

Scaling App development at Zalando

Alexey Agapitov & Volker Leck

Agenda

1. Intro
2. Business challenges and development evolution
3. Drivers for modularization
4. Principles of modular architecture
5. Catalog case-study
6. Challenges & learnings



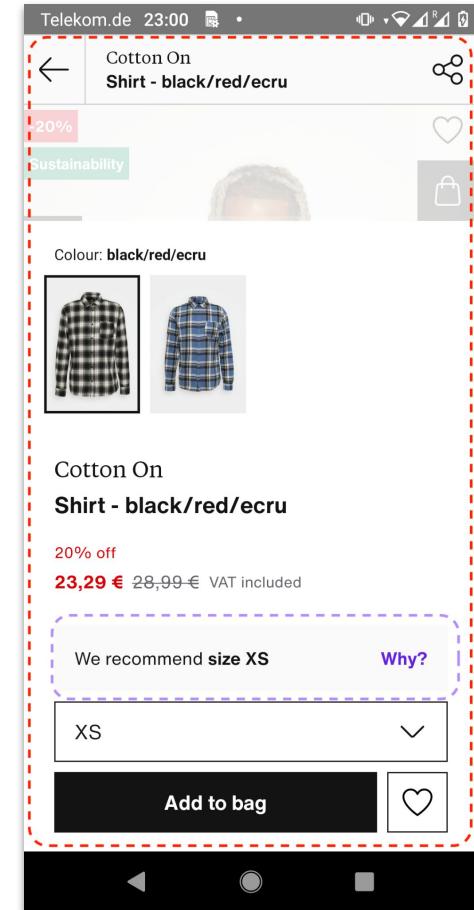
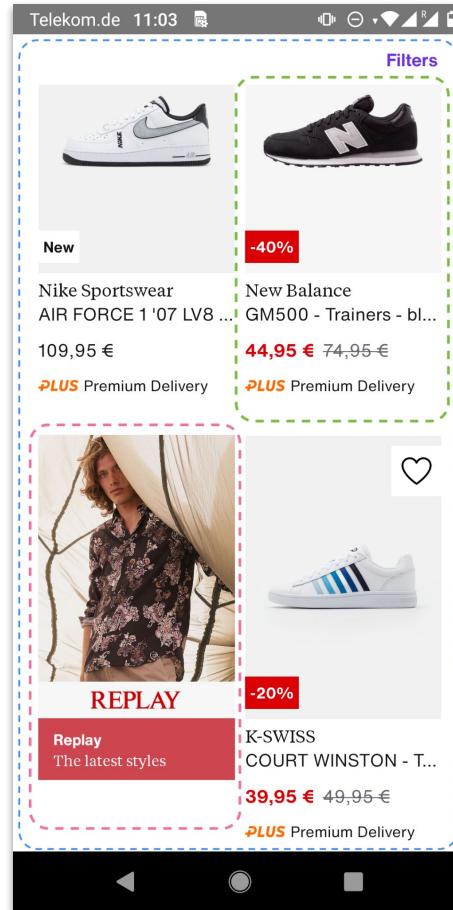
About Zalando

- Online fashion retail company with ~16000 employees from 140 countries
- Offices in Berlin, Dortmund, Dublin, Helsinki
- Active in 23 countries in Europe
- 45 Million active customers in Q2 2021
- 4500 brands
- As of October 2021: listed in the German Stock Market Index (DAX)

