

From Monolithic Web-Apps to Micro-Frontends

Moving towards the micro-world!

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QCon

全球软件开发大会

时间：2023年9月3-5日

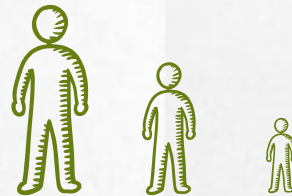
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1.

Introduction to MICRO-FRONTENDS

Moving towards the micro-world!



Monolithic

Airline Team

Database, Backend, Frontend

Monolithic

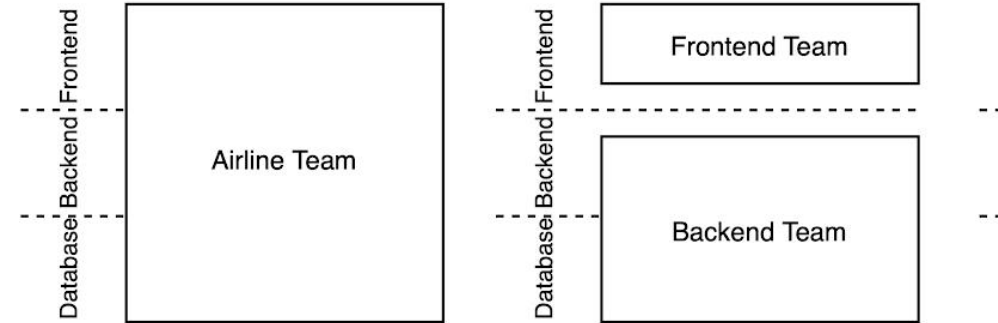
Database
Backend
Frontend

Airline Team

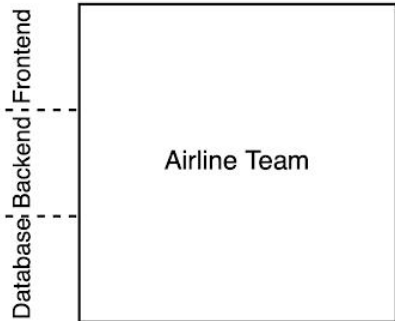
Three-tier

Frontend Team

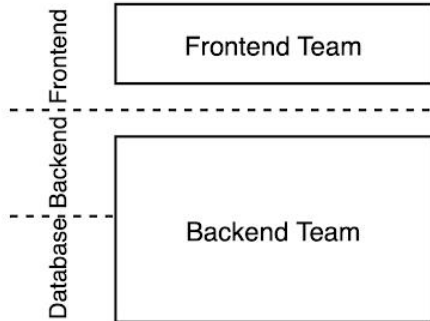
Backend Team



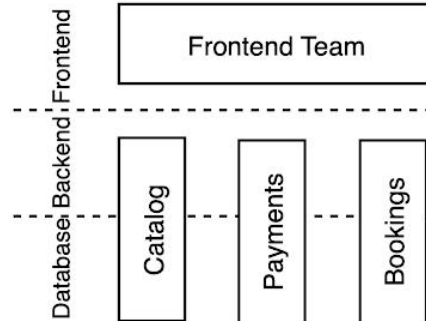
Monolithic



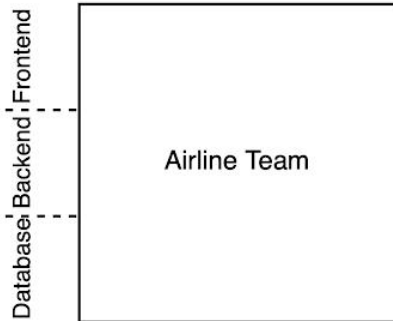
Three-tier



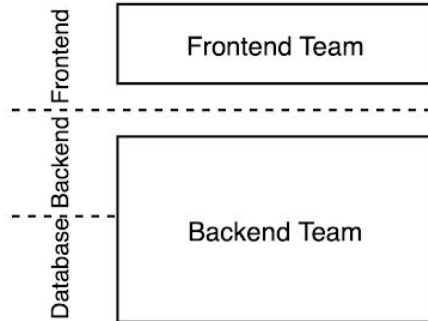
Microservices



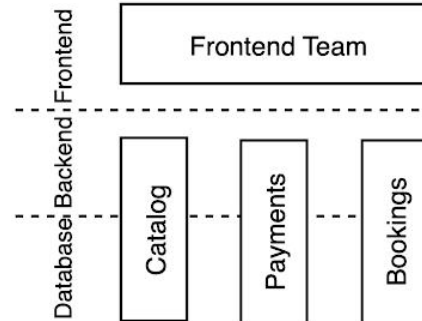
Monolithic



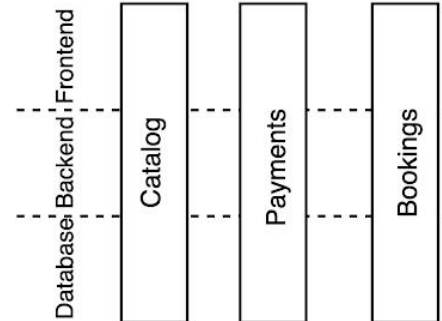
Three-tier



Microservices



Micro-Frontends



What is a Micro-frontend?

Let's connect the dots...



From Domain
Driven Design
(DDD)



