WEBINAR

Unleashing the power of frontend distributed systems with AWS

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AWS

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Are you experiencing **long lead times** to release changes to your users? even though you have **microservices architecture**?

Have you got too many frontend **team dependencies**?

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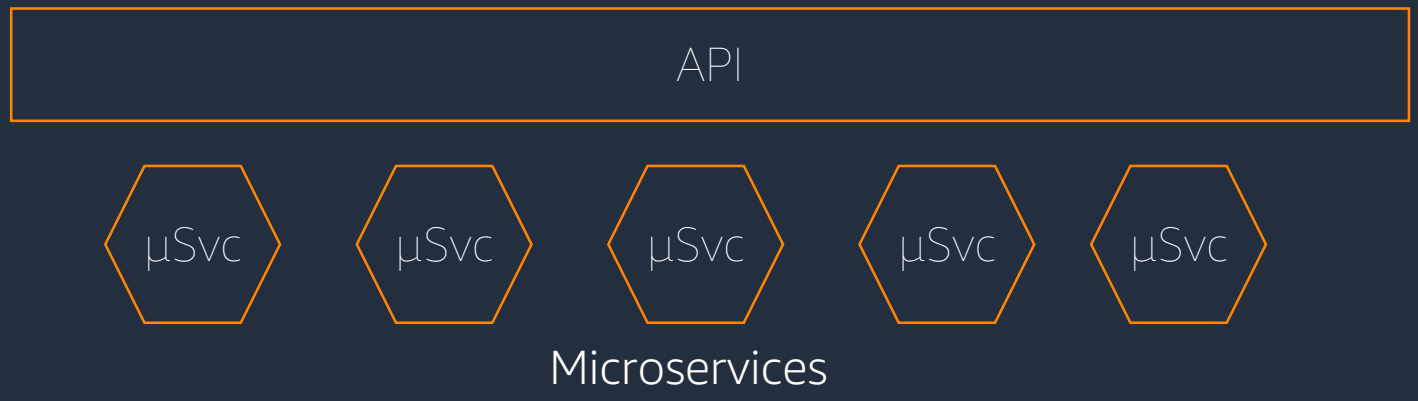
Microservices



Team **autonomy** and **ownership**

Organized by **business domains**

Independent deployment

Loose coupling

Failure Isolation / **Resiliency**

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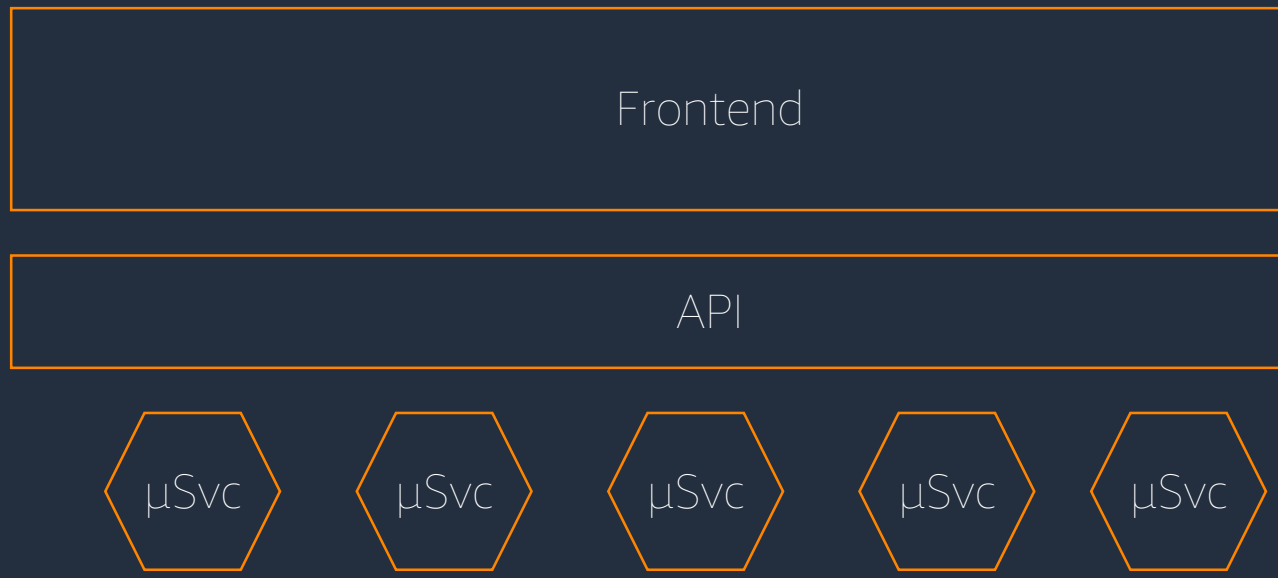
Microservices with a monolithic frontend



Coordinated changes

High **coupling**

No isolation / **low resiliency**

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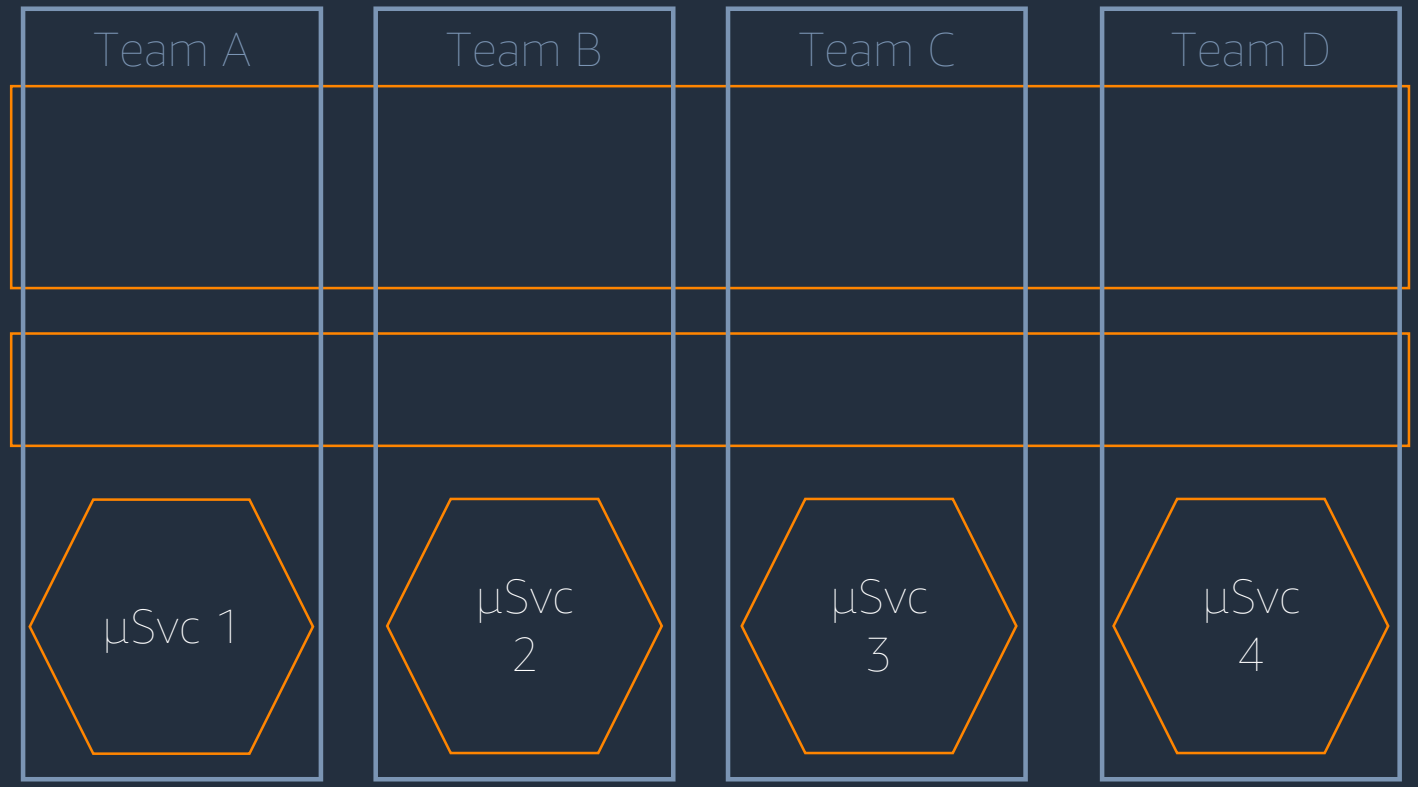
Ownership expectations



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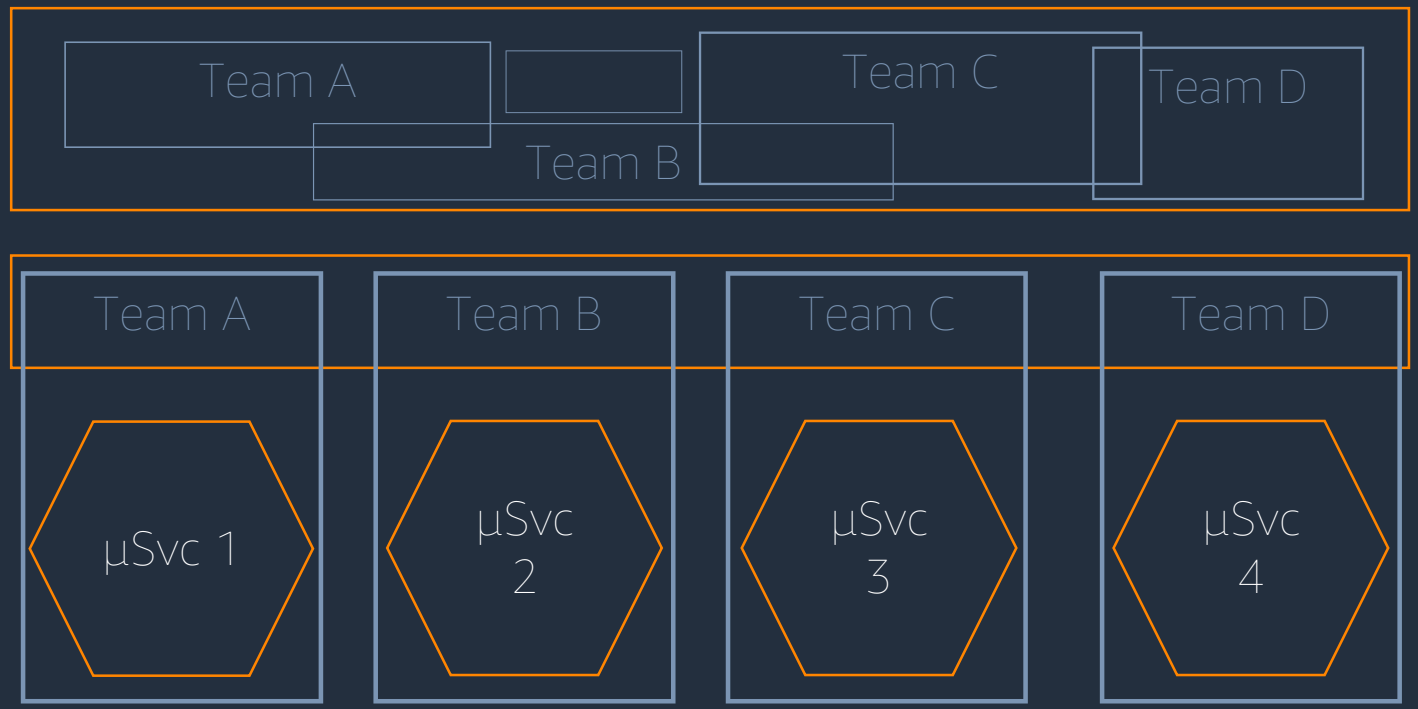
No clear boundaries in the frontend



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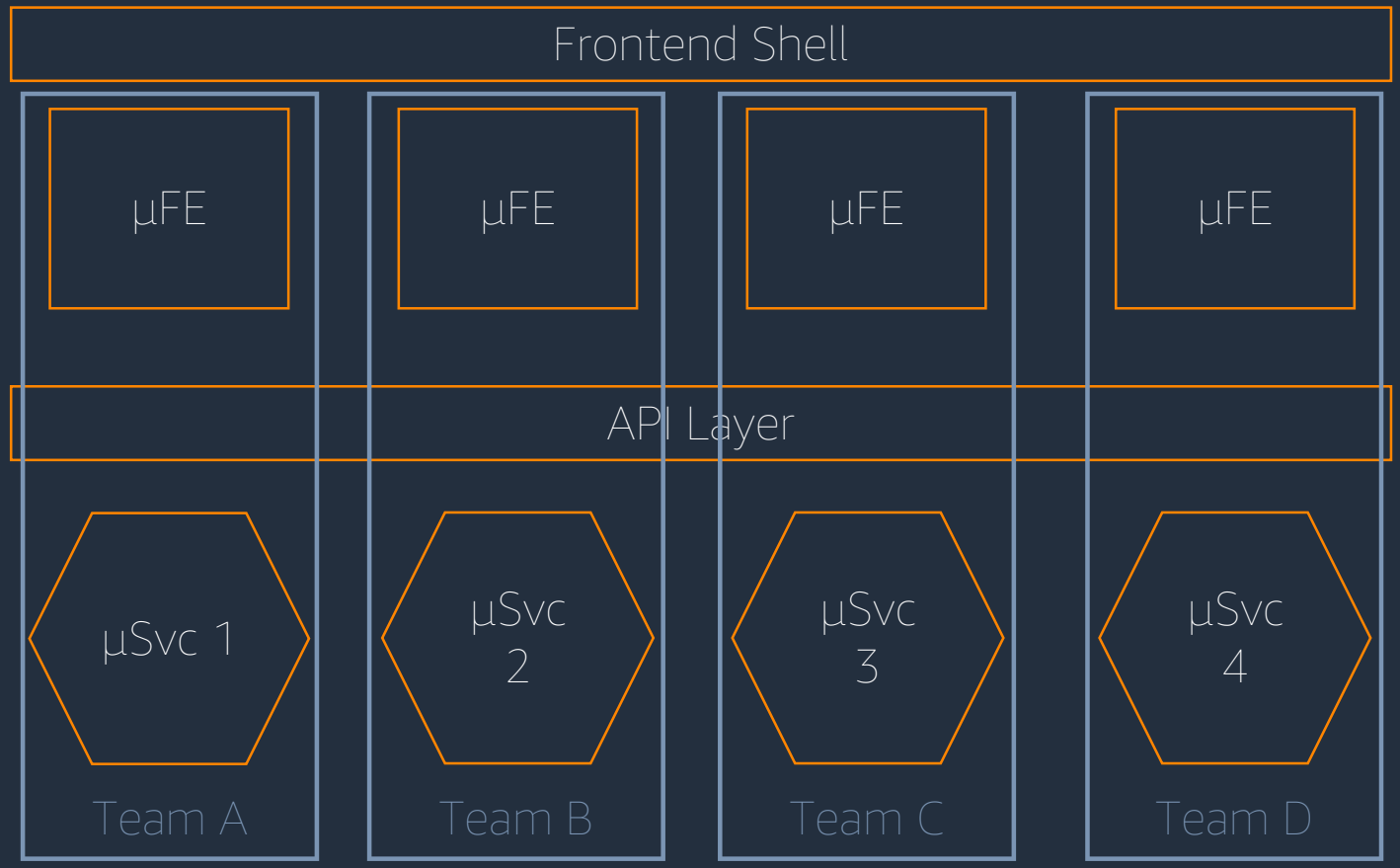
Microfrontends



Microfrontends are:

- **independently deployable**
- providing features of a **business domain**
- **loosely coupled** with the rest of the application
- owned by a ***single*** **team**

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Do you need microfrontends?

Organization context

Application Footprint, # Teams

Optimize key metrics

Web Vitals, Deployment Frequency, Lead Time for Changes

Evaluate trade-offs

Business Agility vs Complexity

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Distributed System Patterns applied to Microfrontends

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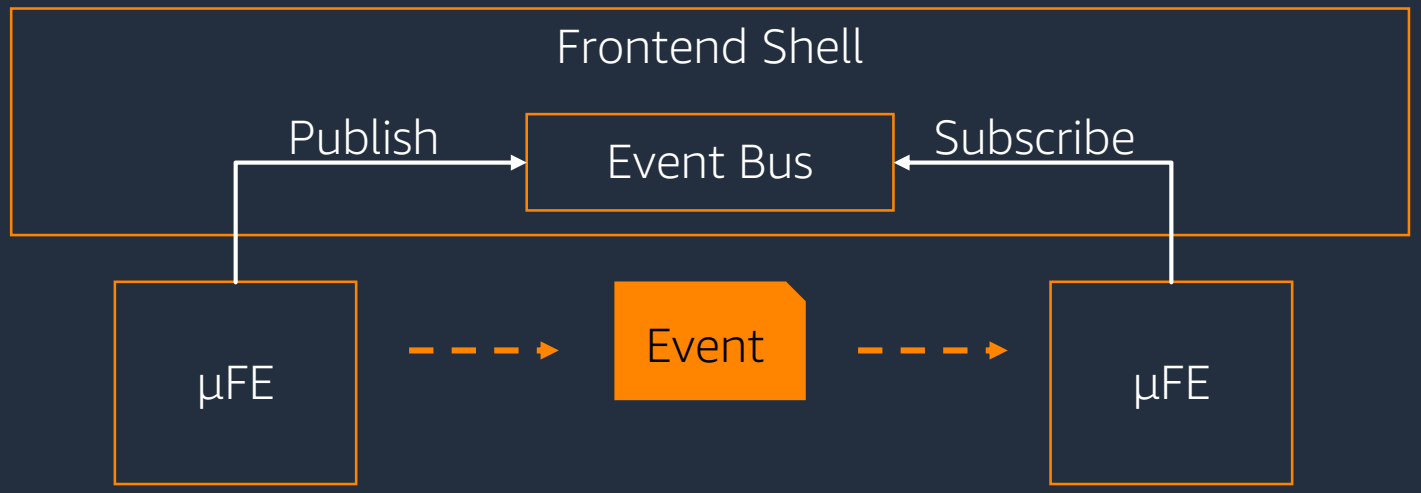
Microfrontends – Communicate



Events provide **well defined contracts** between teams.

No direct integration -> **Reduced coupling**.