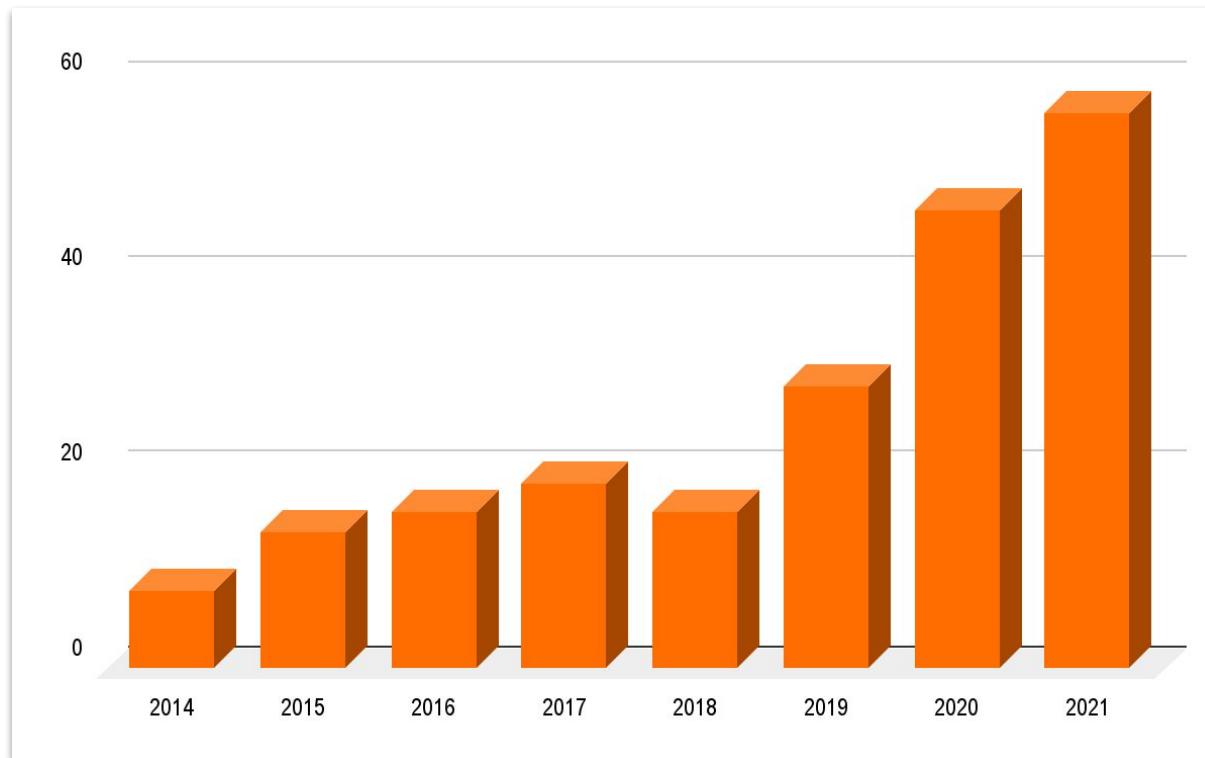
Teams structure

- 6 Pillars
 - Own screens and bigger features
- 6 Programs
 - Contribute to different user journeys
- 4 platform teams

Innersourcing is at the core of this model.



Committers per year



Why modularize?

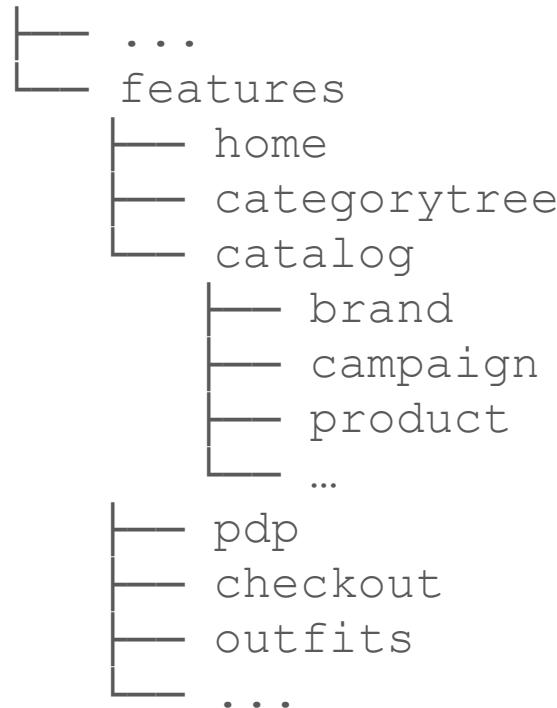
- Increasing complexity and cognitive load
- Unclear ownership and review process
- Increasing number of conflicts at coupling points
- Increasing build times

Wanted Qualities

- Supports parallel development
- Easy to contribute
- Clear code ownership model
- Highly configurable
- Easy to test
- Short feedback cycles, fast builds

Locality and Proximity

- Codebase is easy to explore
- Domain concepts at the top levels
- Sub-systems identifiable via folder structure
- Related concepts in close proximity



Low coupling

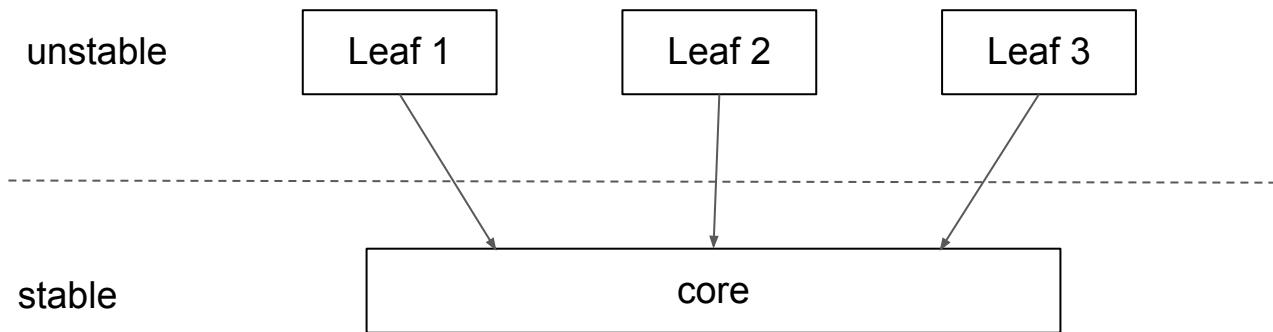
Change is usually **local** to a module. It does not affect other modules.

High Cohesion

Keep **together** what changes at the **same time** and for the **same reasons**.

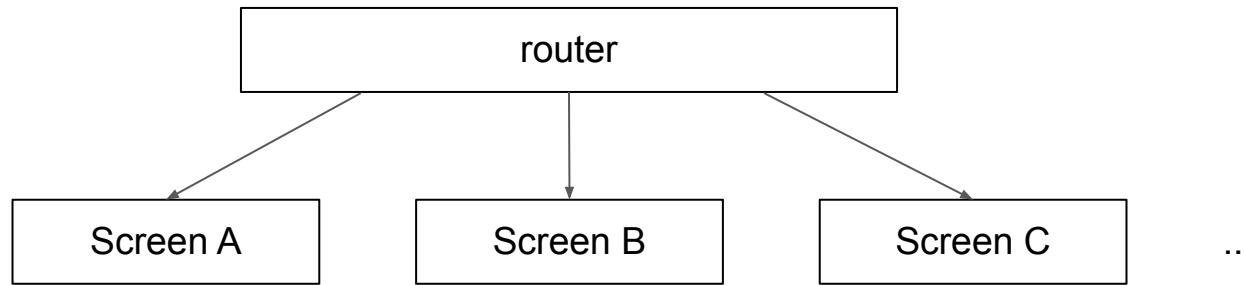
Keep **apart** what changes at **different times** and for **different reasons**.

