



# Microservice UI Composition

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## Ihr Sprecher

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*Trainer, Berater, Entwickler*



@ThorstenMaier

# Warum **Microservices**?

# *„Java Magazin Driven Architecture“*

*Scale team*



***Scale architecture***

*Neue  
Mitarbeiter*



*Zufriedene  
Mitarbeiter*



*Innovation*



*Vielfalt*



## Conways Law

*“Organizations which design systems [...] are constrained to produce designs which are copies of the communication structures of these organizations.”*

*Anforderungen*

**Unabhängige Teams**  
**Unabhängige Releases**  
**Unabhängige Technologie-Stacks**  
**A/B Testing**

# Backend-Microservices sind einfach

*wirklich?*

## *8 Irrtümer der verteilten Datenverarbeitung*

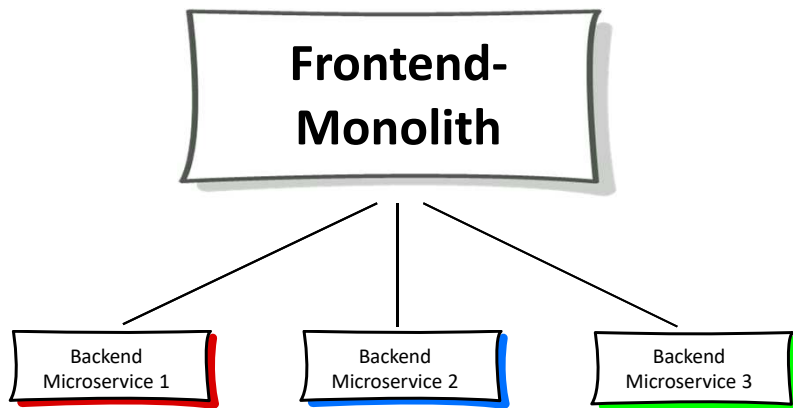
- Netzwerk ist ausfallsicher**
- Latenzzeit = 0**
- Datendurchsatz  $\infty$**
- Netzwerk ist sicher**
- Netzwerktopologie ist stabil**
- ...**
- 1 Netzwerkadministrator**
- Kosten des Datentransports = 0**
- Netzwerk ist homogen**

```
@SpringBootApplication
@RestController
public class Microservice {

    public static void main(String[] args) {
        SpringApplication.run(Microservice.class, args);
    }

    @GetMapping("/helloWorld")
    public String sayHello() {
        return "Hello World";
    }
}
```

*Was ist mit dem*  
**Frontend?**



### *Vorteile Frontend-Monolith*

**„UI-Experten“  
Saubere Backend-Schnittstellen**

*Nachteile Frontend-Monolith*

**Frontend-Team braucht Wissen über alle Services**  
**Teams müssen synchronisiert werden**  
**Frontend-Team als Flaschenhals**

