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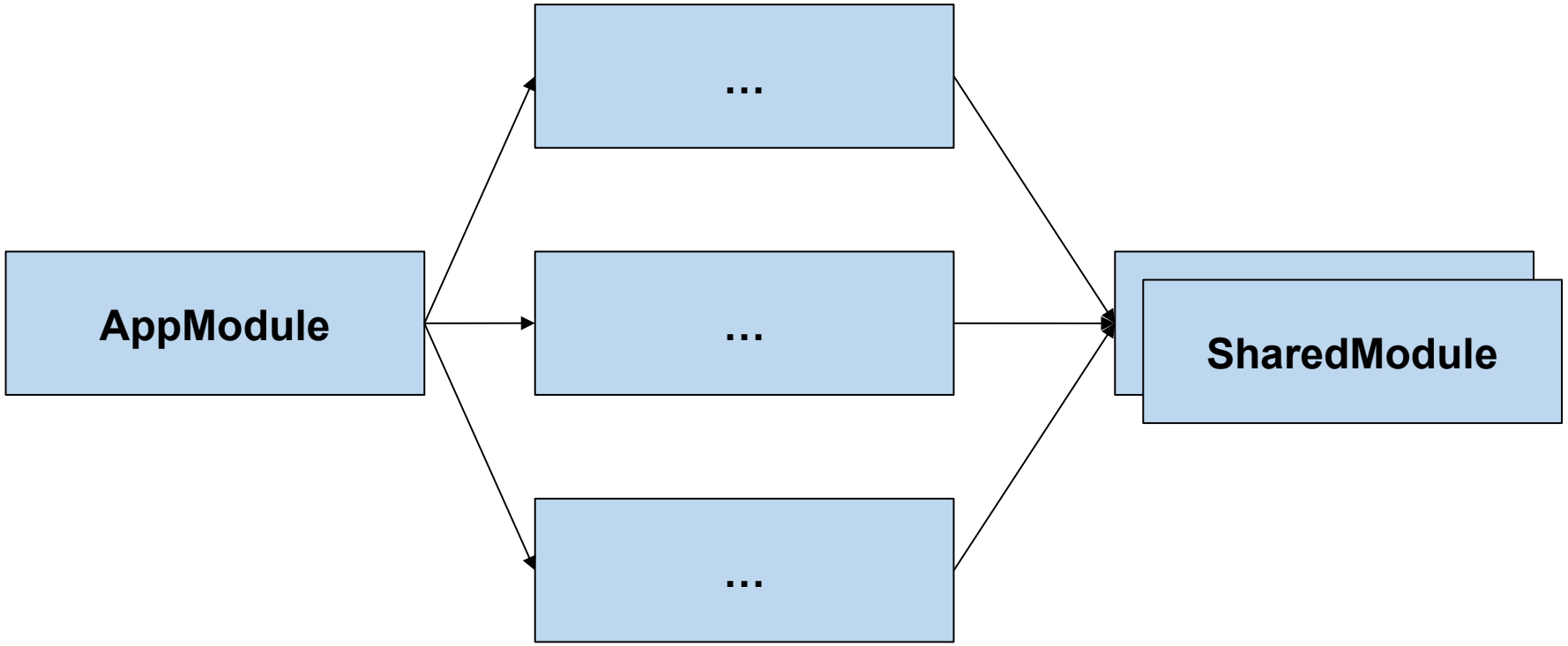
INSIDE KNOWLEDGE

Angular Architektur-Workshop: Strategic Design and Micro Frontends

ANGULARarchitects.io

Typical Module Structure



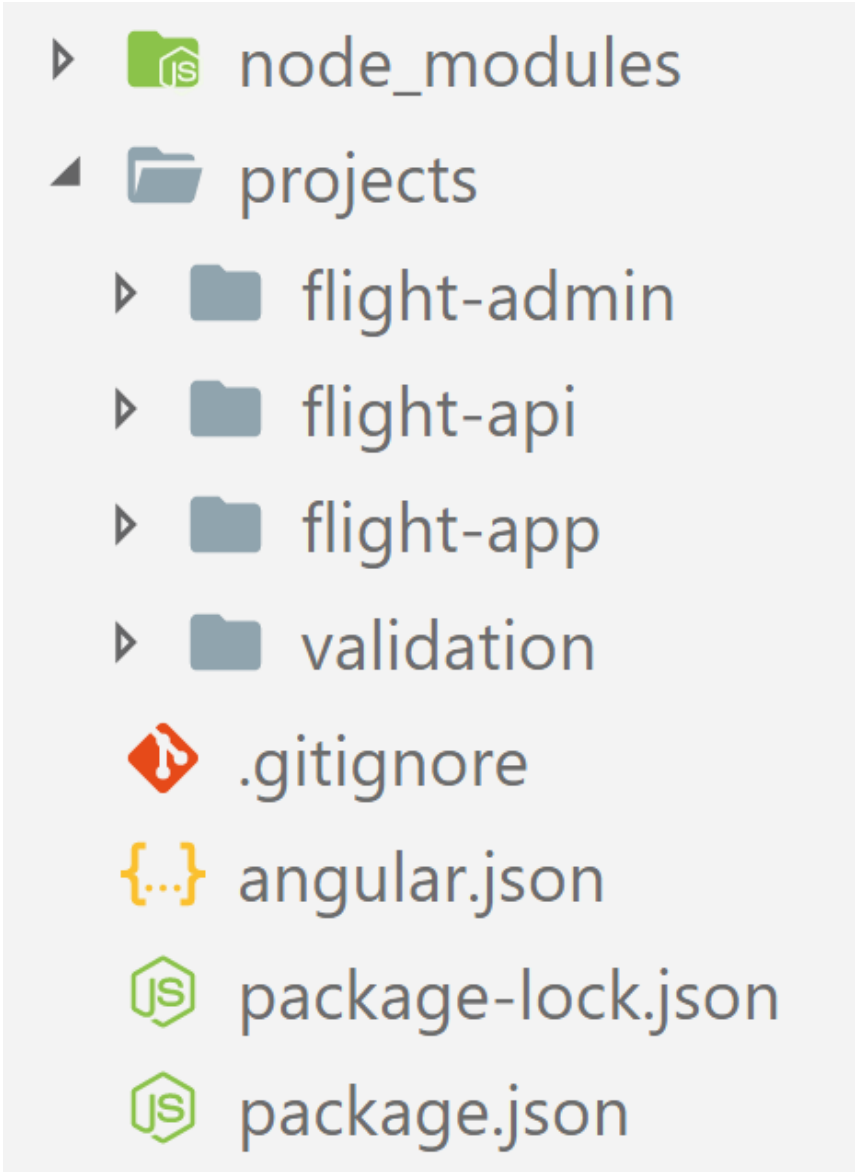
Root Module **Feature Modules** **Shared Modules**

