

CSM WS19/20 | JANUARY 2020

# WEB APPLICATION ARCHITECTURE

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# INHALT

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- 2 Konzept
- 3 Live-Demo
- 4 Technologieauswahl
- 5 Architekturkonzepte & Technologien
  - 5.1 Datenbank
  - 5.2 Backend
  - 5.3 Frontend
- 6 Bewertung



# APP IDEE

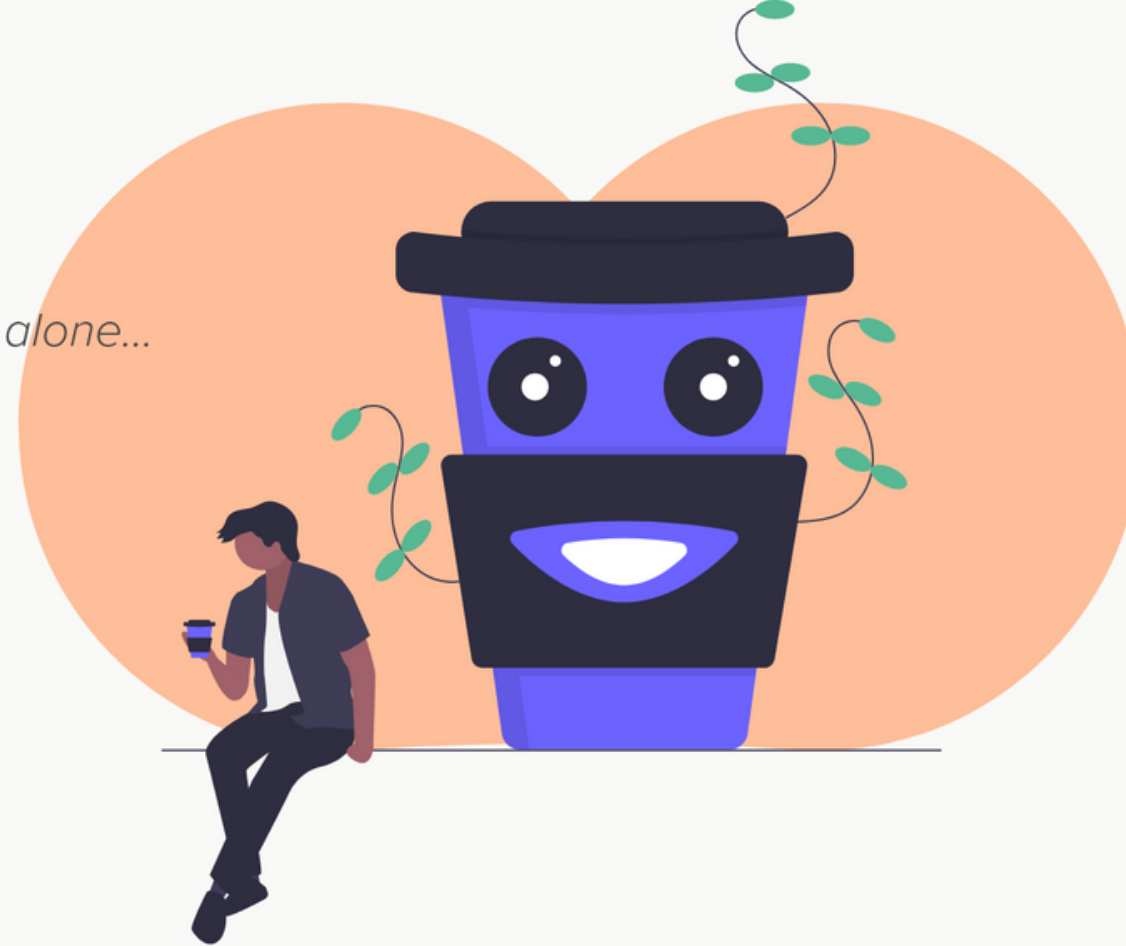


## CoffeeBreaker

- Kaffeepausen stehen im Fokus
  - Menschen über Kaffeepausen kennenlernen
  - Hürden und Grenzen überwinden durch interkulturellen Austausch
- das Eis brechen

*Stop taking your coffee breaks alone...*

# KONZEPT



*...and find your coffee buddies...*



## CoffeeBreaker

Username

Password

[Forgot password?](#)

LOGIN

Don't have an account yet? [Sign Up](#)

Breaks


My Breaks

Profile


Coffee Breaks

Filter Options 


Date




From




To




Max. People

4


Location



Type

unjoined breaks



Conversation Topics



APPLY


CANCEL

Pause vom Uni-Stress

 Today, 13:00 - 14:00  HdM Stuttgart





Chill'n'Talk

 Tomorrow, 16:00  Holzapfel





Mittagspause

 01.11.19, 12:00 - 13:30  HdM Stuttgart



Kurze Kaffeepause

 05.11.19, 17:00  Starbucks



Kaffeepause

 05.11.19, 17:00  Starbucks



Info

Pinboard

News Topics

Pause vom Uni-Stress

 Today

 13:00 - 14:00

 HdM Stuttgart



Conversation Topics

- Gaming
- Daily Life
- Food

 jane\_doe

 max\_mustermann

UNJOIN



Breaks

My Breaks

Profile

Logout 

## Create Coffee Breaks

Date

From

To

Location

Max. People

Conversation Topics

CREATE

CANCEL

Breaks



My Breaks

Profile

Logout 



# Coffee Breaks

Filter Options 

 max. 4 pers. 



Pause vom Uni-Stress



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Kurze Kaffeepause



 05.11.19, 17:00  Starbucks

Kaffeepause



 12.11.19, 17:00  Starbucks

Info

Pinboard

News Topics




jane\_doe

3 min ago

Hey, I'm Jane. Just wanted to let you know that I am going to arrive a little bit late.

Message

 Write something...




Breaks

My Breaks

Profile



# Coffee Breaks

Filter Options 

 max. 4 pers. 