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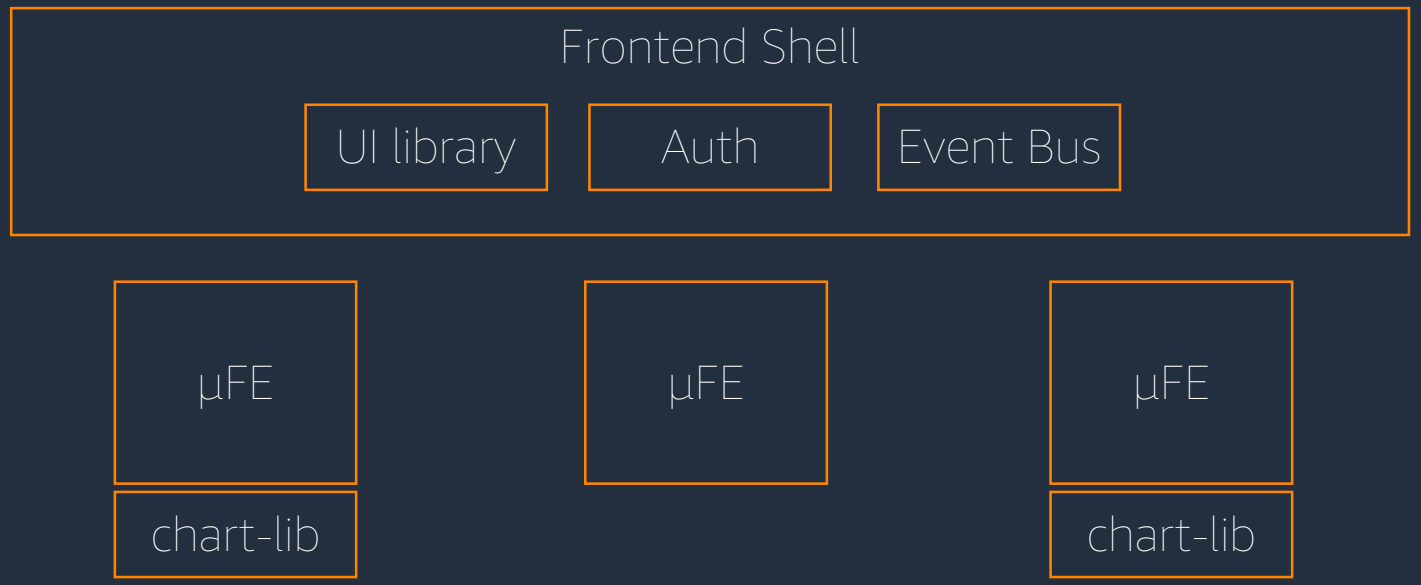
Microfrontends – To Share or Not to share



Share nothing if possible to minimize **team dependencies** and runtime coupling.

Trade-offs for **consistency**, **productivity**, and **performance.**

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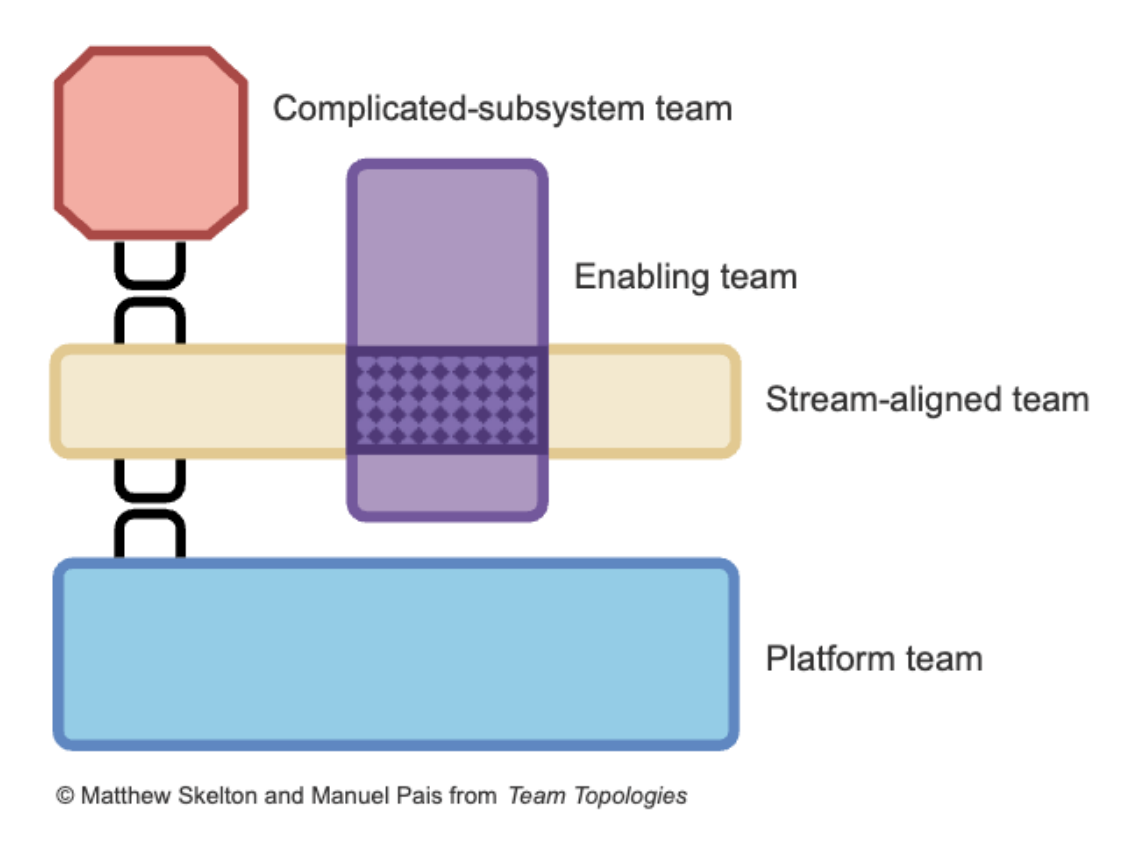
Microfrontends – Team organization patterns



Trade-off some **autonomy** to gain **efficiencies at scale** with platform teams and **enabler teams**.

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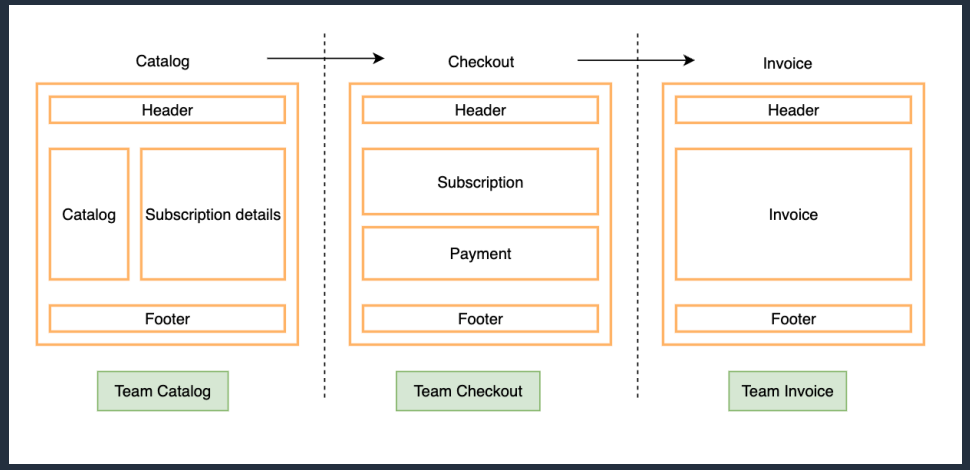
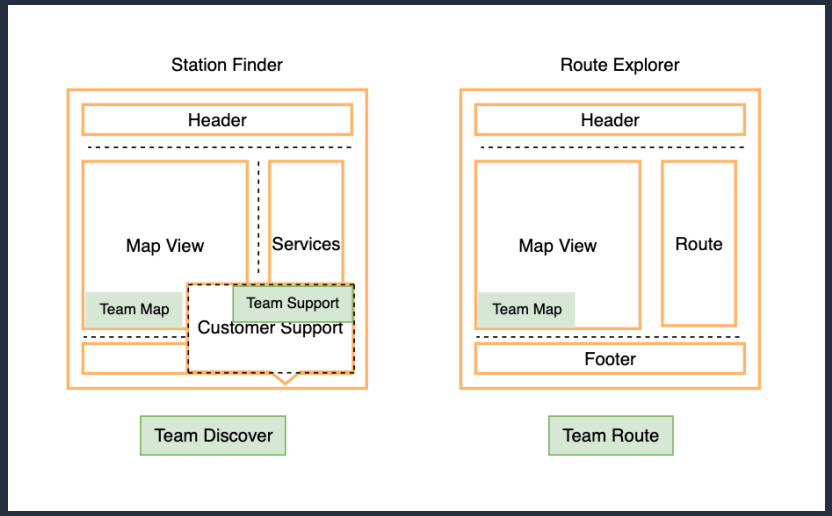
Defining boundaries at the user interface





Find the boundaries with **Domain Driven Design** techniques.

Work with **UX**.

Aim to make it possible to **evolve** your application and **scale your development effort**.

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Microfrontends on AWS

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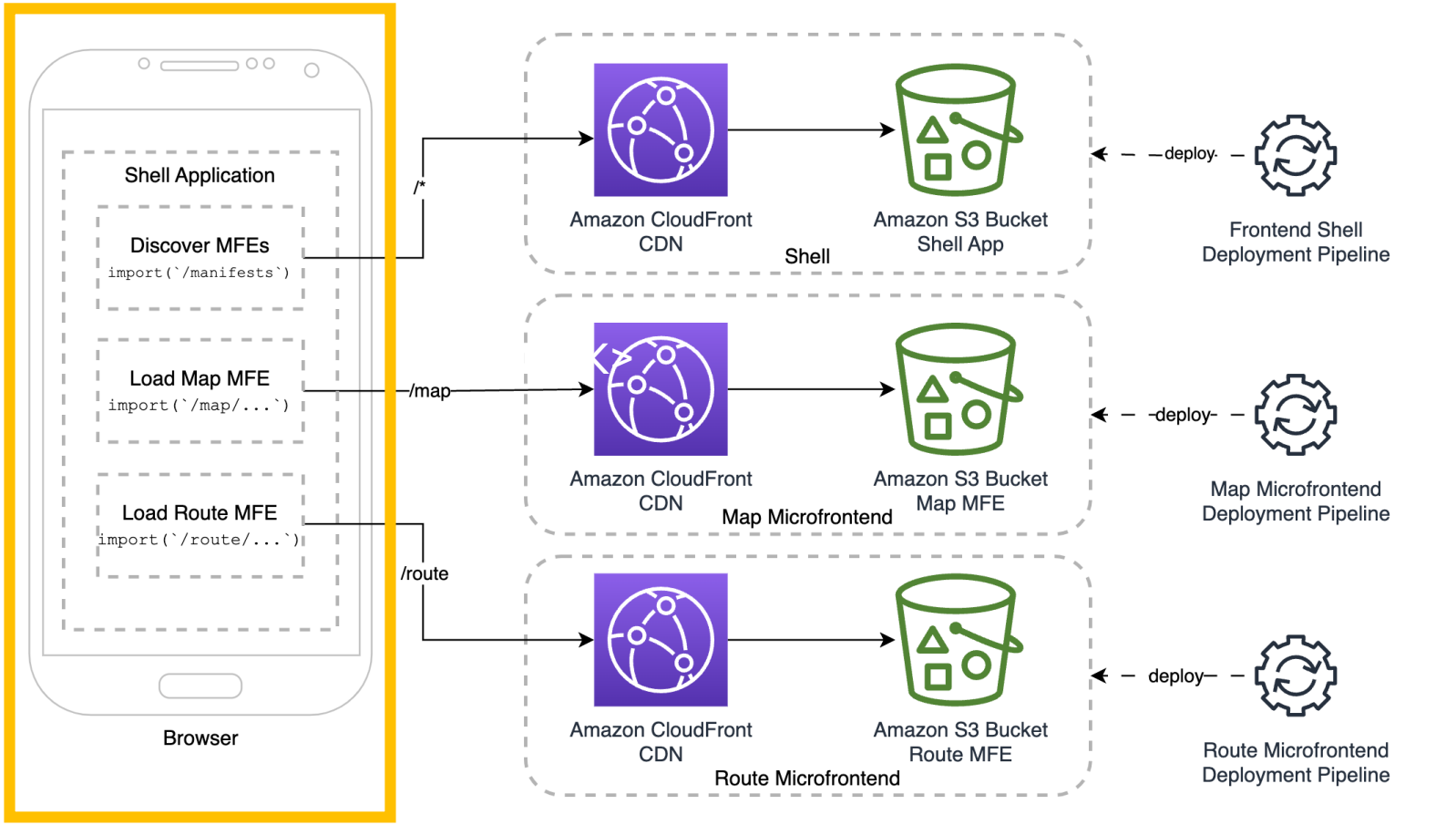
Example - Client side composition



Discovery on the client, via loading manifests / import maps.

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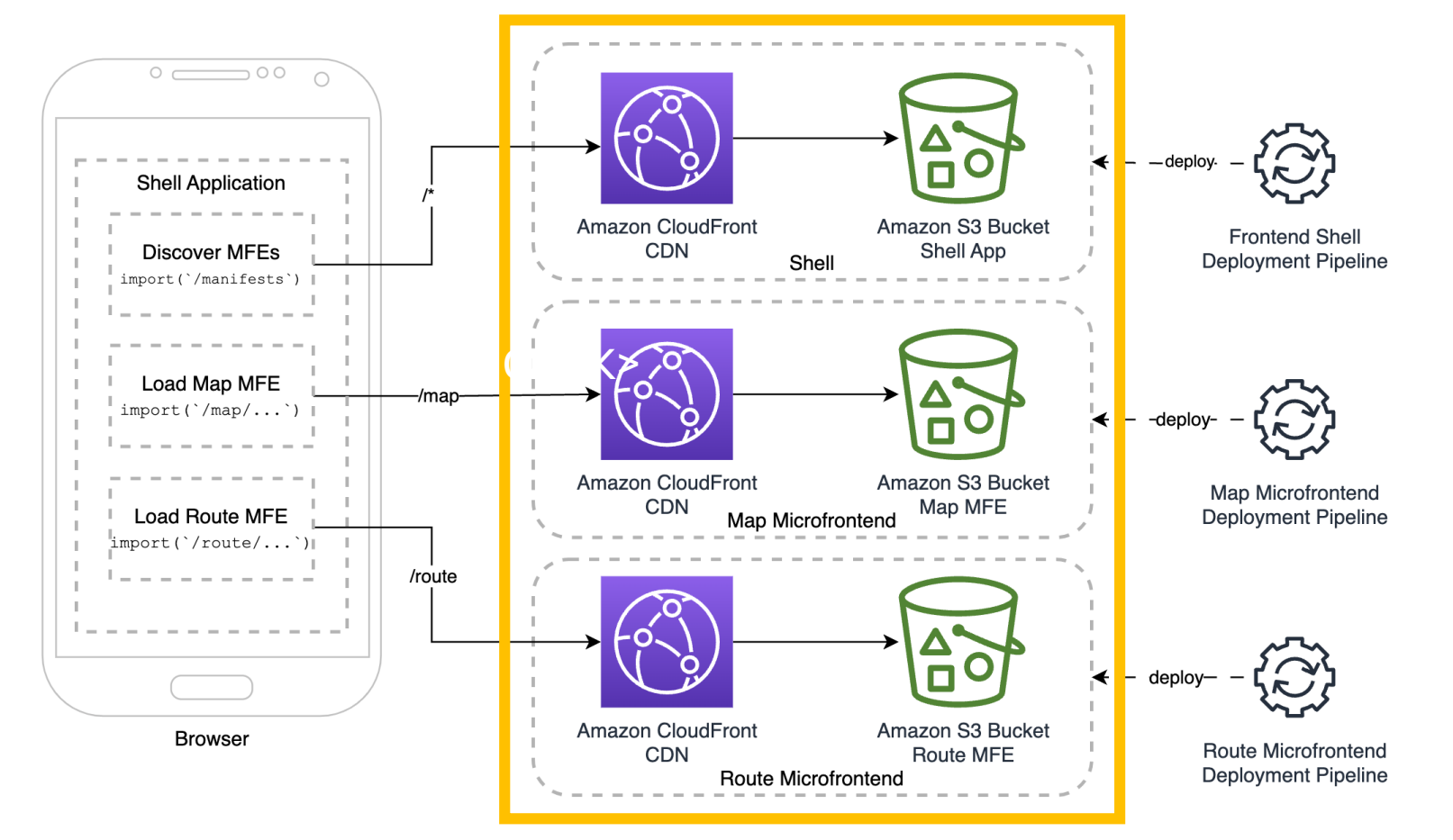
Example - Client side composition



Performant and cost efficient hosting.

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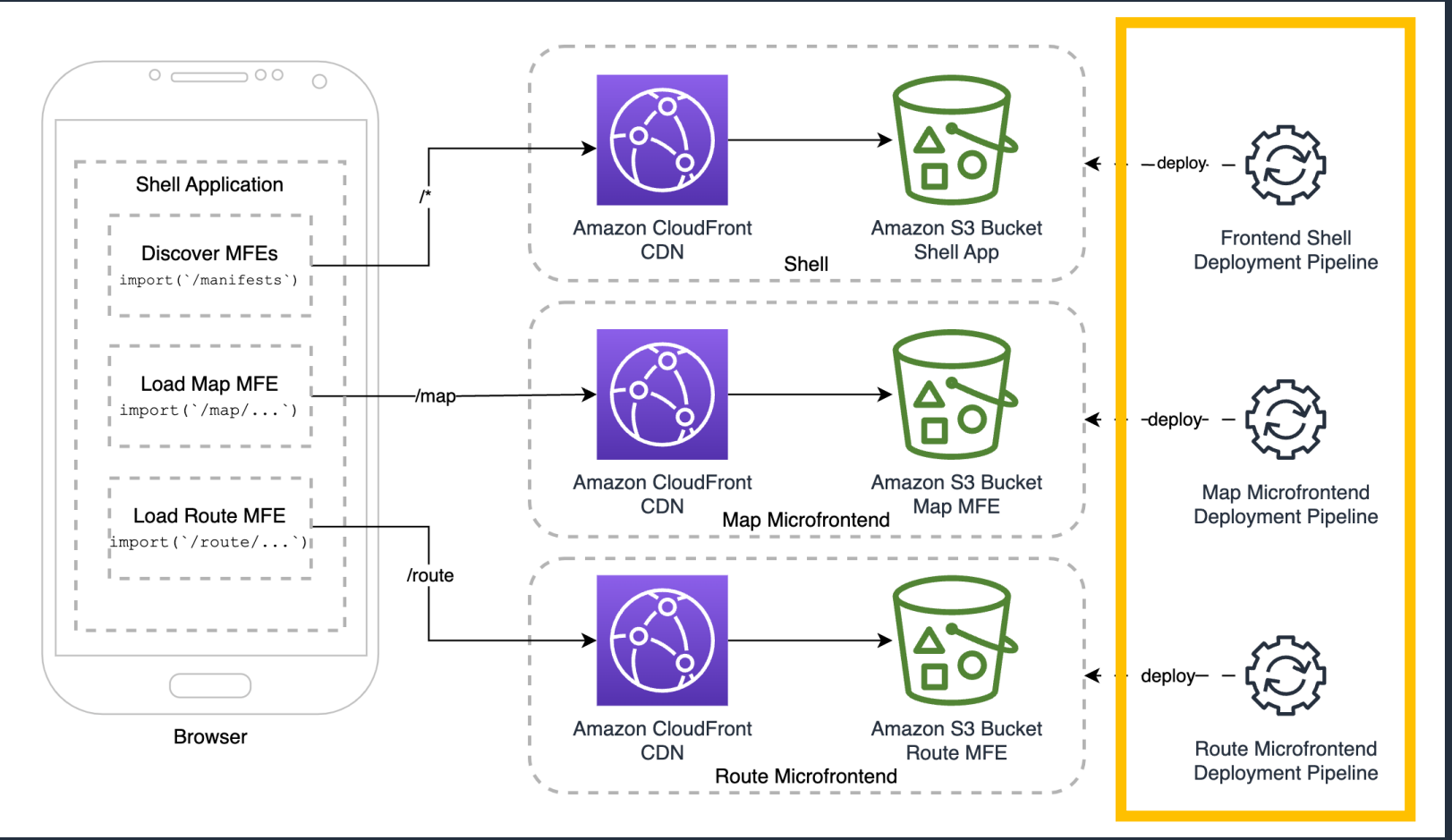
Example - Client side composition



