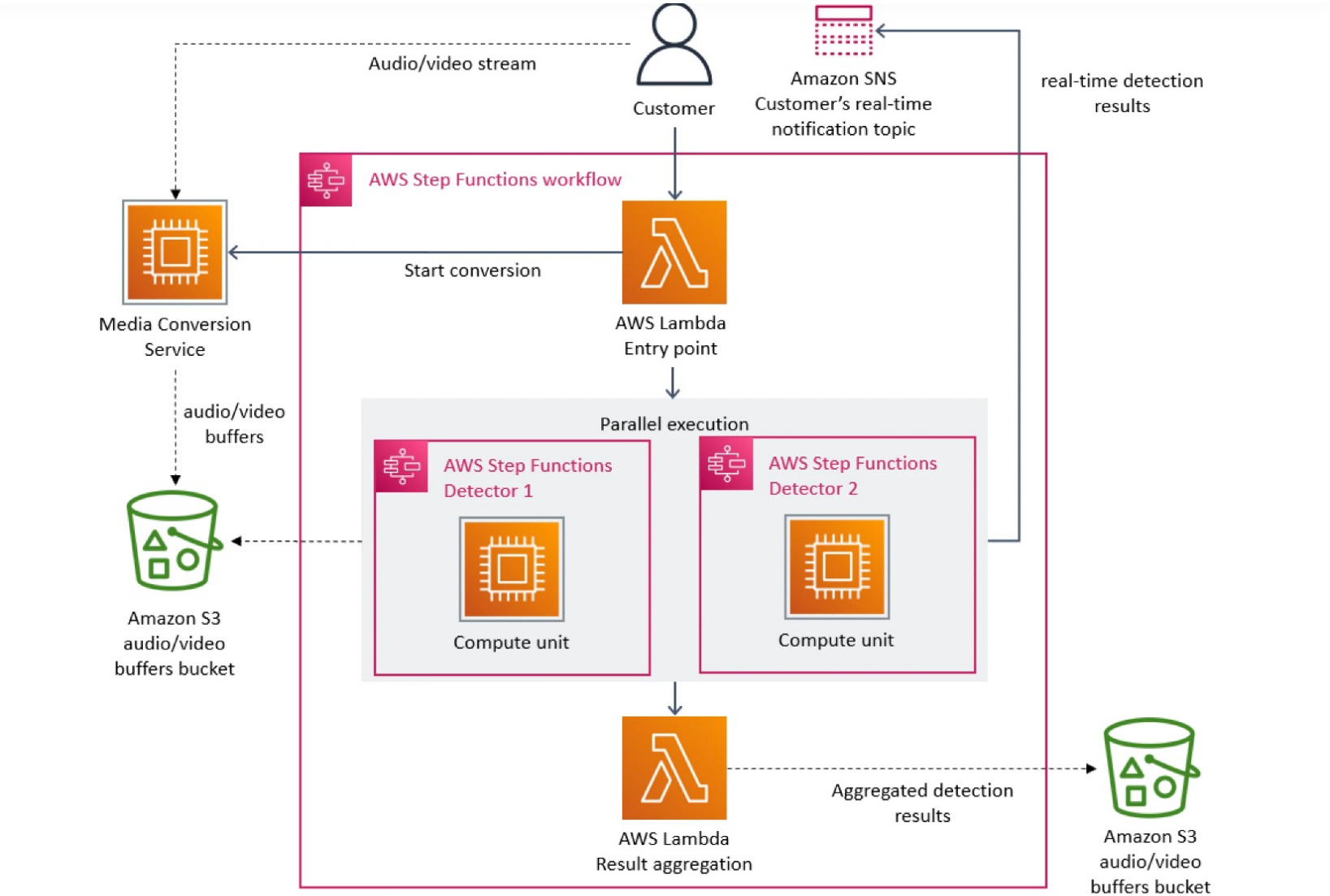
What you don’t want – “A Distributed Monolith”



https://www.techtarget.com/searchapparchitecture/tip/The-distributed-monolith-What-it-is-and-how-to-escape-it


prime video | TECH
Homepage
Our Innovation
Our People
Our Story
Video Streaming
Scaling up the Prime Video audio/video monitoring service and reducing costs by 90%
The move from a distributed microservices architecture to a monolith application helped achieve higher scale, resilience, and reduce costs.

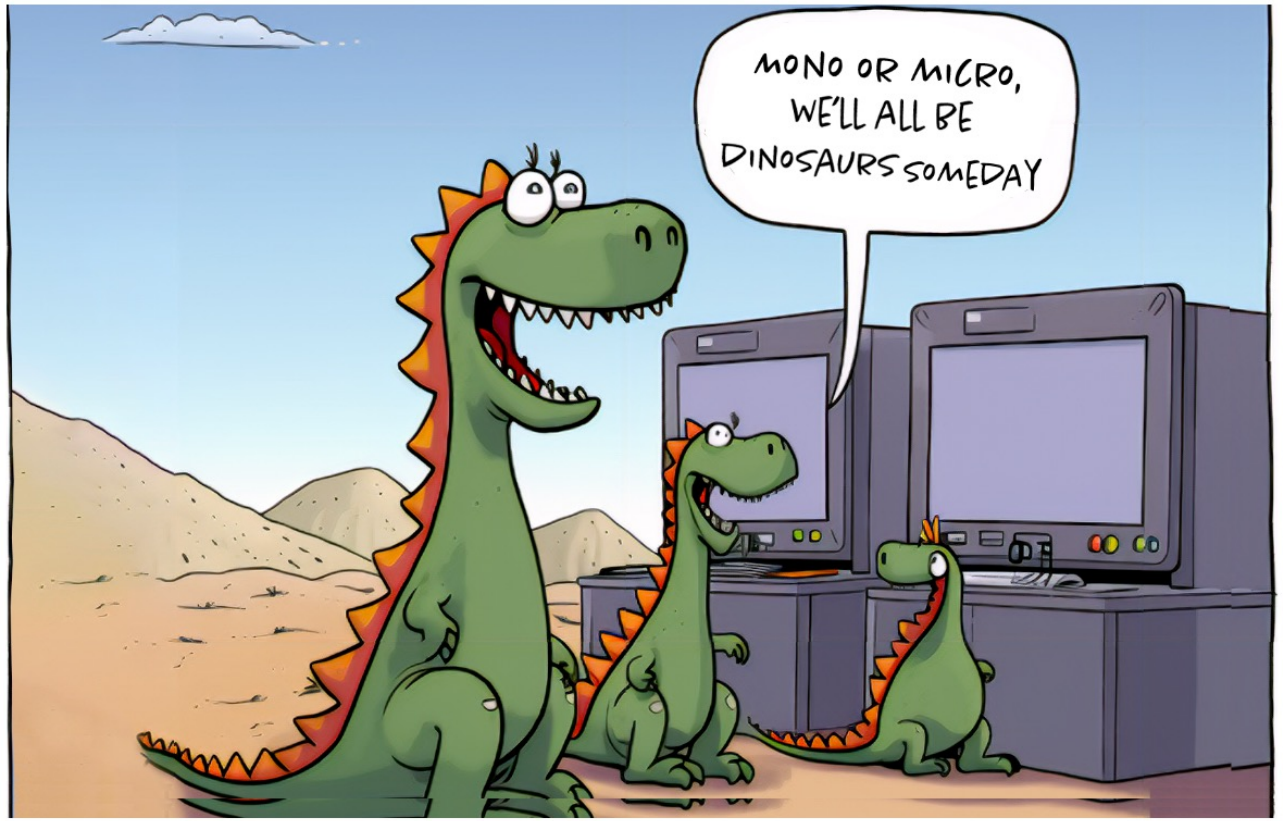
Prime Video – Distributed Stack



The initial architecture of our defect detection system.

Monoliths are not dinosaurs

May 05, 2023 • 774 words



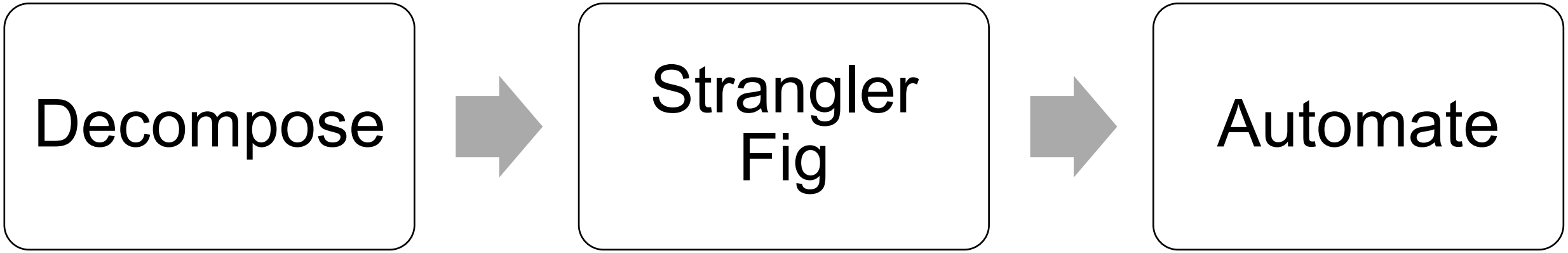
https://www.allthingsdistributed.com/2023/05/monoliths-are-not-dinosaurs.html

Building evolvable software systems is a strategy, not a religion. And revisiting your architectures with an open mind is a must.