Changes at leaf modules



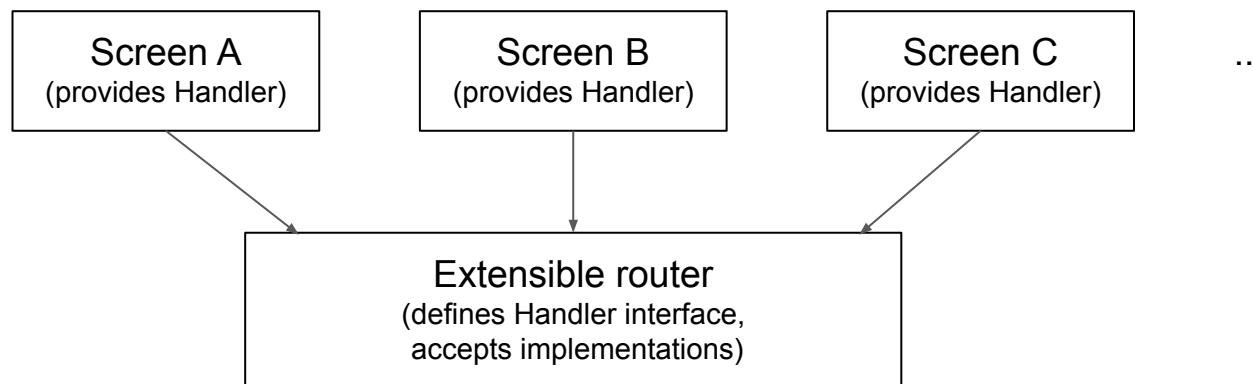
Changes at leaf modules - Example Router

A router needs to know all the targets to navigate to.

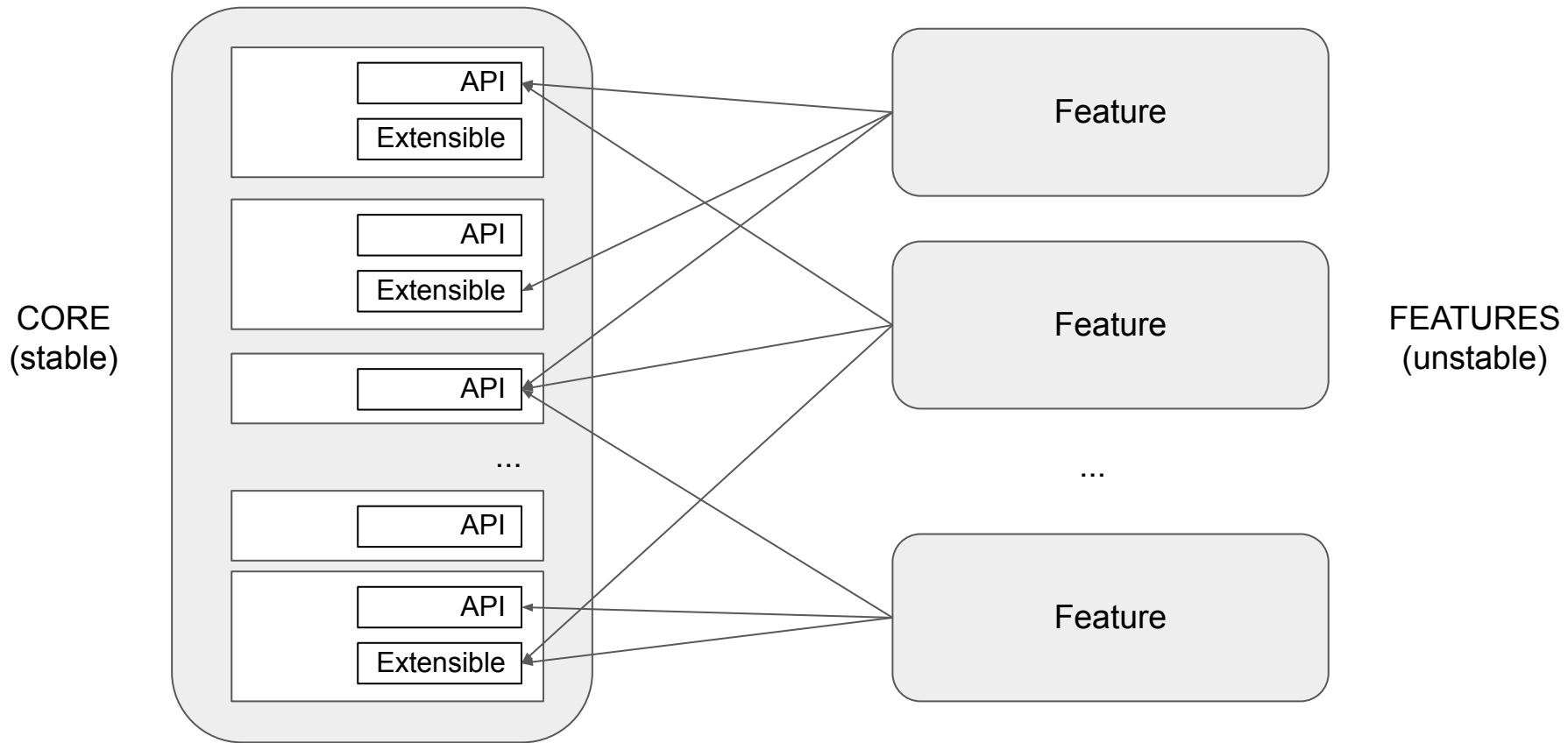


Changes at leaf modules - Example Router

A router needs to know all the targets to navigate to, **but only at runtime**.