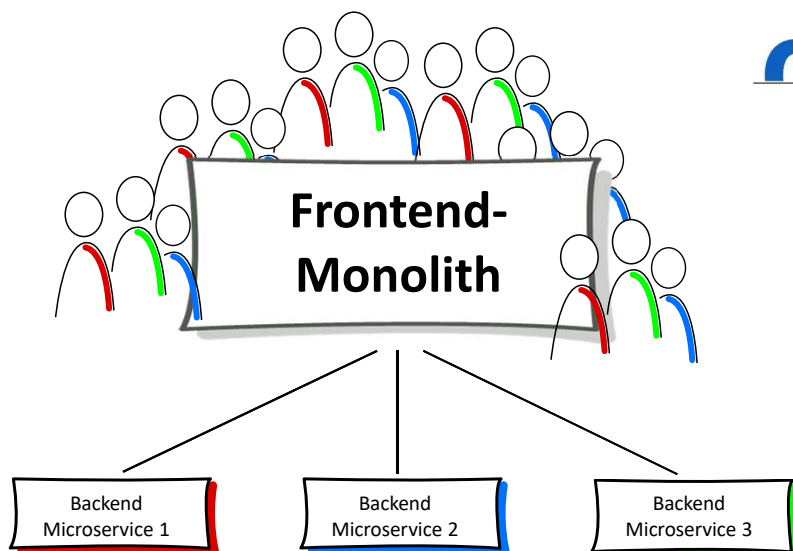
*Nochmal die Anforderungen*

~~**Unabhängige Teams**~~  
~~**Unabhängige Releases**~~  
~~**Unabhängige Technologie Stacks**~~  
~~**A/B Testing**~~

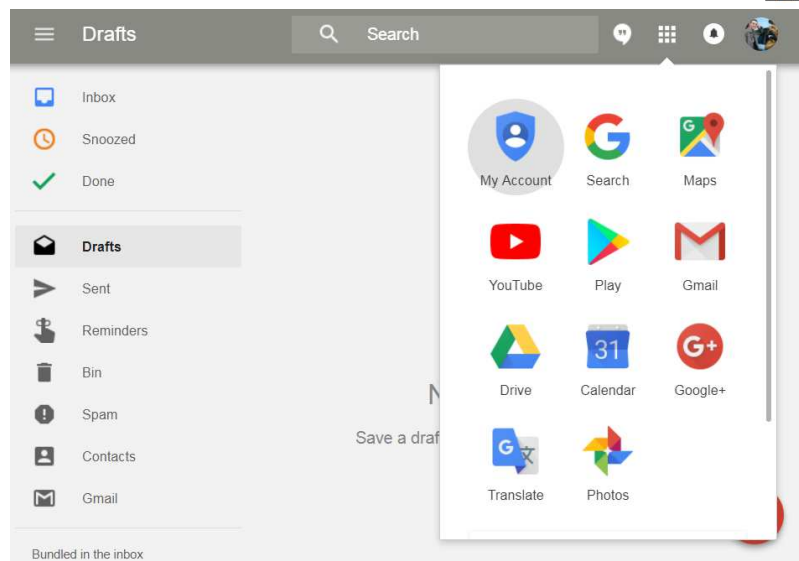
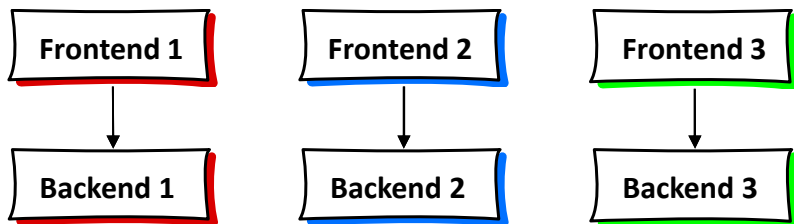


# 50% Backend / 50% Frontend?

*Dann machen wir auch nur 50% Microservices!*



Herausforderungen:  
**Konsistentes Aussehen?!  
Integration in eine UI?!**



*Sind das noch*  
**Microservices?**

Hifi Shop New **Router Service** **Search Service**

---

### The new Wireless Headphones

Cras justo odio, dapibus ac facilisis in, egestas eget quam. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet.

[Get your headphones today](#)