- Werner Vogels, CTO - Amazon

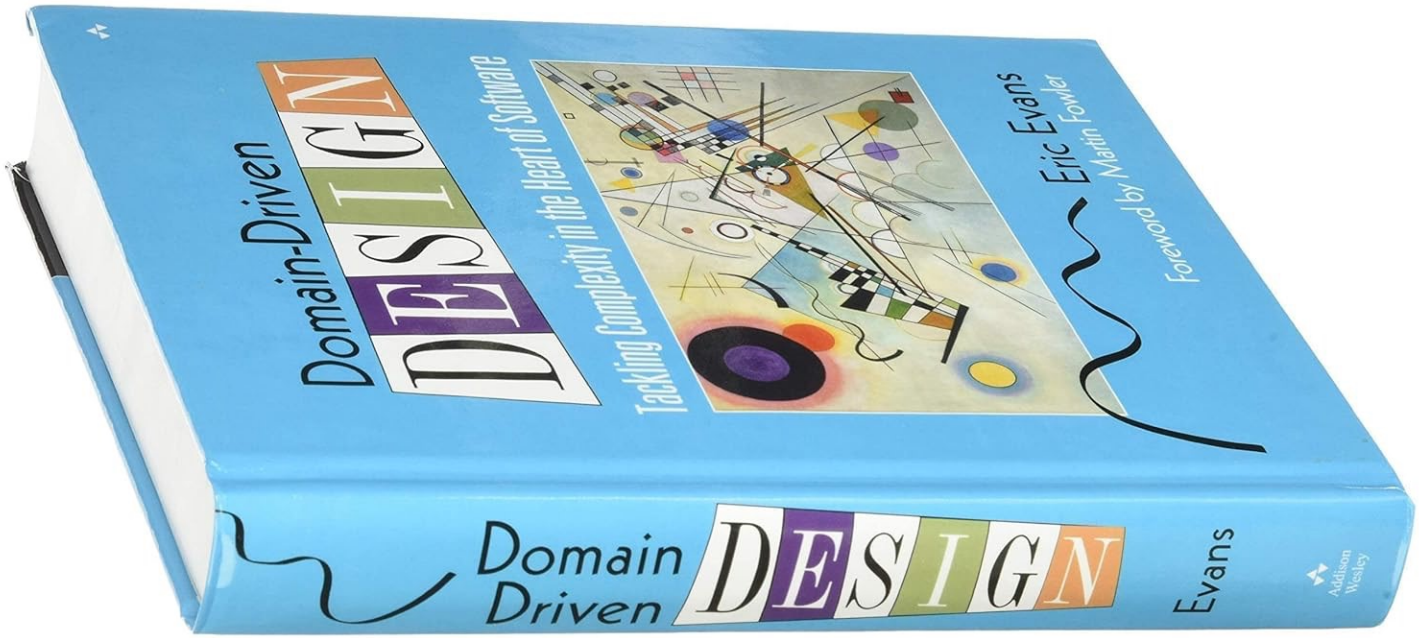
How do we move from a Monolith to Microservices Architecture?

3-Step Approach



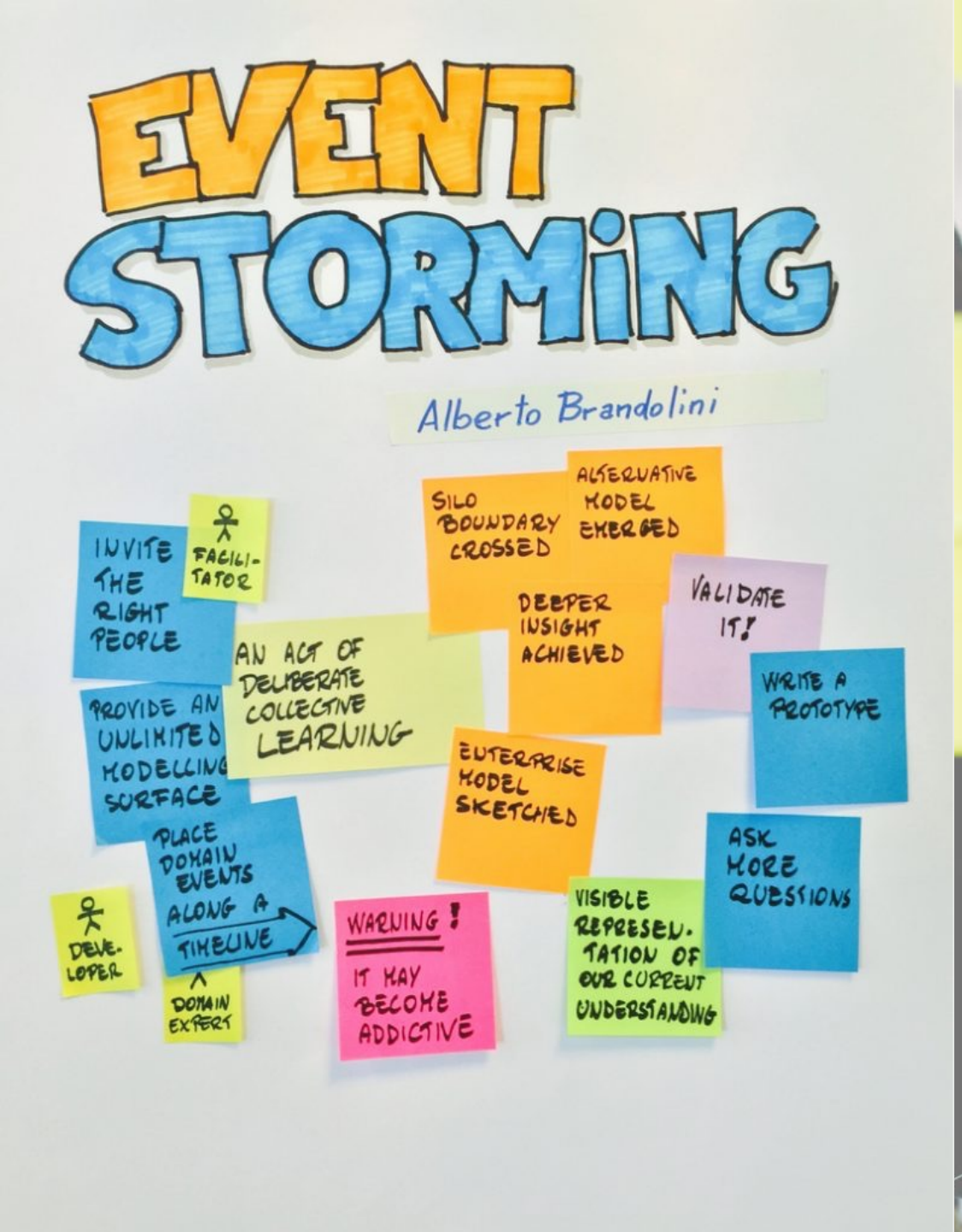
Step 1: Decompose

Domain-driven Design (DDD)



Domain-driven design focuses on *understanding* a domain, and its subdomains.

DDD helps you to find a shared language spanning business and engineering.



1. Identify events, systems, actors, etc.

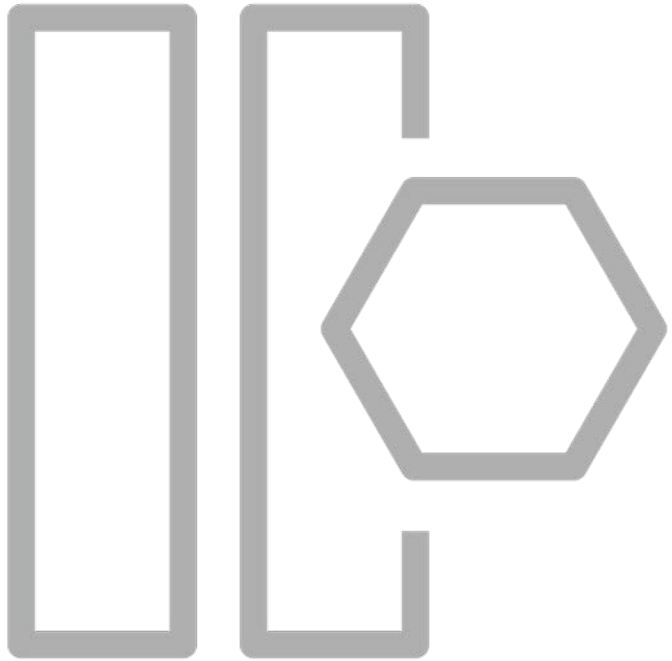
2. Cluster-related concepts

3. Define bounded contexts and sub-domains

What is EventStorming?

A workshop-based approach to breaking down a non-trivial domain with the goal of coming to a shared understanding.