Micro-frontends are the technical representation of a business subdomain, they allow independent implementations with same or different technology choices, finally they avoid sharing logic with other subdomains and they are own by a single team

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Driven Design
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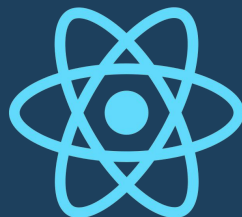


A programming language, frameworks or
libraries are just

tools for expressing an intent.

The most important thing is having a
clear idea what we have to build and
how do it

Technology independency



Technology independency

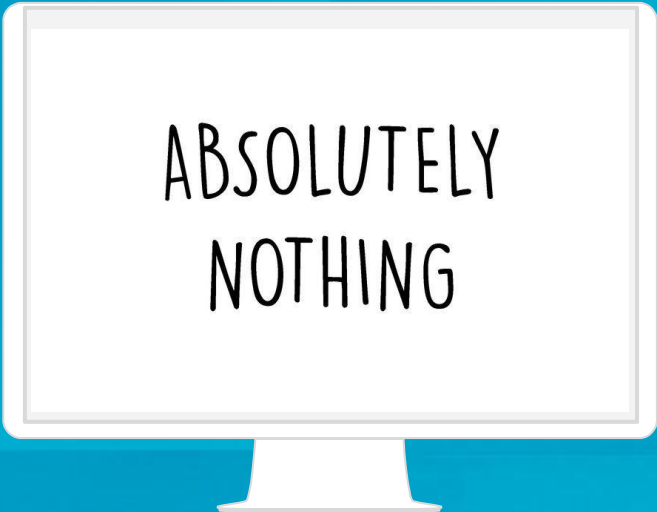
Tech independency is going to impact:

- . best tech choice for the job
- . hiring, retention and onboarding process
- . building and deployment process
- . company's standards
- . developers morale

From Domain
Driven Design
(DDD)

“

Micro-frontends are the technical representation of a business subdomain, they allow independent implementations with same or different technology choices, finally they avoid sharing logic with other subdomains and they are own by a single team