### Product Service

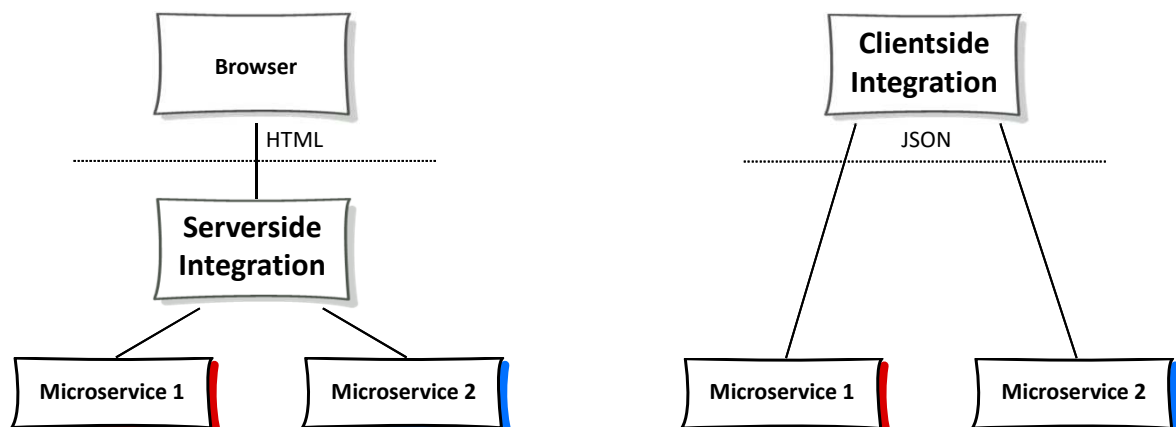
<h4>It's magical</h4> <p>They combine world-class noise cancelling technology with the freedom of wireless—and now you can give them your distinct style, whether it's your unique color combination or your favorite team's scheme.</p> <p><a href="#">View details &gt;</a></p>	<h4>Wireless</h4> <p>You love music. And you want it wireless. So we made it effortless. You'll wonder why you did it any other way. When it came to the tech inside these earbuds, we focused on every little detail.</p> <p><a href="#">View details &gt;</a></p>	<h4>Comfortable</h4> <p>Get clear, powerful sound from our first truly headphones. They're engineered to stay in place, and stay comfortable. We packed them full of technologies so you can push your workout to the next level.</p> <p><a href="#">View details &gt;</a></p>
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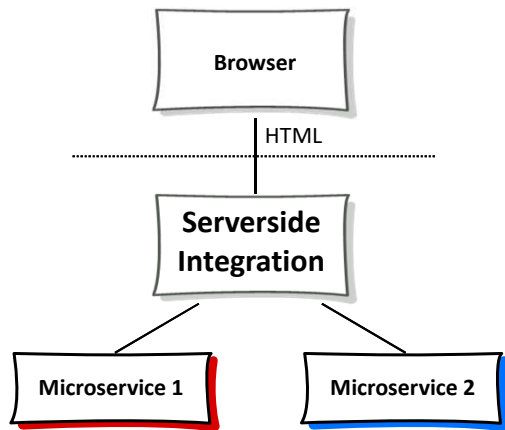
© Hifi Shop 2017 **Meta Info Service**

# MICRO FRONTENDS

## Integration

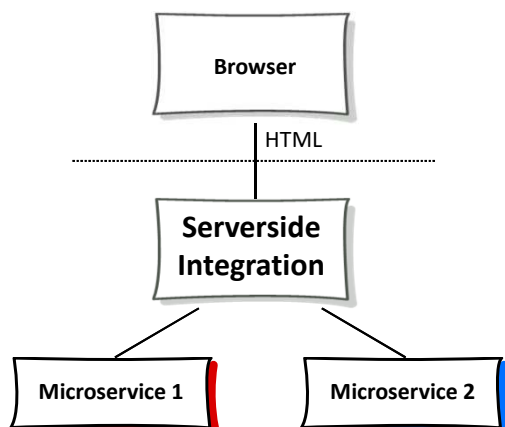


## Vorteil

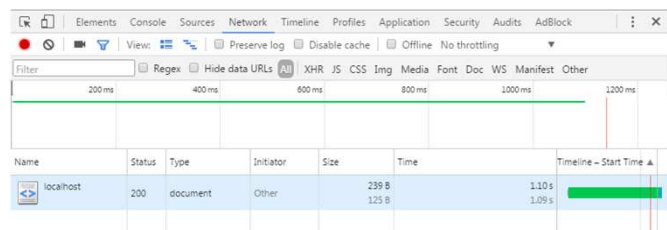


# SEO

## Nachteil



Hello, I am running on port 8081  
Error: http://localhost:8082/



## First Page Impression



Facebook verbessert  
First Page Impression durch

# Big Pipe

## BigPipe I

```

<html>
<head>

</head>
<body>
  <div id="content1">-</div>
  <div id="content2">-</div>
  <div id="content3">-</div>

</body>
</html>