Pause vom Uni-Stress



 Today, 13:00 - 14:00  HdM Stuttgart



Chill'n'Talk



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Mittagspause



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
Kurze Kaffeepause



 05.11.19, 17:00  Starbucks

Kaffeepause



 12.11.19, 17:00  Starbucks

Info

Pinboard

News Topics

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua



SPIEGEL ONLINE • 2 hours ago

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua



Tagesspiegel • 1 day ago

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua



DIE WELT • 2 days ago





Breaks

My Breaks


Profile

## Your Profile


Edit 




Username

 max\_mustermann

Interest

 Development, Netflix, Bouldering

Coffee Type

 Americano

Logout 

# UMSETZUNG - LIVE DEMO



**CoffeeBreaker**

# TECHNOLOGIEAUSWAHL

## DATENBANK



## BACKEND

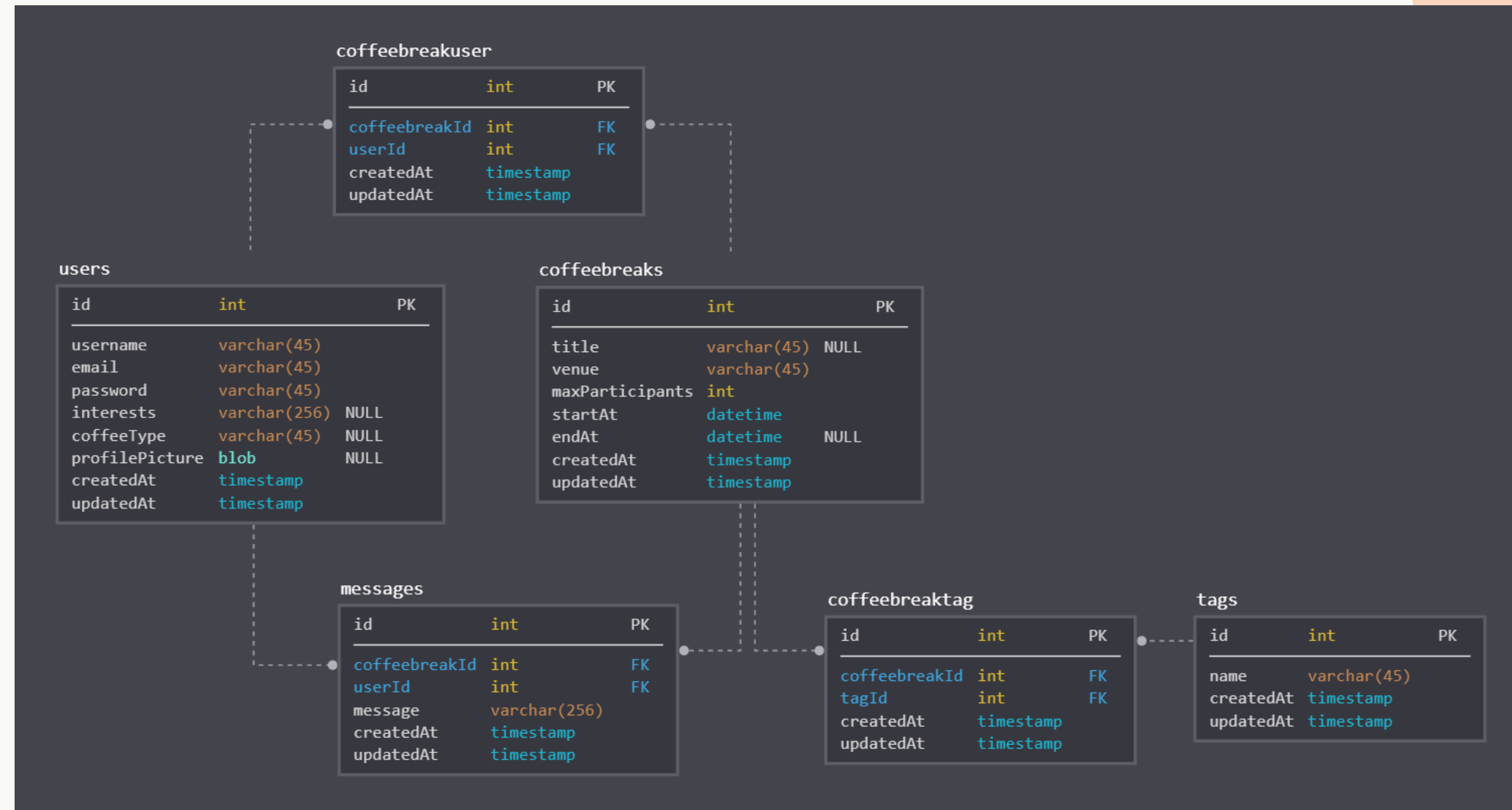


## FRONTEND



# DATENBANKMODELL

## Relationale MariaDB Datenbank



# SEQUELIZE

- Object Relational Mapper für Node.js
  - Unterstützt alle gängigen relationalen DB-Systeme
  - Migrations
  - Database Seeding
- keine SQL-Statements selbst schreiben

# SEQUELIZE

Model - entspricht SQL-Tabellendefinition

```
"use strict";
module.exports = (sequelize, DataTypes) => {
  const Coffeebreak = sequelize.define(
    "Coffeebreak",
    {
      title: DataTypes.STRING,
      venue: DataTypes.STRING,
      maxParticipants: DataTypes.INTEGER,
      startAt: DataTypes.DATE,
      endAt: DataTypes.DATE
    },
    {}
  );
  Coffeebreak.associate = models => {
    Coffeebreak.belongsToMany(models.Tag, { through: "CoffeebreakTag" });
    Coffeebreak.belongsToMany(models.User, { through: "CoffeebreakUser" });
  };
  return Coffeebreak;
};
```

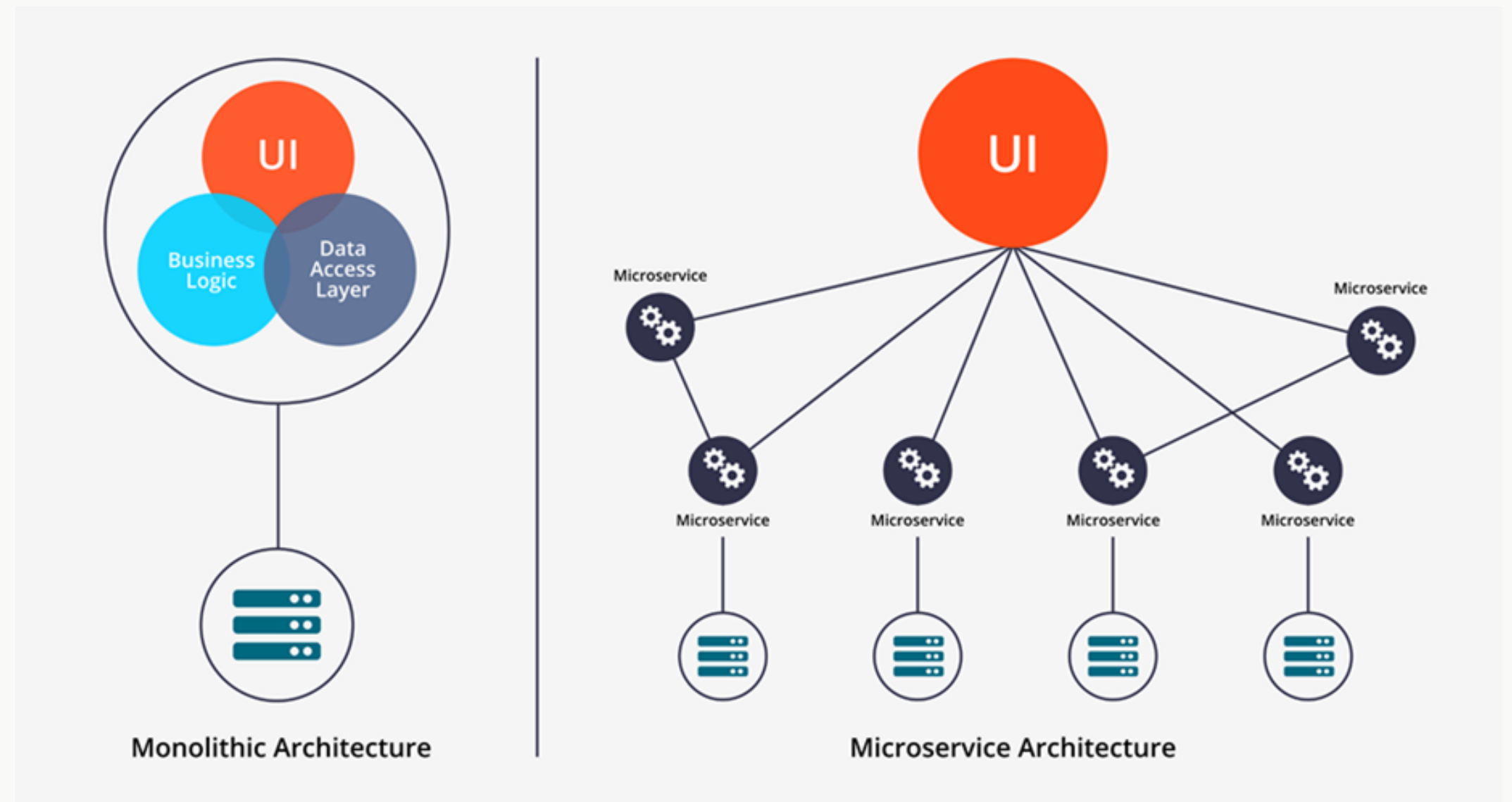
Datenbankabfrage

```
let coffeebreak = await Coffeebreak.findOne({
  where: {
    id: id
  },
  attributes: { exclude: ["createdAt", "updatedAt"] },
  include: [
    {
      model: Tag,
      attributes: ["id", "name"],
      through: { attributes: [] }
    },
    {
      model: User,
      attributes: [
        "id",
        "username",
        "interests",
        "coffeeType",
        "profilePicture"
      ],
      through: { attributes: [] }
    }
  ]
});
```