ABSOLUTELY
NOTHING

Share nothing... and I mean **NOTHING**

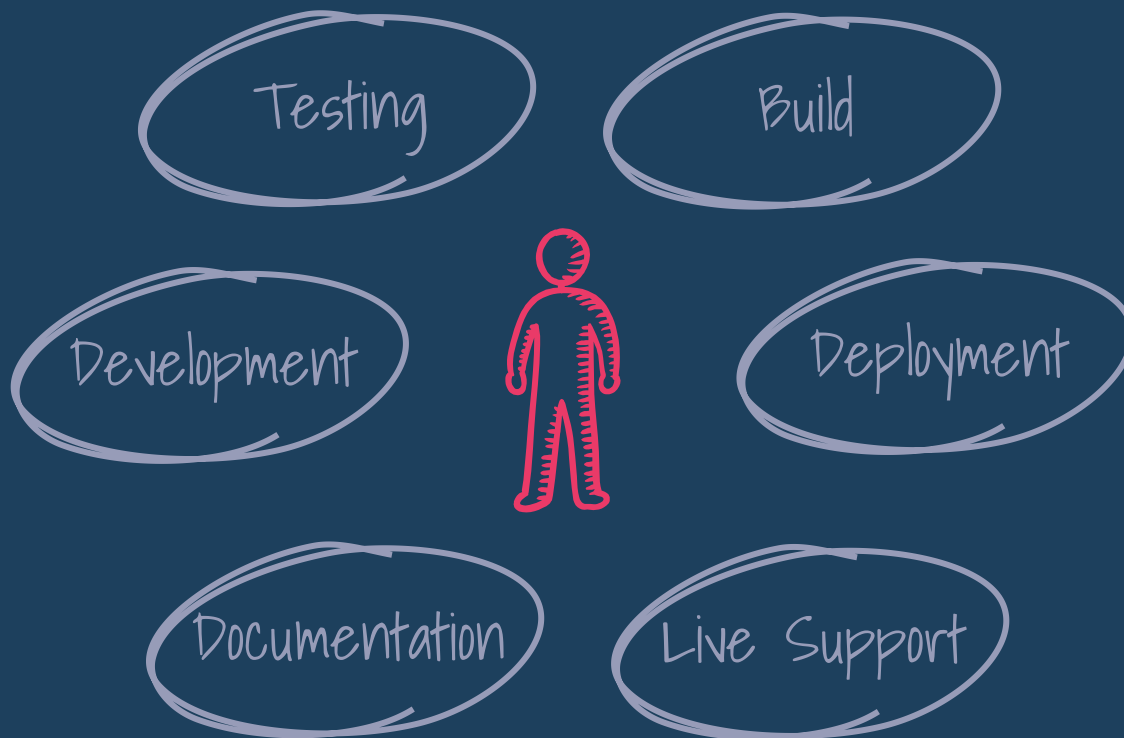
Avoid to share components or code across different subdomains, abstraction could make our code more complex to maintain in the long run, the communication overhead could become a bottleneck for our organizations

From Domain
Driven Design
(DDD)



Micro-frontends are the technical representation of a business subdomain, they allow independent implementations with same or different technology choices, finally they avoid sharing logic with other subdomains and they are own by a single team

Teams ownership



Teams ownership

- . A team can own 1 or multiple subdomains
- . Teams could contribute to others team's micro-frontends
- . Sharing experience between teams can help the company's growth



Which are the companies using
Micro-frontends today?



bootstrap



Open component



Interface framework



Edge Side Include (ESI)



iframes

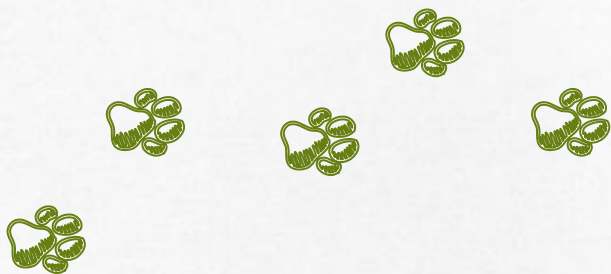
Commonalities between those companies

- . Large organizations
- . Distributed teams
- . Fast iterations and releases
- . Looking for technical teams independency
- . Massive growth
- . Aiming for the best technical quality

2.