Contents

- (npm-)Packages
- Nx Monorepos
- Strategic Design and DDD
- Microfrontends

Monorepos

Monorepo Structure



Advantages

- Everyone uses the latest versions
- No version conflicts
- No burden with distributing libs

Two Flavors

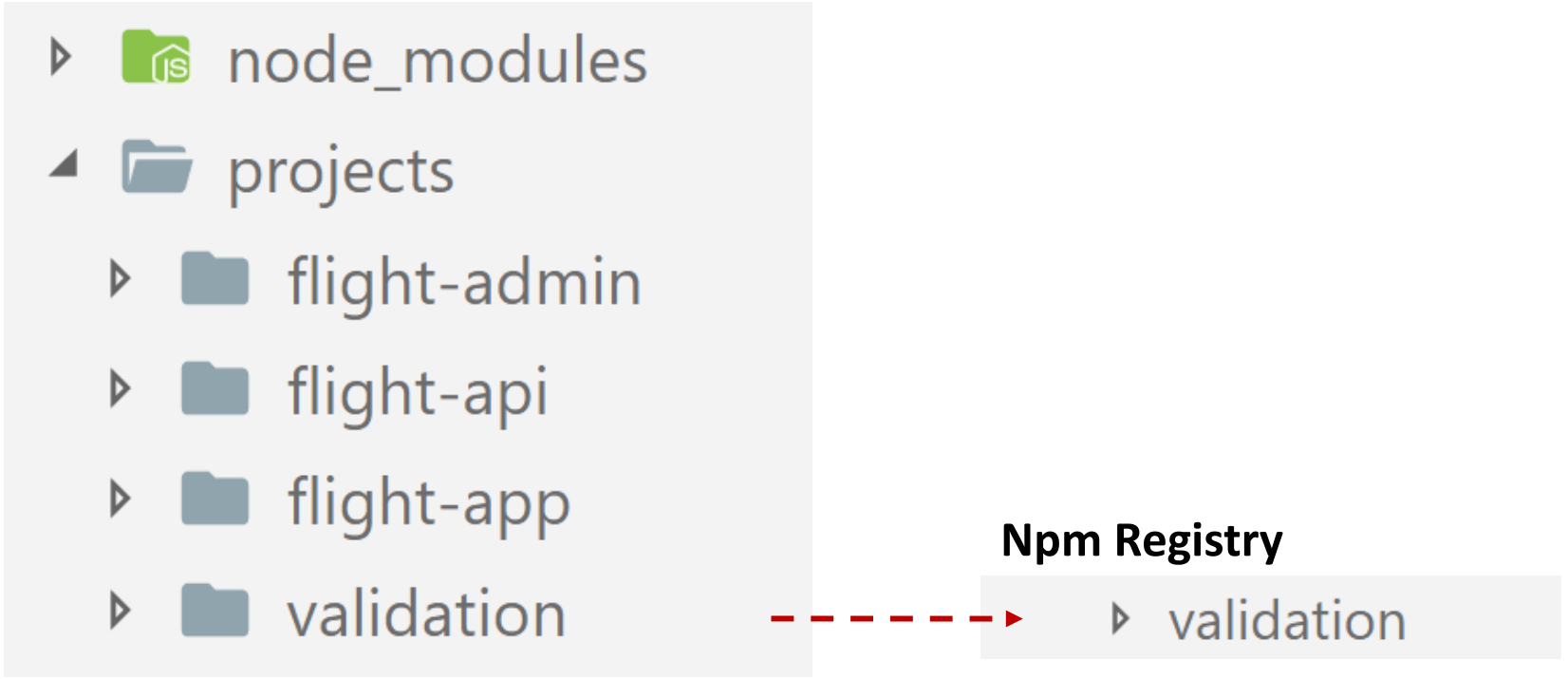
Project Monorepo

- Like Workspaces/Solutions in different IDEs

Company-wide Monorepo

- E. g. used at Google or Facebook

Moving back and forth



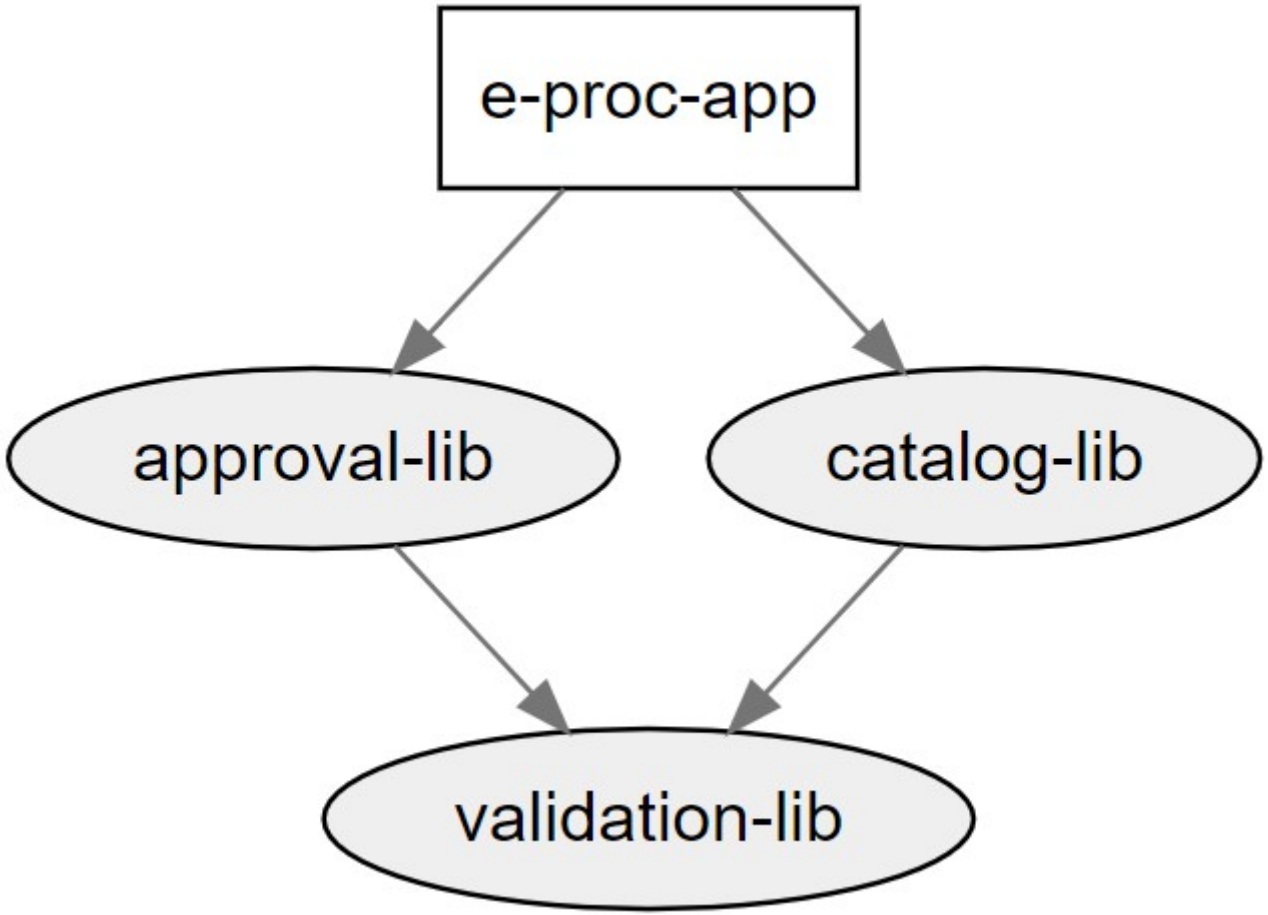
Tooling & Generator

https://nrwl.io/nx

Nrwl Extensions for Angular

An open source toolkit for enterprise Angular applications.