Independent continuous delivery pipelines

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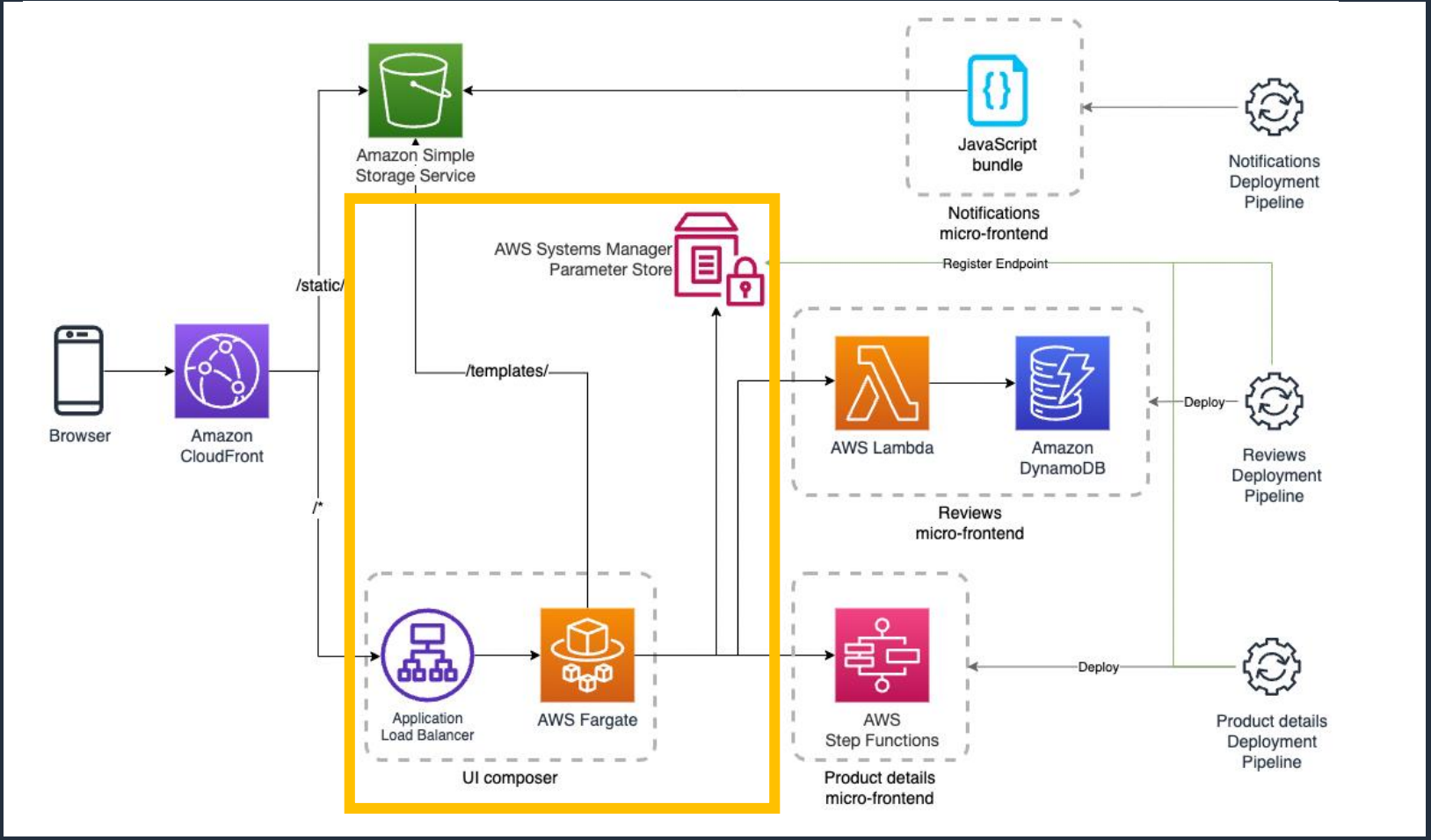
Example – Server-side composition



Discovery on the server via page composer microservice.

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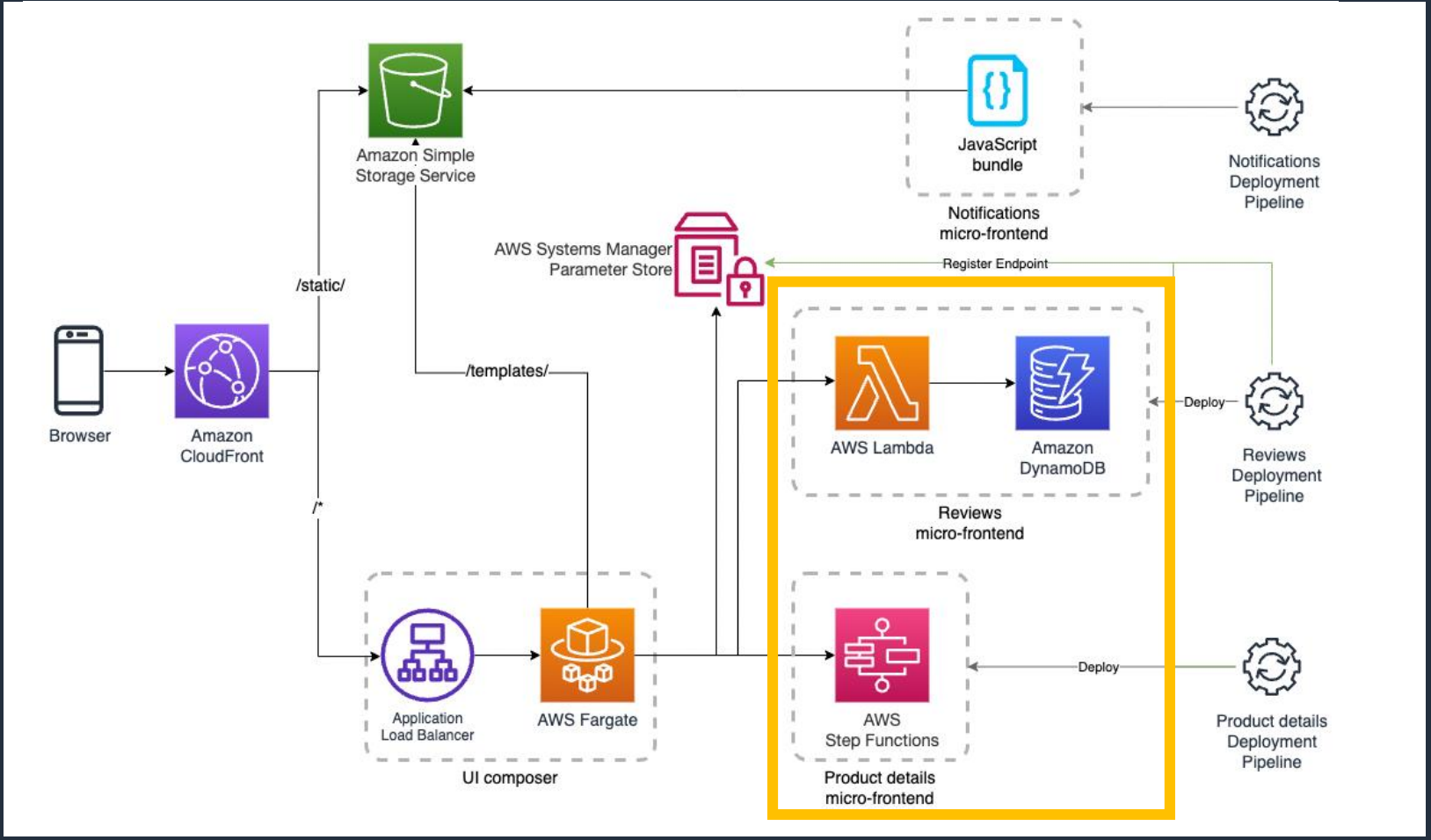
Example – Server-side composition



Choose the best fit serverless compute for your domain.

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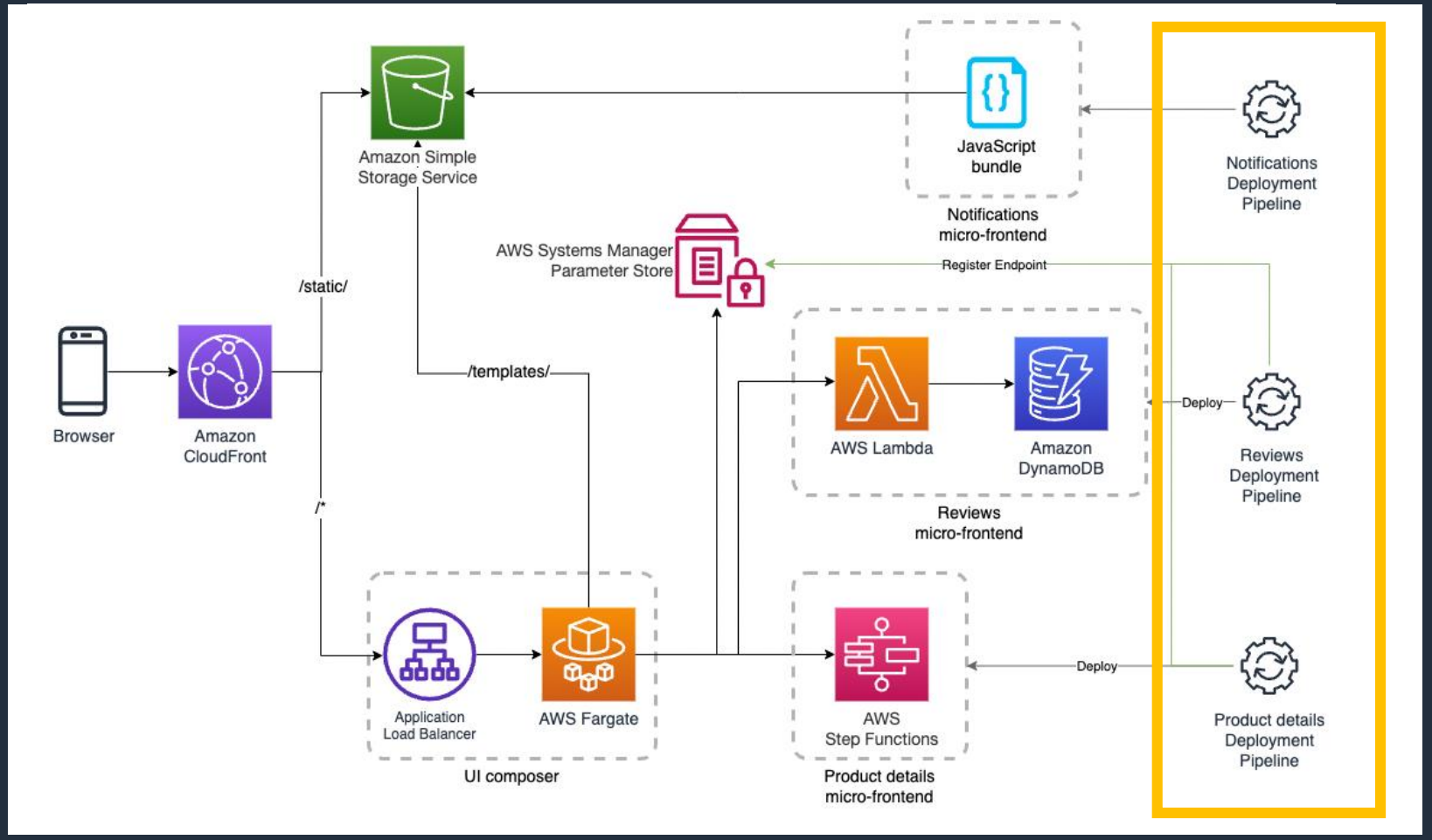
Example – Server-side composition



Independent continuous delivery pipelines

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Many patterns are emerging

Let’s have a look at a **real world implementation**.

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Dunelm's Microfrontends Journey

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Introduction

Warren Fitzpatrick
Principal Engineer, Dunelm
Digital Optimisation

Dunelm
Homewares Retailer, UK
Founded in 1979
Over 170 stores nationwide

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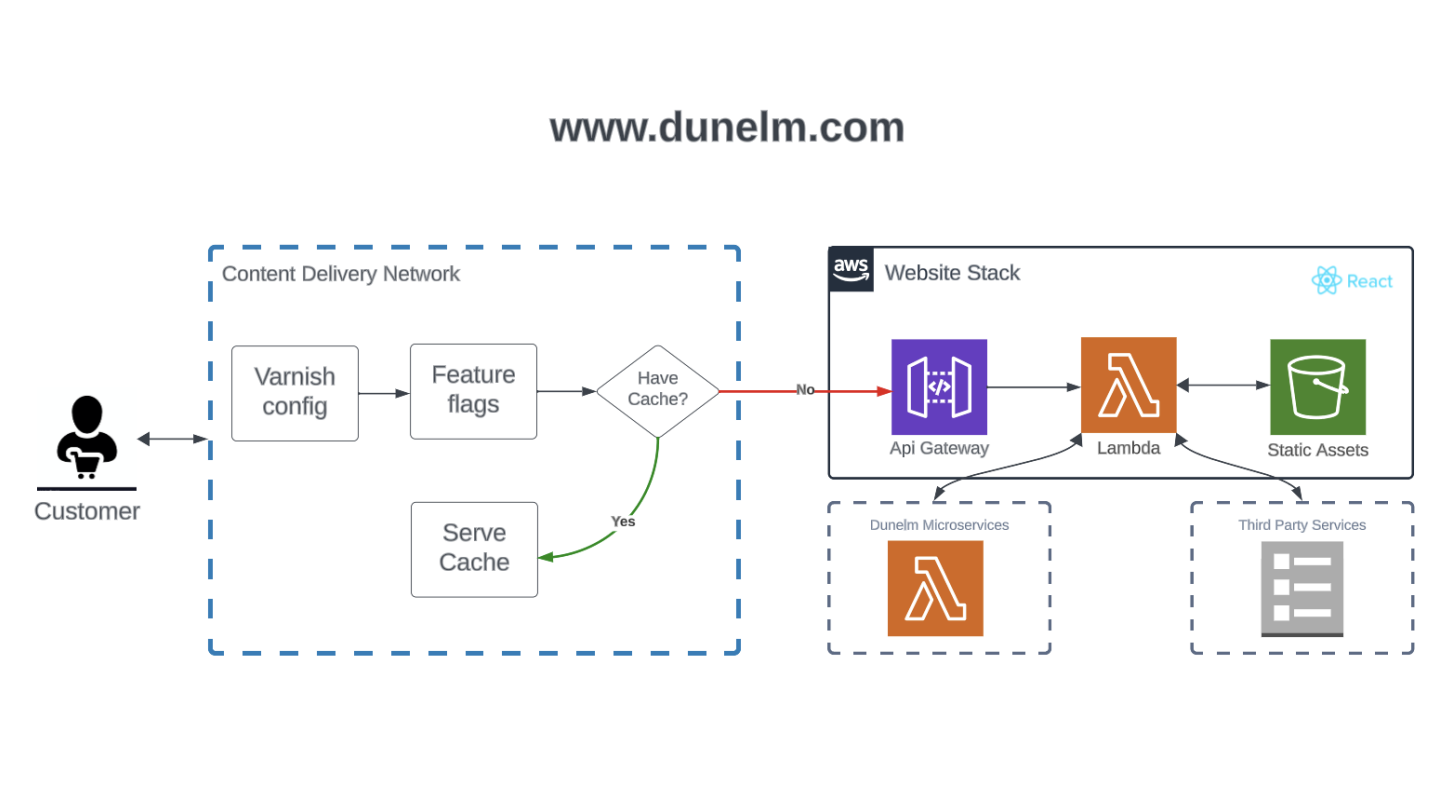
Where our story begins



Microservices architecture

Monolithic frontend

Isomorphic React application

Monorepo codebase

High risk deployment

Slows down over time

Difficulty in scaling **teams**

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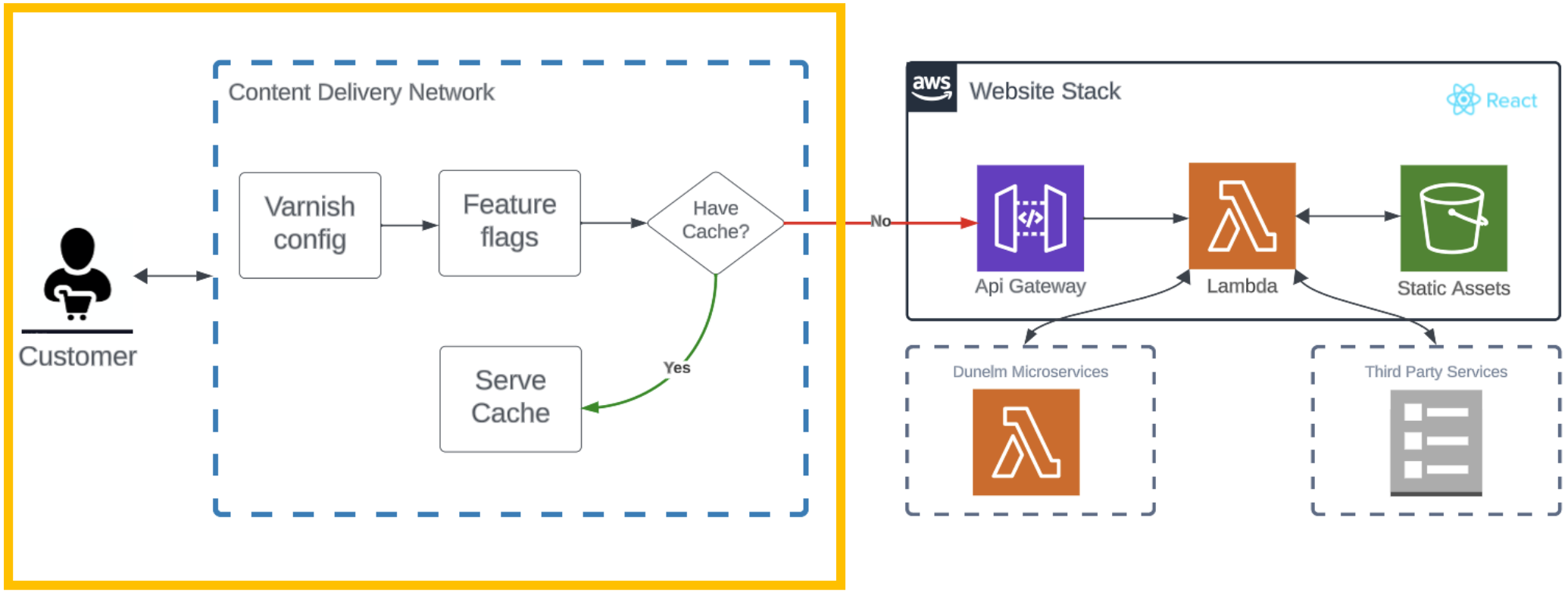