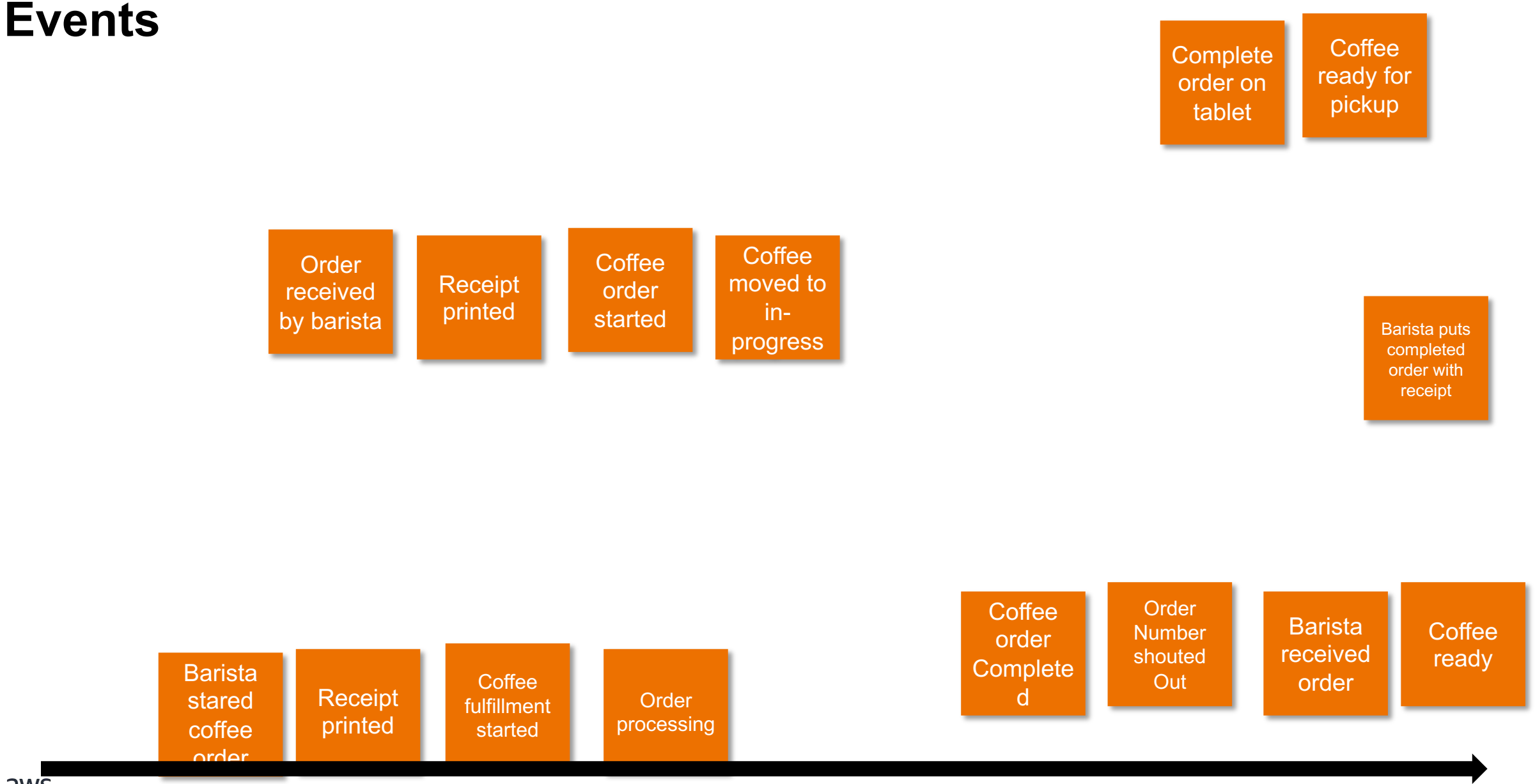
EventStorming room layout



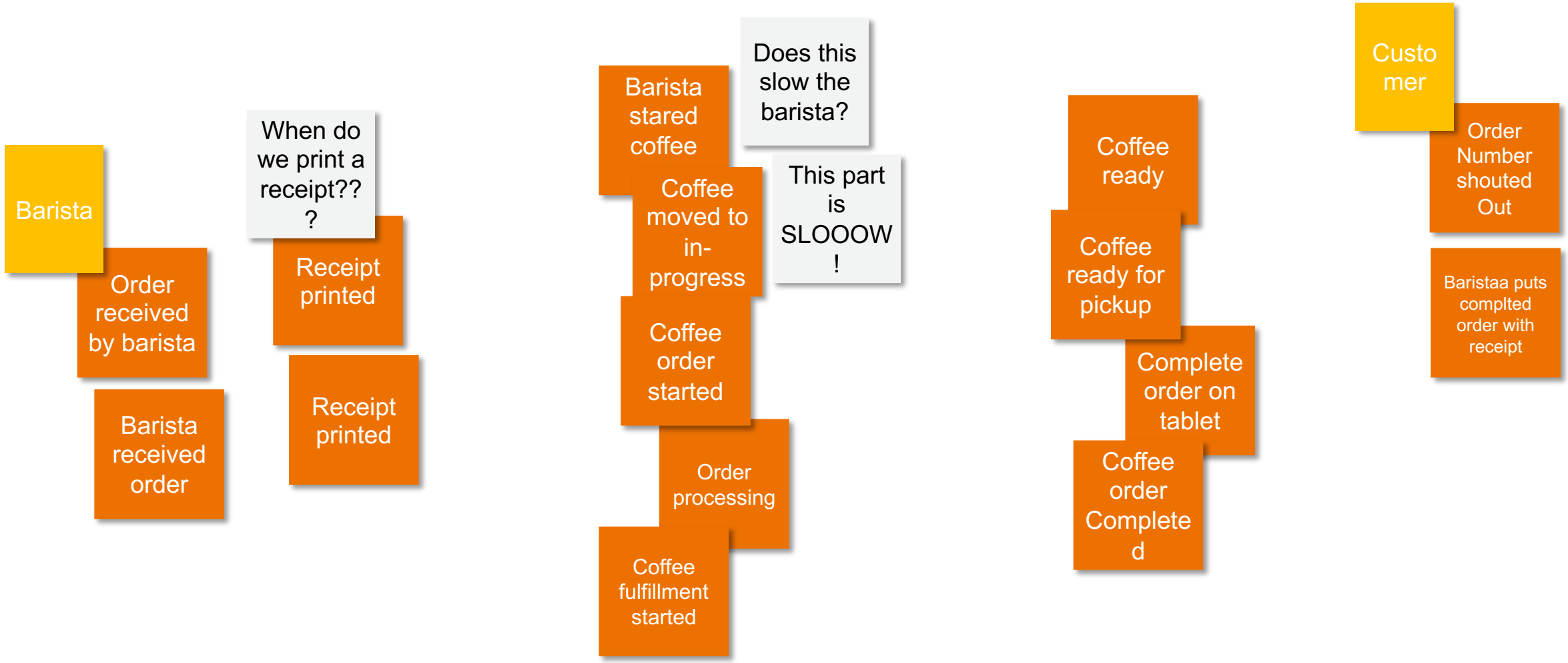
event

Something that a domain expert cares about. Immutable facts that have occurred in the past.

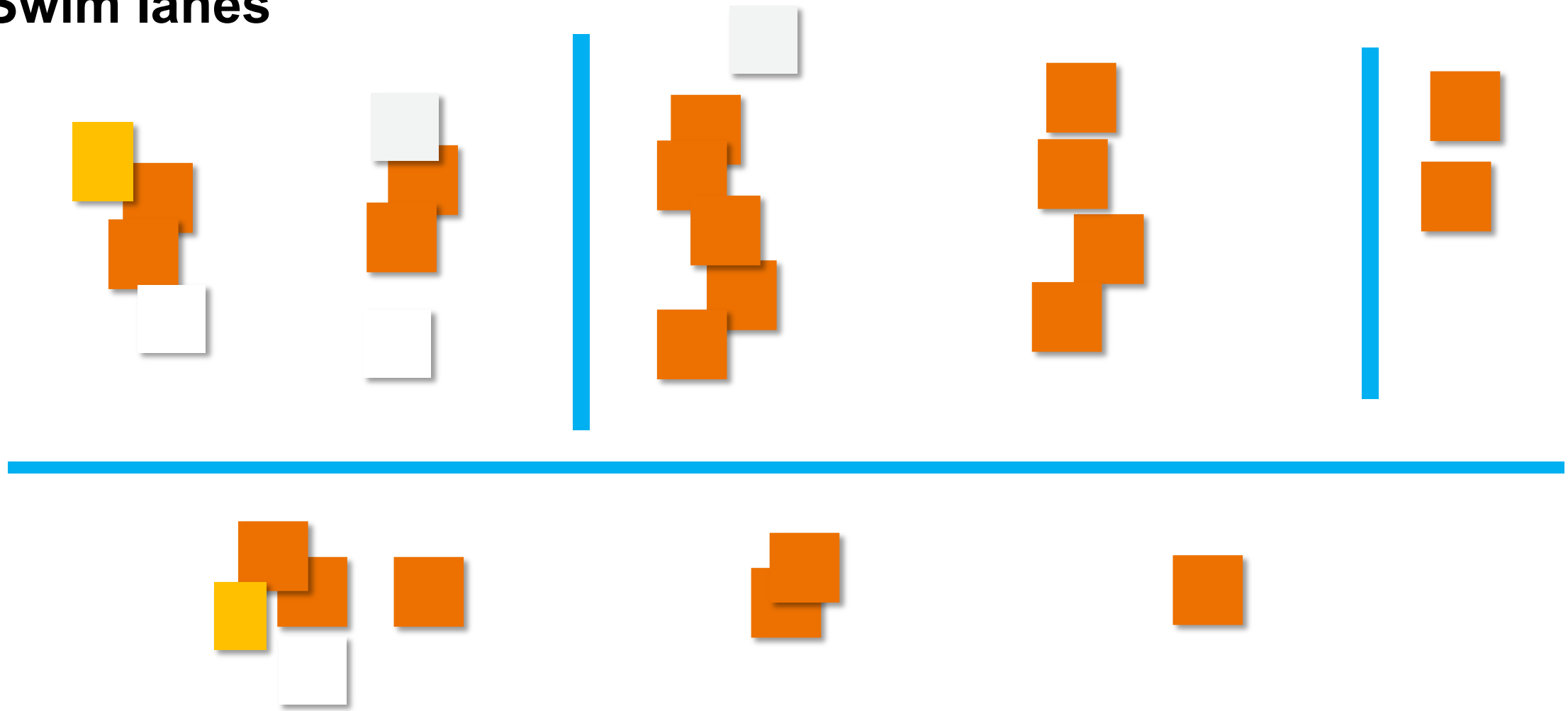
Events

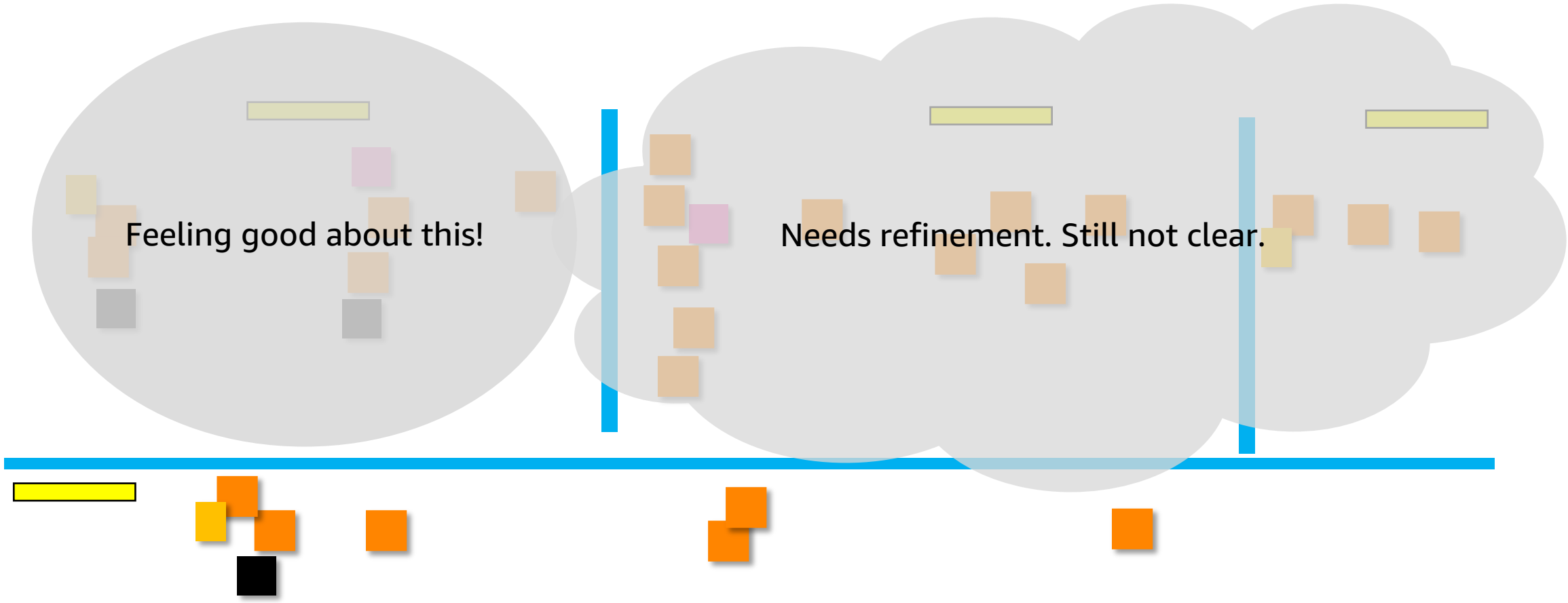

Complete order on tablet
Coffee ready for pickup
Order received by barista
Receipt printed
Coffee order started
Coffee moved to in-progress
Barista puts completed order with receipt
Barista stared coffee order
Receipt printed
Coffee fulfillment started
Order processing
Coffee order Completed
Order Number shouted Out
Barista received order
Coffee ready