You, 9 days ago • added try catch and error ha

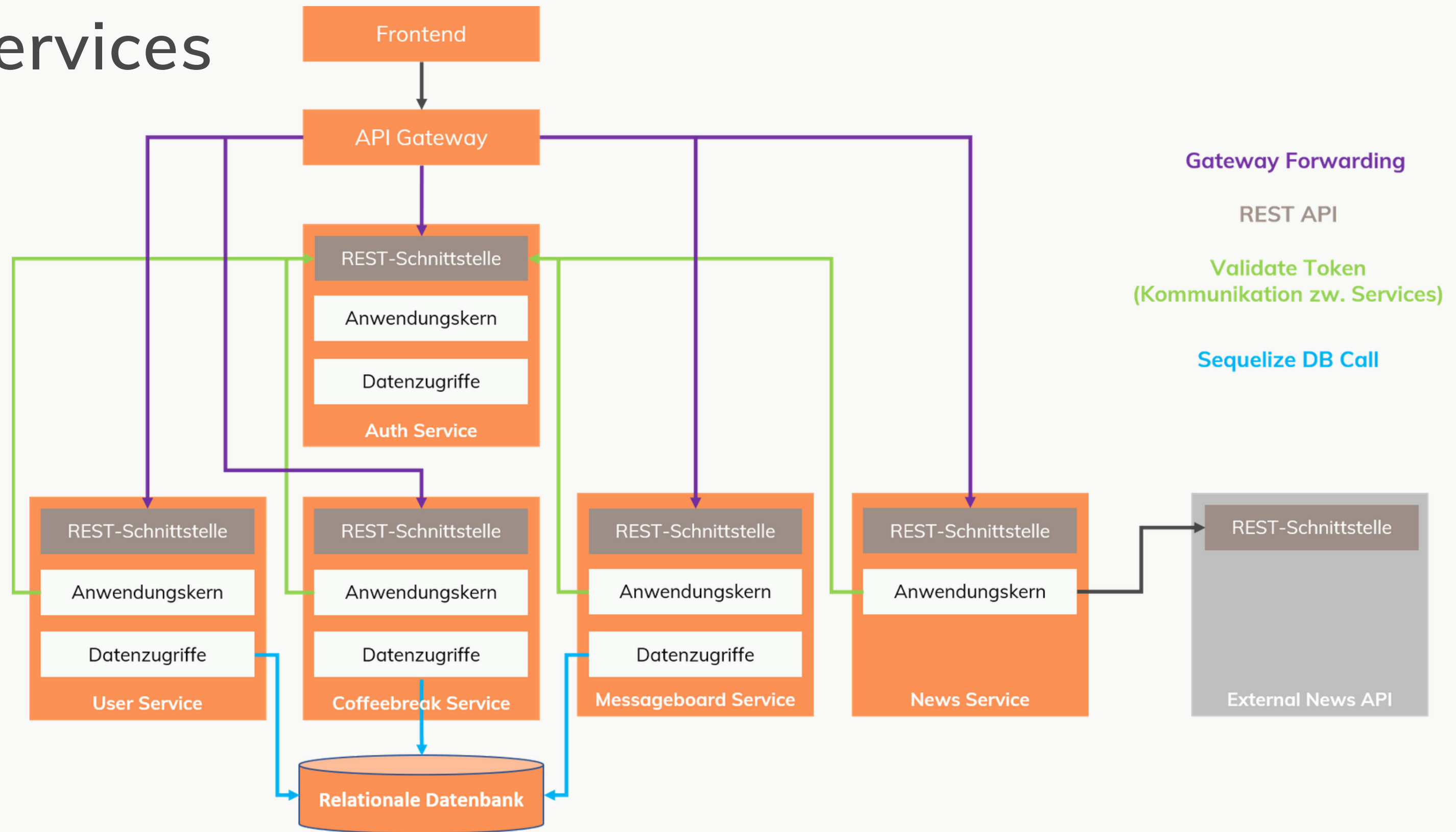
# MICROSERVICES

- Verteilte Systeme
- Kommunikation findet über genau definierte Interfaces statt (meistens REST)
- Lose Koppelung zwischen einzelnen Komponenten