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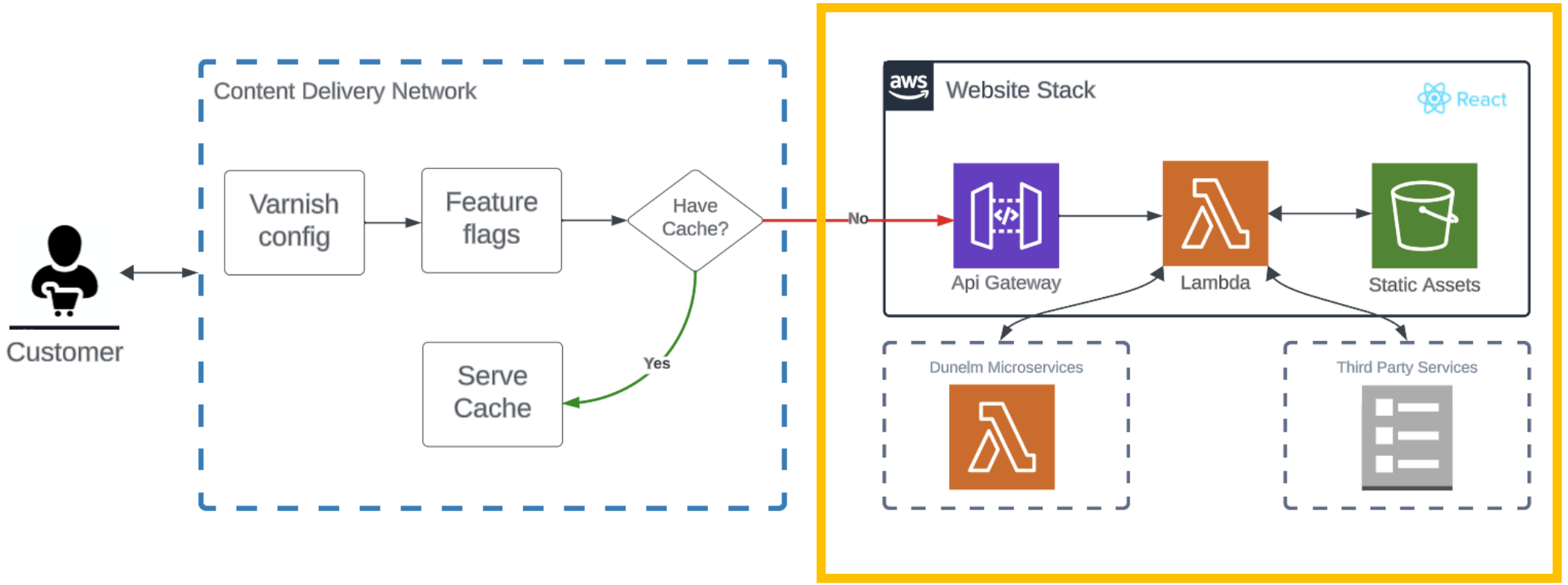

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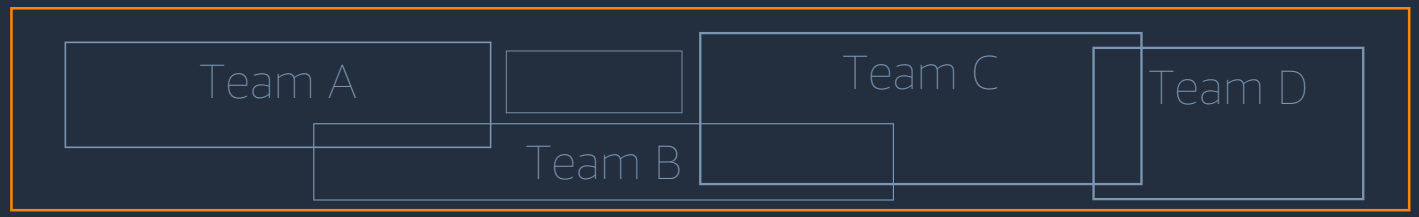
Issues at scale



11 teams working in same repo

Communication becomes difficult

Challenges with ownership

Performance declines over time

Complexity increases with changes

Lead time incrementally increases

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Why is lead time increasing?

Data report carried out

Lead time doubled

Time spent reverse engineering

Unintentional bugs introduced

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"Our website has a lot of tests..."

8200
Unit tests

Pipeline becoming slower

400
Integration tests

Tests becoming flaky

150
End-to-end tests

Blocking teams releasing

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What were our options?

Can we run our tests more reliably?

- In house solution created
- Improved, but not fixed

Can we refactor the codebase in place?

- Complex dependency structure
- Cannot halt work for teams

High priority work must continue uninterrupted

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What we want to achieve

Make it easy for teams to take ownership

Decrease lead time on frontend changes

Improve website performance

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What we want to achieve

Make it easy for teams to take ownership

Decrease lead time on frontend changes

Improve website performance

Improve online accessibility

Create consistency for all GUIs

Improve developer experience

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Are Microfrontends suitable for our goals?

Make it easy for teams to take ownership

Decrease lead time on frontend changes

Improve website performance

Improve online accessibility

Create consistency for all GUIs

Improve developer experience

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Are Microfrontends suitable for our goals?

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"Microfrontend architecture is not a silver bullet"

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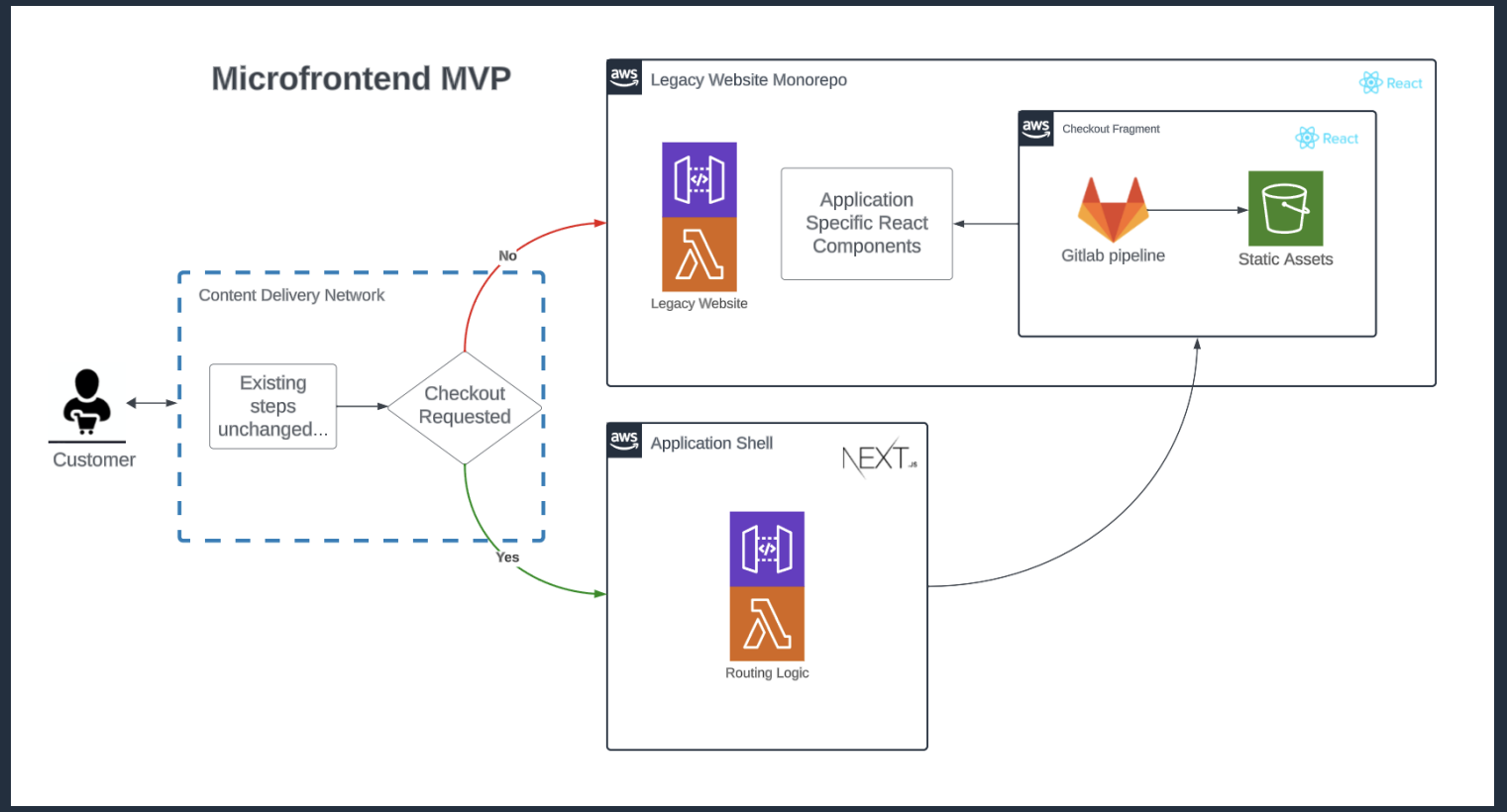
Microfrontend MVP – Checkout



MVP approach to start small

Goal is to prove hypothesis

Ownership assigned to a team

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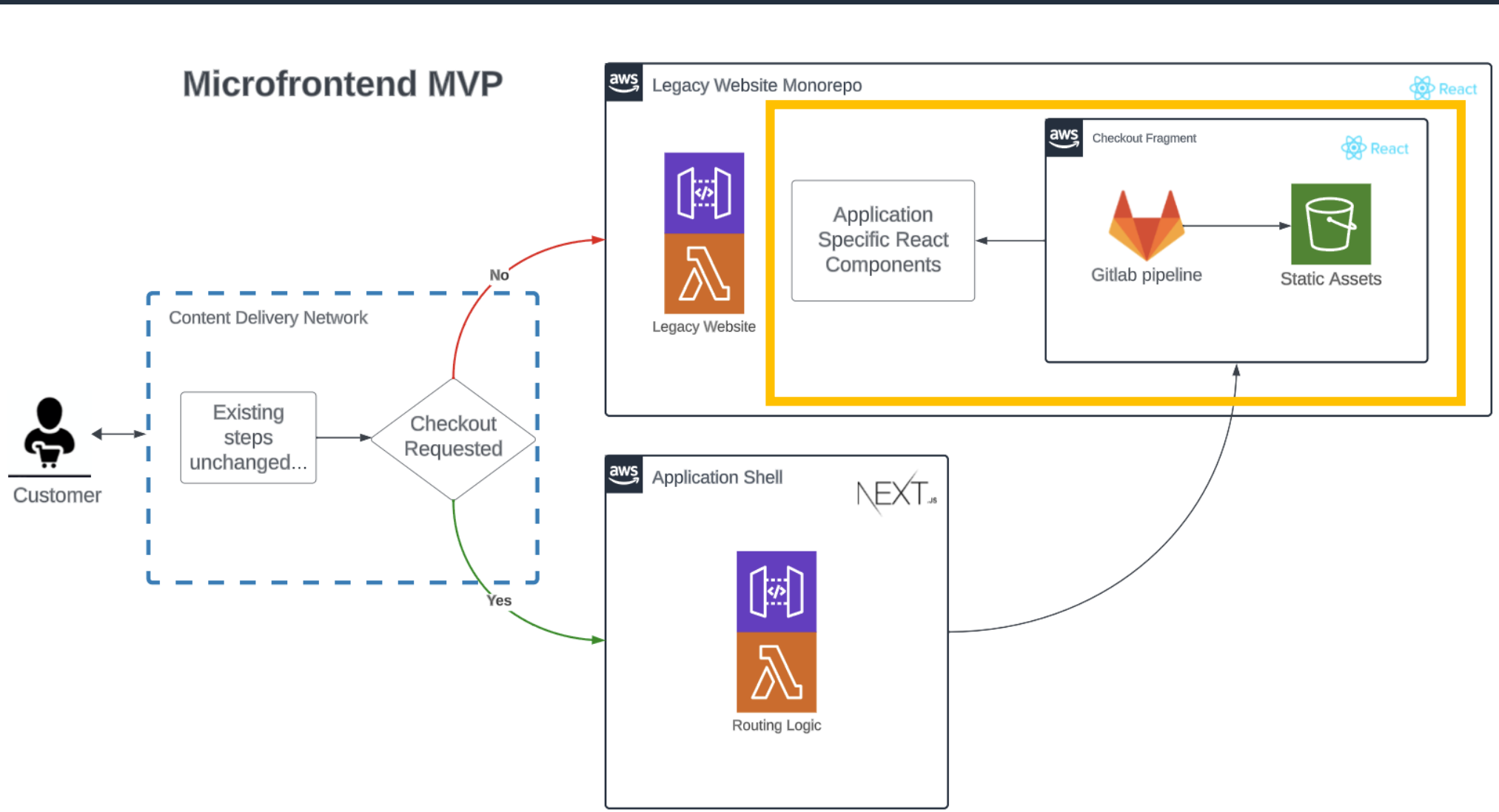

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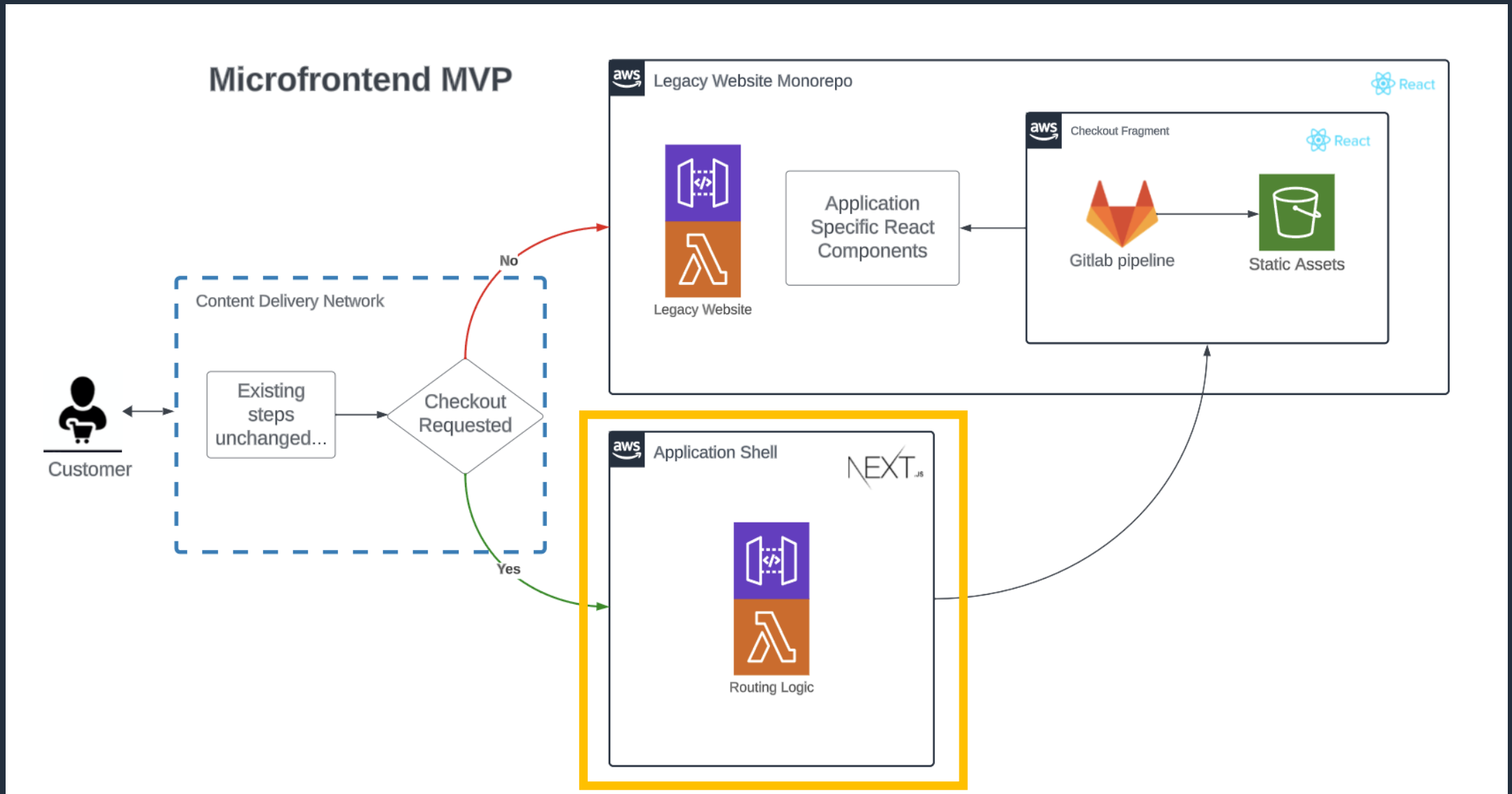