Identify Questions, Hotspots, People

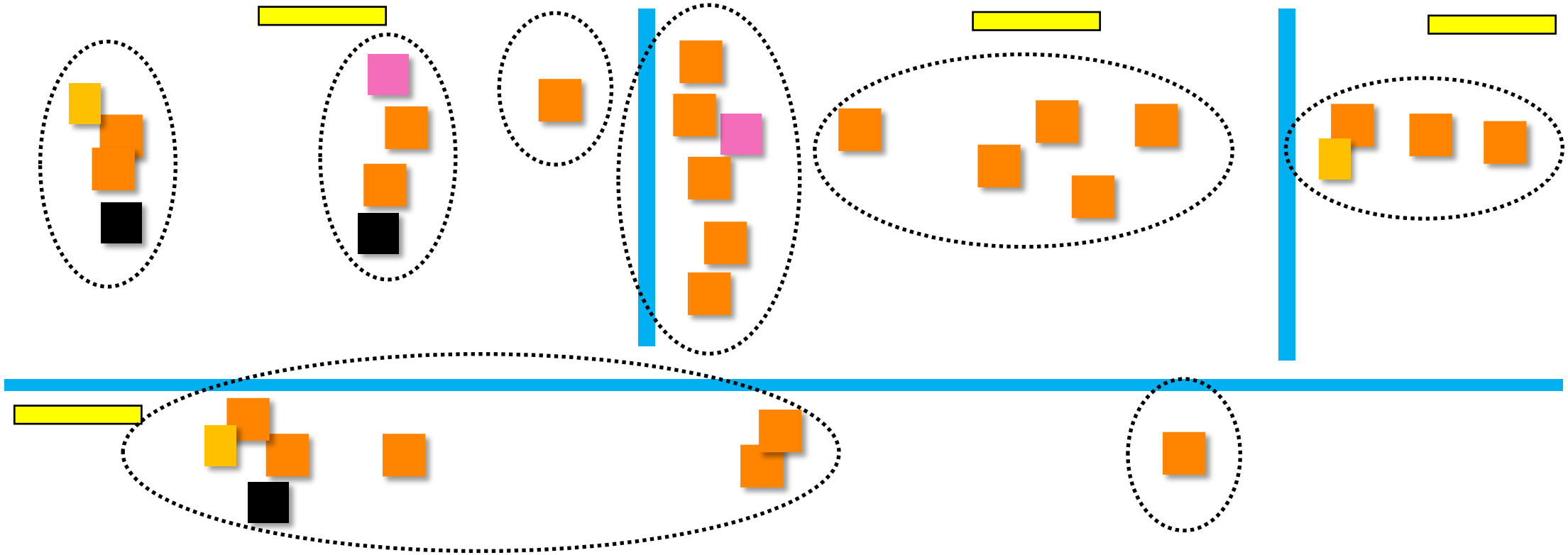


Swim lanes

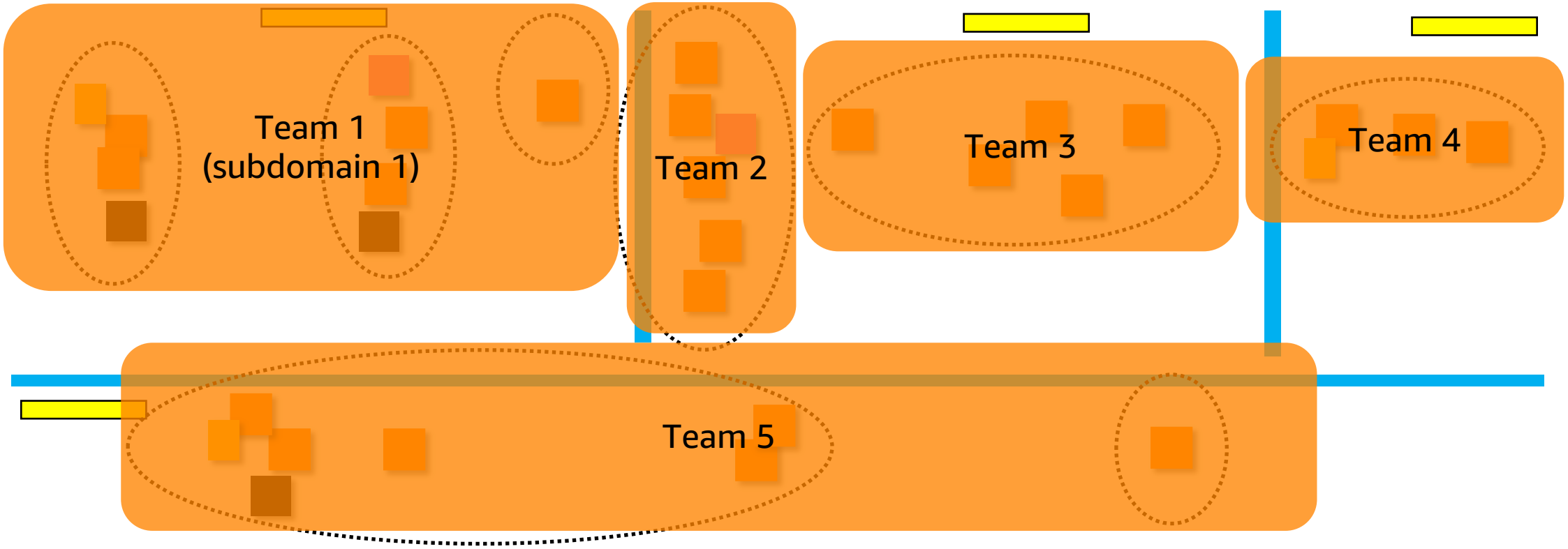



Feeling good about this!
Needs refinement. Still not clear.

Identifying Boundaries



Identifying boundaries



Step 2: Strangler Fig Approach

If you do a big-bang rewrite, the only thing you are guaranteed of is a big bang.

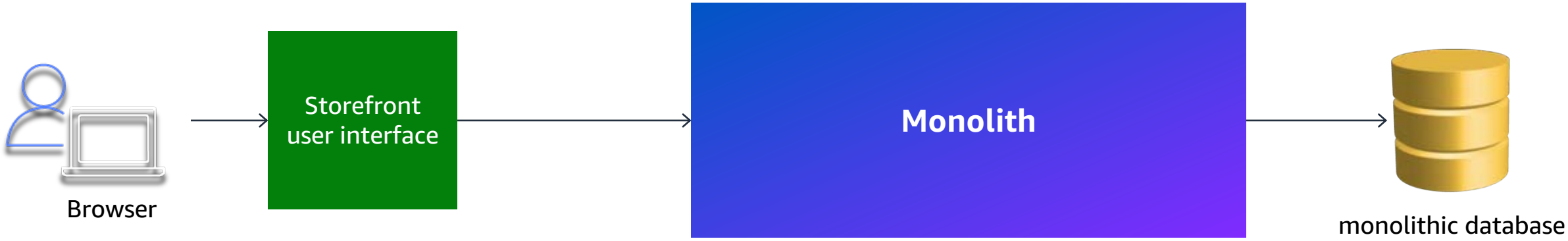
Martin Fowler

Thoughtworks

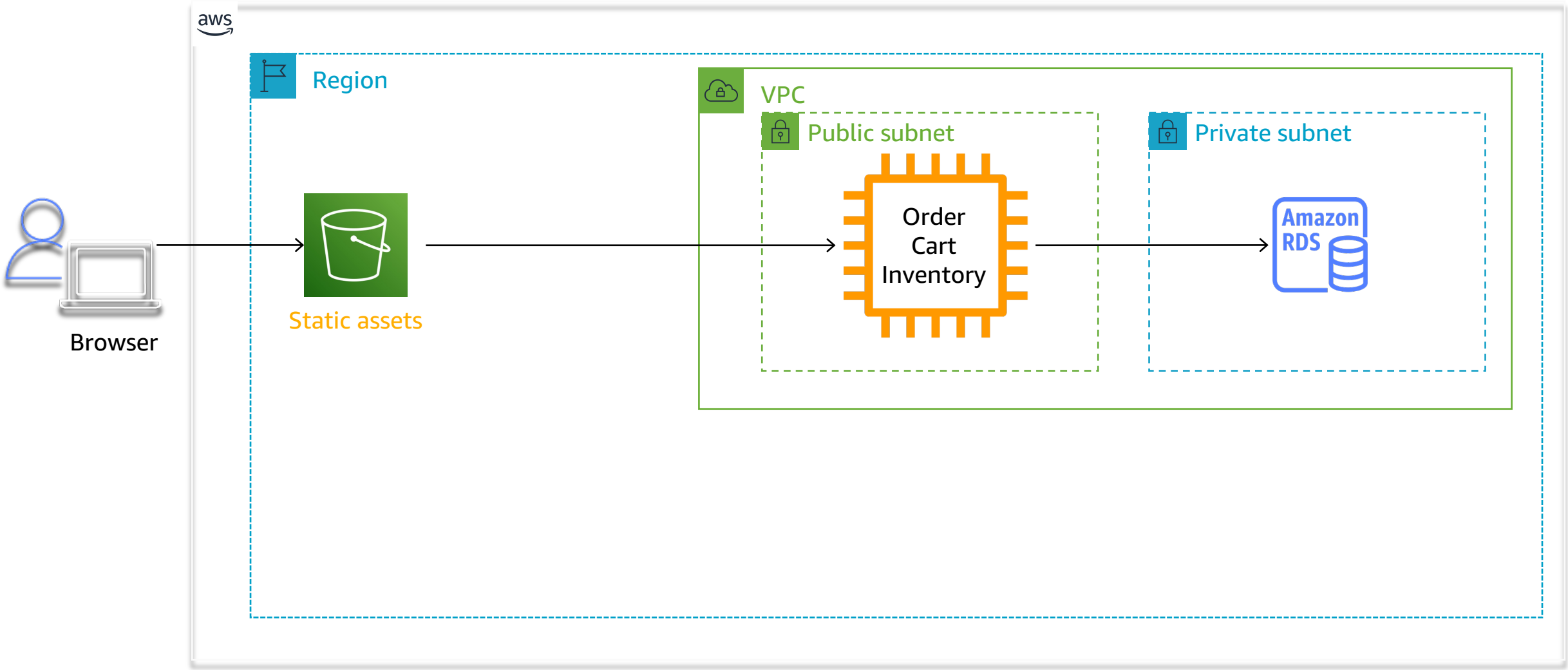
Strangler Fig pattern - Releasable incremental refactoring