Visualize Module Structure



Creating a Workspace

```
npm install -g @angular/cli

ng new workspace

cd workspace

ng generate app my-app
ng generate lib my-lib

ng serve --project my-app
ng build --project my-app
```

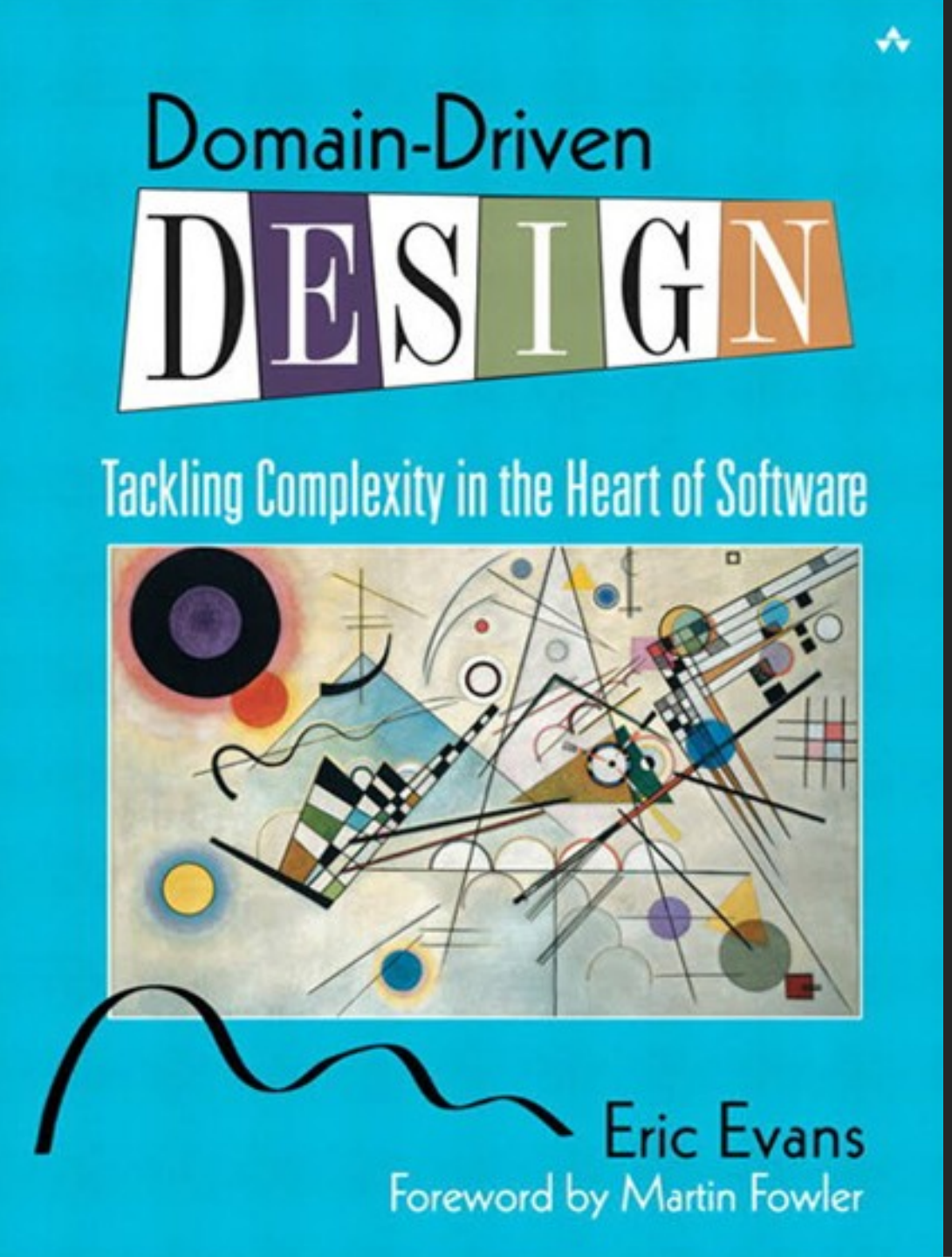
Creating a Workspace

```
npm install -g @angular/cli

npm init nx-workspace workspace

cd workspace

ng generate app my-app
ng generate lib my-lib --buildable

ng serve --project my-app
ng build --project my-app
```

DEMO

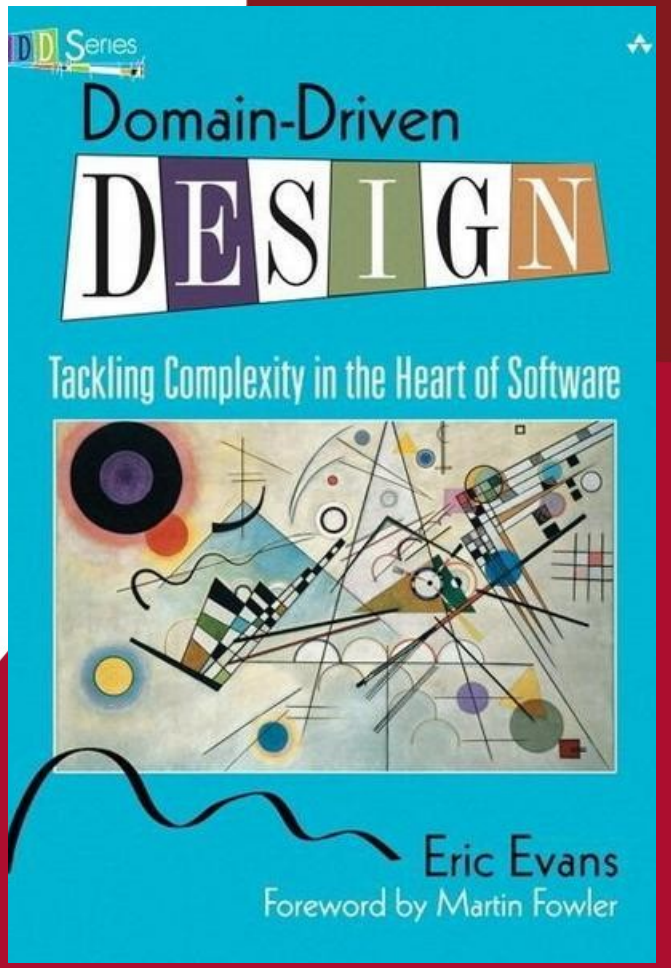
DDD

in a nutshell



Methodology for bridging the gap b/w requirements and architecture/ design

How to create sustainable frontend architectures with ideas from DDD?