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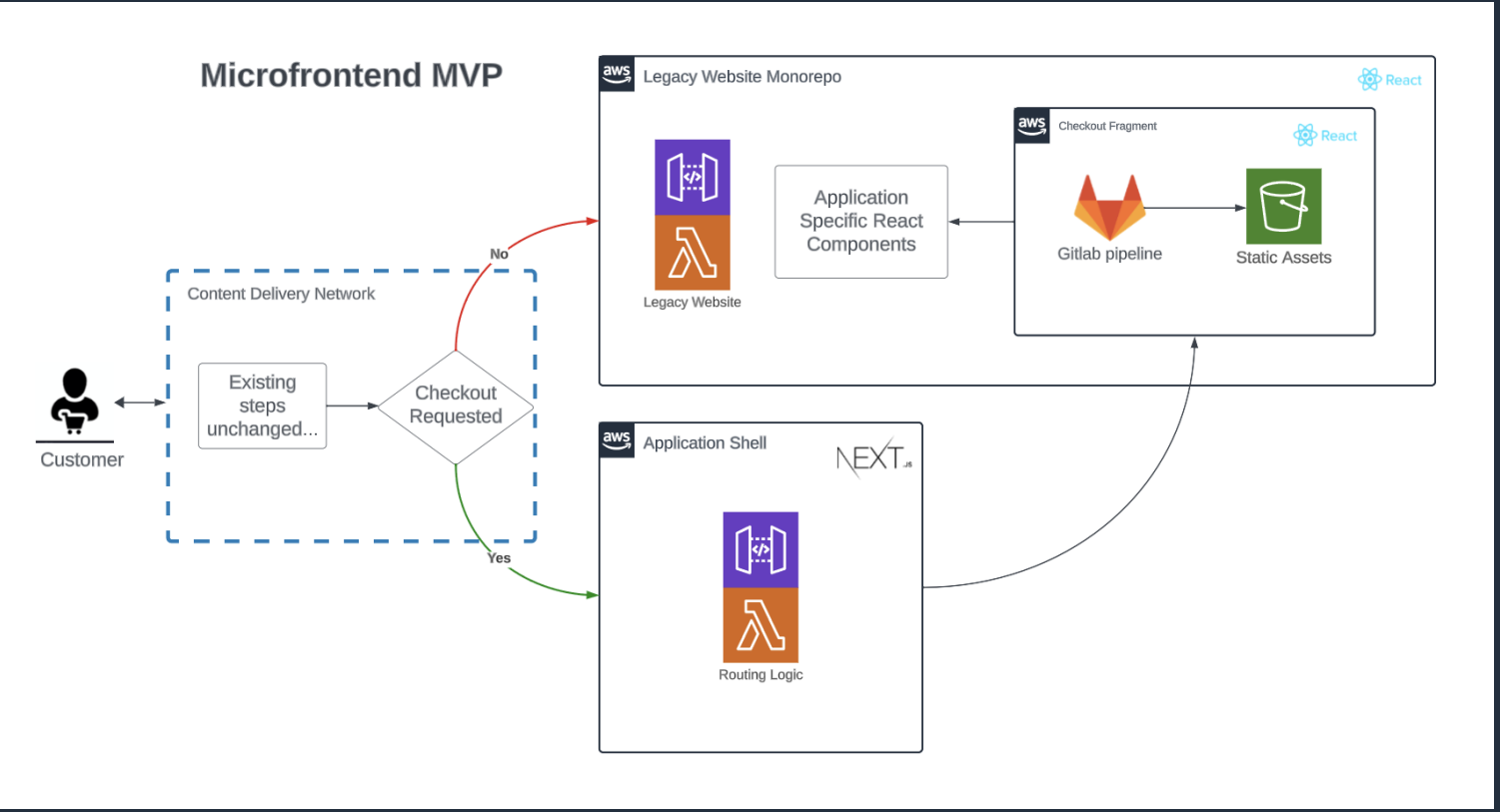
Checkout Results



Revenue uplift generated

Shorter lead time on changes

Tight coupling created

Tests began to fail

Coupled checkout back to website

Convinced by results

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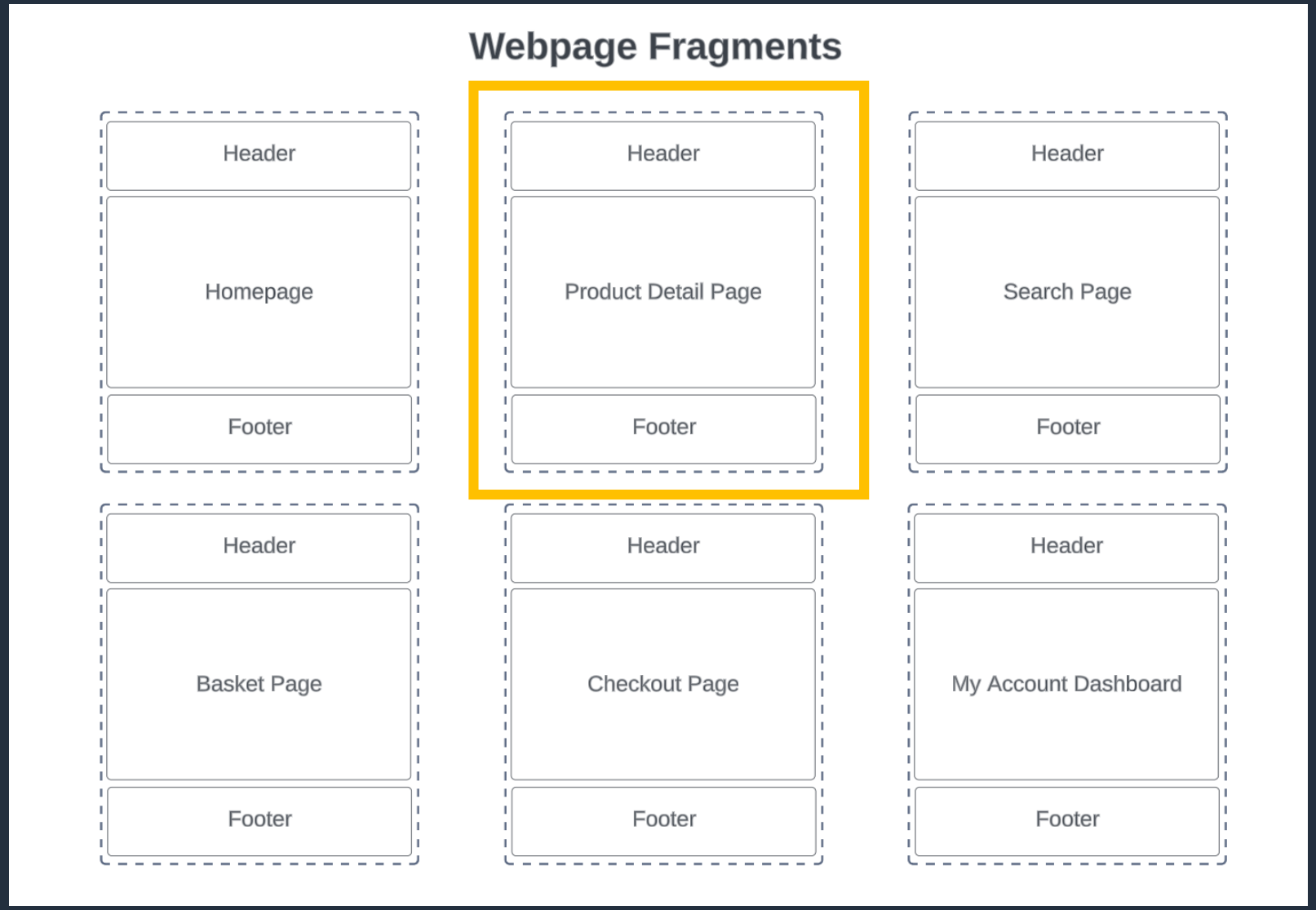

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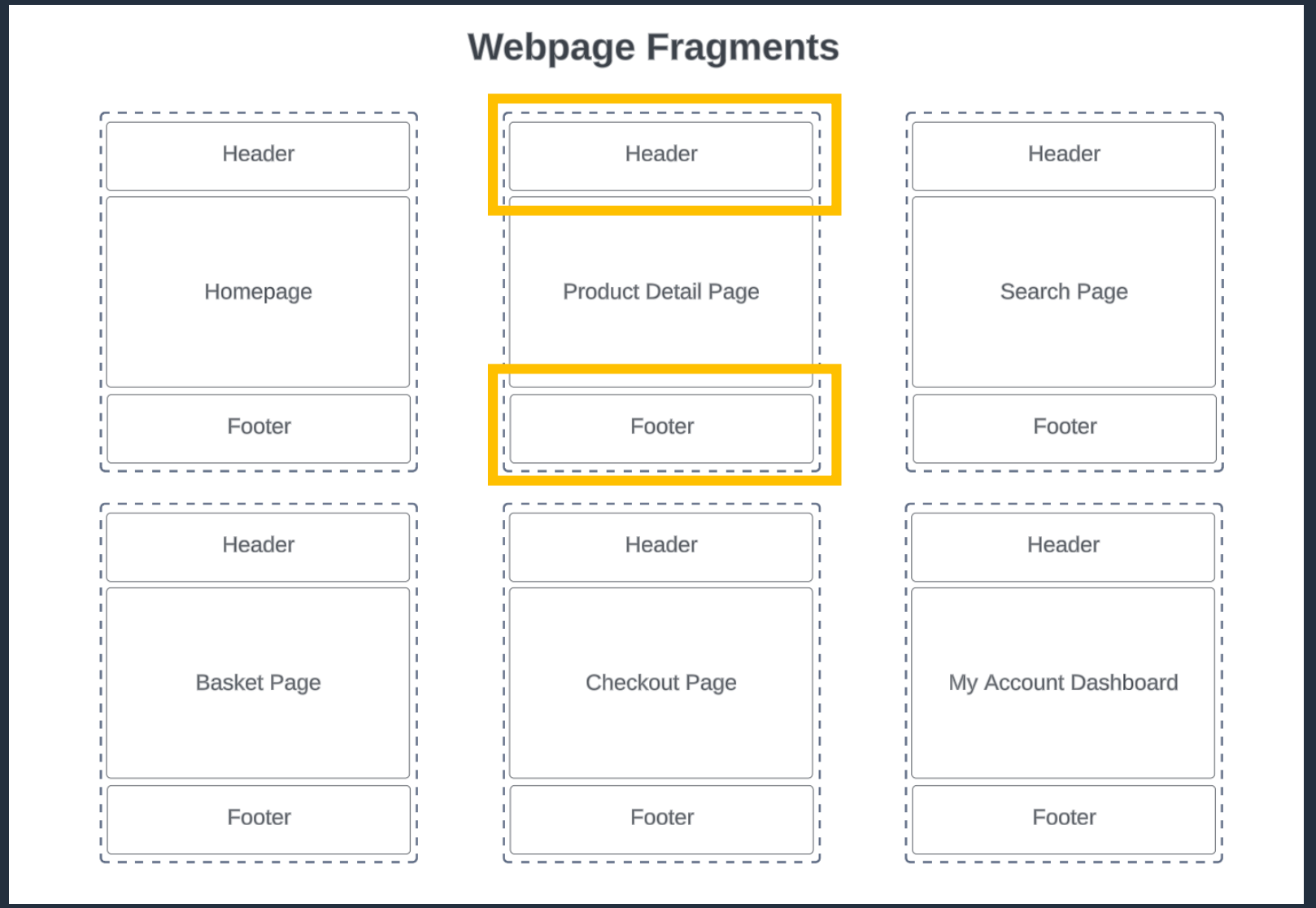

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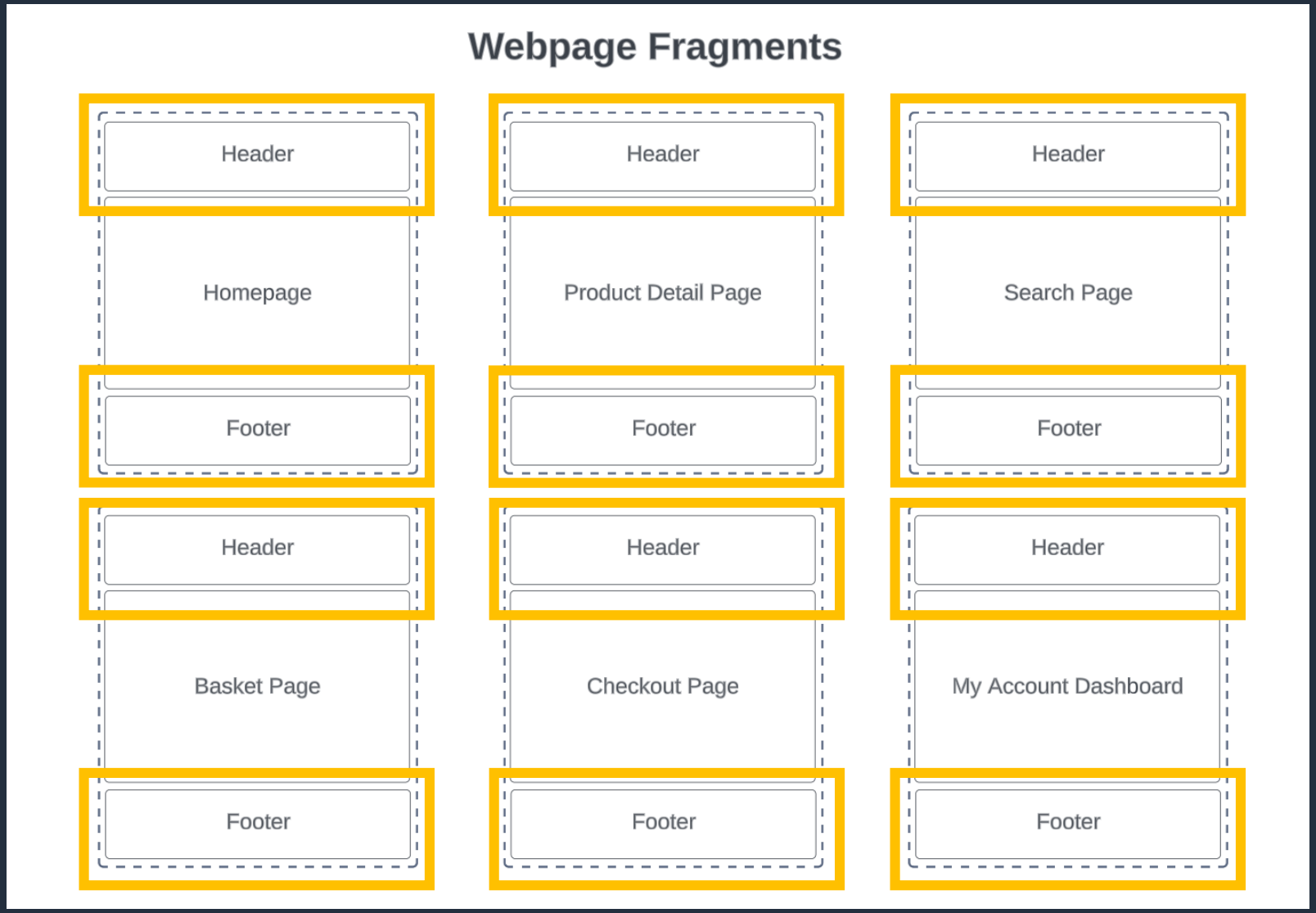

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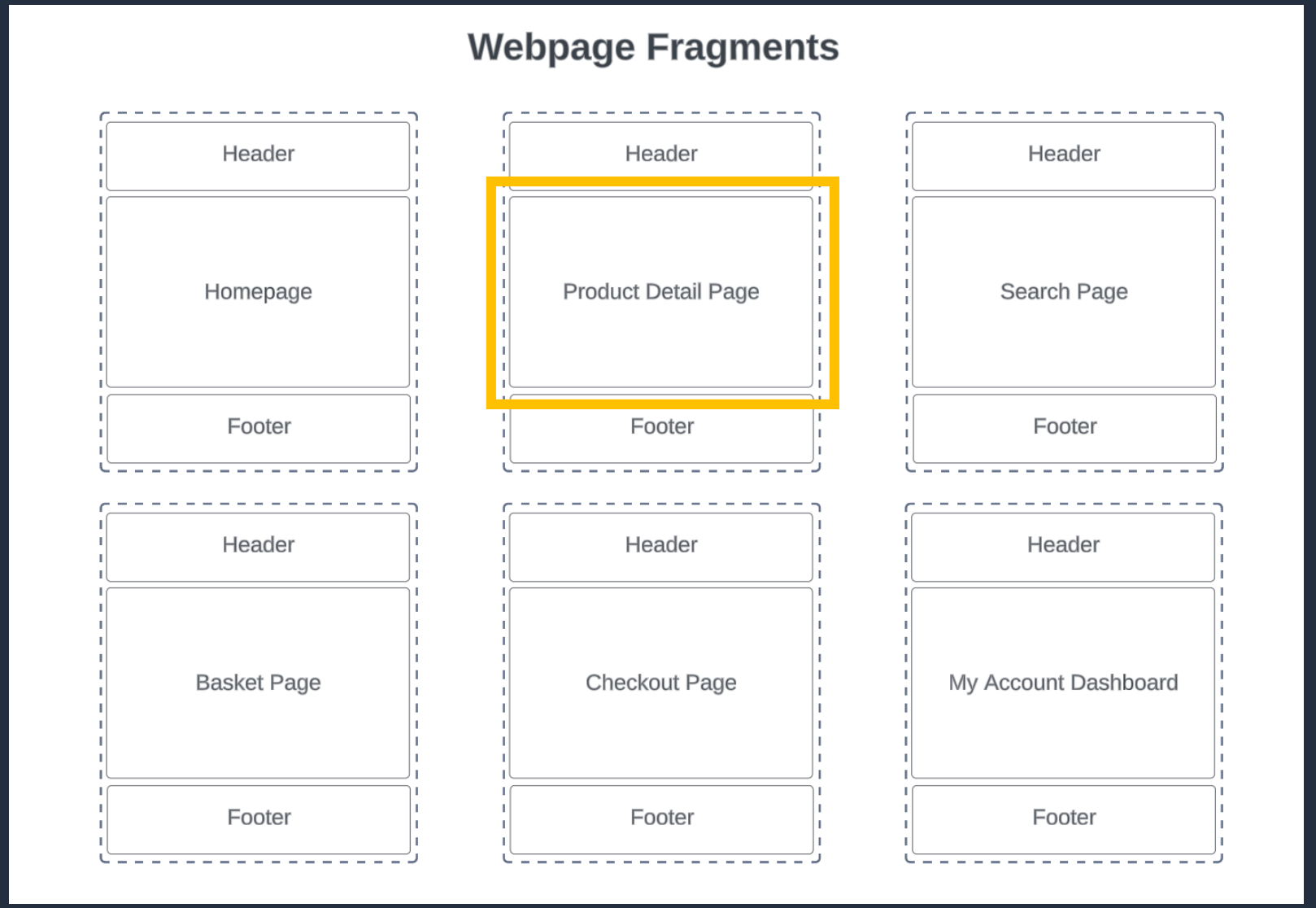