```

## BigPipe II

```
<html>
<head>
  <script type="text/javascript">
    function arrived(id, text) {
      document.getElementById(id).innerHTML = text;
    }
  </script>
</head>
<body>
  <div id="content1">-</div>
  <div id="content2">-</div>
  <div id="content3">-</div>

</body>
</html>
```

## BigPipe III

```
<html>
<head>
  <script type="text/javascript">
    function arrived(id, text) {
      document.getElementById(id).innerHTML = text;
    }
  </script>
</head>
<body>
  <div id="content1">-</div>
  <div id="content2">-</div>
  <div id="content3">-</div>
  <script>arrived("content3", "Wohooo 3");</script>
  <script>arrived("content1", "Wohooo 1");</script>
  <script>arrived("content2", "Wohooo 2");</script>
</body>
</html>
```

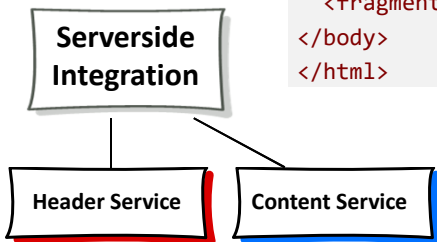
```
private void pagelet(PrintWriter writer, String id, String content) {  
    writer.write("<script>"  
        + "arrived(\"" + id + "\", '" + content + "');" +  
        "</script>\n");  
    writer.flush();  
}
```

*Zalando setzt noch einen drauf*

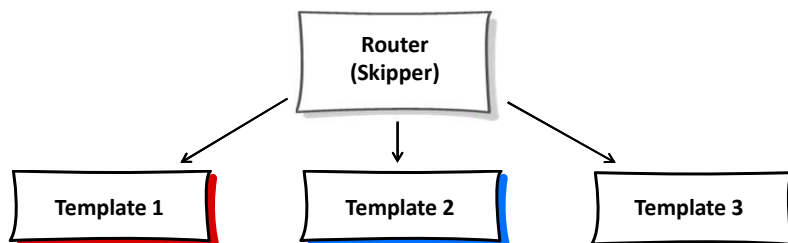
# Project Mosaic



```
<html>  
<head>  
  <script type="fragment" src="http://assets.domain.com"></script>  
</head>  
<body>  
  <fragment src="http://header.domain.com"></fragment>  
  <fragment src="http://content.domain.com" primary></fragment>  
  <fragment src="http://footer.domain.com" async></fragment>  
</body>  
</html>
```

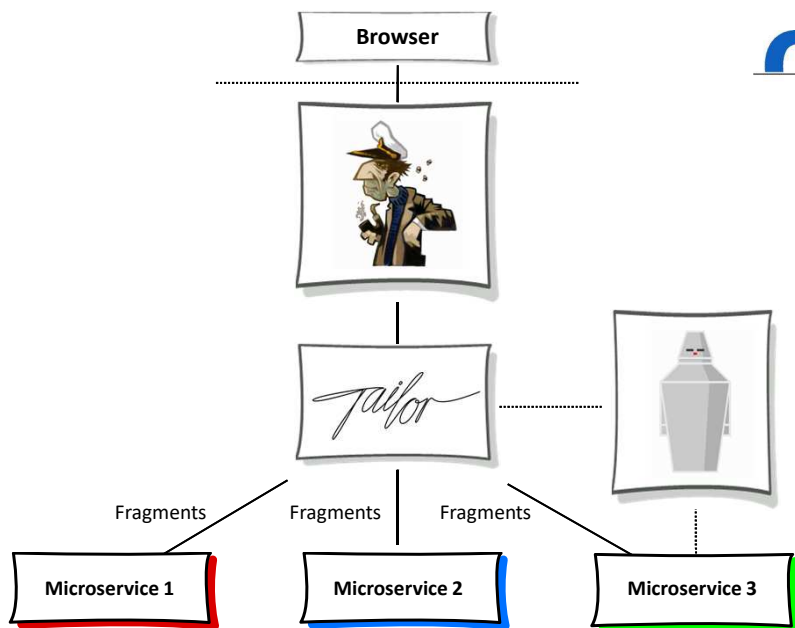


```
service1: Path("/service1/*_") -> "https://s2.example.org";  
service2: Path("/service2/*_") --> auth() -> "https://s1.example.org";
```