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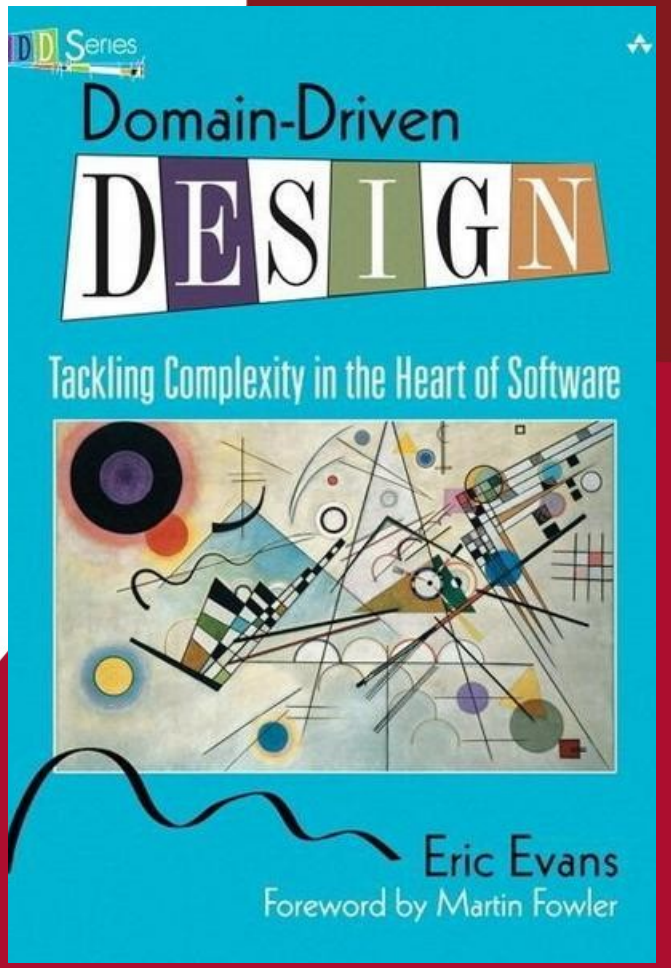
How to create **sustainable** **frontend** architectures with **ideas from DDD**?



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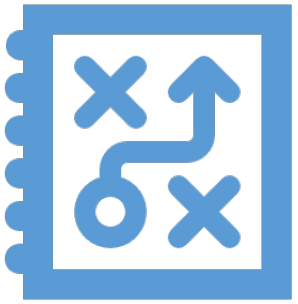
Domain Driven Design