https://martinfowler.com/bliki/StranglerFigApplication.html

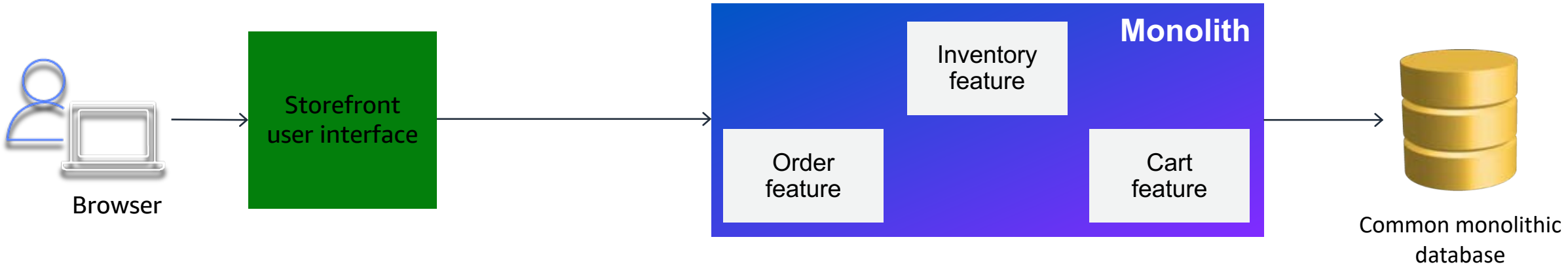
The monolith



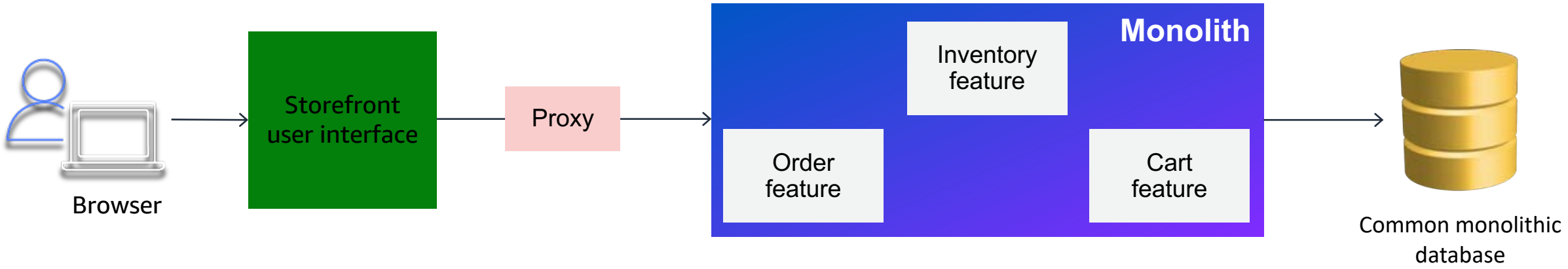
Current architecture



Decompose


Browser
Storefront user interface
Monolith
Inventory feature
Order feature
Cart feature
Common monolithic database

Proxy


Browser
Storefront user interface
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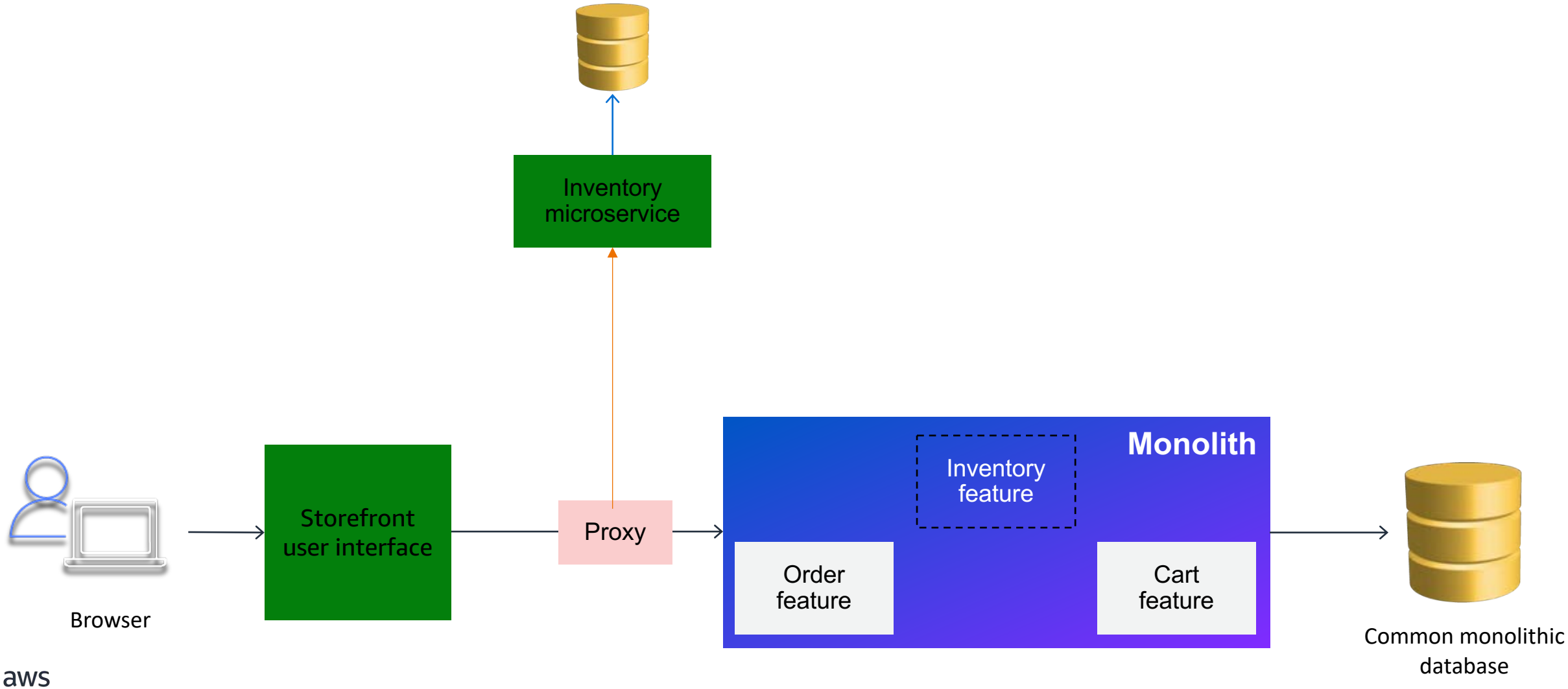
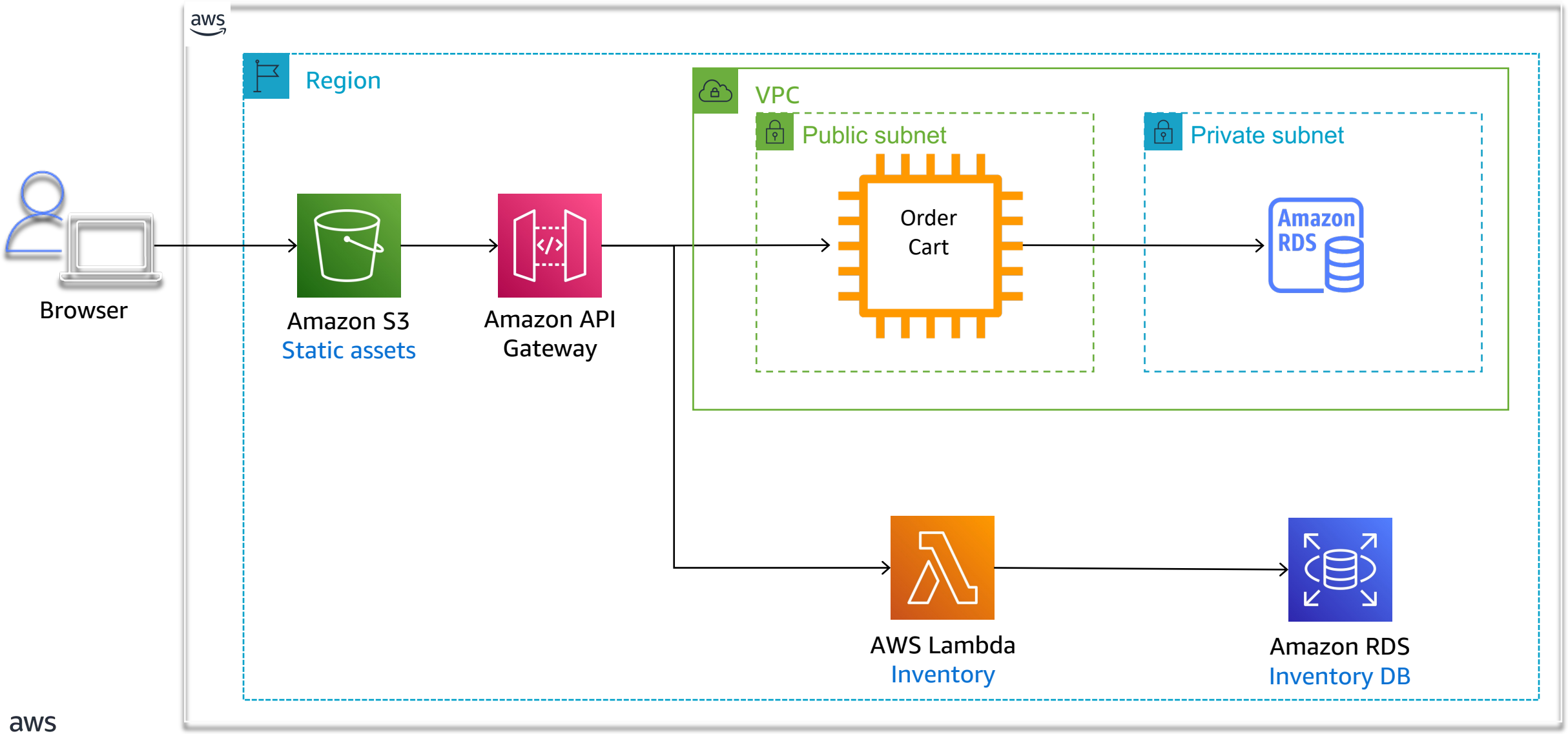
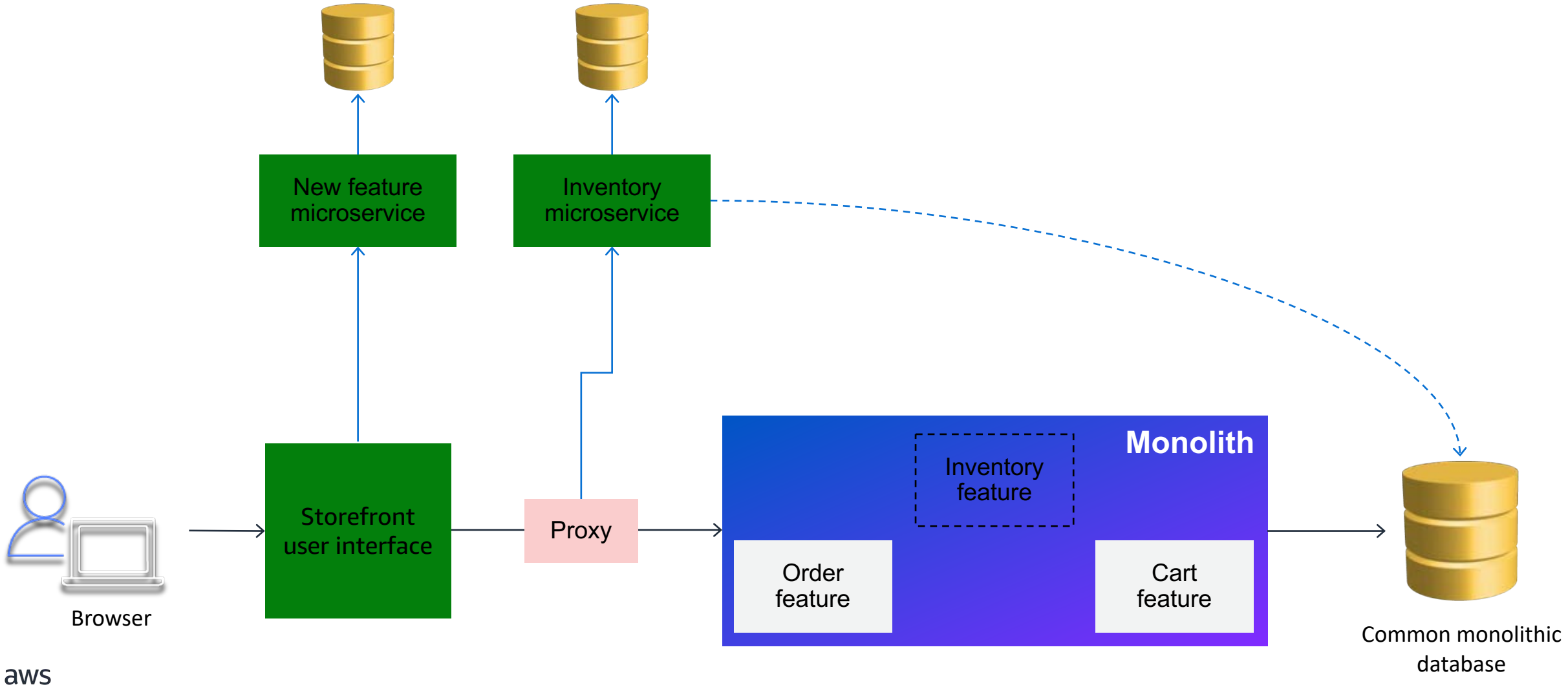
Strangler Fig