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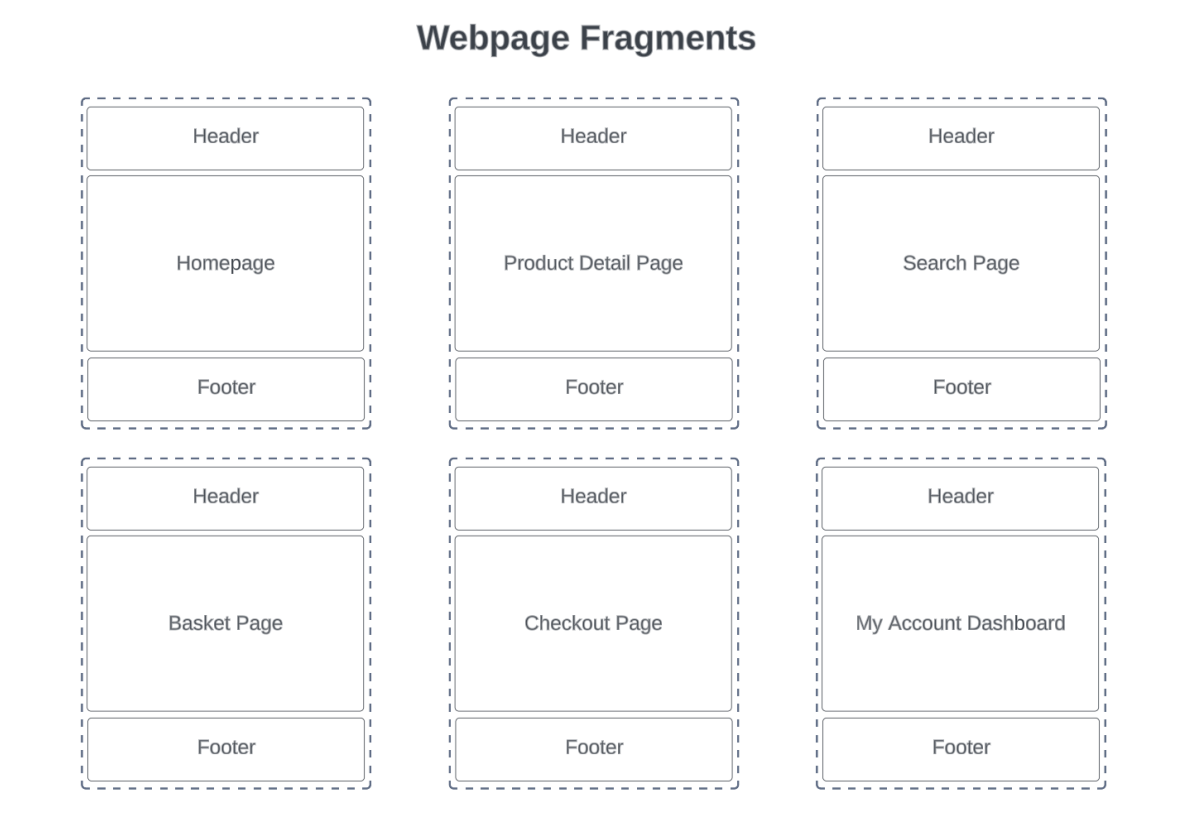
Designing our fragments and approach



Poly repo approach decided

Consistency must be orchestrated

Component Library necessary

Share Nothing by default

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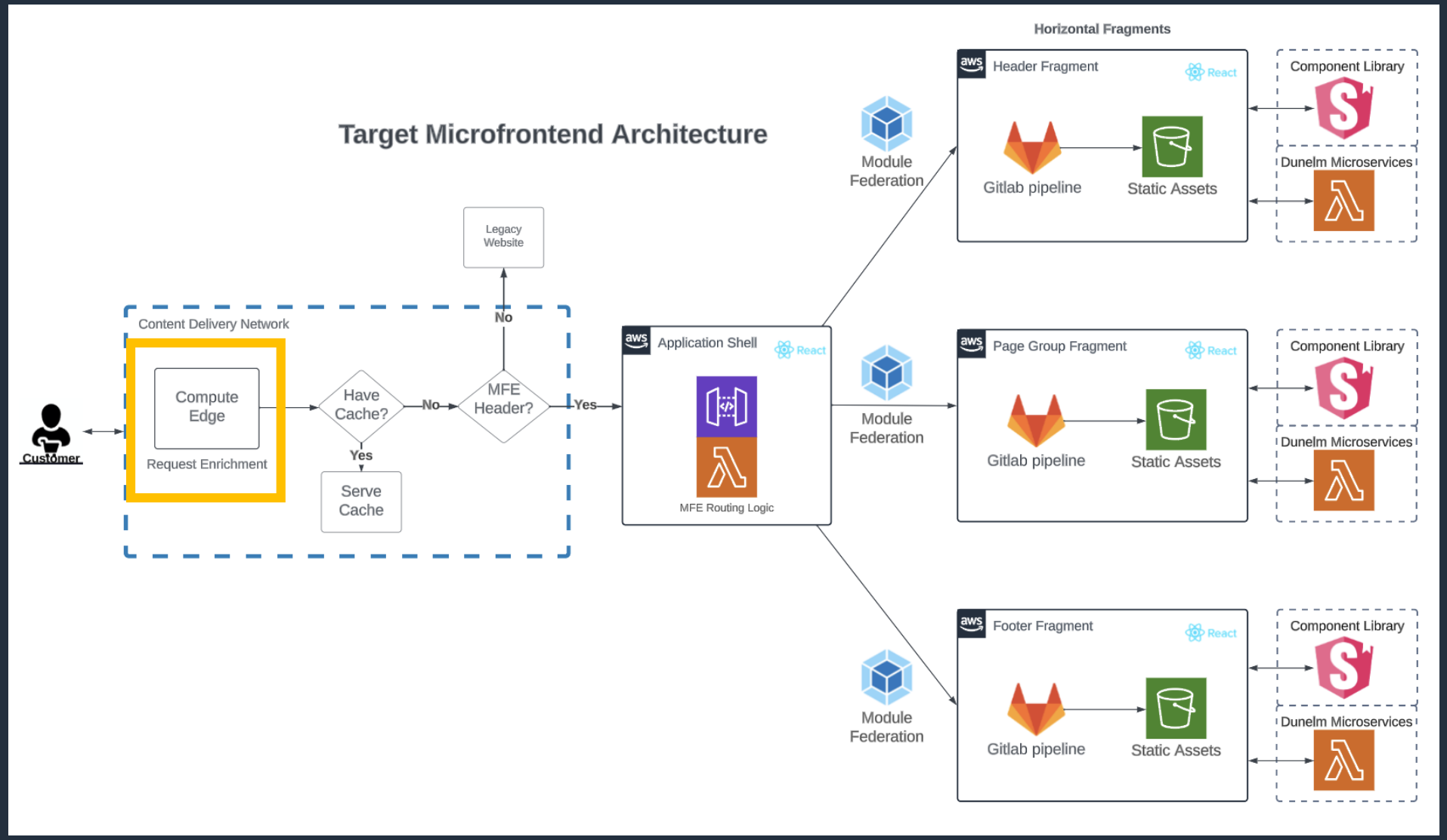

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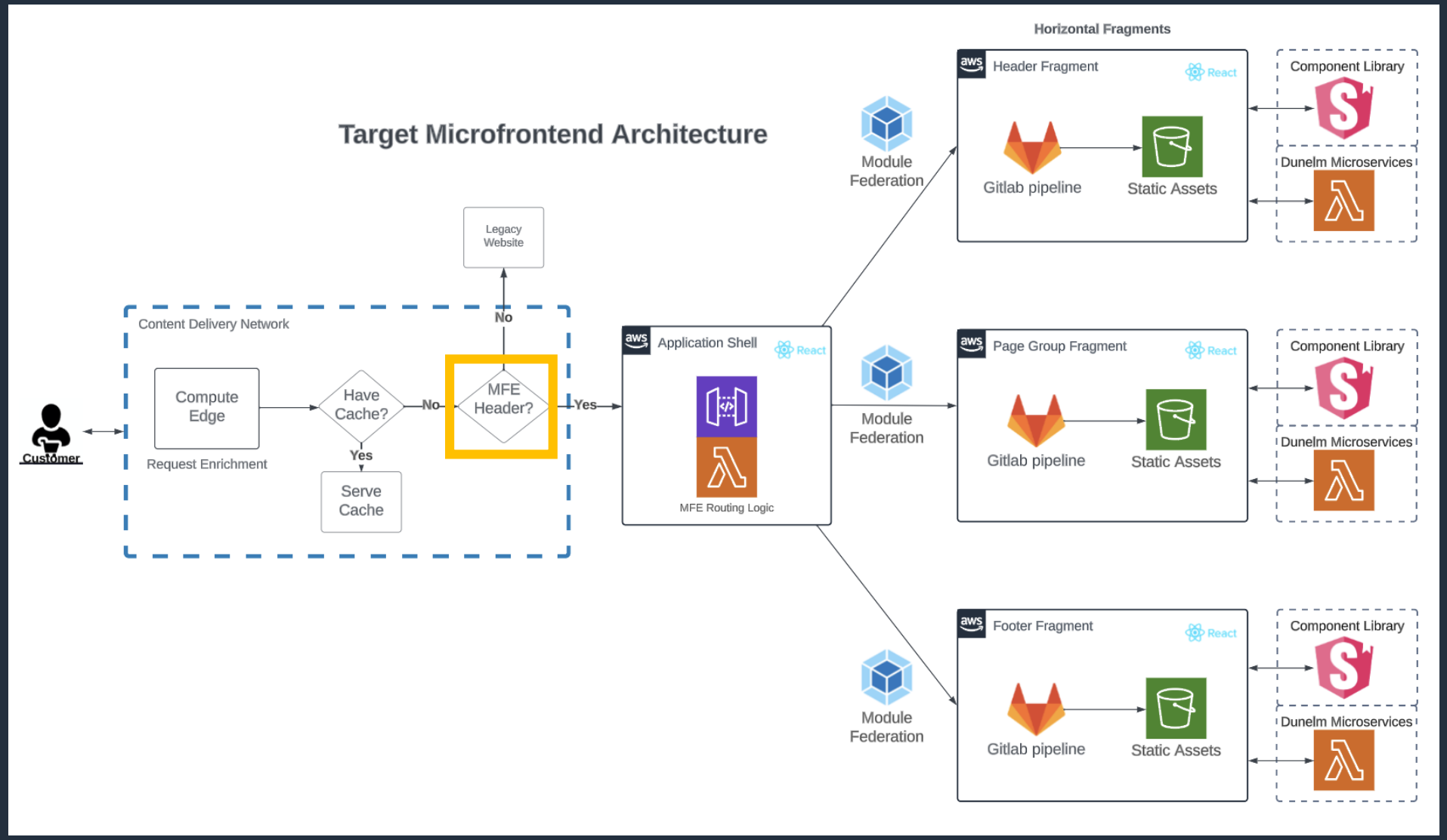

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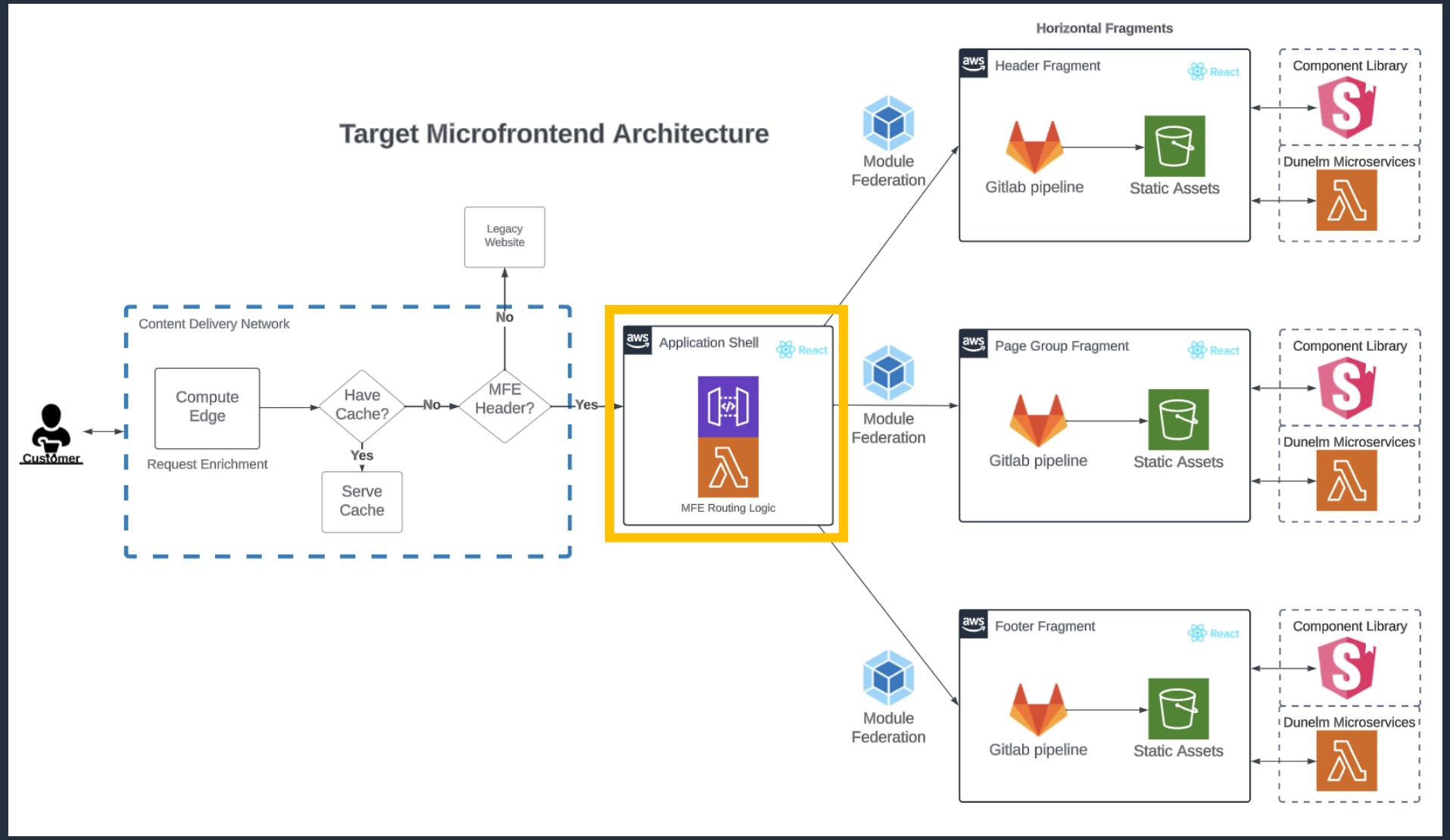

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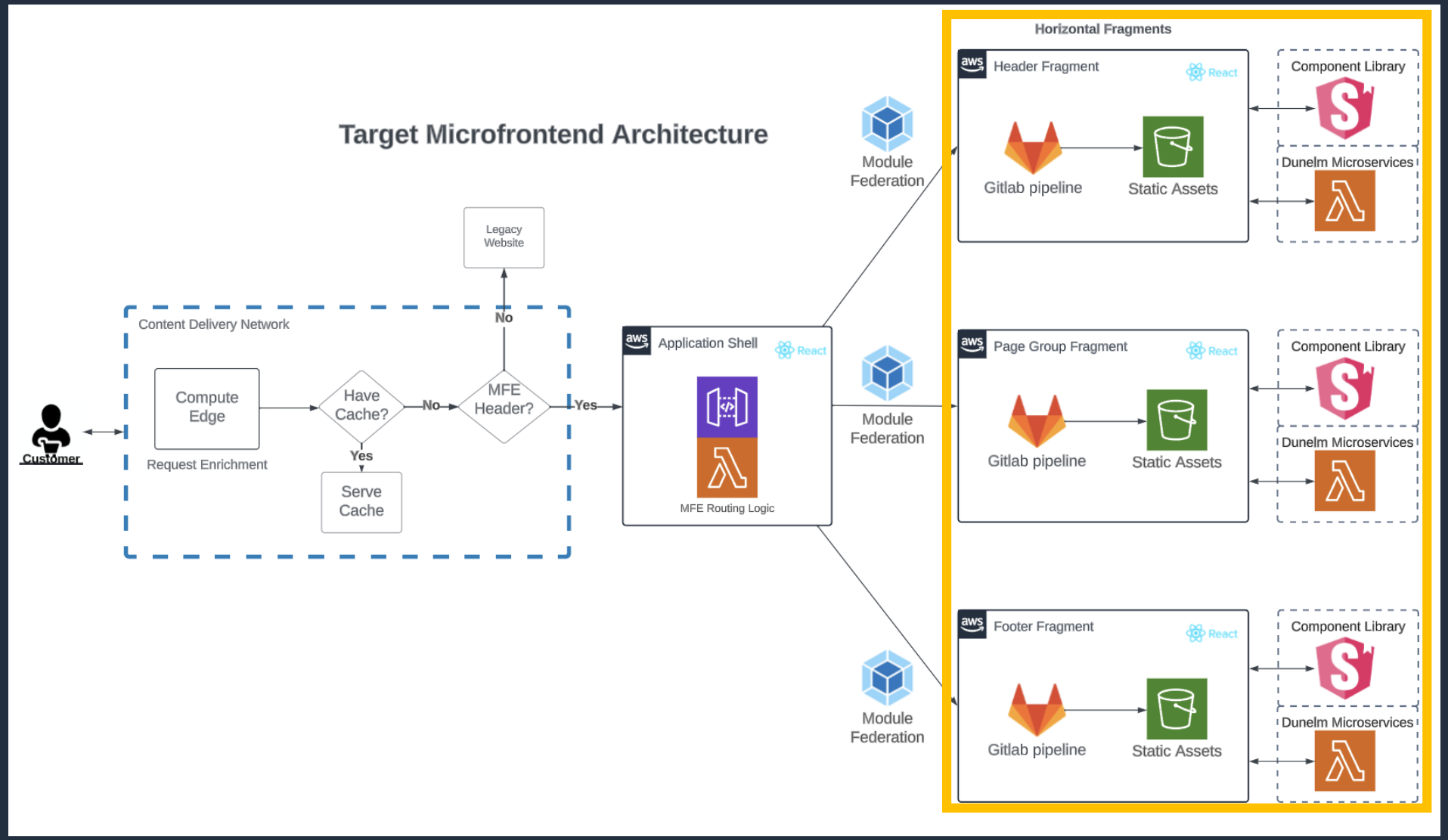