Plugin Architecture



Zooming in

- Same principles apply within a feature
- Stable parts vs fluently changing areas of experimentation/development
- Extract stable and extensible core machinery
- Changing contributions plug into core
- Enables rapid experimentation and Premise contributions

Case Study: Catalog

T-shirts & tops for kids   



Filters 2

Top filters

- Gender 1
- Age 2
- Size
- Bra

Showing 6.834 items



Filters



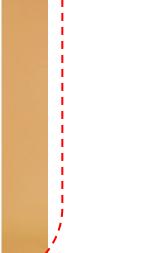
Bubbleroom **ELENA WRAP - Shift dr...** **CARLOTTA FLOURNE...**

39,95 € 62,95 €

Let's talk about length

Knee-length 7.186 items


Calf-length 5.089 items


Short 6.55 items


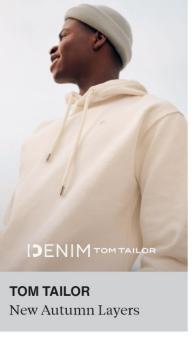


Superdry **Long sleeved top**

from 27,99 € 39,99 €

Spitzbub **JOHANN - Print T-shirt**

from 16,90 € 34,90 €



Abercrombie & Fitch **VNECK 3 PACK - Basic...**

31,35 € 38,95 €

PLUS Premium Delivery



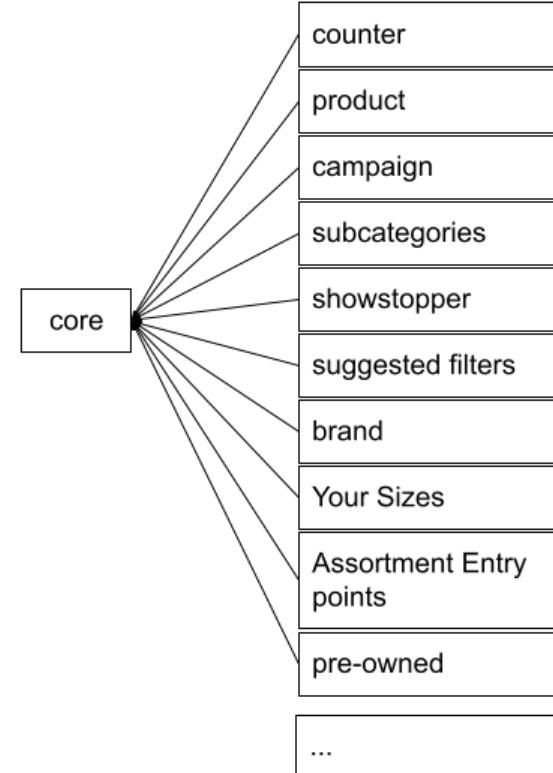
Case Study: Catalog

Core engine (extensible)

- Provides data from Backend
- Defines contract for extensions
- Triggers Parsing/Rendering of content

Extensions

- Implement contract
- Register with core
- Render concrete catalog items



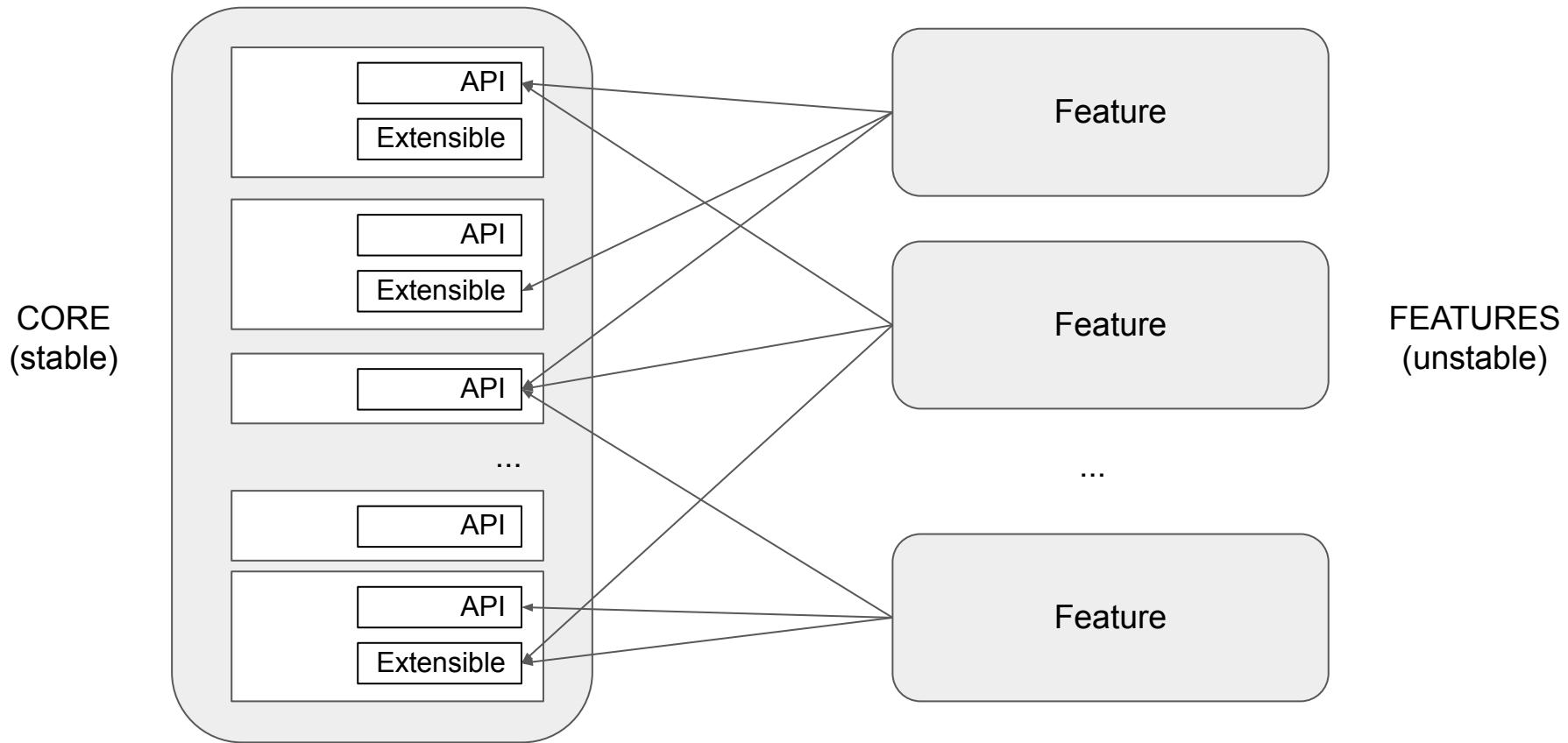
Case Study: Catalog - Parsing contract

```
interface CatalogItem {  
  
    interface Dispatcher {  
        fun parserFor(node: CatalogNode): Parser?  
    }  
  
    interface Parser {  
        fun parse(node: CatalogNode): CatalogItem?  
    }  
  
    fun isFullWidthItem(): Boolean = false  
    ...  
}
```