Decomposing a System

Design Patterns
& Practices



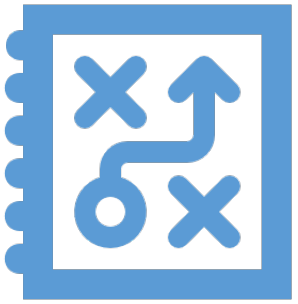
Strategic Design

Tactical Design

Domain Driven Design

Decomposing a System

Design Patterns
& Practices

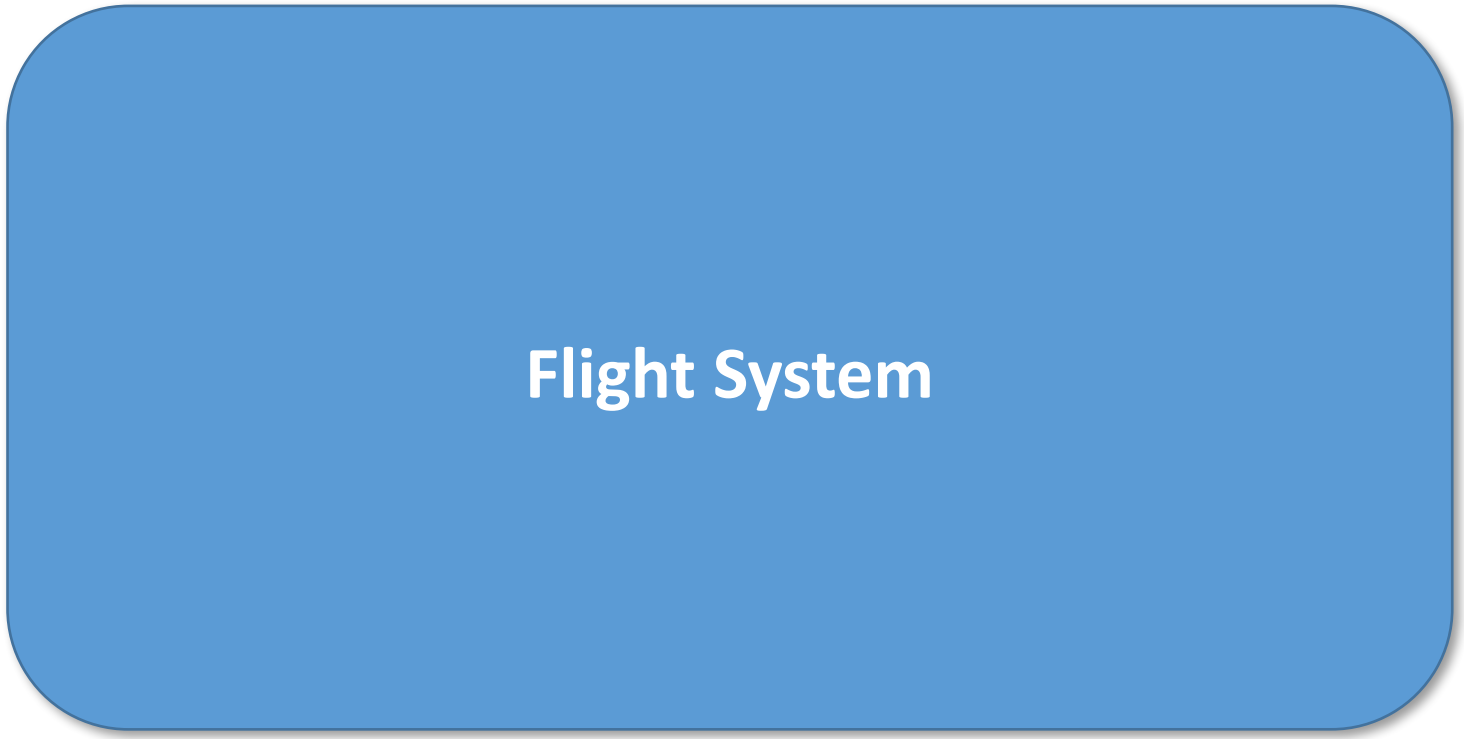


Strategic Design

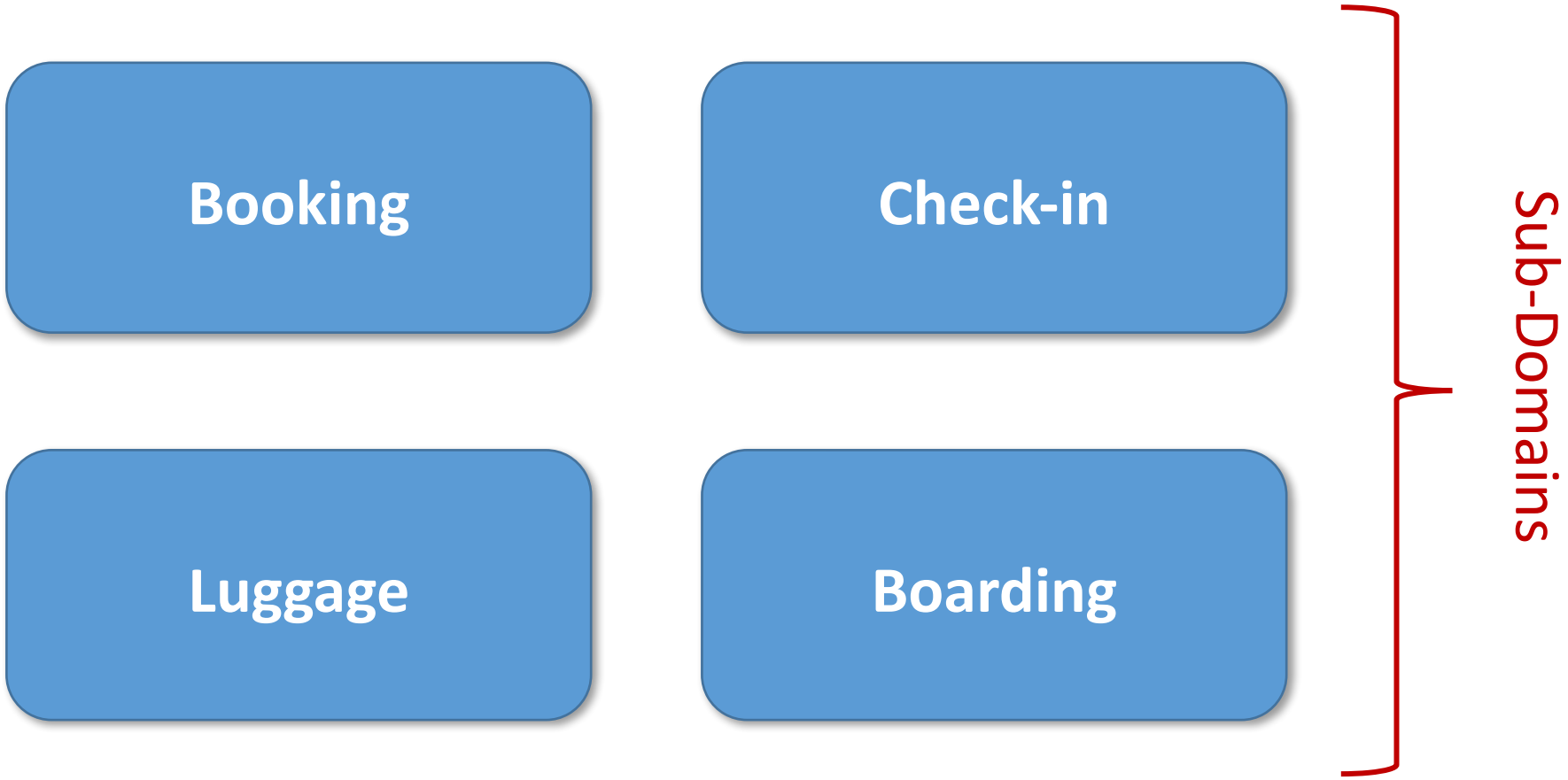
Tactical Design