# Shaker

*einheitliche UI Komponenten Bibliothek*

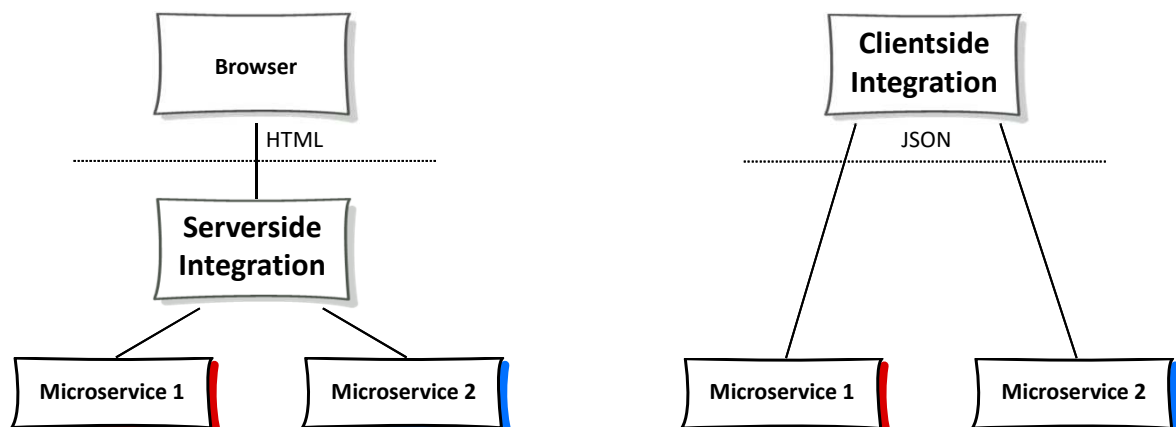


```
<div cx-url='{{server:local}}/application/widget/{{cookie:userId}}'  
  cx-cache-ttl='10s' cx-cache-key='widget:user:{{cookie:userId}}'  
  cx-timeout='1s' cx-statsd-key="widget_user">
```

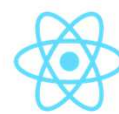
This content will be replaced on the way through

```
</div>
```

## Integration



*Alle wollen*

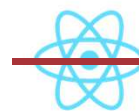


React



Vue.js

*keine direkte Unterstützung für Microservices*



~~React~~



~~Vue.js~~

Hifi Shop New Sale Headphones Speakers Support Vue.js

Vue.js Search Search

## The new Wireless Headphones

Cras justo odio, dapibus ac facilisis in, egestas eget quam. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum...

# ANGULAR

**It's new**  
They combine world-class noise cancelling technology with the freedom of wireless—and now you can give them your distinct style, whether it's your unique color combination or your favorite team's scheme.

**Wireless**  
You love music. And you want it wireless. So we made it effortless. You'll wonder why you did it any other way. When it came to the tech inside these earbuds, we focused on every little detail.

**Comfortable**  
Get clear, powerful sound from our first truly headphones. They're engineered to stay in place, and stay comfortable. We packed them full of technologies so you can push your workout to the next level.