# ARCHITEKTUR - BACKEND

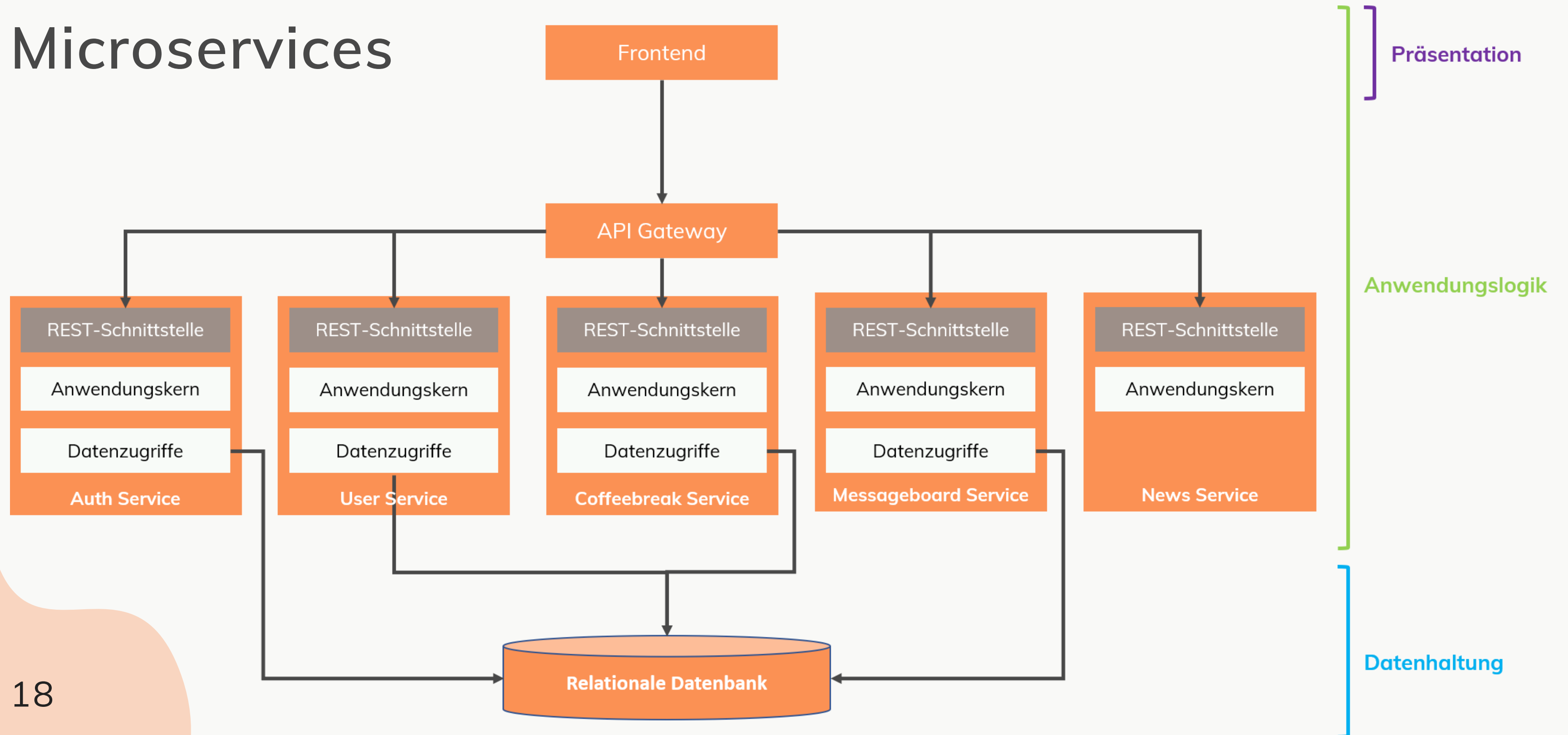
## Microservices





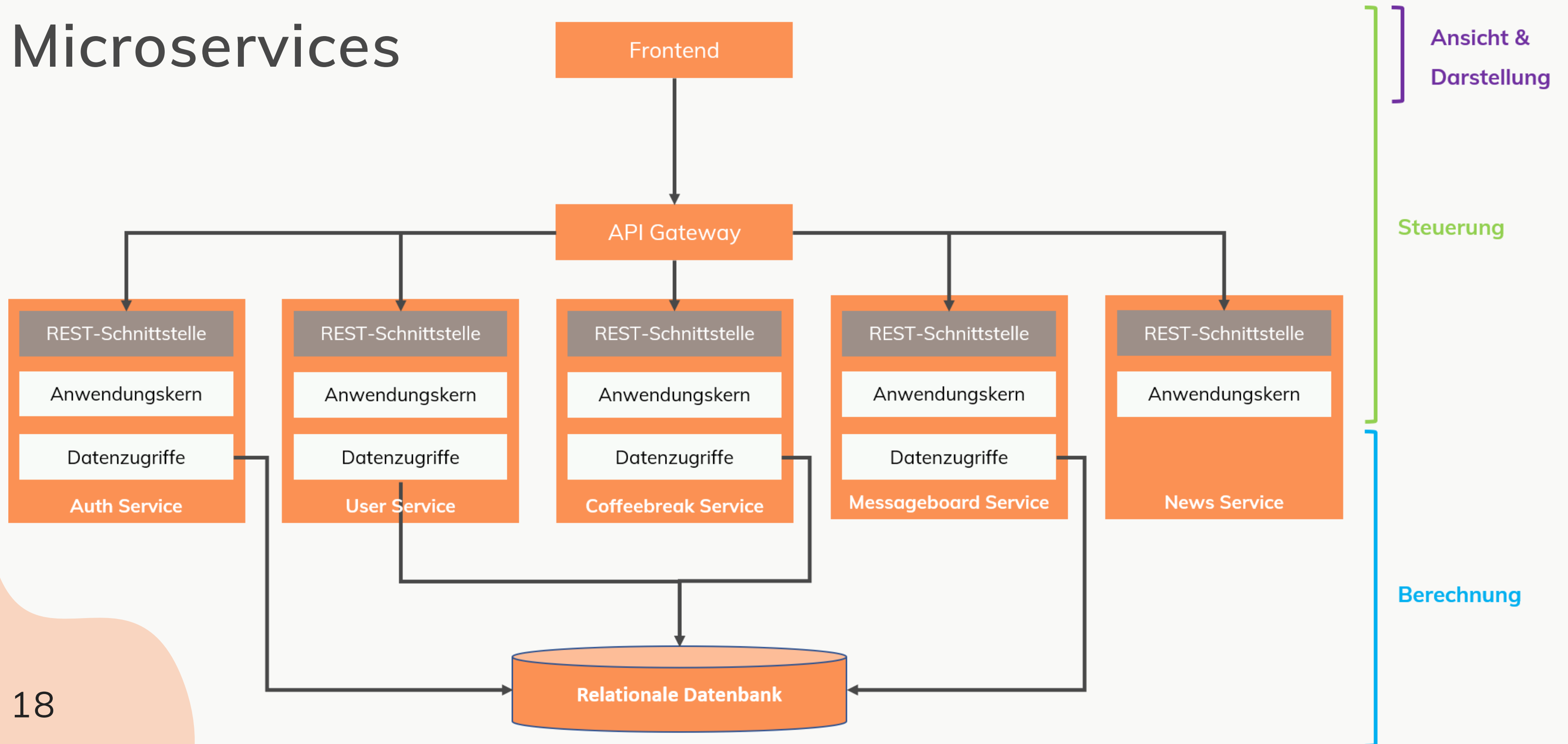
# ARCHITEKTUR - BACKEND

## Microservices



# ARCHITEKTUR - BACKEND

## Microservices



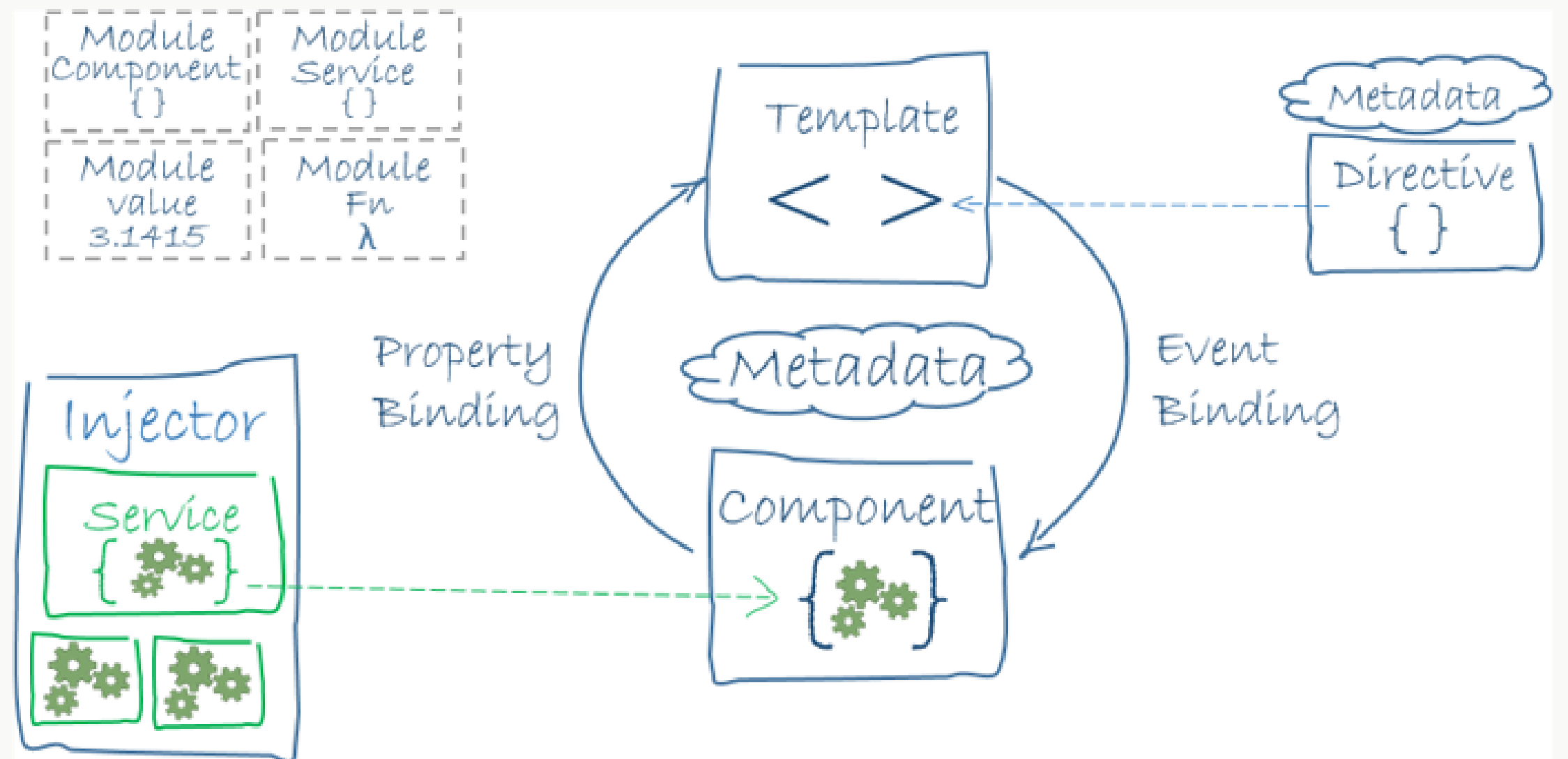
# SWAGGER

- Open Source Framework zum Entwerfen, Dokumentieren und Testen von HTTP-Webservices
- Automatische Generierung der API-Dokumentation
- Gutes Tool für API-First Ansatz
- Bessere Zusammenarbeit durch klar definierte Schnittstellen & Testbarkeit

→ [Link zu Swagger](#)