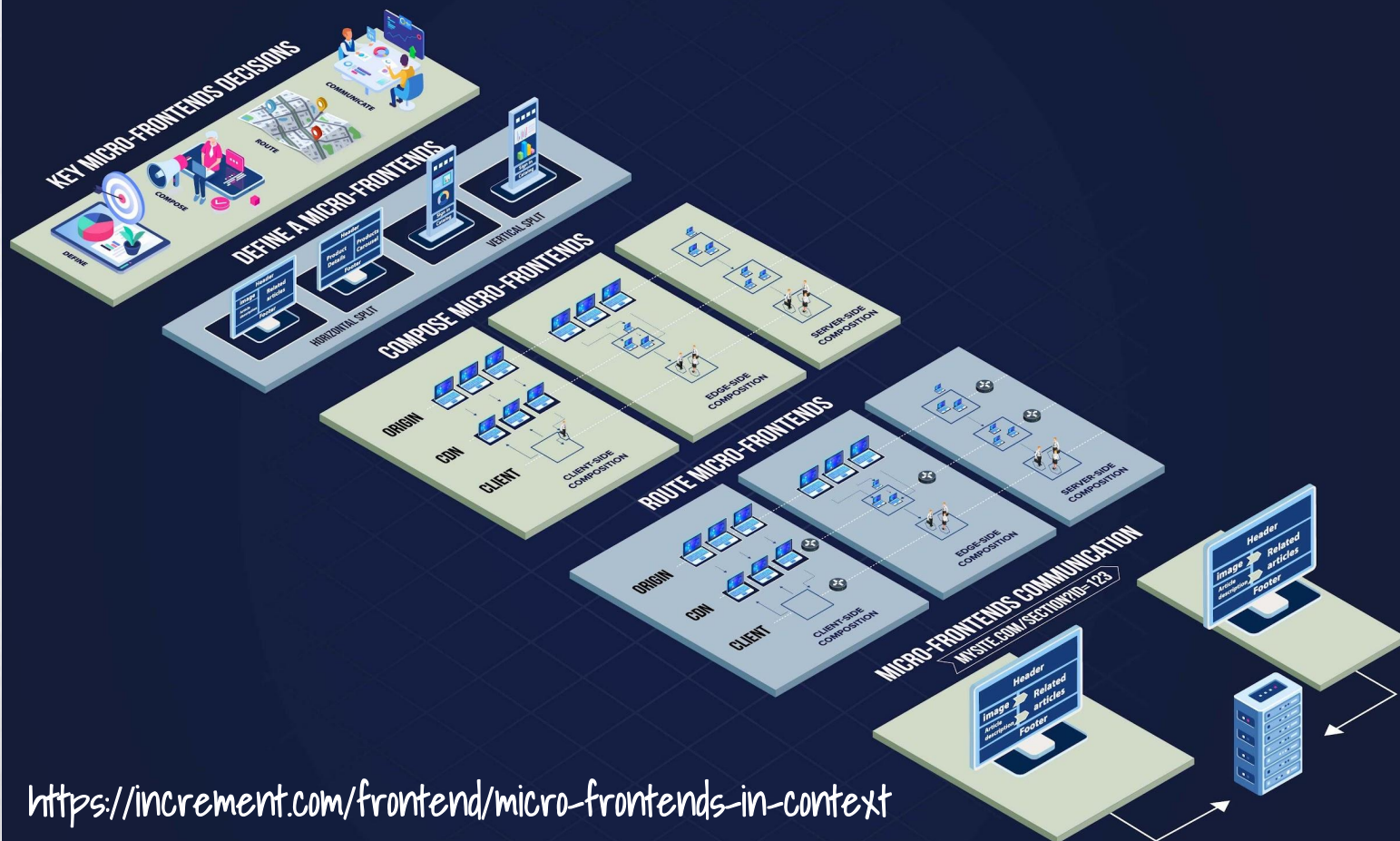
Architectural implementation

The journey of a thousand miles
begins with one step



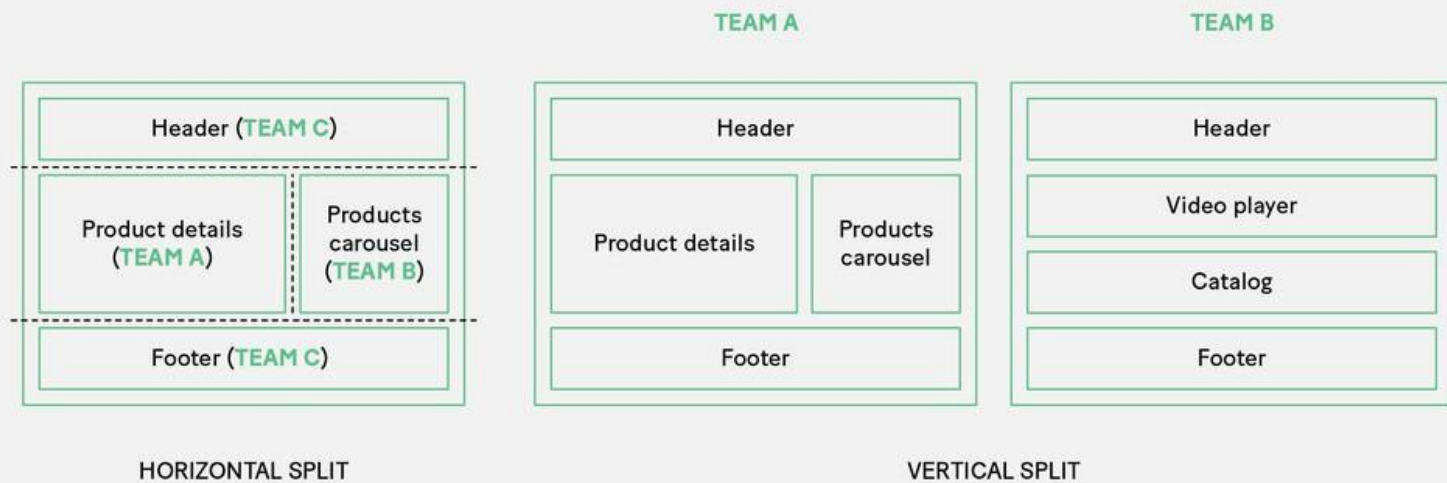
MICRO-FRONTENDS DECISIONS FRAMEWORK

:"Software architecture is those decisions which are both important and hard to change" M.Fowler