View details » View details » View details »

© Hifi Shop 2017 React

META FRAMEWORK

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# Micro Frontends

*The DOM is the API*

<https://micro-frontends.org/>

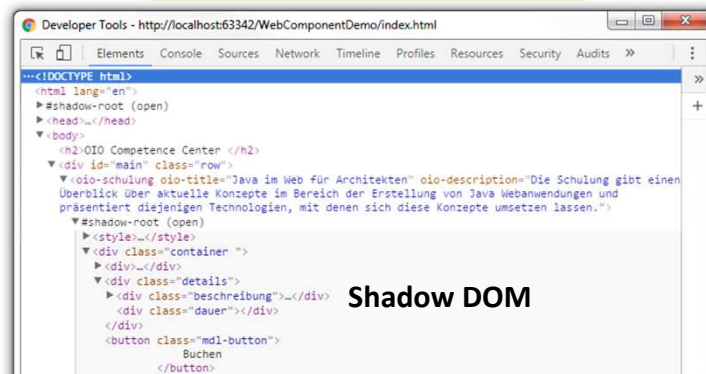
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## Java im Web für Architekten

Die Schulung gibt einen Überblick über aktuelle Konzepte im Bereich der Erstellung von Java Webanwendungen und präsentiert diejenigen Technologien, mit denen sich diese Konzepte umsetzen lassen.

Buchen

Custom element



```
<<!DOCTYPE html>
<html lang="en">
  <#shadow-root (open)>
    <#head>...</#head>
    <#body>
      <h2>OIO Competence Center </h2>
      <div id="main" class="row">
        <div class="col">
          <div class="description">
            <h3>Java im Web für Architekten</h3>
            <p>Die Schulung gibt einen Überblick über aktuelle Konzepte im Bereich der Erstellung von Java Webanwendungen und präsentiert diejenigen Technologien, mit denen sich diese Konzepte umsetzen lassen.</p>
          </div>
          <div class="button">
            <button class="mdl-button">
              Buchen
            </button>
          </div>
        </div>
      </div>
    </#body>
  </#shadow-root (open)>
</html>
```

Shadow DOM

`<router-navigation></router-navigation>`

### The new Wireless Headphones

Cras justo odio, dapibus ac facilisis in, egestas eget quam. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet.

Get your headphones today

`<product-details></product-details>`

#### It's magical

They combine world-class noise cancelling technology with the freedom of wireless—and now you can give them your distinct style, whether it's your unique color combination or your favorite team's scheme.

View details >

#### Wireless

You love music. And you want it wireless. So we made it effortless. You'll wonder why you did it any other way. When it came to the tech inside these earbuds, we focused on every little detail.

View details >

#### Comfortable

Get clear, powerful sound from our first truly headphones. They're engineered to stay in place, and stay comfortable. We packed them full of technologies so you can push your workout to the next level.

View details >

© HiFi Shop 2017

`<meta-footer></meta-footer>`



```
class SearchProduct extends HTMLElement {
  constructor() {
    super();
    this.innerHTML = '<input type="text"><button>Search</button>';
  }
}
window.customElements.define('search-product', SearchProduct);
```



Vue.js

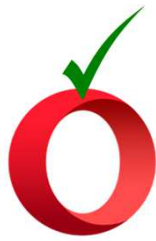
```
class RouterNavigation extends HTMLElement {
  constructor() {
    super();
    this.innerHTML = 'Navigation <search-product></search-product>';
  }
}
window.customElements.define('router-navigation', RouterNavigation);
```

```
connectedCallback() {
  window.addEventListener('router:navigation:changed', this.refresh);
}
```

```
window.dispatchEvent(new CustomEvent('router:navigation:changed',
  {'detail': 'Support'}
));
```