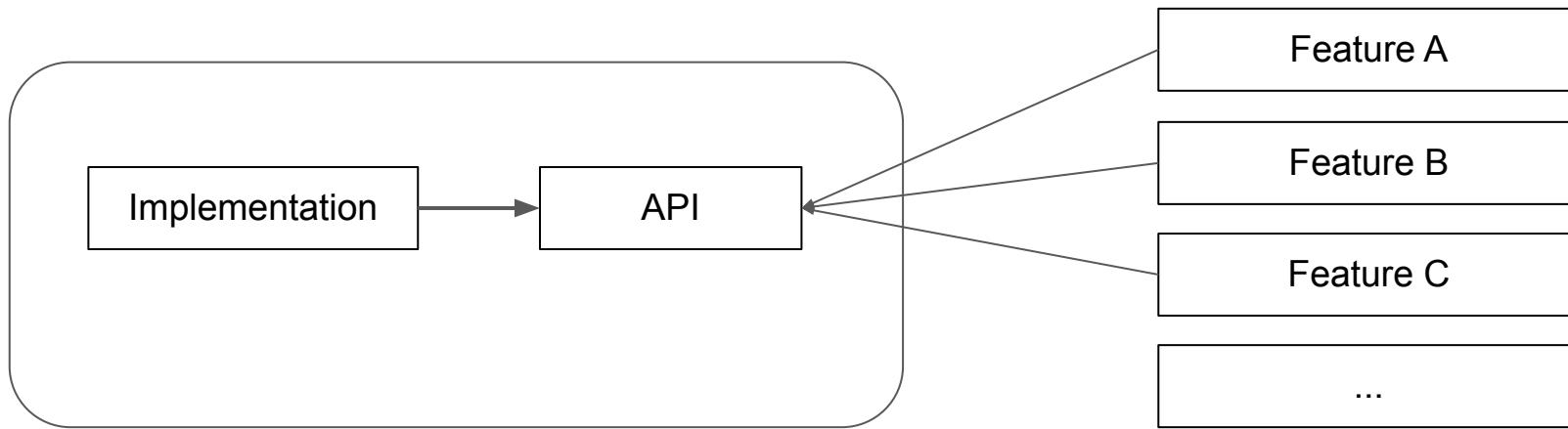
Case Study: Catalog - Rendering contract

```
abstract class CatalogItemWidget(val itemView: View) {  
  
    abstract fun bind(item: CatalogItem)  
    ...  
  
    interface Factory {  
  
        fun withParent(parent: ViewGroup): CatalogItemWidget  
  
        fun canBind(item: Class<out CatalogItem>): Boolean  
  
        ...  
    }  
}
```