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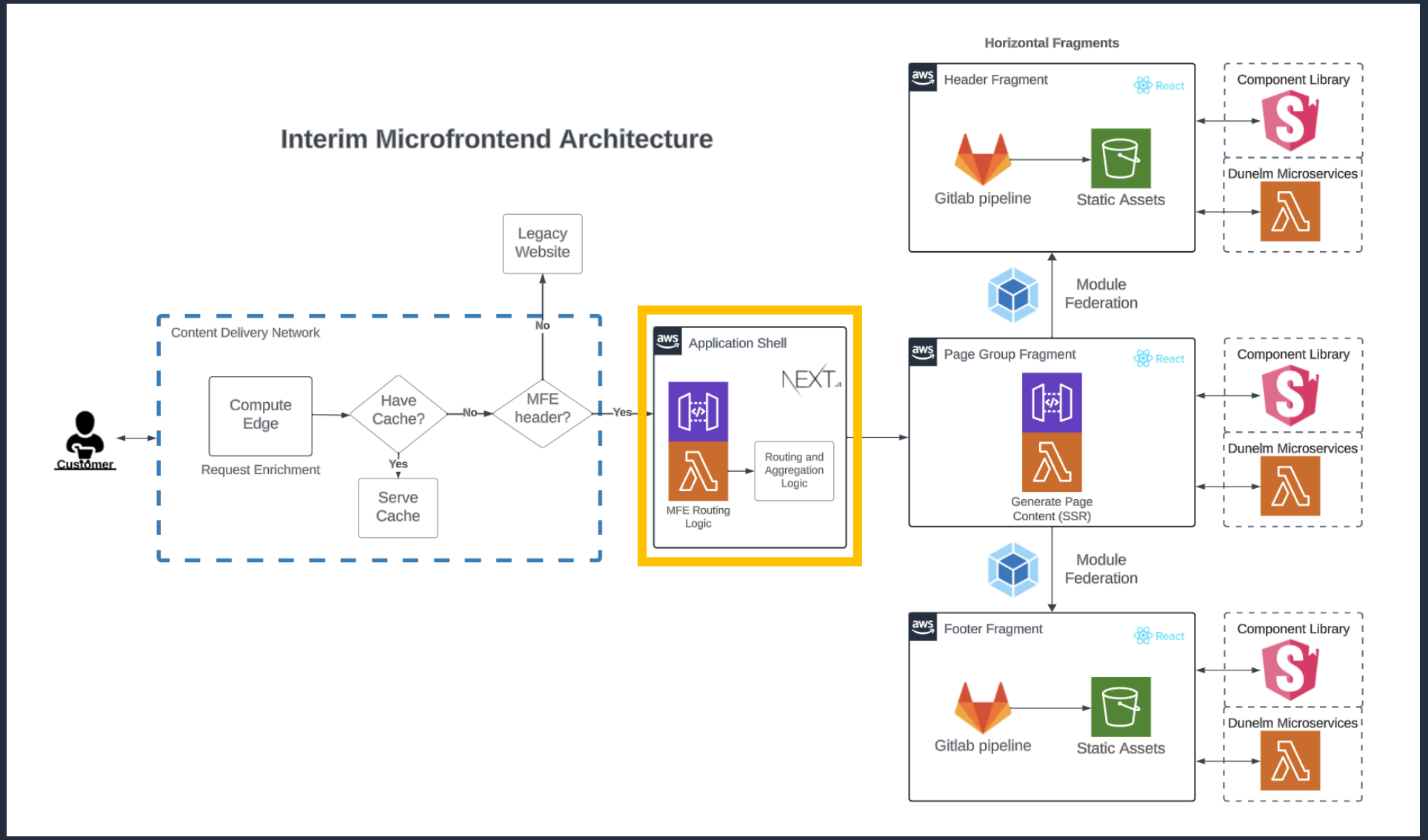

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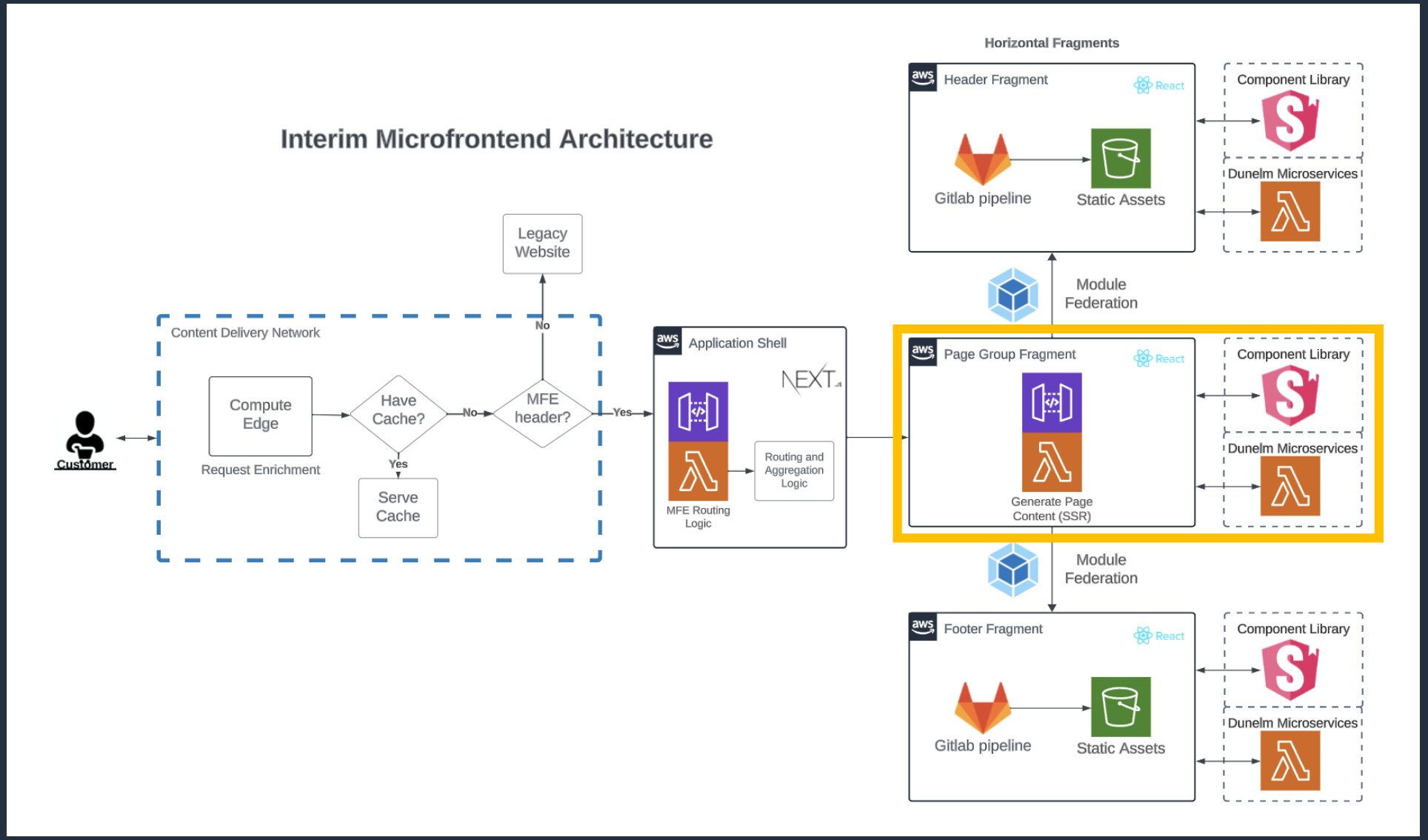

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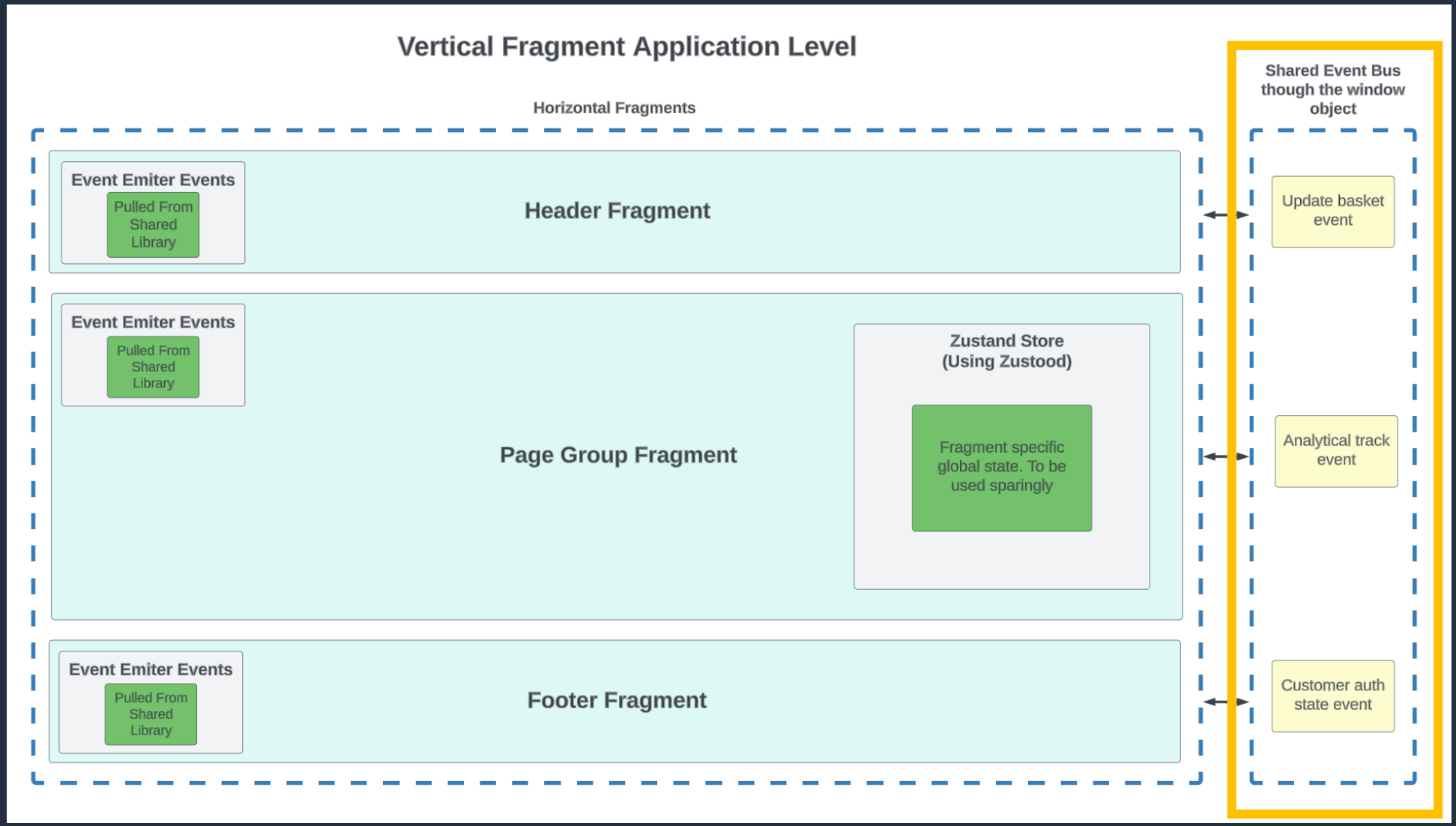

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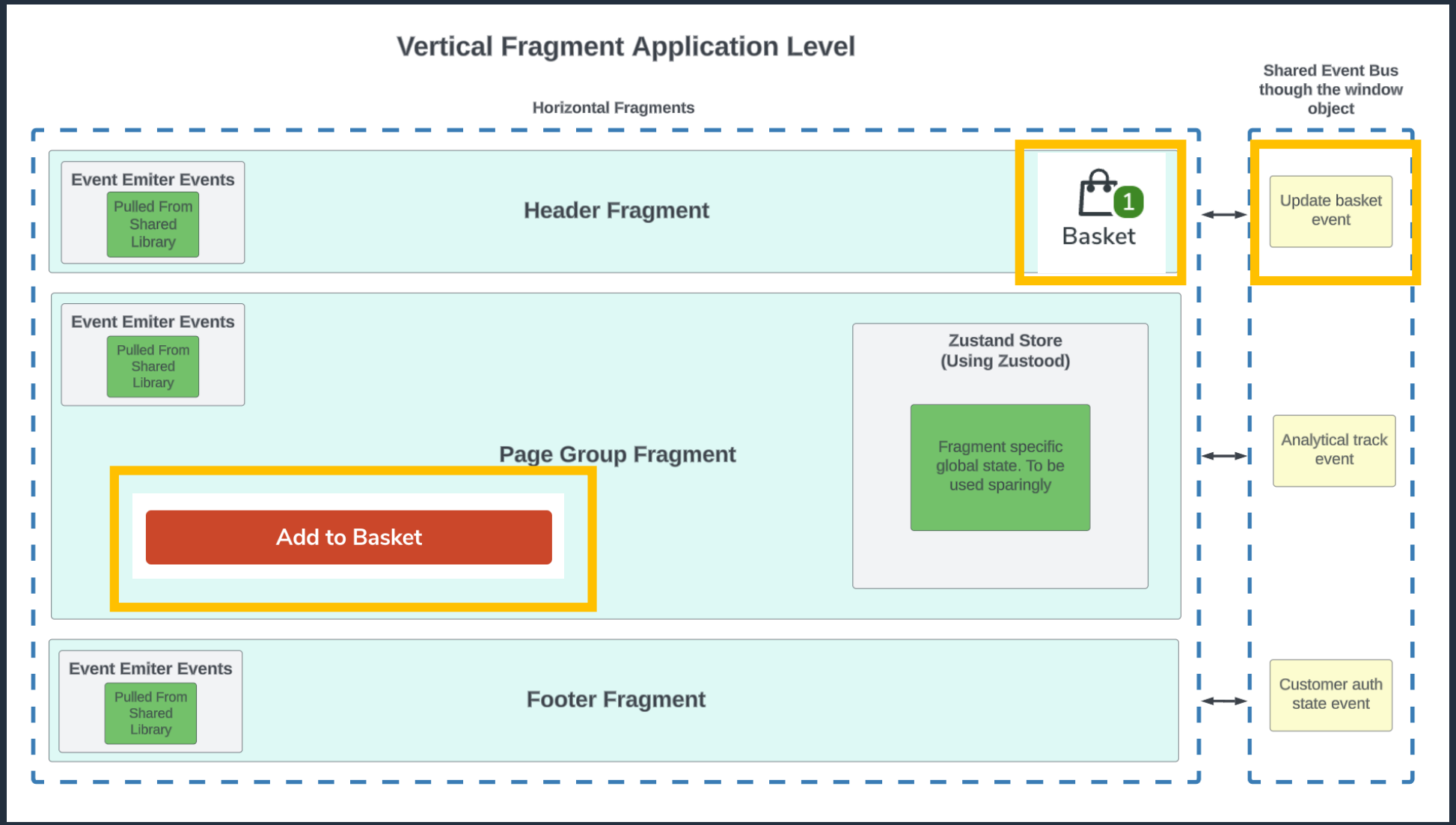

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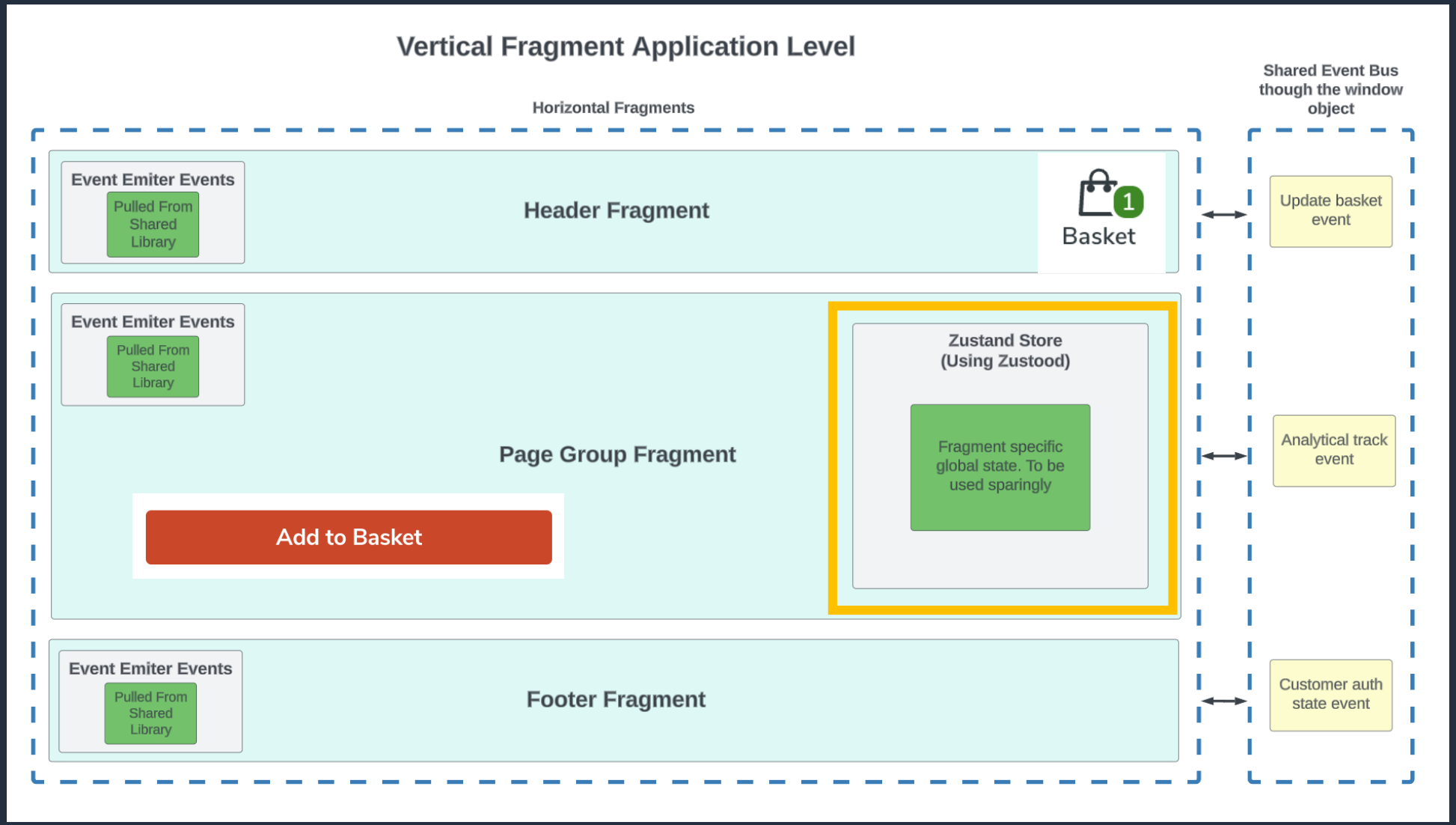