# Browser Support

*Custom Elements v1*



# Browser Support

*Custom Elements v1*



**Mit Polyfill (~5 KB)**



# Universal Rendering?

*“Serverside Rendering”*

# SSI

*Ja... “Server Side Includes”*

```
$ curl http://127.0.0.1:3000/search-product
```

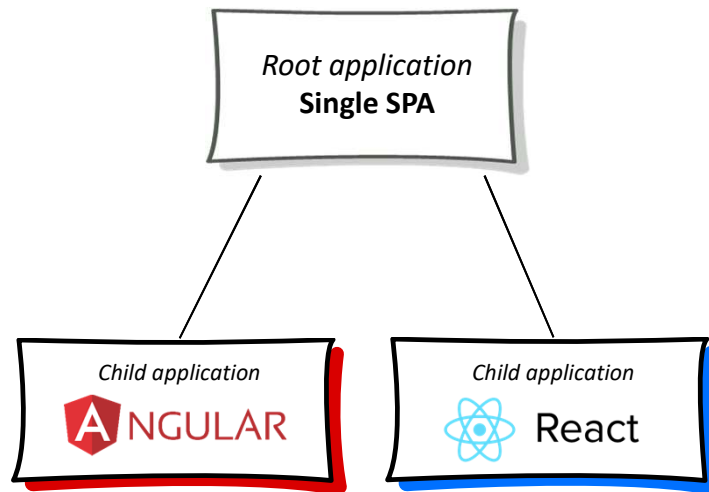
```
<input type="text"><button>Search</button>
```

```
<search-product>  
  <!--#include virtual="/search-product" -->  
</search-product>
```

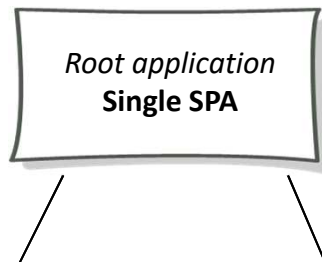
# *Zuviel Handarbeit?*

# Single SPA

<https://github.com/CanopyTax/single-spa>



<https://github.com/CanopyTax/single-spa>



```
import * as singleSpa from 'single-spa';

singleSpa.declareChildApplication('app-1', () => import('./app1/app1.js'));
singleSpa.declareChildApplication('app-2', () => import('./app2/app2.js'));

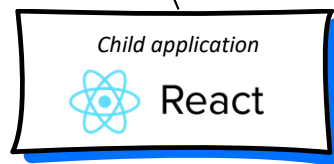
singleSpa.start();
```

<https://github.com/CanopyTax/single-spa>

```
export function bootstrap(props) {
  // app1 initialisieren
}

export function mount(props) {
  // app1 im DOM Baum einhängen
}

export function unmount(props) {
  // app2 aus dem DOM Baum aushängen
}
```



<https://github.com/CanopyTax/single-spa>

```
import React from 'react';
import ReactDOM from 'react-dom';
import singleSpaReact from 'single-spa-react';
import Root from './root.component.js';

const reactLifecycles = singleSpaReact({
  React,
  ReactDOM,
  rootComponent: Root,
  domElementGetter,
});

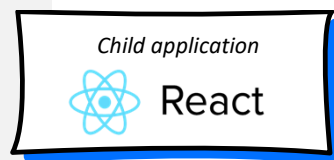
export function bootstrap(props) {
  return reactLifecycles.bootstrap(props);
}

export function mount(props) {
  return reactLifecycles.mount(props);
}

export function unmount(props) {
  return reactLifecycles.unmount(props);
}

function domElementGetter() {
  // Make sure there is a div for us to render into
  let el = document.getElementById('app1');
  if (!el) {
    el = document.createElement('div');
    el.id = 'app1';
    document.body.appendChild(el);
  }

  return el;
}
```



<https://github.com/CanopyTax/single-spa>

*Scale team*



***Scale architecture***



**Fragen ?**

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**Vielen Dank für Ihre  
Aufmerksamkeit!**

**Orientation in Objects GmbH**

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