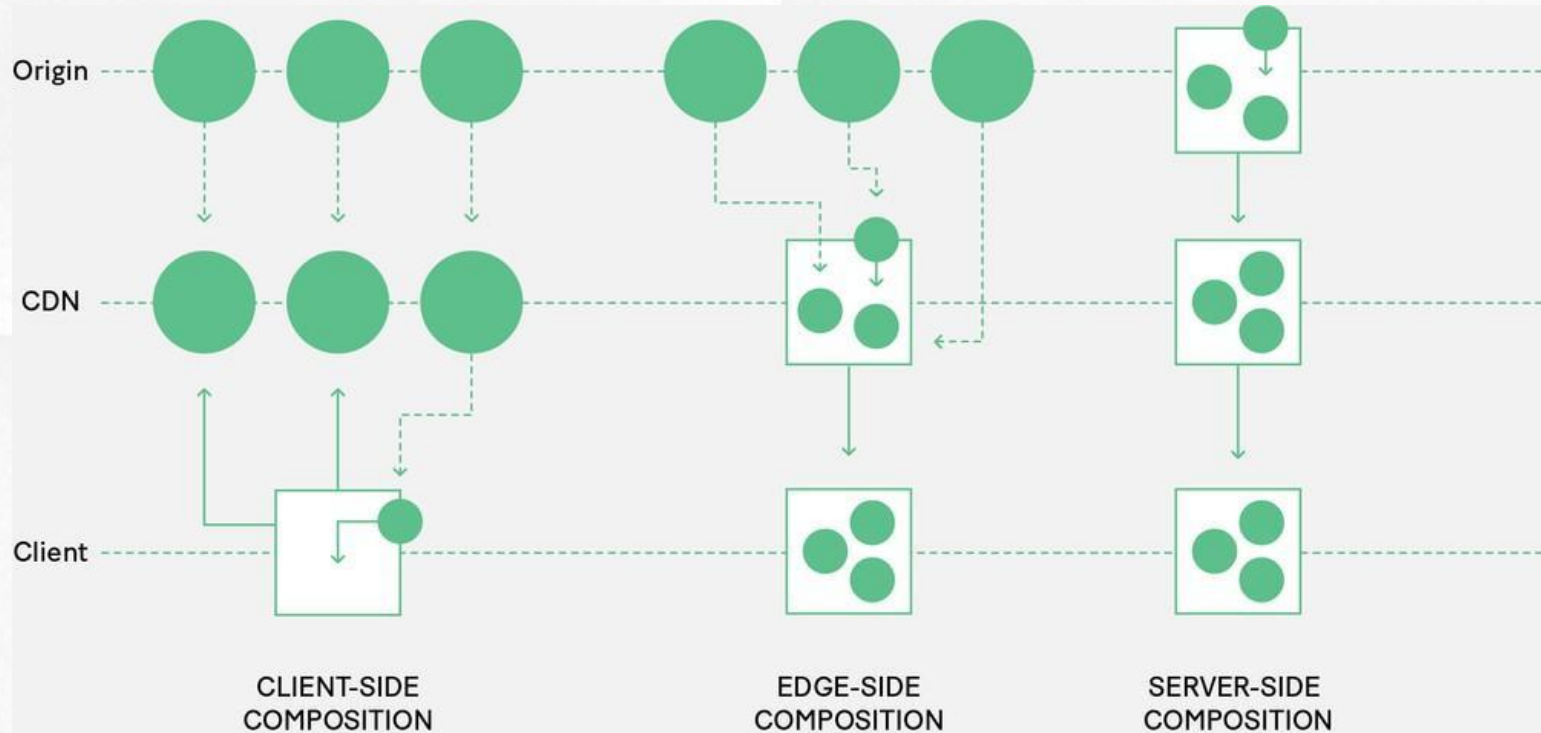


<https://increment.com/frontend/micro-frontends-in-context>

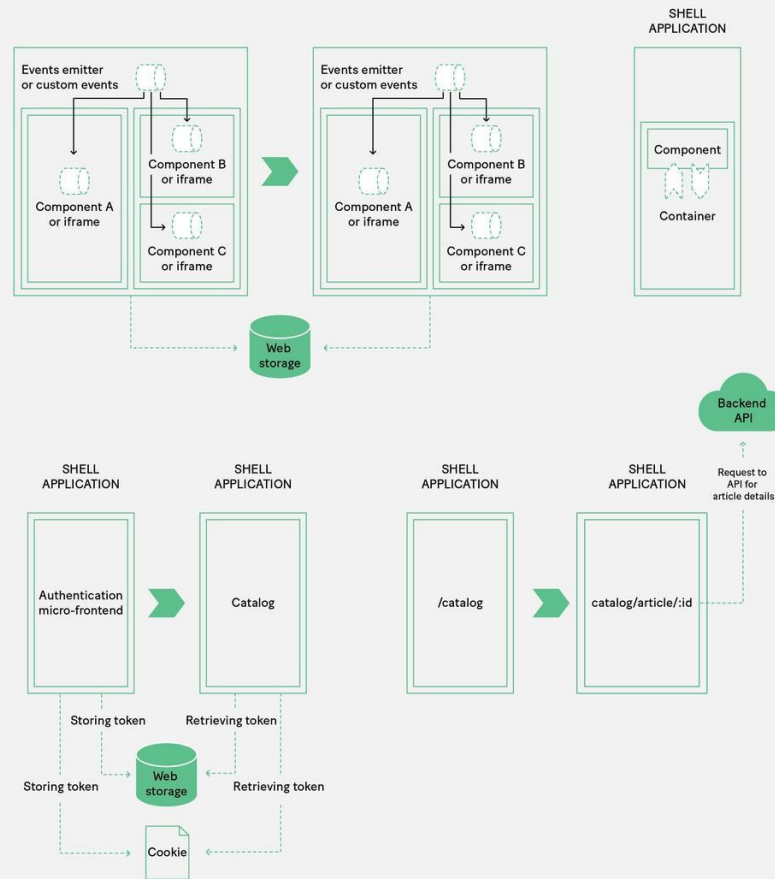
Identify a micro-frontend



Compose and Route a micro-frontend



Micro-frontends communication



Spotify



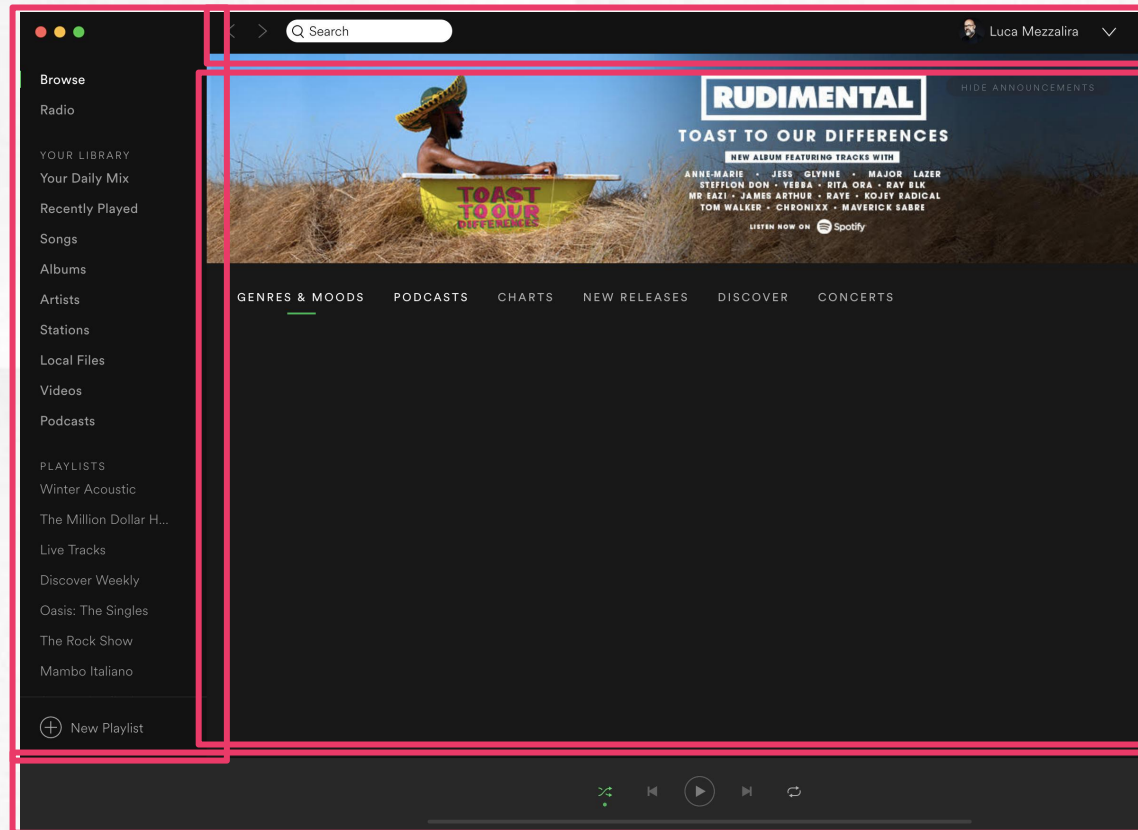
Iframes

An iframes composition is the choice made by Spotify with an event bus for coordinating the events across different iframes.

The desktop application mixes Web technologies with C++ codebase for the low-level operations

UPDATE (03/19) Spotify moved away from this implementation for the web application
<https://bit.ly/2OGVPlE>

Iframes



Server-side composition

Zalando was one of the pioneers on micro-frontends with Mosaic9 (www.mosaic9.org) in particular we need to highlight Tailor.js, an open source system for assembling the components on-demand on a backend layer written in Go.