This is what Strategic DDD prevents

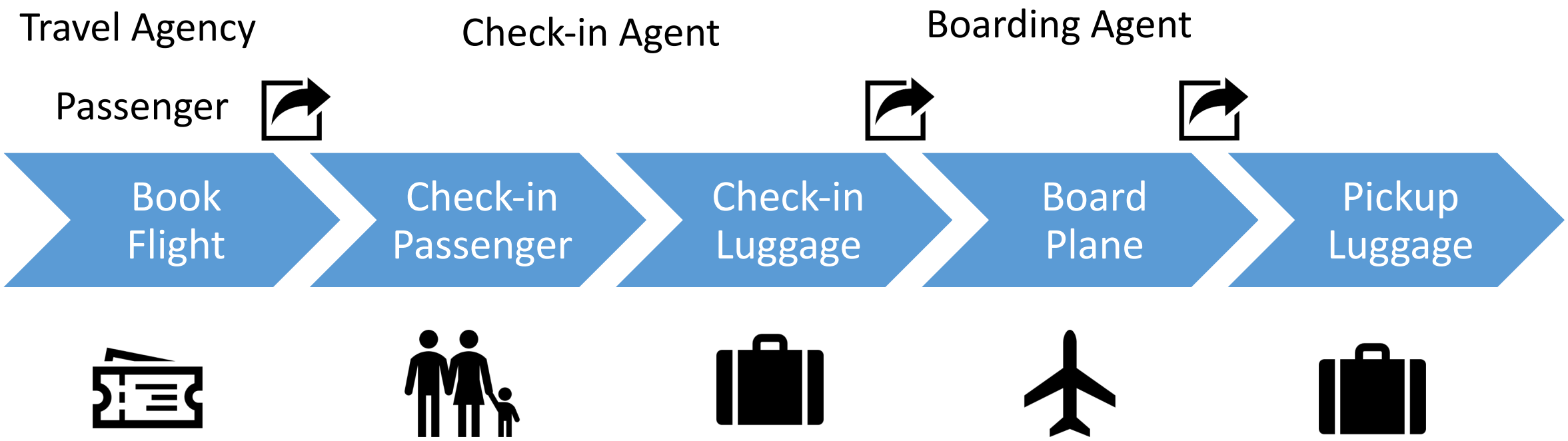
Example

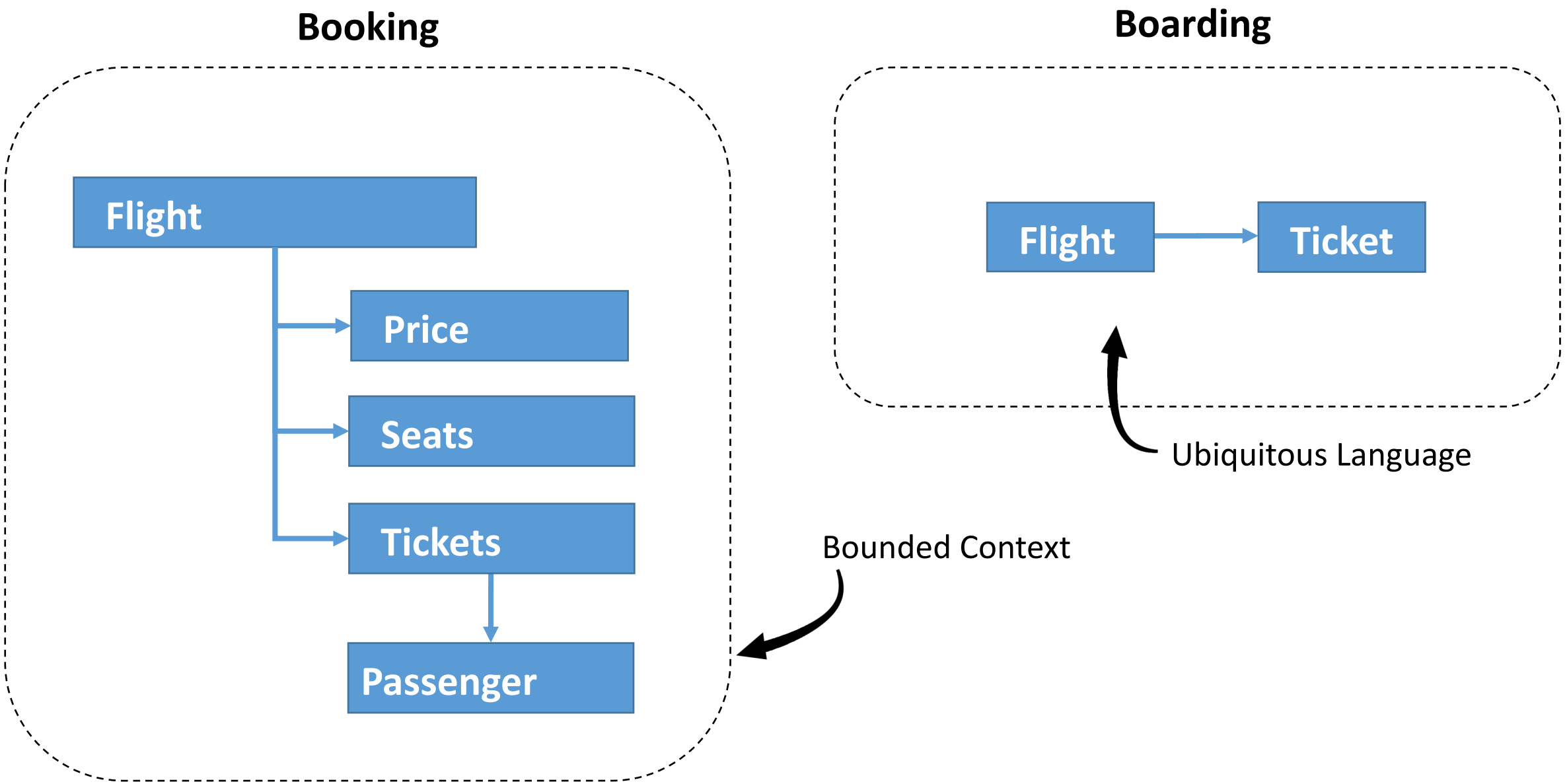


Example



Finding Sub-Domains





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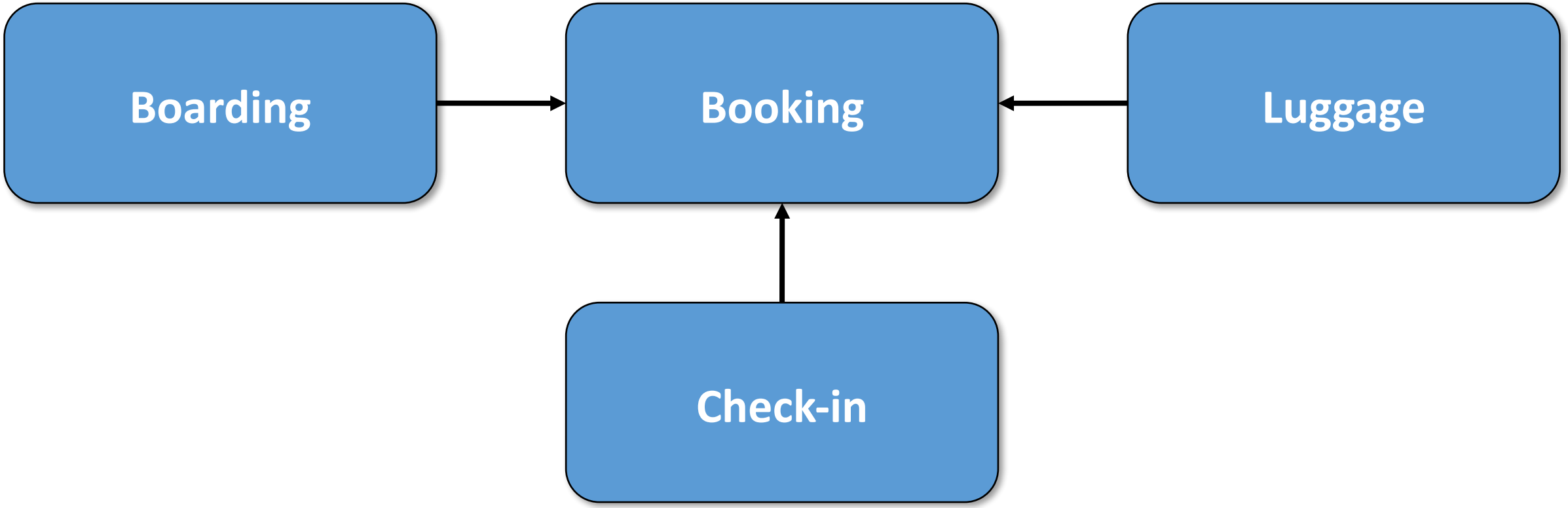
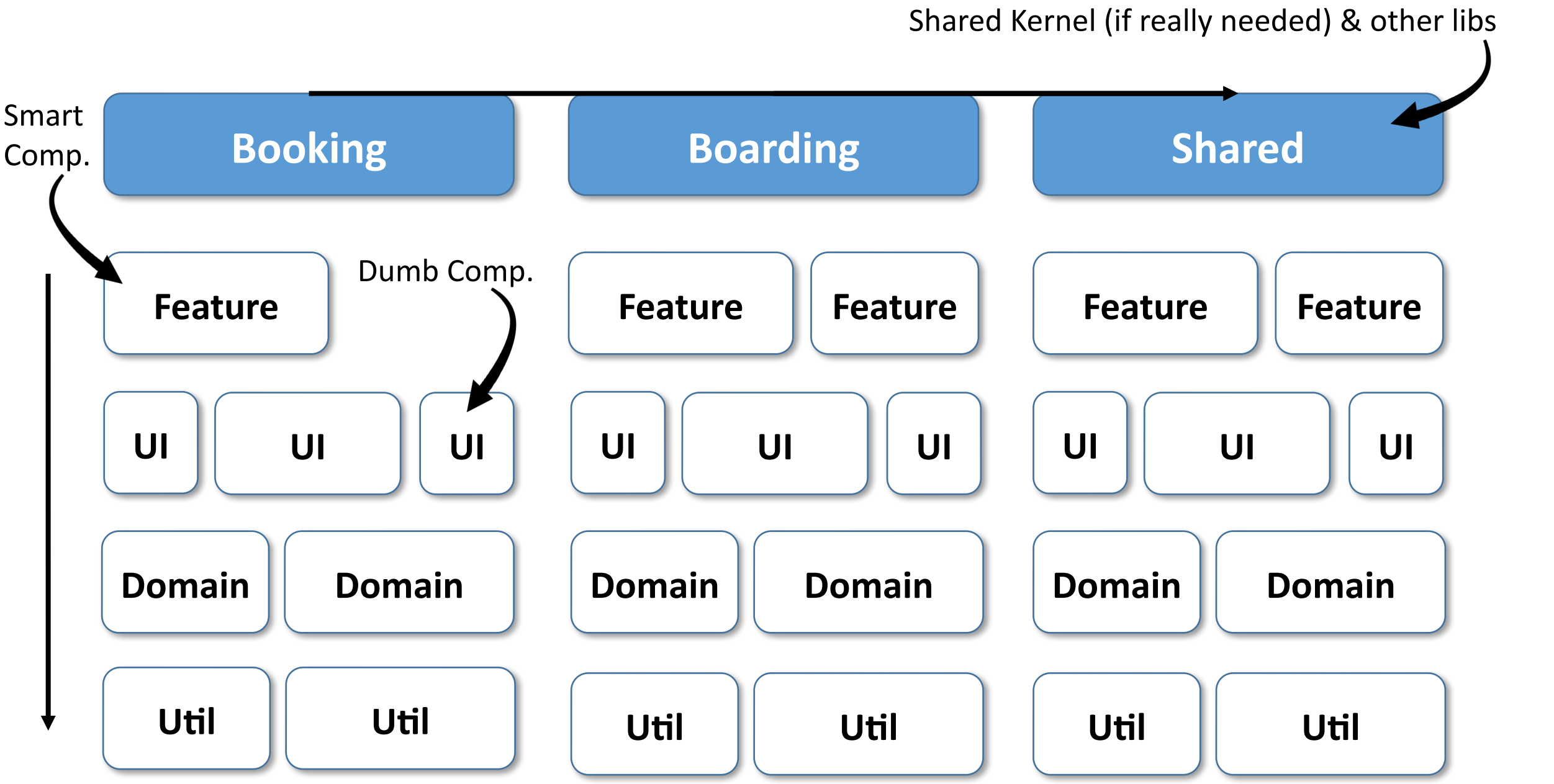
Context Map