# ANGULAR

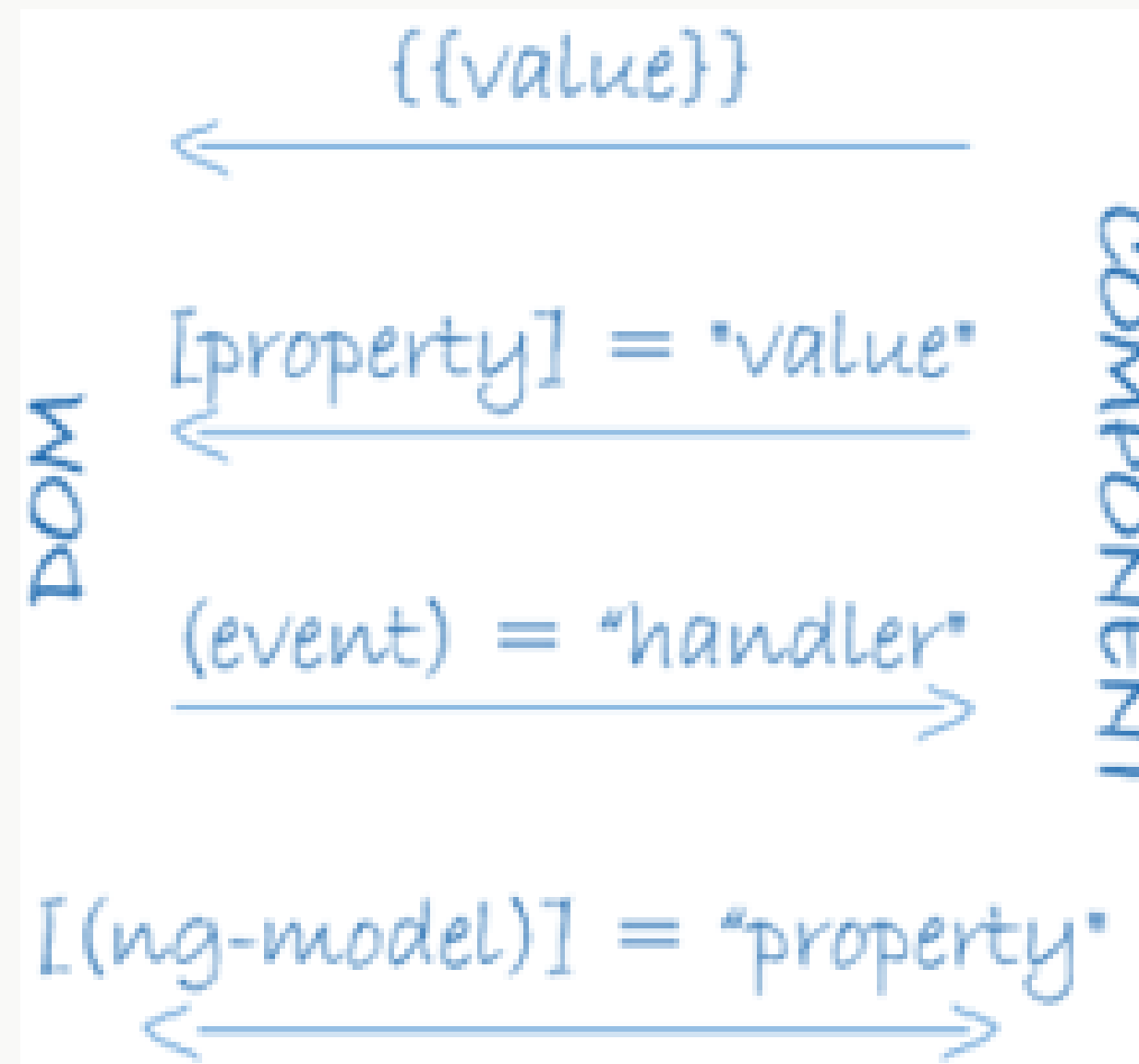
- Single-Page-Application
- Component-based MVVM
- Navigation über Router / URLs



# ANGULAR - DATA BINDING

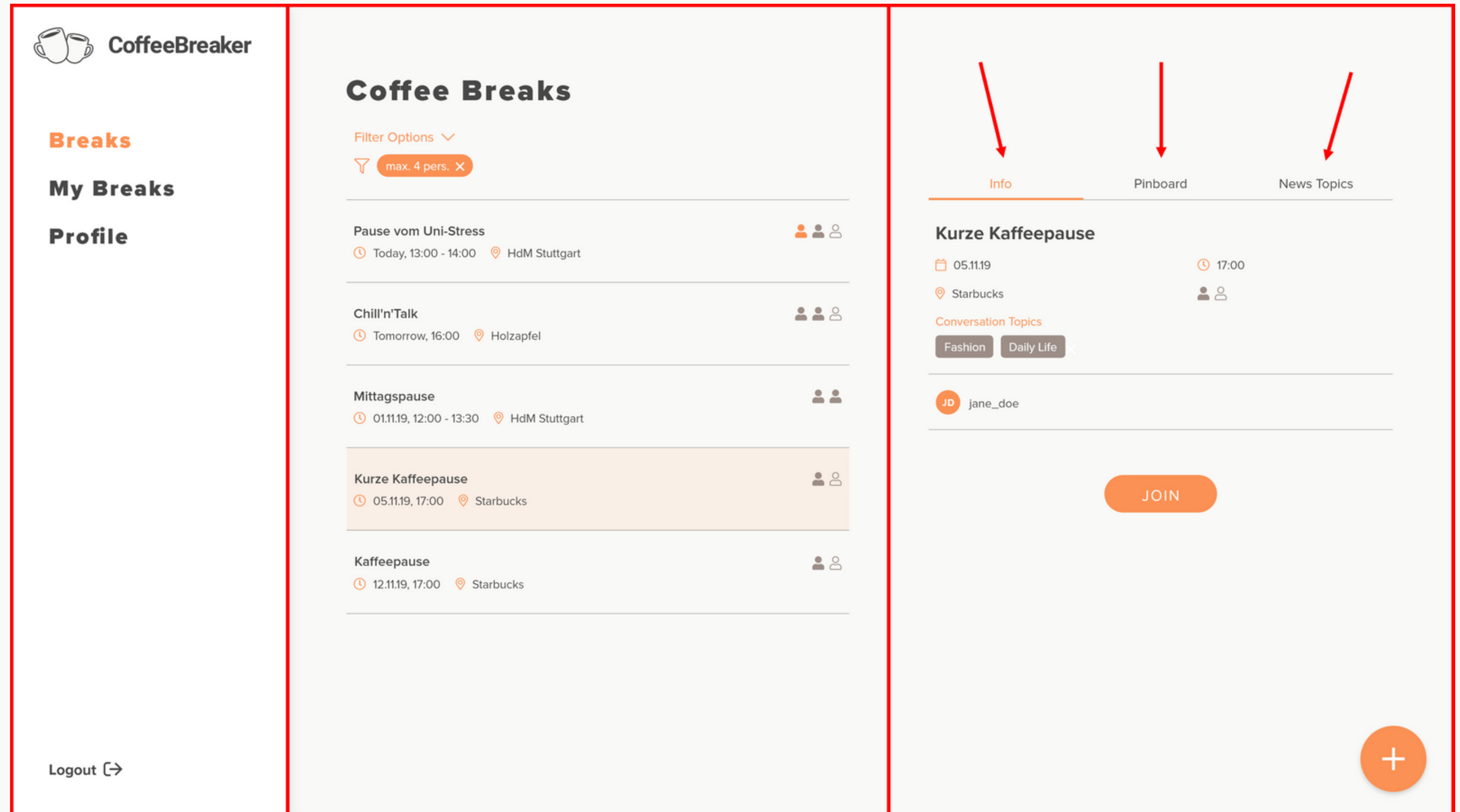
Verschiedene Methoden für Data Binding / Property Binding

- Interpolation
- Property Binding
- Event Binding
- Two-way data binding



# ANGULAR COMPONENTS

## Example



# EXAMPLE

- Global variables
- API call through service
- Object model mapping
- Event emitter