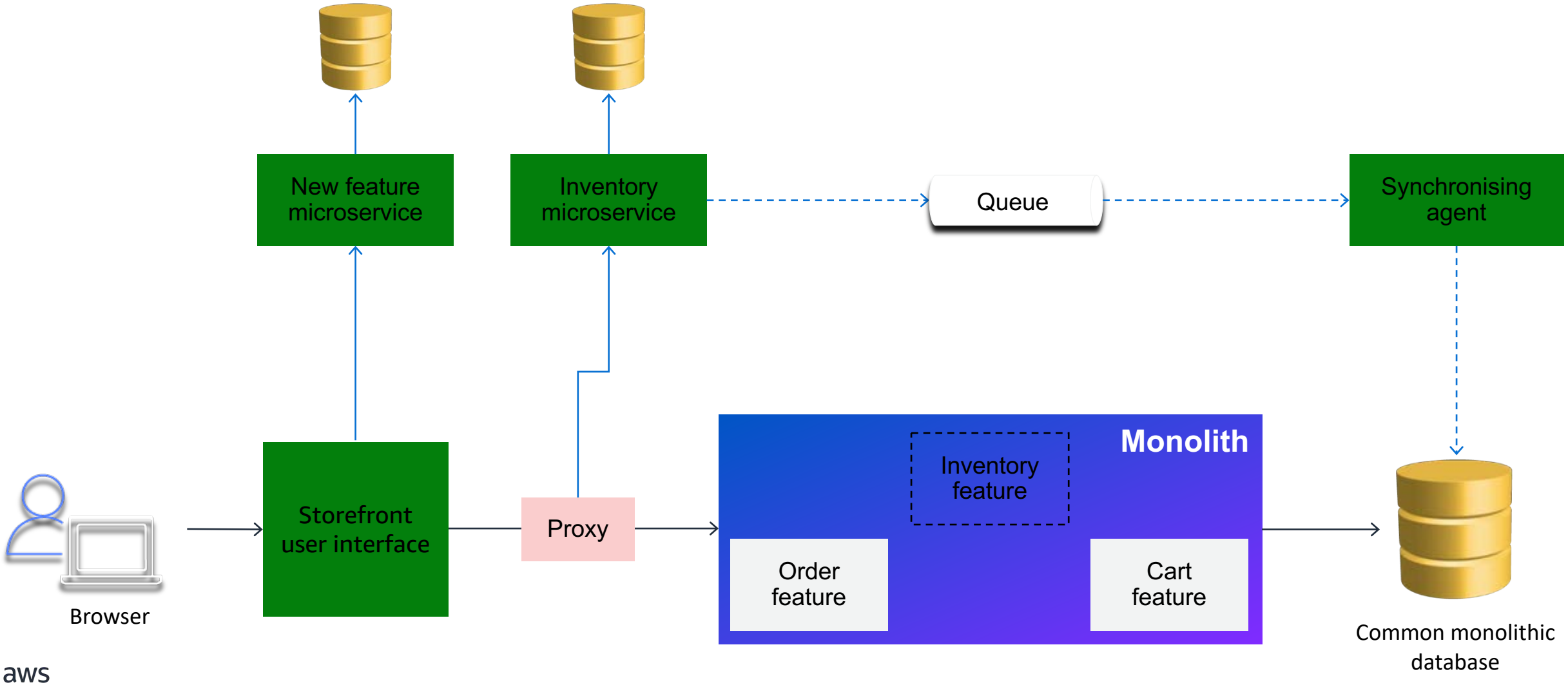
Strangler Fig architecture

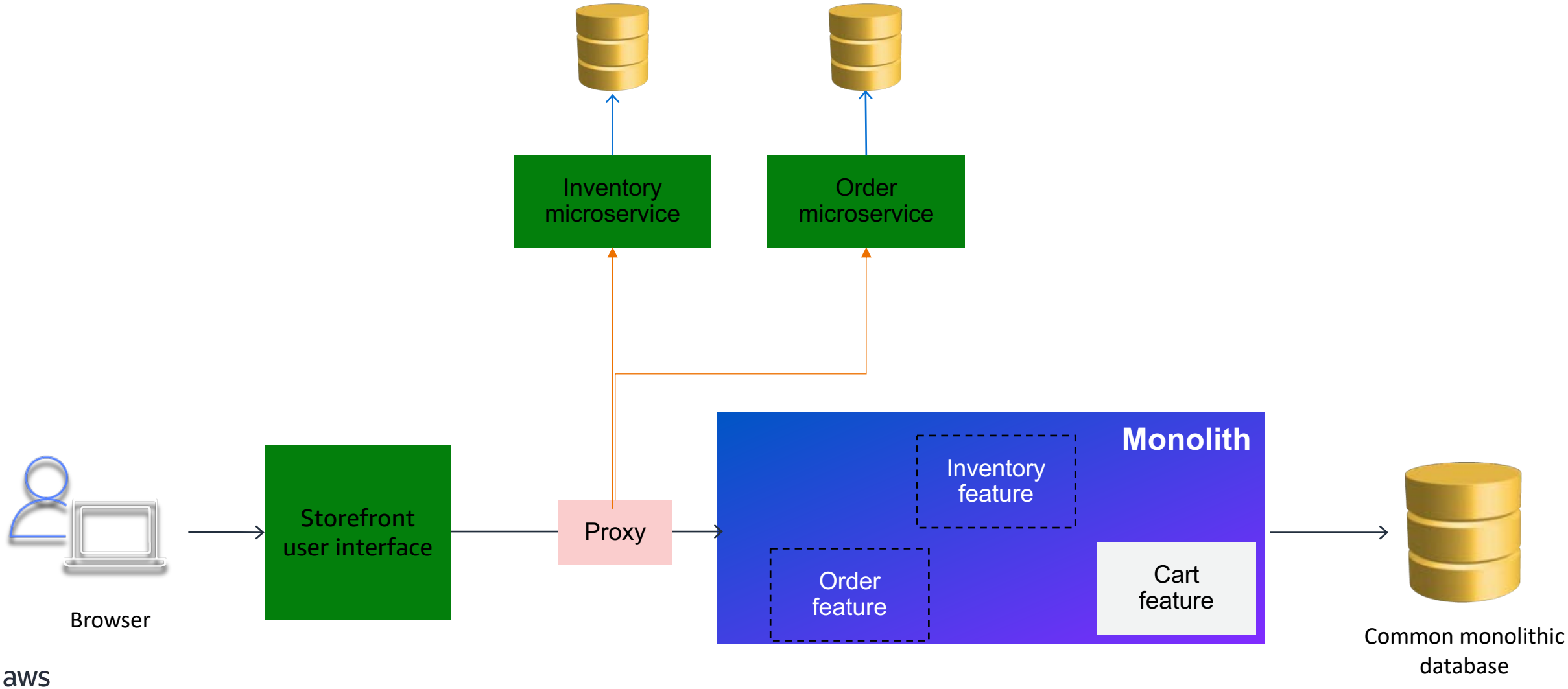


Data Consistency



Data Consistency




Inventory microservice
Order microservice
Storefront user interface
Proxy
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Inventory feature