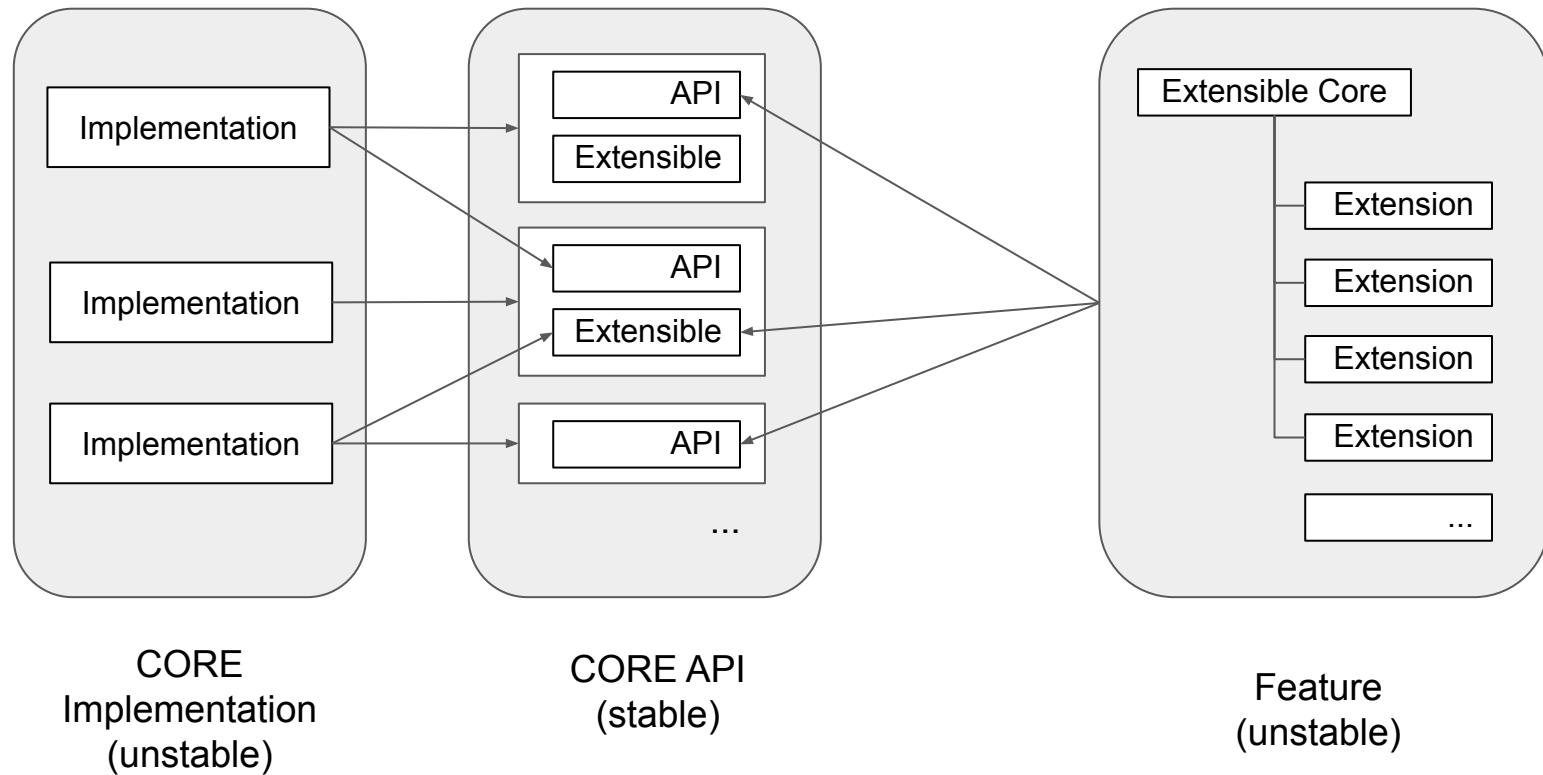
Plugin Architecture



Evolving the Core



Target Architecture

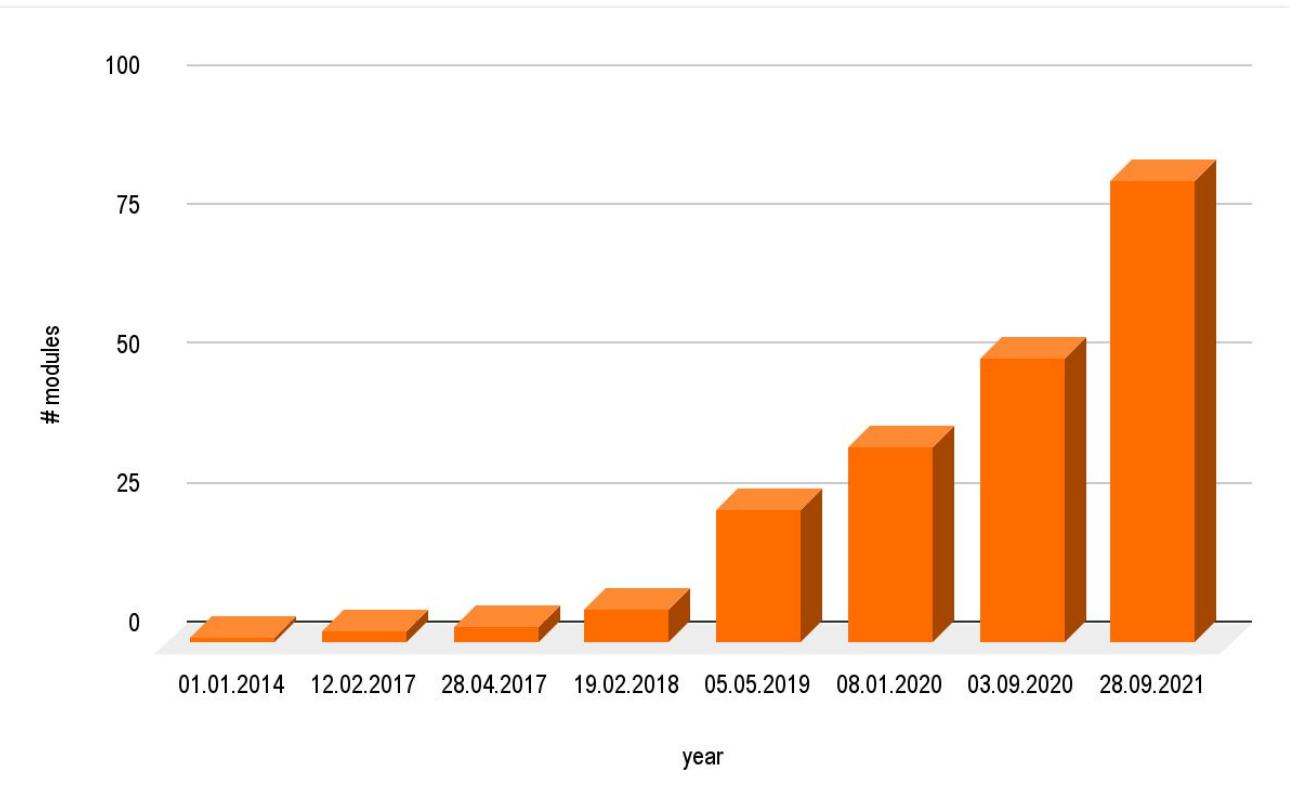


Where we are

- Features on the hot path are modularized and most of the others are extracted from the monolith
- Incremental feature development is mostly smooth
- Core needs to be decoupled and splitted further
- Modularize the remaining features in the monolith

Number of modules by year

Is growing...