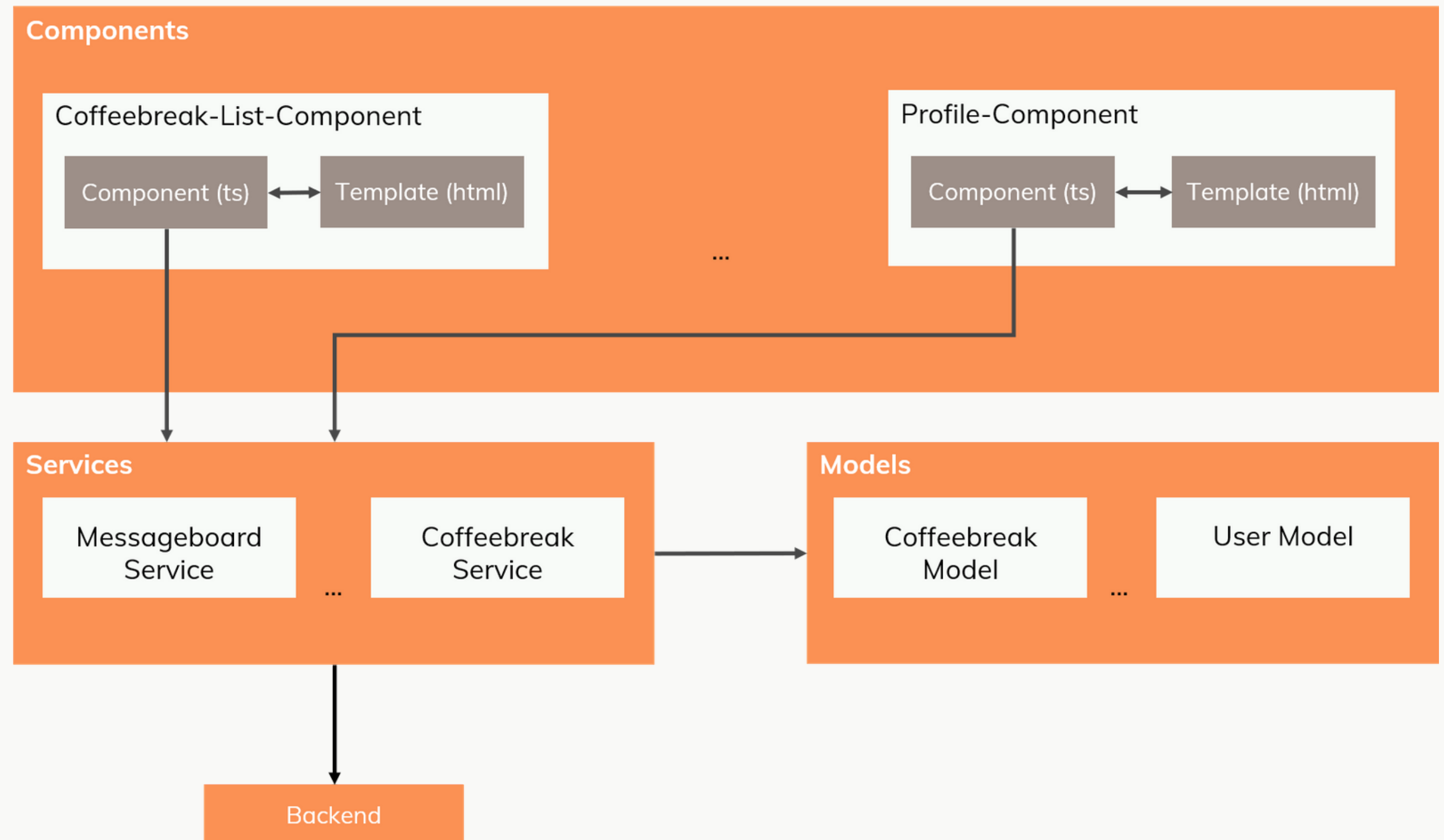
```
<app-search-coffeebreak
  class="coffeebreaks-view-component"
  (coffeebreakClicked)="coffeebreakDetailsClicked($event)"
  [changedCoffeebreakJoined]="changedCoffeebreak"
></app-search-coffeebreak>
<div class="coffeebreaks-view-component">
  <mat-tab-group mat-stretch-tabs (selectedTabChange)="onTabChange($event)">>
    <mat-tab label="Details">
      <app-coffeebreak-details
        [coffeebreak]="clickedCoffeebreak"
        (changeCoffeebreakJoinedFlagEvent)="changeCoffeebreakJoinedFlag($event)"
      ></app-coffeebreak-details>
    </mat-tab>
```

```
joinCoffeebreak() {
  const currentUser = this.authService.currentUser;
  const userToAdd = new CoffeebreakUser(
    currentUser.id,
    currentUser.username,
    currentUser.interests,
    currentUser.coffeeType,
    currentUser.profilePicture
  );
  this.coffeebreakService
    .addUserToCoffeebreak(userToAdd, this.coffeebreak)
    .subscribe(res => {
      localStorage.setItem("authJWT", res.authToken);
      this.coffeebreak.users = res.read.Users.map(
        user =>
          new CoffeebreakUser(
            user.id,
            user.username,
            user.interests,
            user.coffeeType,
            user.profilePicture
          )
      );

      this.coffeebreak.isJoined = true;
      this.changeCoffeebreakJoinedFlagEvent.emit(this.coffeebreak);
    });
}
```