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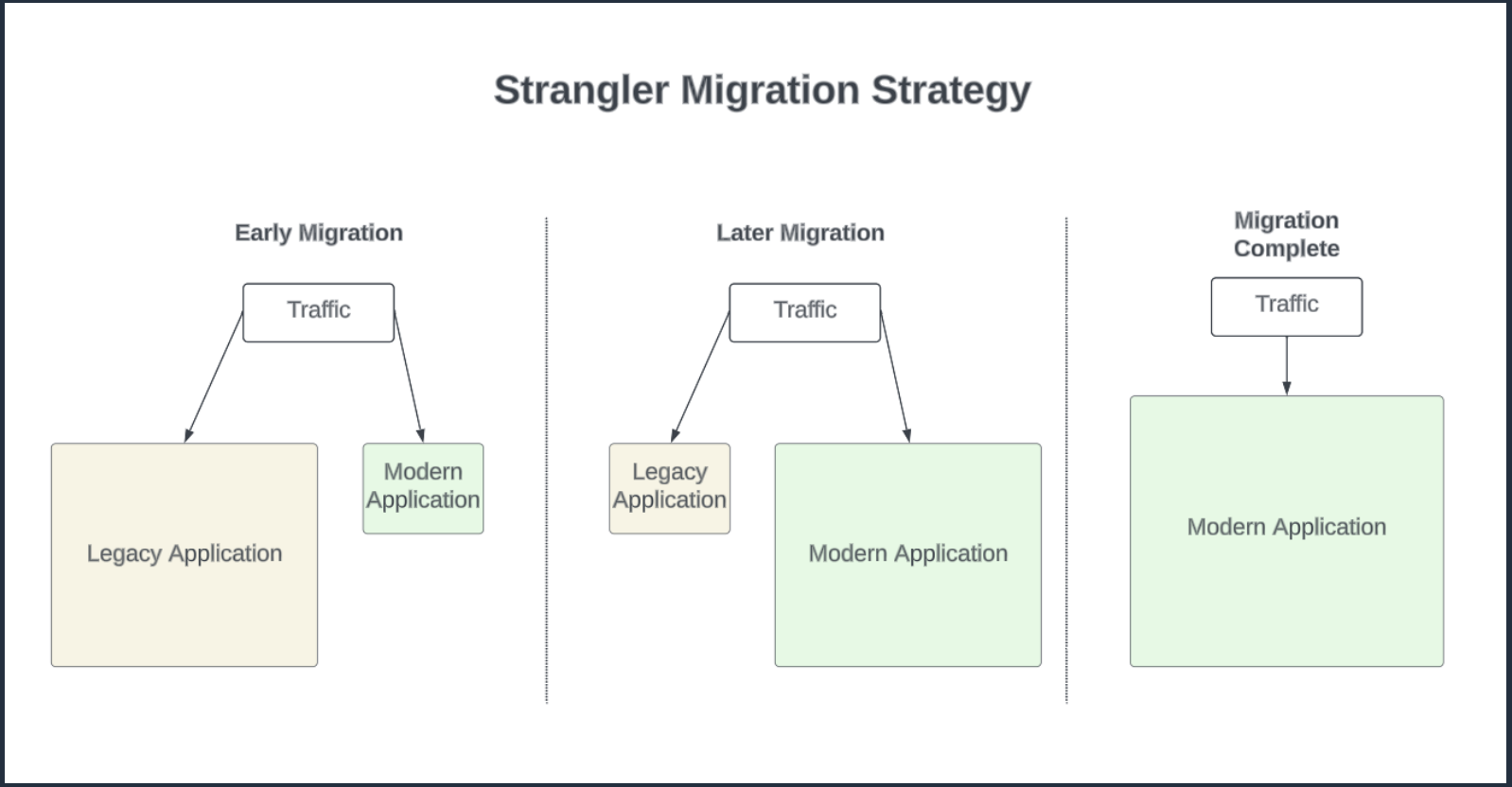
Migration Strategy



Iterative migration strategy

Microservices pattern

Works for **Microfrontends**

One **page group** at a time

Low impact to existing work

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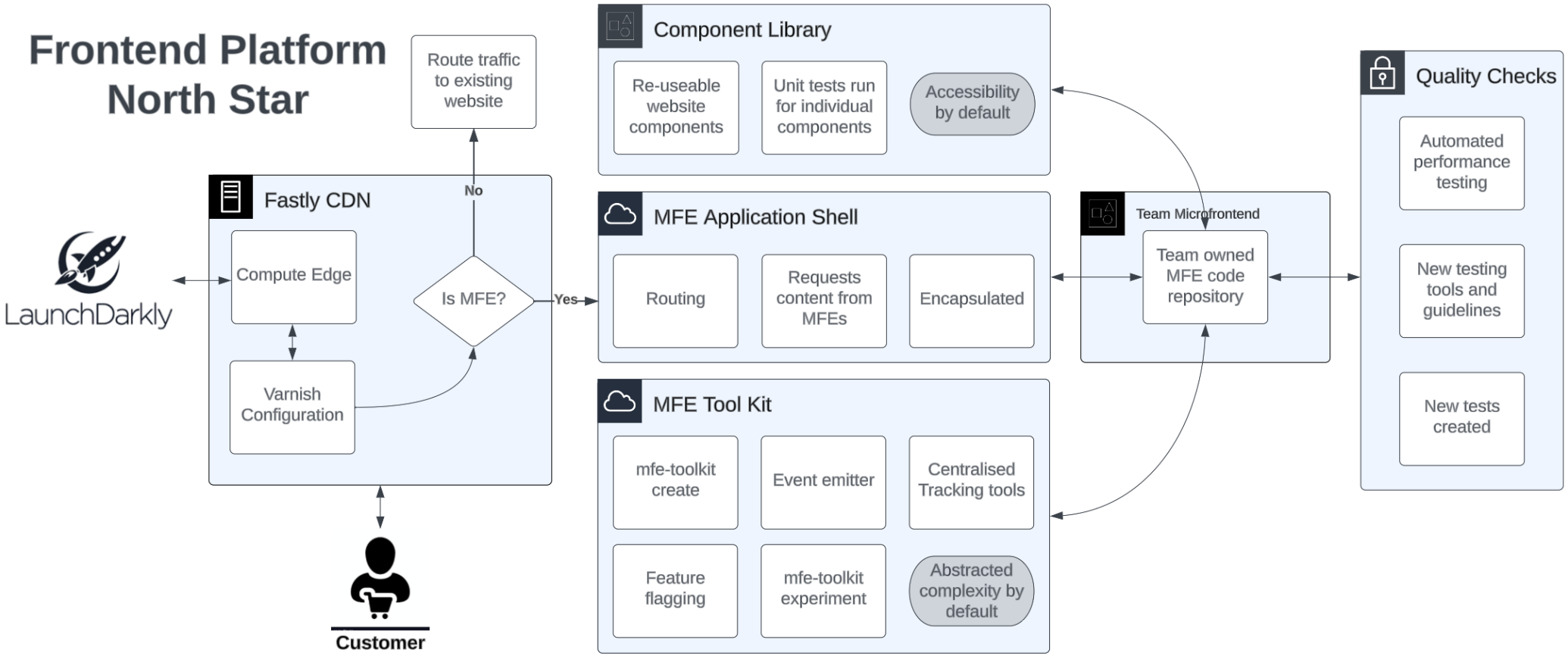
Frontend Platform North Star



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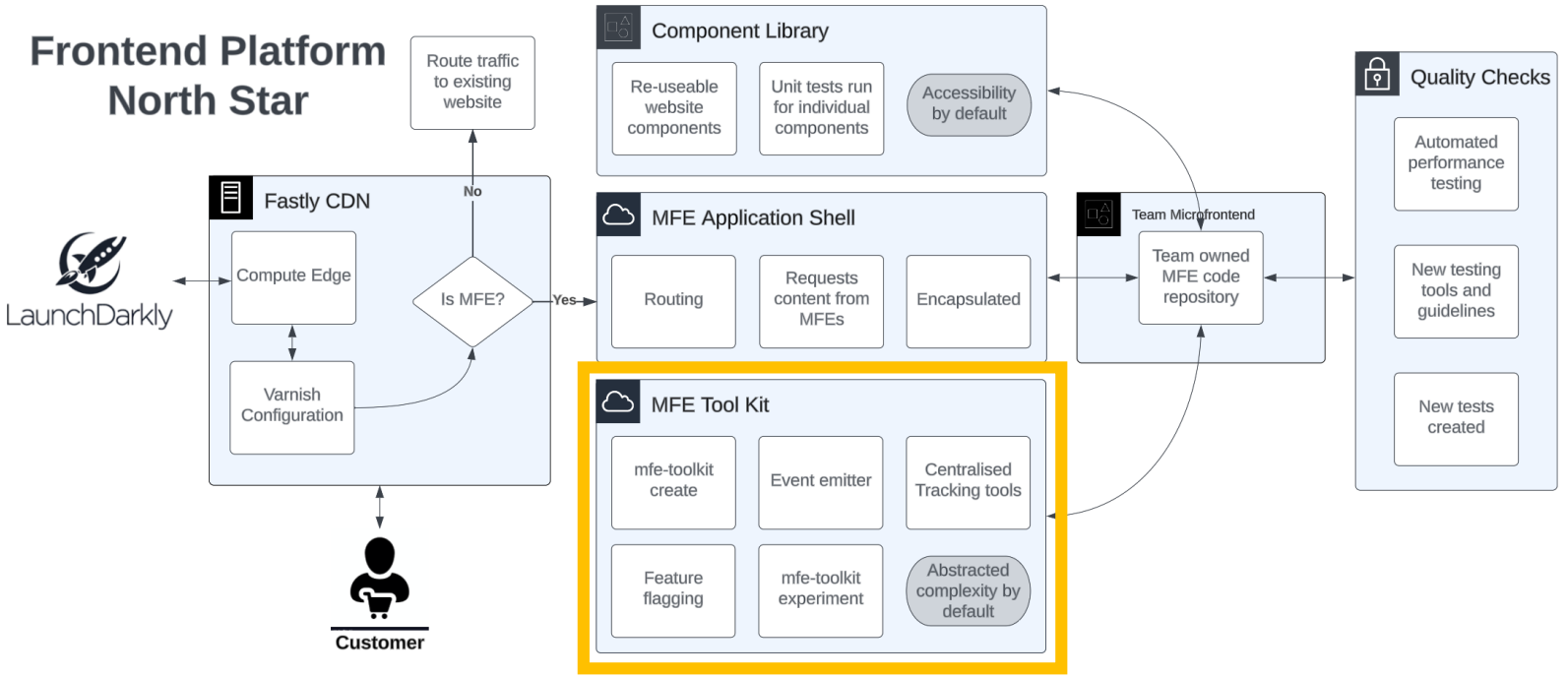

Abstract complexity with tools

Ability to scaffold a project

Examples of common patterns

Saves time for teams

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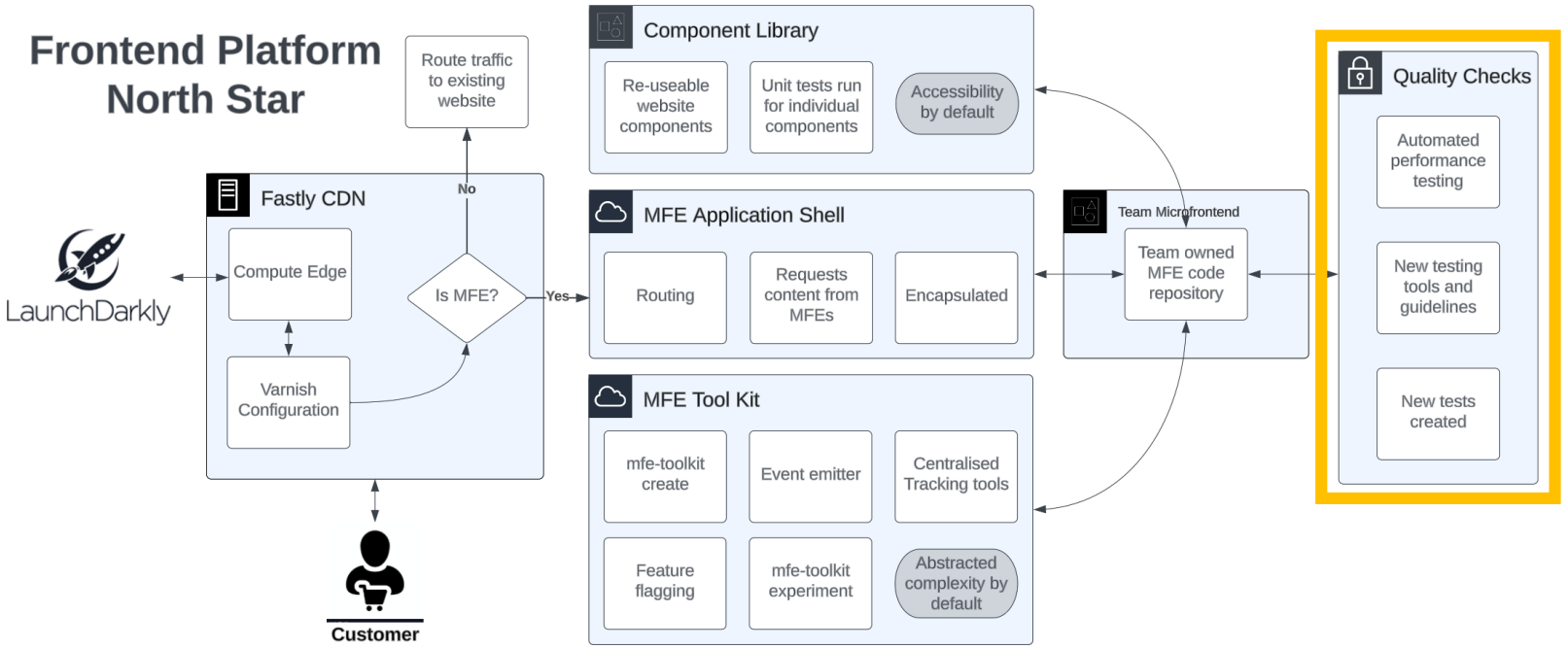

Prevent issues ahead of release

Checks during development cycle

Address issues before production

New tools and guidelines

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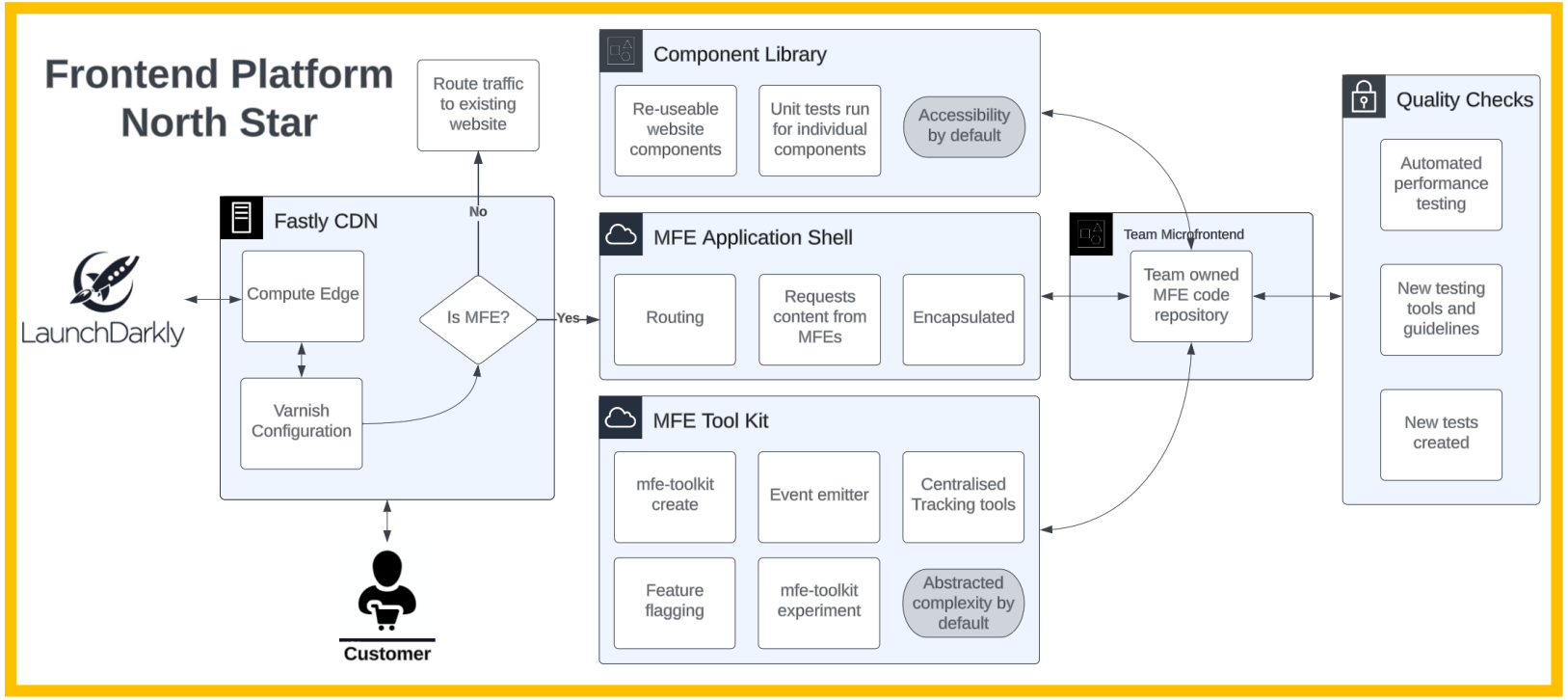

Dedicated Ownership required

Enablement topology missing

Consistency and efficiency

New enablement crew created

Enable and empower

Decentralise knowledge

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What progress have we made?

- ~90% of the Frontend Platform is built
- 60,000 Product Detail Pages delivered recently
- First migration was successful, despite challenges

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"Issues will always arise"

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What progress have we made?

Teams being onboarded with new process

Projects outside of the website benefitting from the component library

Developer Experience improved

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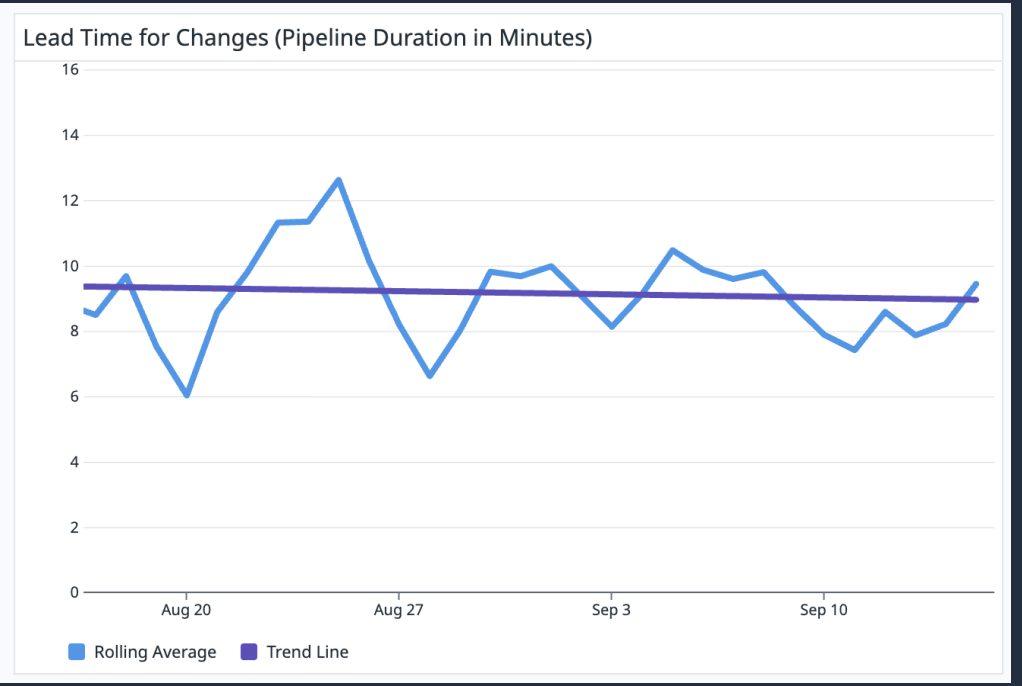
What about performance and lead time?



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Final thoughts

We are still on our Micro-Frontend journey!

Every organisation is different

Tailor teams to business domains

Ability to scale infinitely

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"Microfrontends open avenues for your teams"

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Thank you!

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Thank you!

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