Challenges and learnings

- Splitting the monolith is not easy ⇒ extract code first and then decouple
- Modularization best practices written for smaller apps do not necessarily apply to bigger ones
- Cacheability issues ⇒ single module triggering recompilation of others
- Build configurations management
- Defining API/contract(s) in the core flexible enough for features, but without too much boilerplate



Trade-offs

Pros

- Impact analysis based on modules to speed-up test suite
- Easy to configure GitHub codeowners

Cons

- Configuration time grows with number of modules
- Low coupling requires integration testing to identify issues
- Running tests on Firebase TestLab becomes slower and less effective with many modules

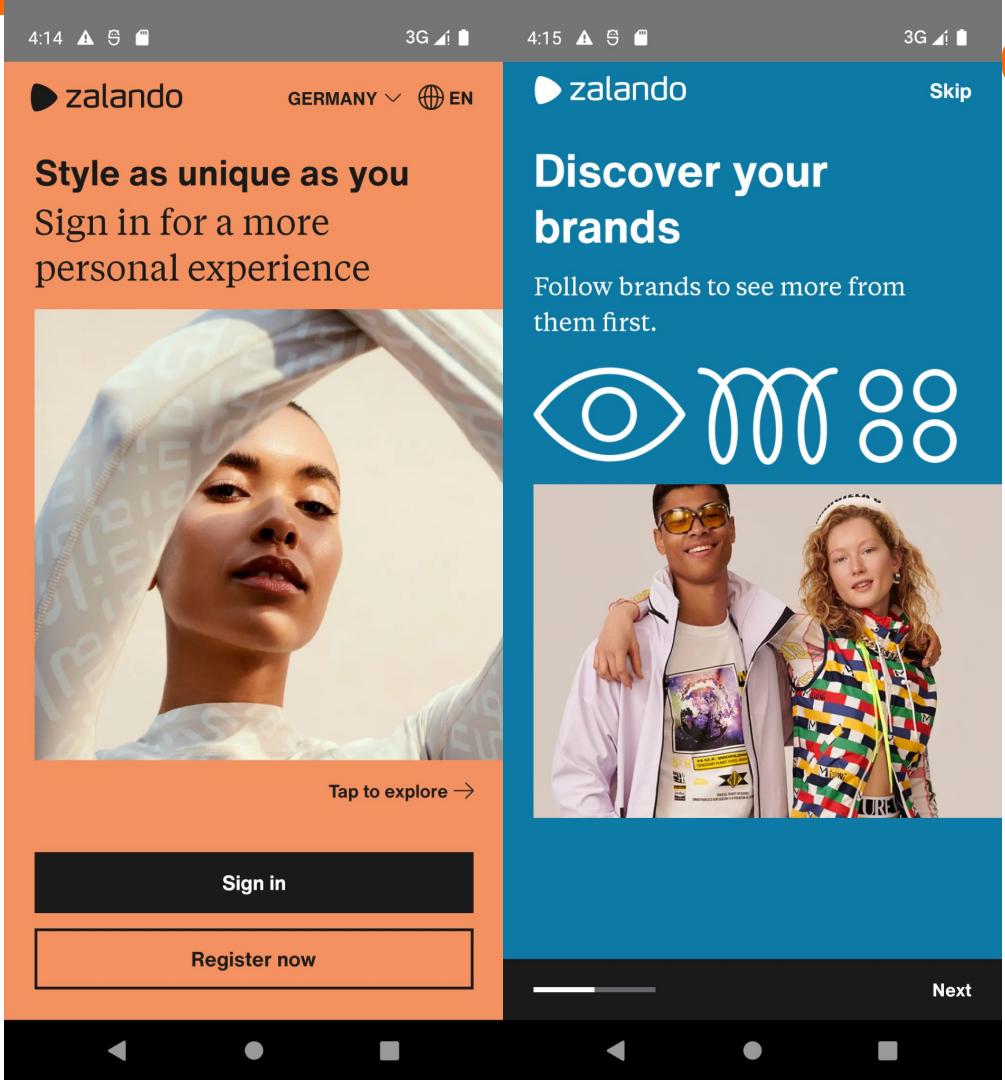


Thank you

And we are hiring!

FashionStore App

- Screenshots
- Main features
- cross-feature functionalities



4:16

3G

4:18

3G

4:20

3G



Women's clothing



adidas by Stella McCartney
Training jacket - black

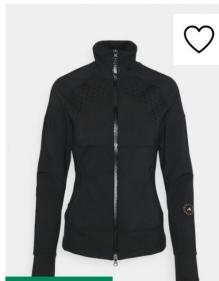


Filters

1

Sustainability

Showing 53 items



Sustainability

adidas by Stella McCart...
TRUEPUR - Training ja...

129,95 €



Sustainability

adidas by Stella McCart...
PUFFER - Winter coat - ...

399,95 €



adidas by Stella McCartney
Training jacket - black

199,95 € VAT included

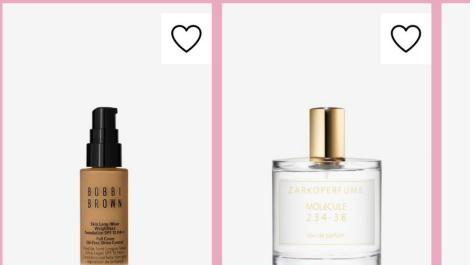


Sustainability



Sustainability

Hey beauty,
you're home



Bag

Liked items

Shipped by adidas
Tue, 05/10 - Fri, 08/10



adidas by Stella McCartney
PUFFER - Winter coat - cloud...