# ARCHITEKTUR - FRONTEND

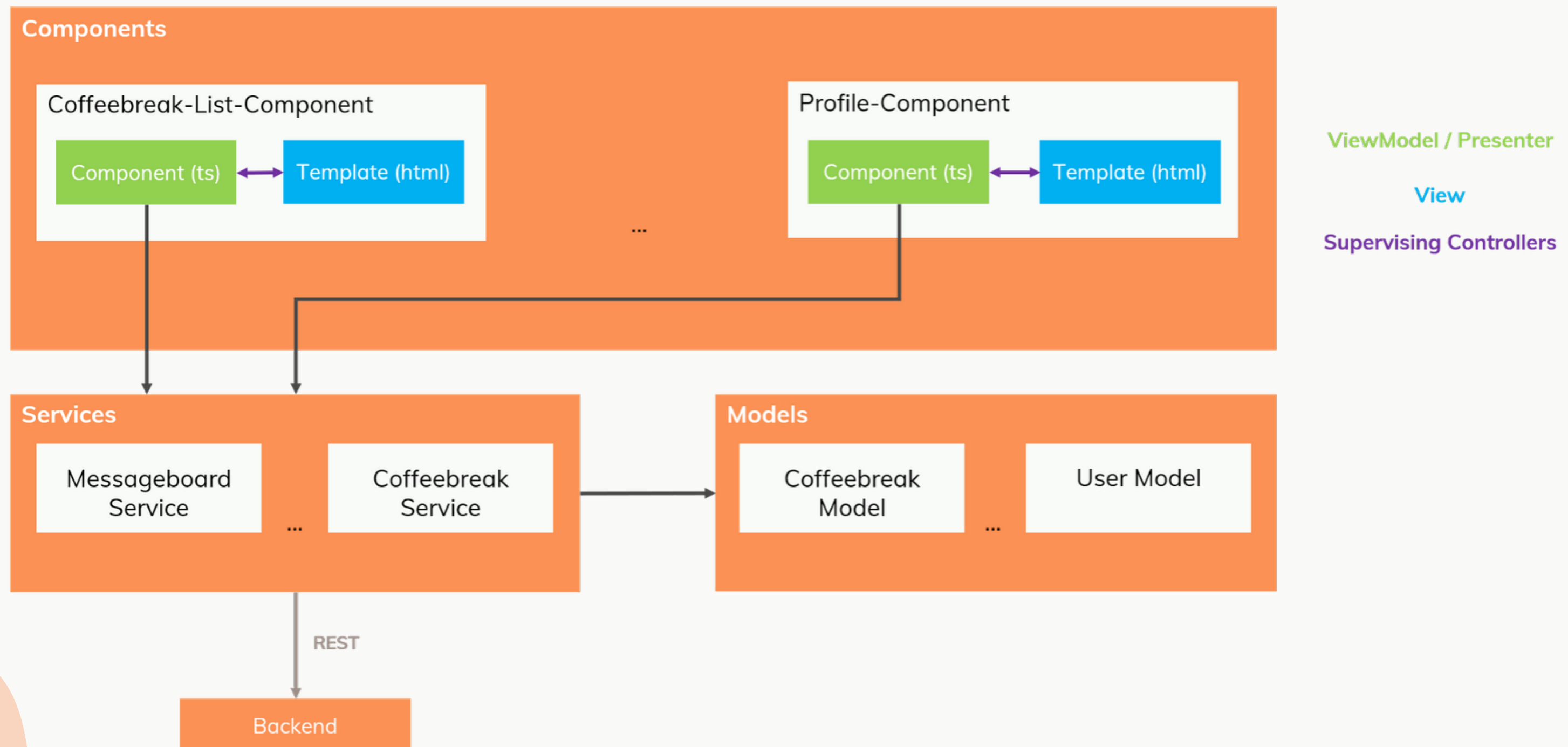
## Component-based MVVM





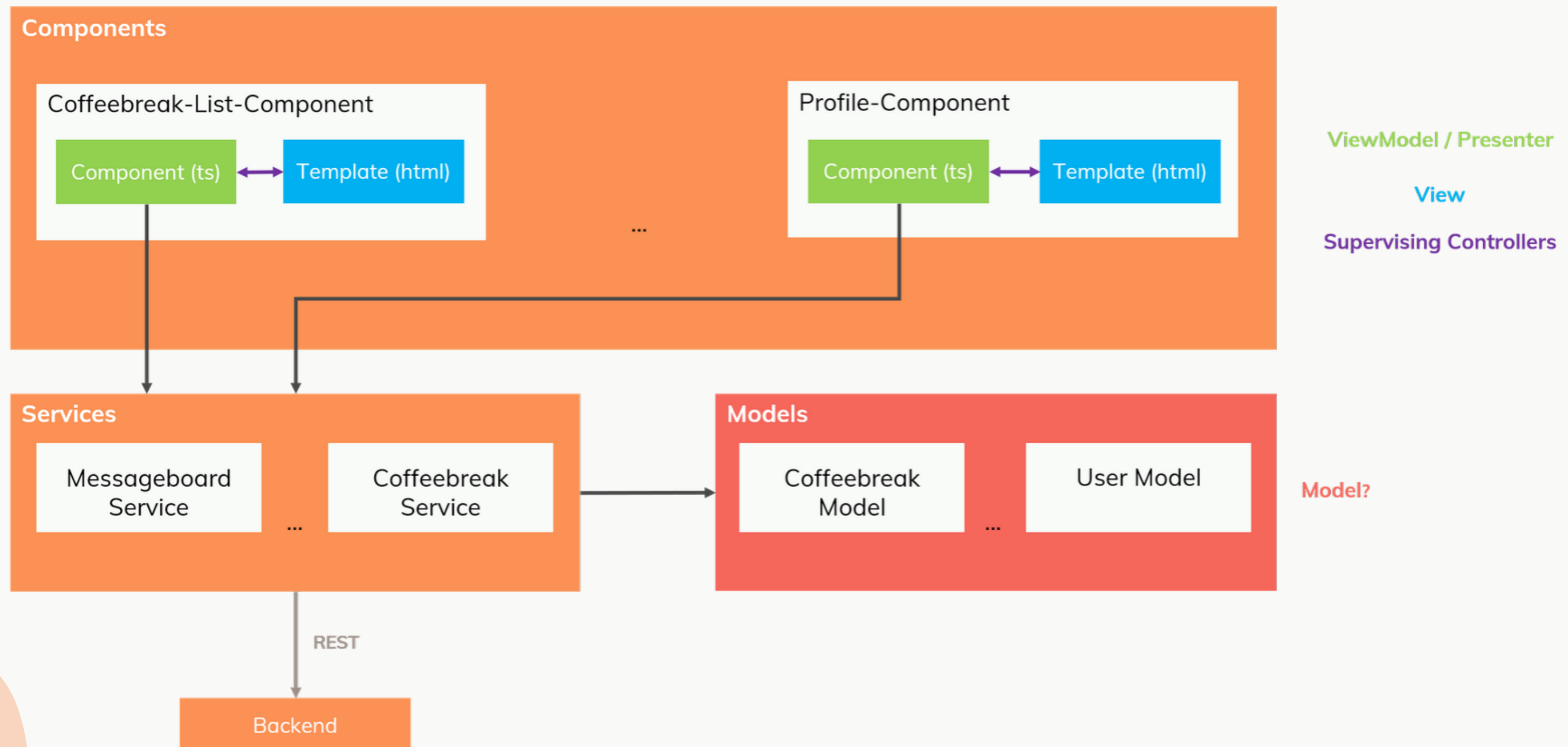
# ARCHITEKTUR - FRONTEND

## Component-based MVVM



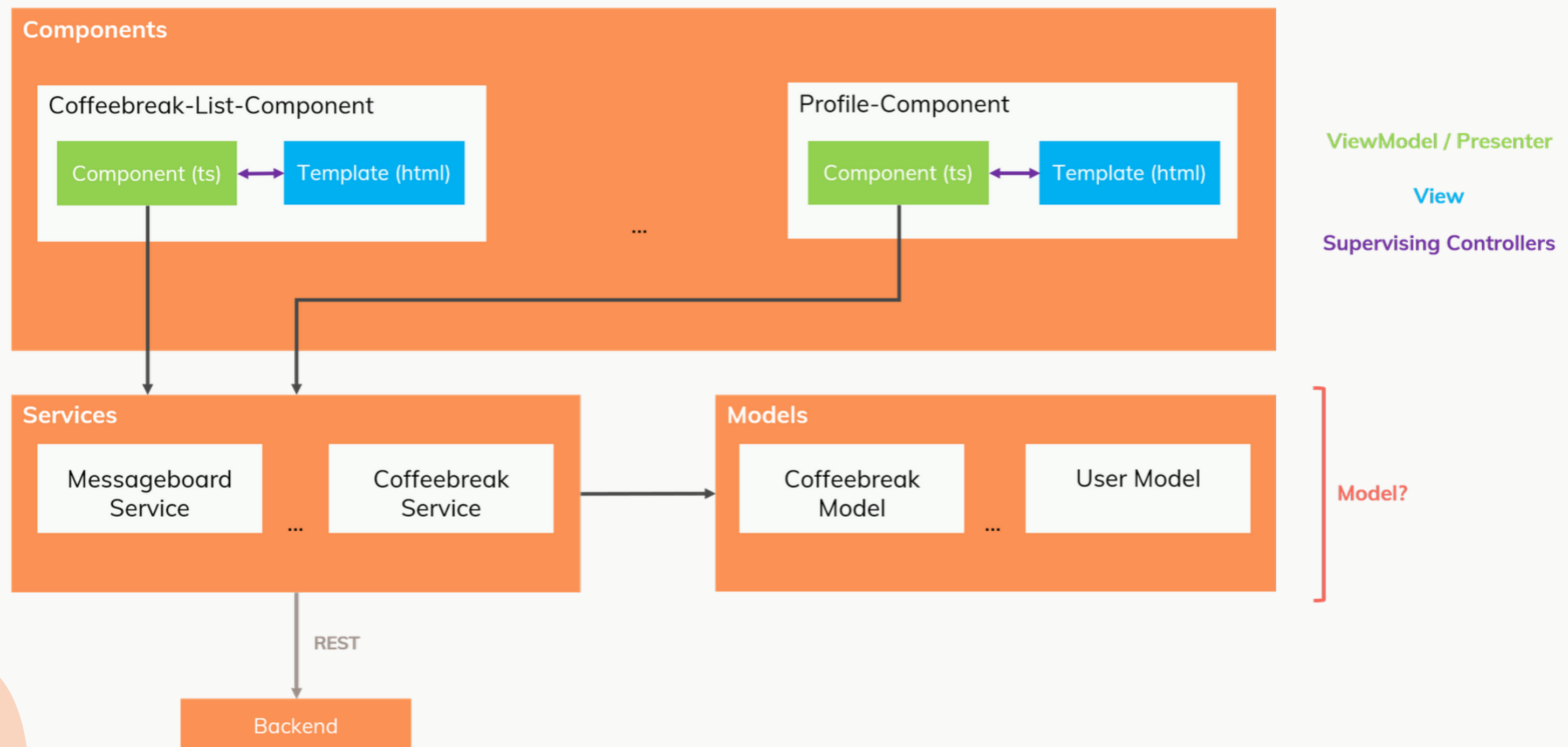
# ARCHITEKTUR - FRONTEND

## Component-based MVVM



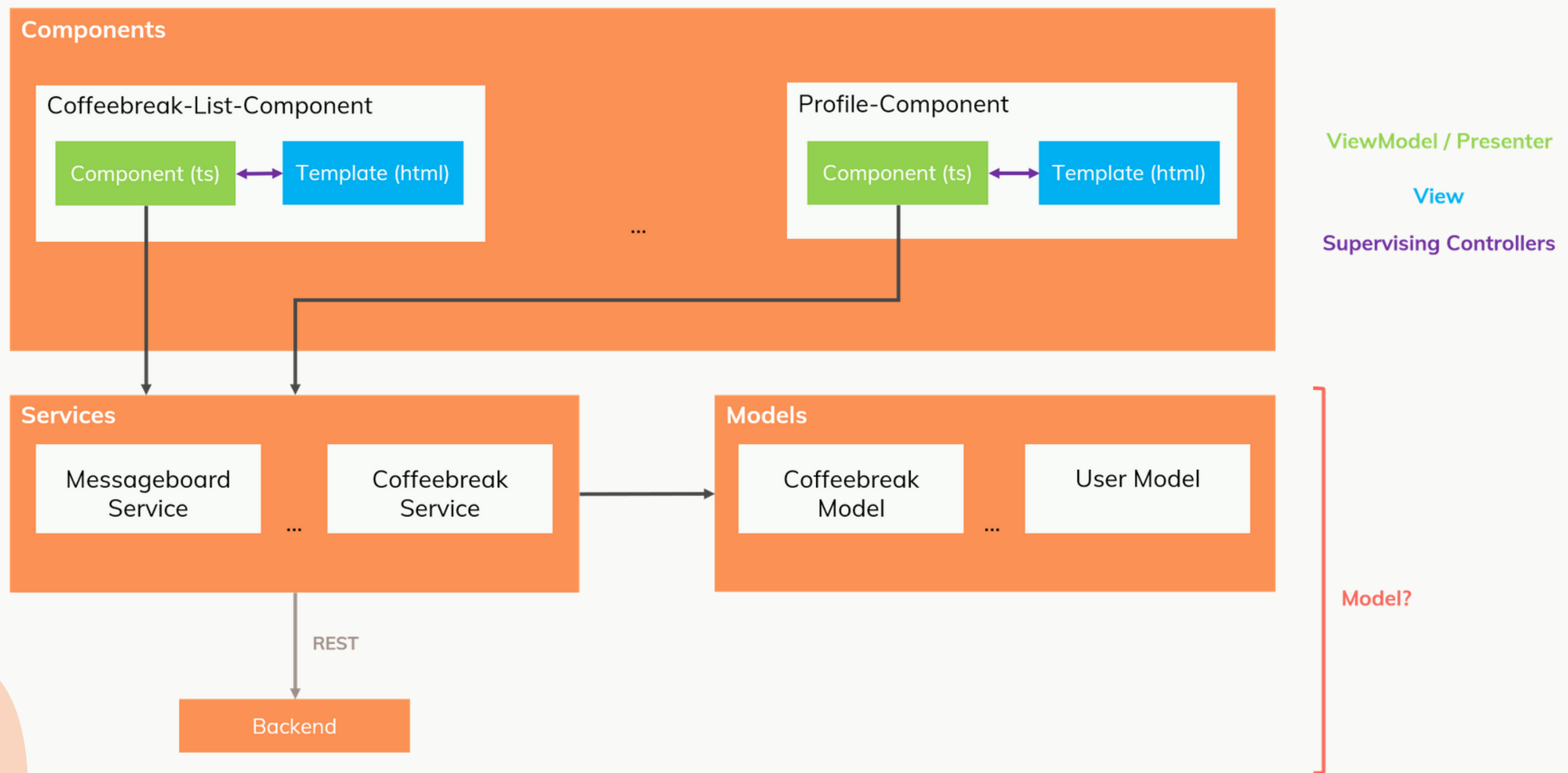
# ARCHITEKTUR - FRONTEND

## Component-based MVVM



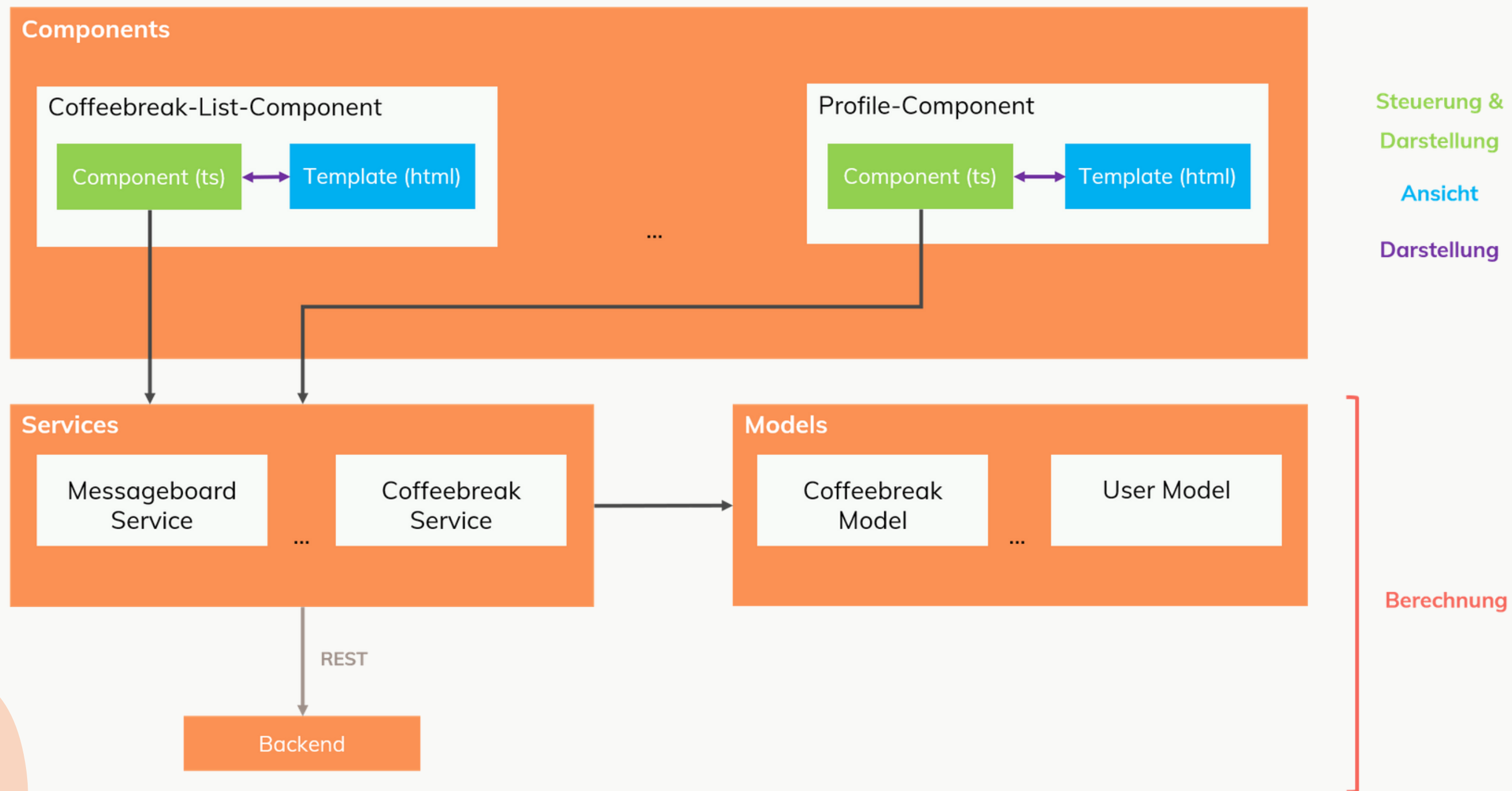
# ARCHITEKTUR - FRONTEND

## Component-based MVVM



# ARCHITEKTUR - FRONTEND

## Component-based MVVM



# BEWERTUNG

- Microservices erlauben unabhängiges Arbeiten (Komponentenverantwortliche)
- Programmiersprache für Microservice durch Entwickler/Teams frei wählbar
- Microservices bieten Skalierbarkeit, z.B. Verteilen auf mehrere Server
- Microservices-Architektur hat hohen Konfigurationsaufwand
- Schnittstellen durch Swagger-Dokumentation für jeden leicht nachvollziehbar und testbar
- Angular hat eine sehr große Community & gute Dokumentation
- Angular hat große Menge an Libraries für leichtes Development, z.B. Material



**VIELEN DANK !**

**FRAGEN?**