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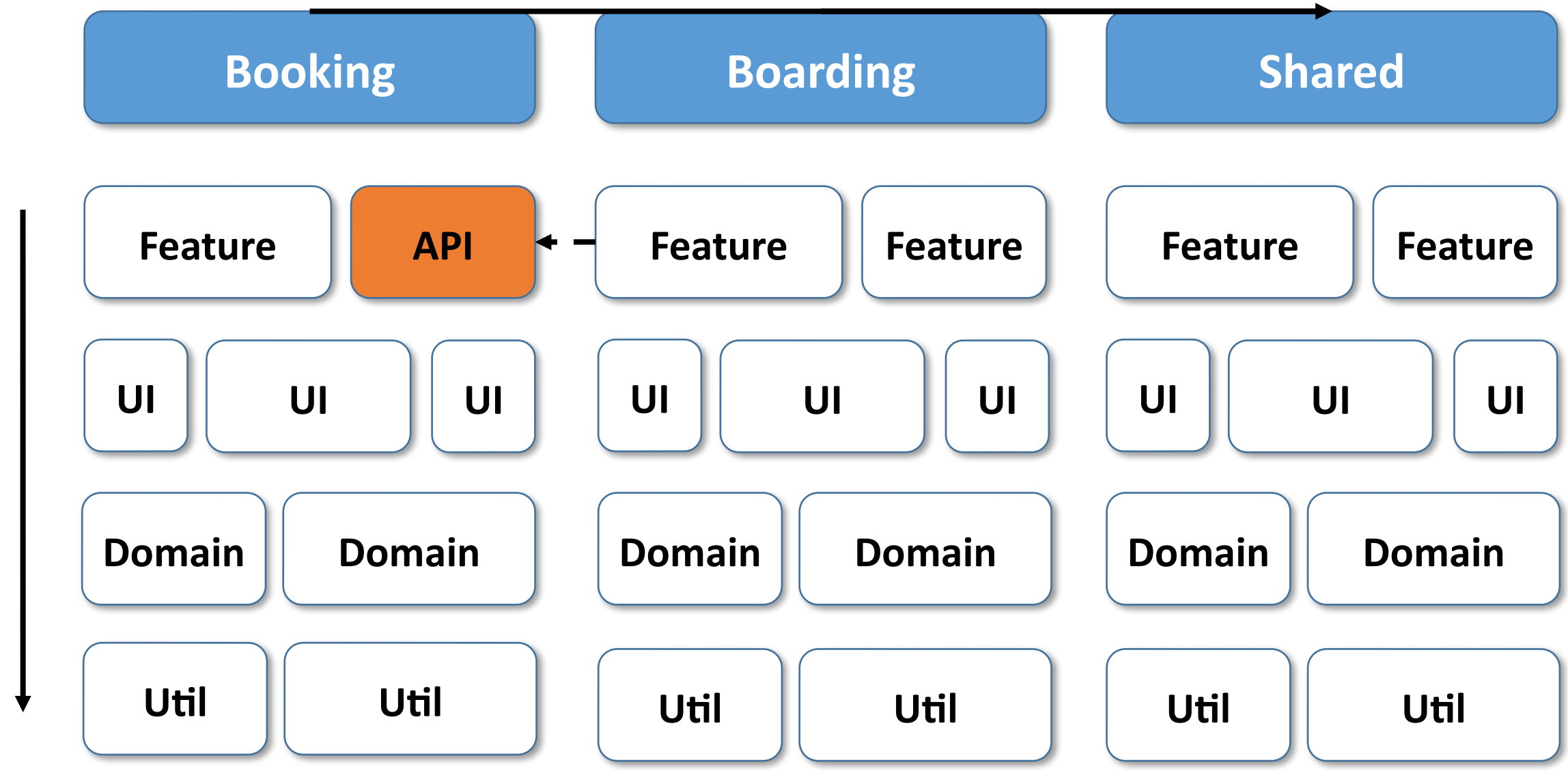
Enterprise Monorepo Patterns, Nrwl 2018: https://tinyurl.com/y2jjxld7