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Cart feature
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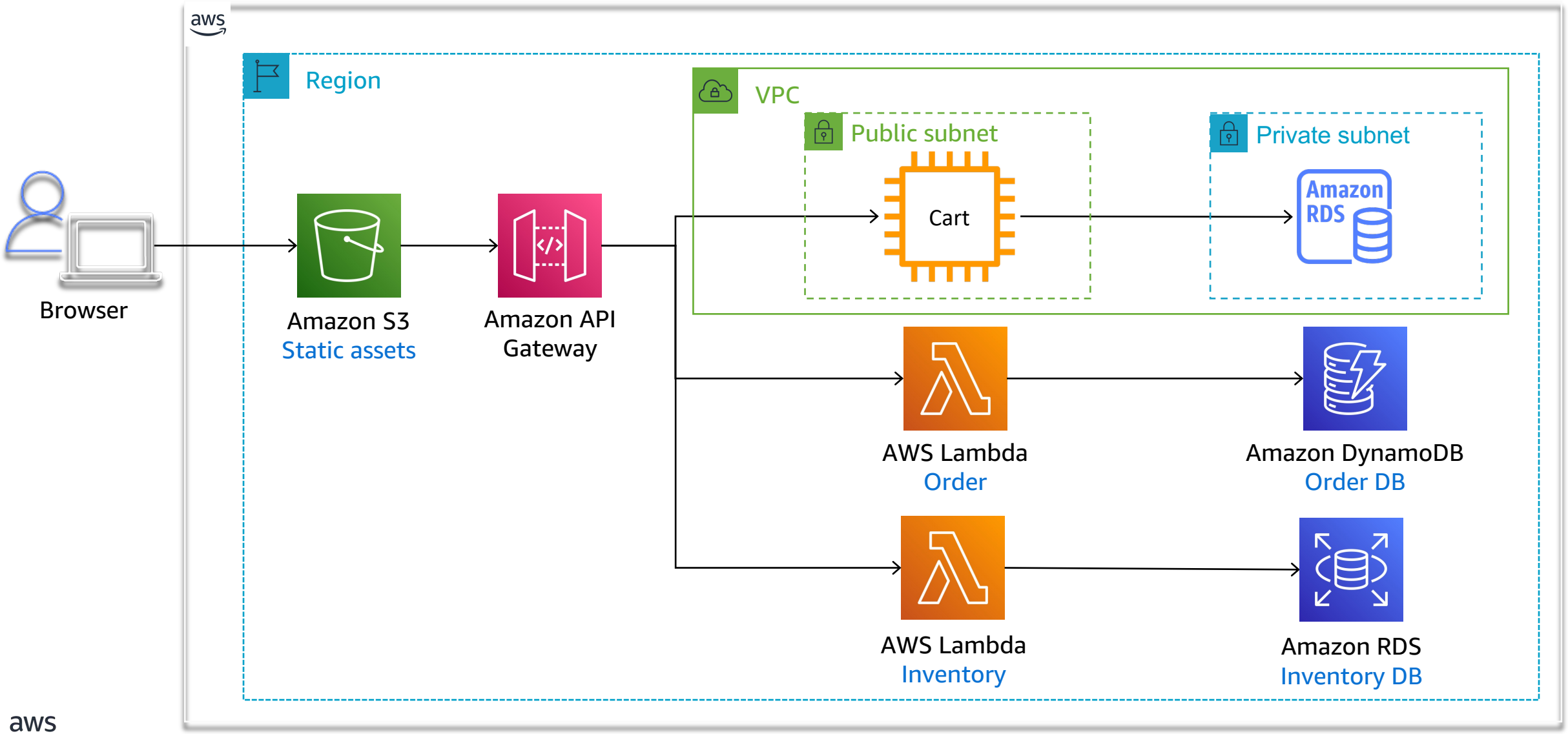
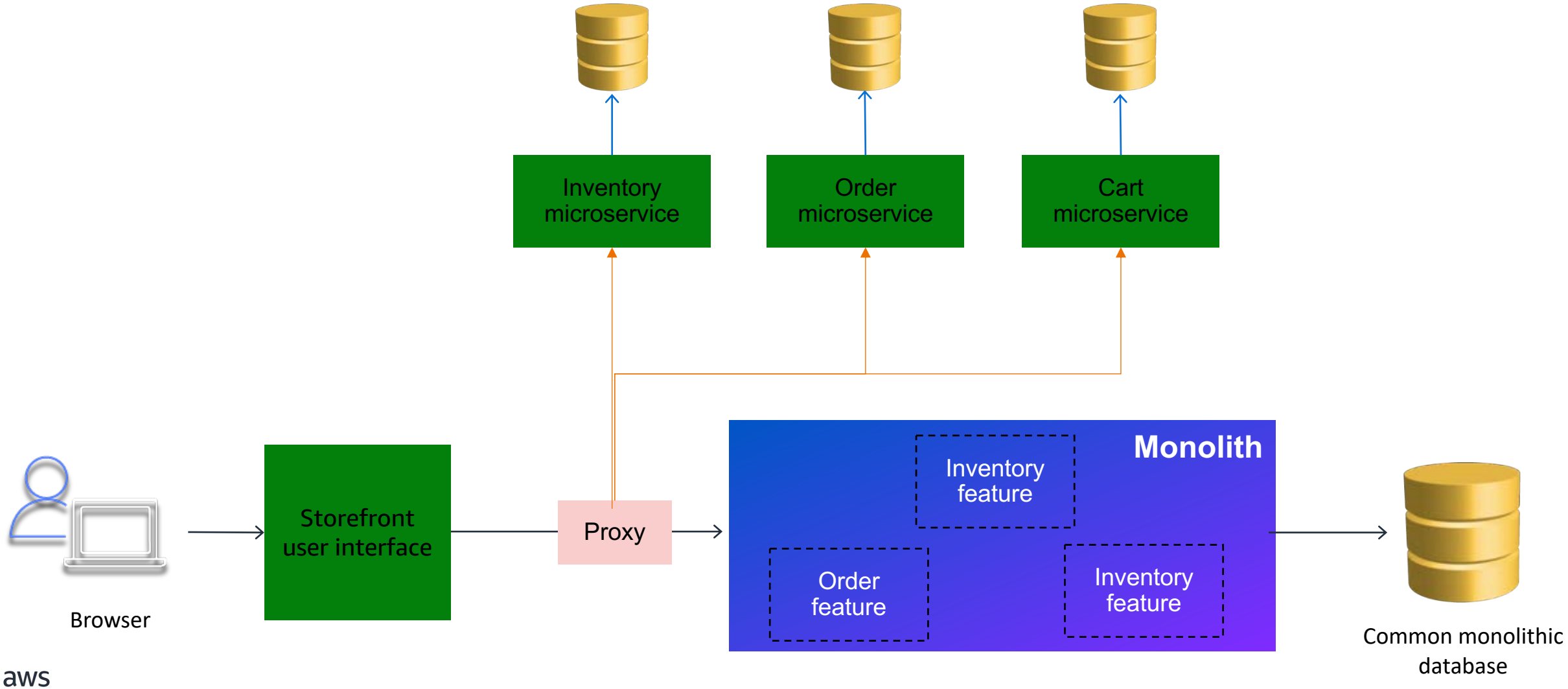
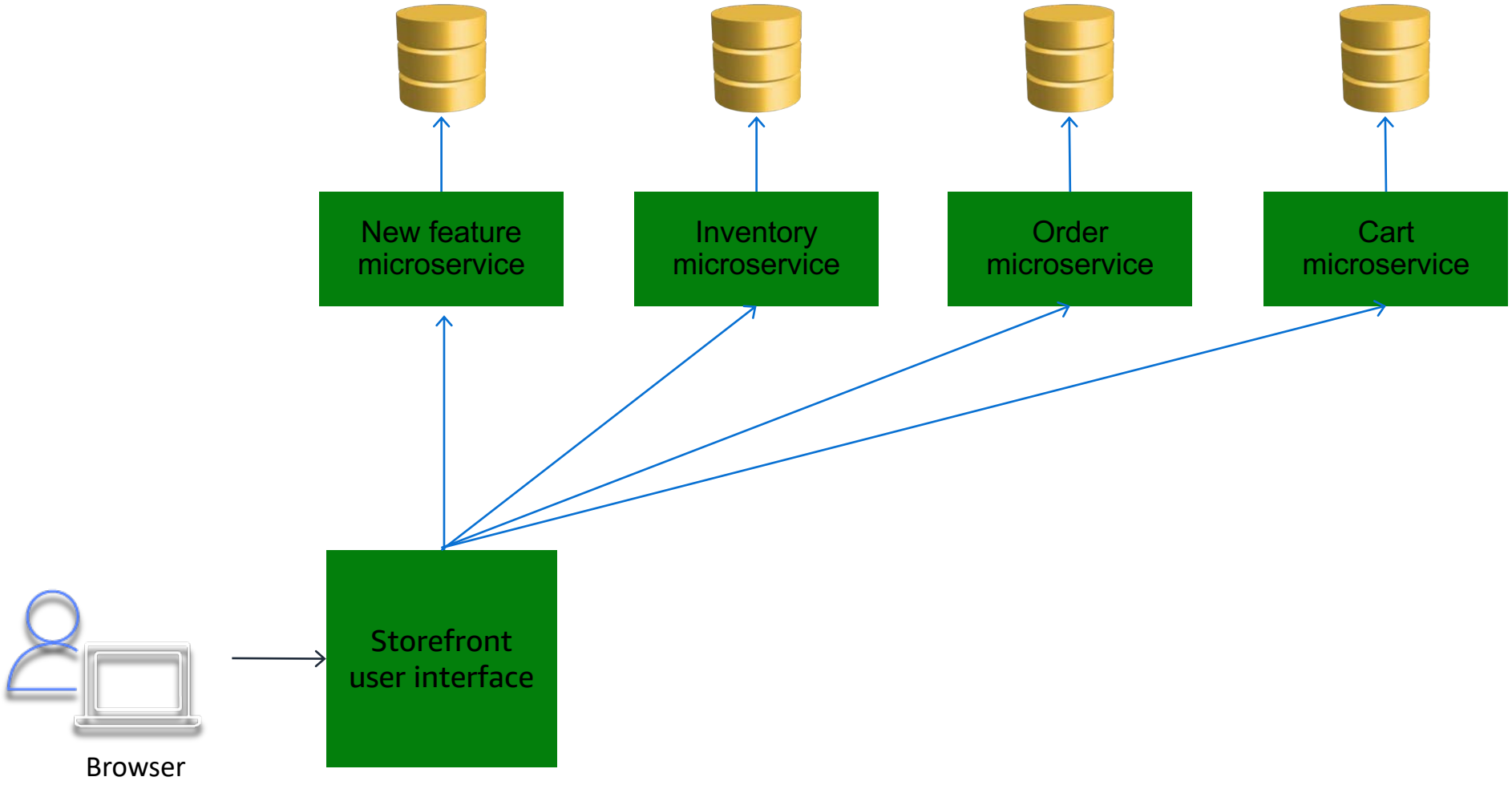
Common monolithic database