At the end of 2018 they are moving their implementation to a server-side include system called “Interface framework”

IKEA



Edge Side Includes (ESI)

Ikea embraces Micro-frontends via [transclusion mechanism](#) via [Edge Side Includes](#) (aka ESI)

ESI is a proposal made by several CDNs companies in order to standardise the way you can compose frontend pages via transclusion. In this case the HTML page is composed on the edge allowing a dynamic way for composing pages

More info about ESI from [Kotte's post](#)

4.

Technical challenges

Better make the horizon your goal;
it will always be ahead of you

Shift of mindset

From:

- . technology decisions upfront
- . reluctance of architectural changes
- . global coding style decisions
- . shared automation pipelines
- . code reusability
- . longer onboarding process

Shift of mindset

Technology agnosticism

Embracing changes and accommodate new architectural requirements

Team coding style and best practices definition

Independent automation pipelines

Acceptance of code duplication in favour of speed

Easier hiring and onboarding

Innovation



Search Engine Optimizations

Standard
implementation



Dynamic
Rendering



NOW
what?

Credits

This work is based on the
collaboration with



Luca Mezzalira

VP of Architecture at DAZN
Google Developer Expert

Currently AWS Principal
Serverless Solution Architect



Severi Peltonen

Elenium Oy



Severi Peltonen, Luca Mezzalira, Davide Taibi.

Motivations, benefits, and issues for adopting Micro-Frontends: A Multivocal Literature Review
Information and Software Technology, Volume 136, 2021

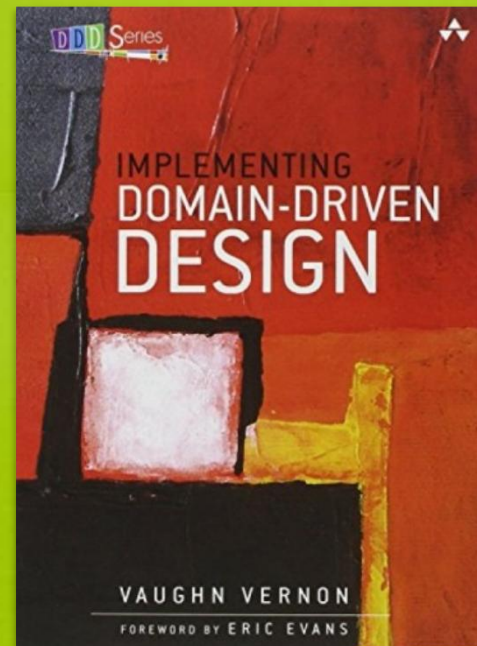
DDD resources

Decompose by subdomain

<https://bit.ly/2DUTQ1v>

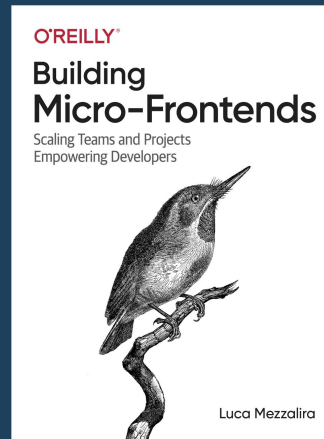
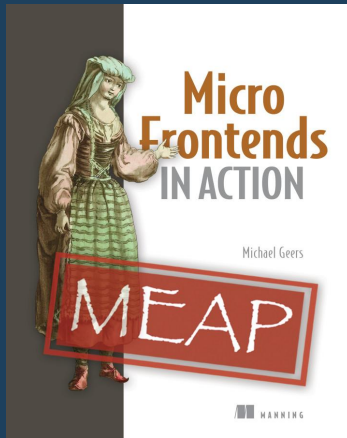
Subdomains and bounded context in DDD

<https://bit.ly/1BPZfiW>



Micro-frontends... try yourself!

- Single-SPA: www.single-spa.js.org
- ESI: gustafnk.github.io/microservice-websites/
- Mosaic: www.mosaic9.org
- Open Components: github.com/opencomponents/oc
- Feature Hub: feature-hub.io
- Learning/Sharing: www.buildingmfe.com







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