399,95 €

Colour: cloud white

Size: XS

Quantity: 1

Sold by [adidas](#)

Nike Sportswear
AIR MAX 90 - Trainers - blac...

139,95 €

Threadbare
CROFT - Tracksuit bottoms - ...

44,95 €

L'Oréal Paris
COLOR RICHE ULTRA MATT...

8,95 € 9,95 €
5 g (179,00 € / 100 g)
Size One Size

Zalando Beauty
ZALANDO ADVENT CALEND...

99,95 €
Size One Size

Shipping 0,00 €

Total VAT included 399,95 €

[Checkout](#)



Become a member

zalando PLUS

Faster delivery, early access to hot releases, and more

We're giving you a 30-day trial to test all the perks of Plus. After that it's only 15 € a year, and you can cancel anytime.



Feedback



[Try Plus for free](#)

Marks & Spencer London
2 PACK - Leggings - Trousers - ...



Your sizes

Sustainability



Better Cotton Initiative

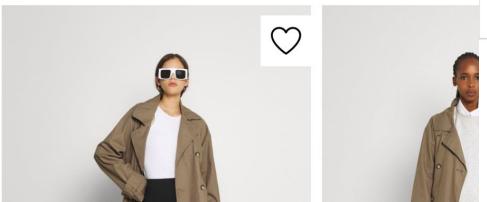
By buying cotton items from this brand, you're supporting more sustainable cotton farming. Products with this label contain at least 50% cotton, from a retailer or brand that is committed to sourcing Better Cotton and investing in BCI Farmers. It does not mean the product is made of physically traceable Better Cotton.

Marks & Spencer London

+ Follow

Complete the look

Outfit inspiration



Add items

From your orders

From your closet



← Your brands

Brands you're following

Add brands

'47

✓ Following

8848 Altitude

✓ Following

9Fashion

✓ Following

9N1M SENSE

✓ Following

A-VIEW

✓ Following

adidas Originals

✓ Following

adidas Performance

✓ Following

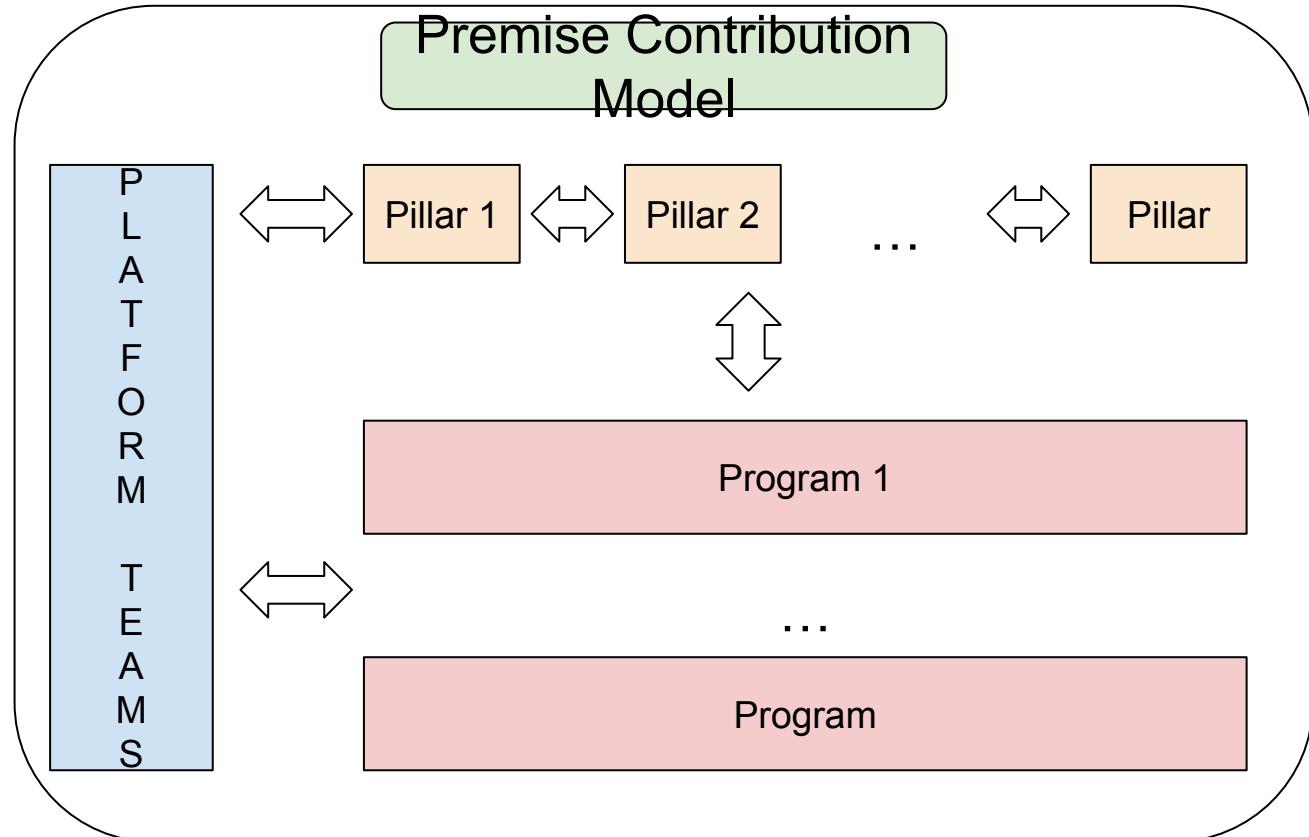
Bershka

✓ Following

Teams

4 for platform

12 for features



Ownership examples