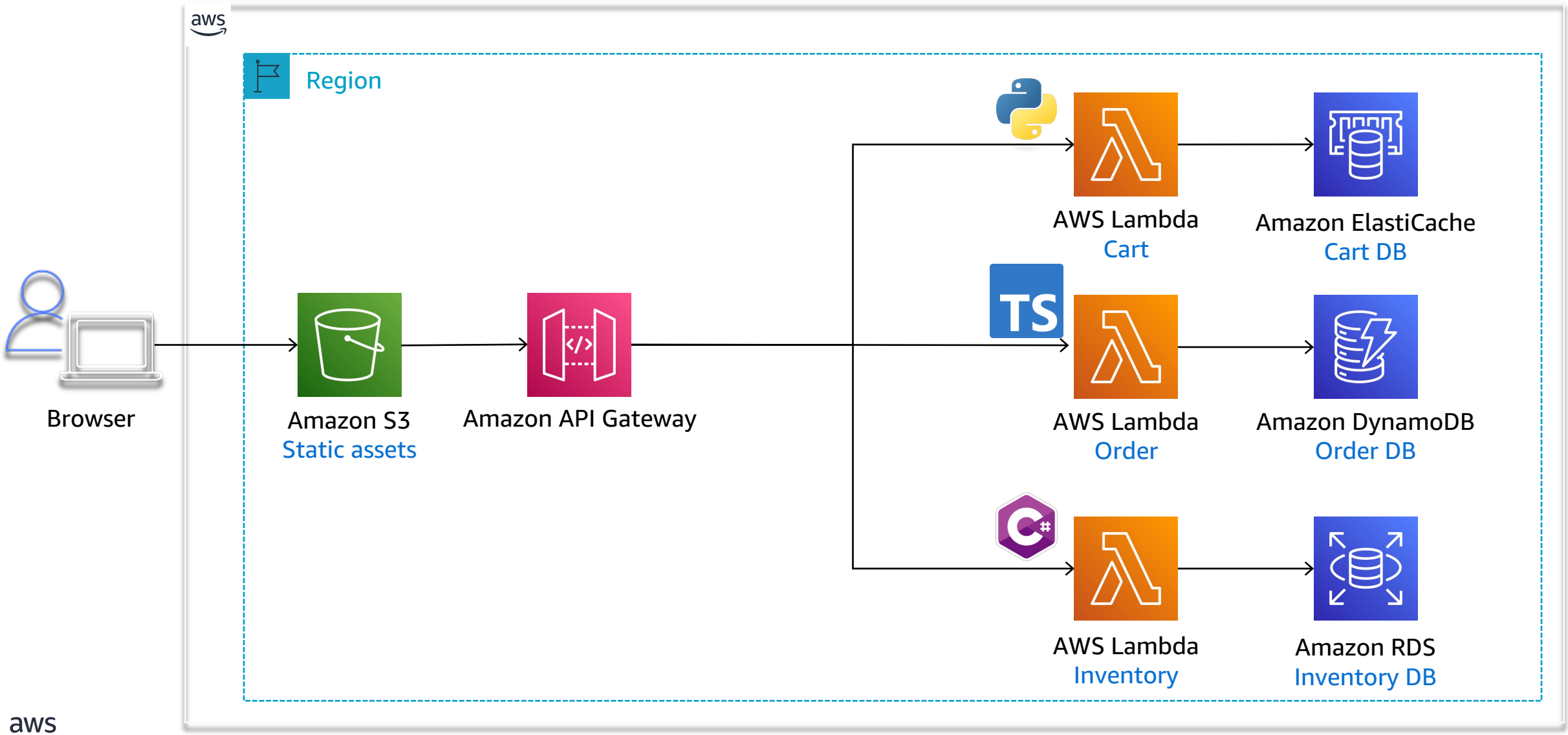

aws
Region
VPC
Public subnet
Private subnet
Cart
Amazon RDS
Browser
Amazon S3
Static assets
Amazon API Gateway
AWS Lambda
Order
Amazon DynamoDB
Order DB
AWS Lambda
Inventory
Amazon RDS
Inventory DB
aws


Inventory microservice
Order microservice
Cart microservice
Storefront user interface
Proxy
Monolith
Inventory feature
Order feature
Inventory feature
Browser
Common monolithic database

Final state

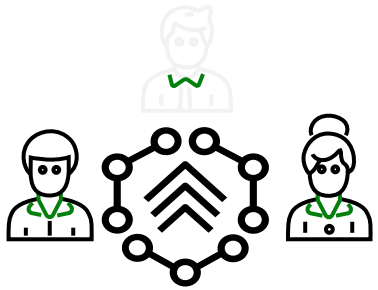

New feature microservice
Inventory microservice
Order microservice
Cart microservice
Storefront user interface
Browser

Final State


aws
Region
Browser
Amazon S3
Static assets
Amazon API Gateway
AWS Lambda
Cart
Amazon ElastiCache
Cart DB
AWS Lambda
Order
Amazon DynamoDB
Order DB
AWS Lambda
Inventory
Amazon RDS
Inventory DB

Step 3: Automate

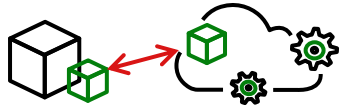
AWS Migration Hub Refactor Spaces



AWS Migration Hub
Refactor Spaces

Reduce the time to set up and manage a refactor environment

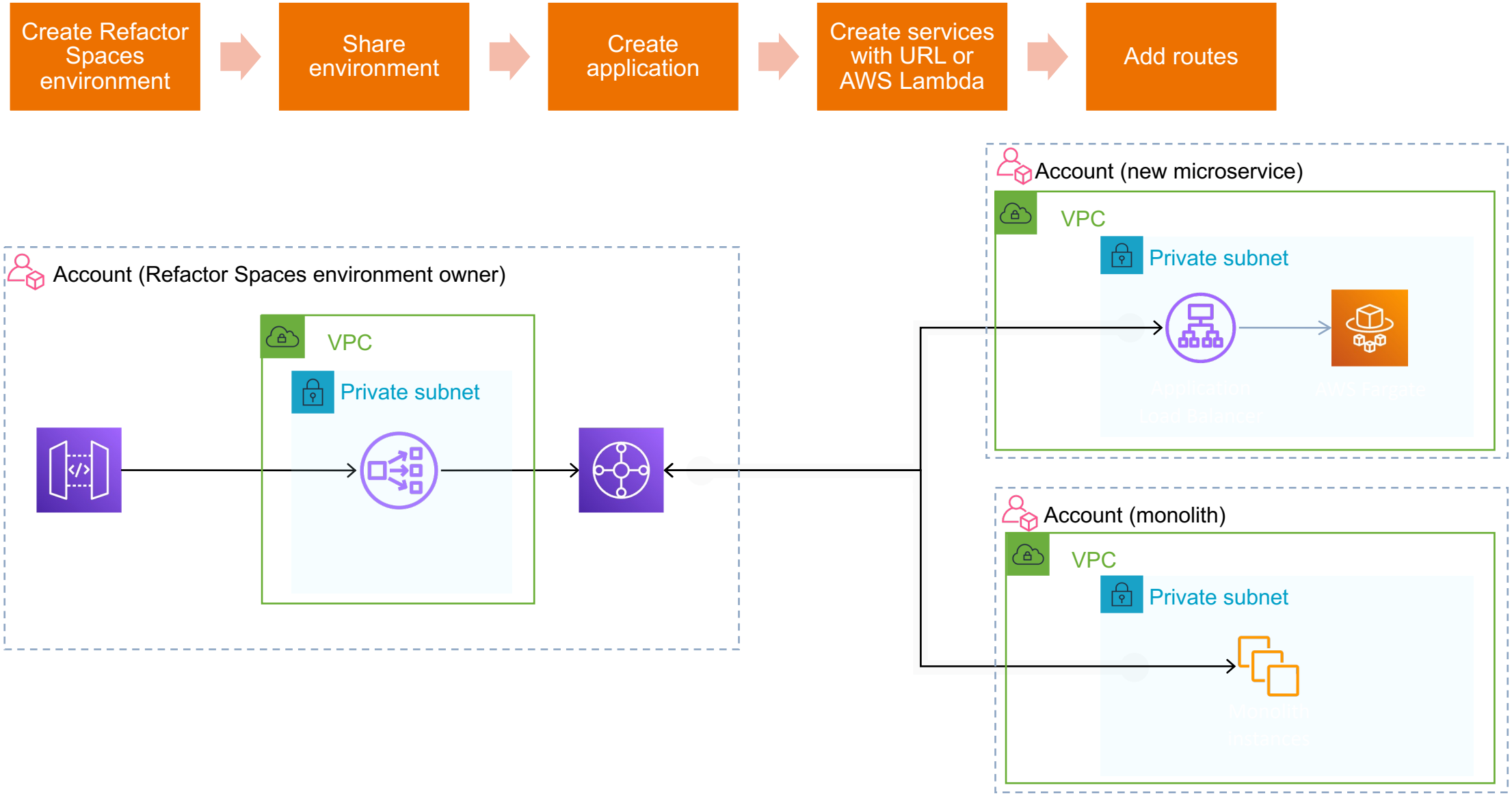
Shield application consumers from infrastructure changes



Reroute traffic from old to new across multiple AWS accounts

Start **refactoring** applications in **days** instead of months

Strangler fig with Refactor Spaces



Thank You!