Booking
Boarding
Shared
Feature
API
Feature
Feature
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UI
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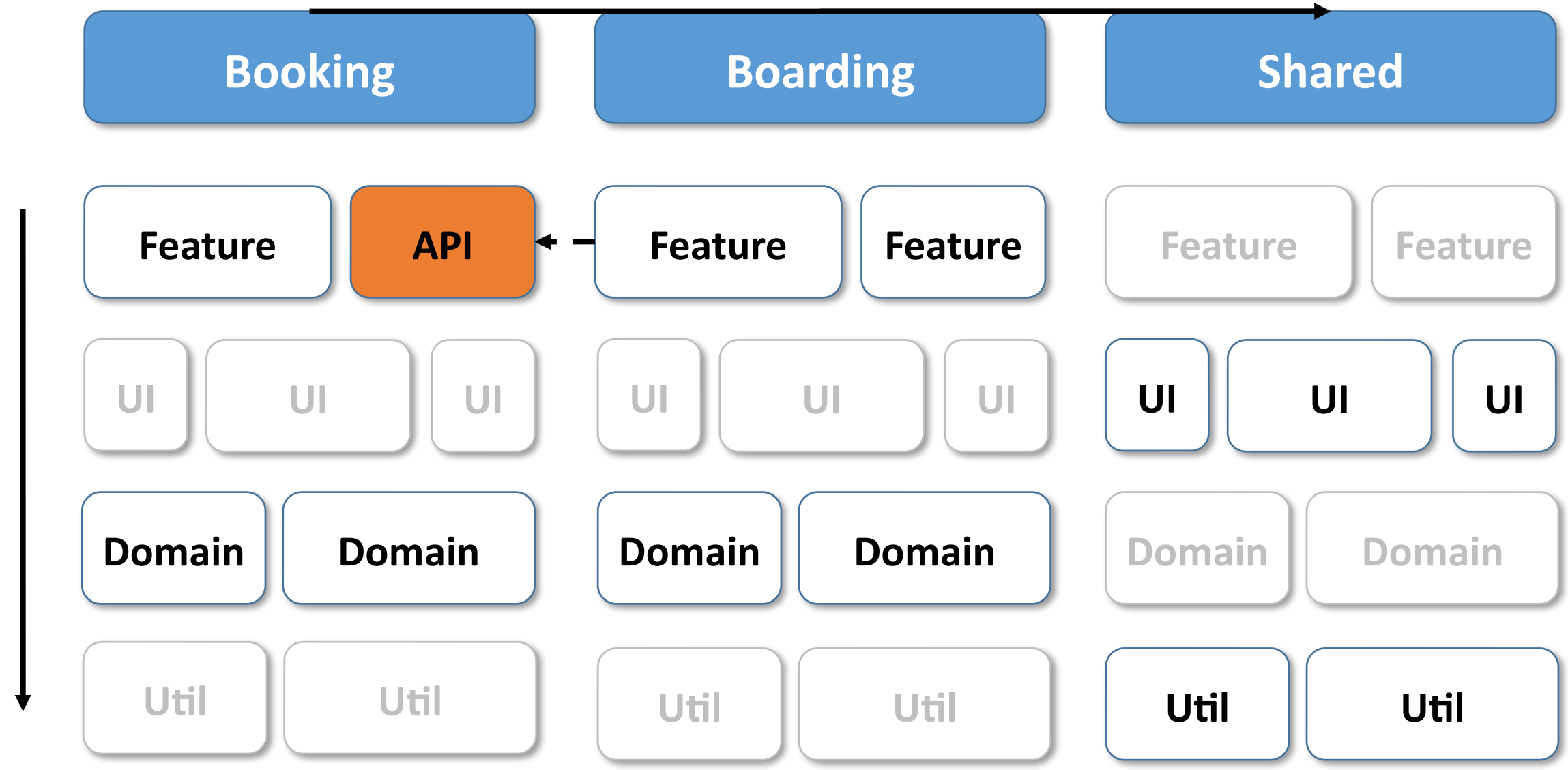
Booking
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Shared
Feature
API
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Util

DEMO

Build Cache

Best Performance: Several Apps!

Nx Plugins

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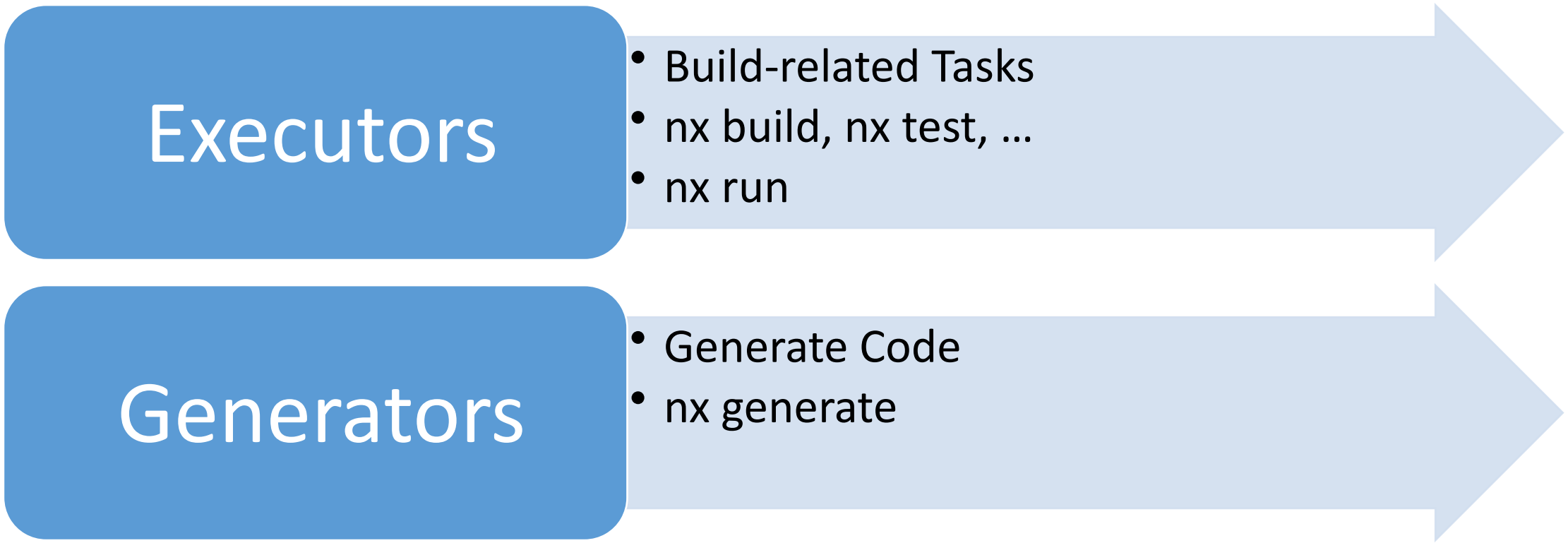
Add Plugin to Workspace

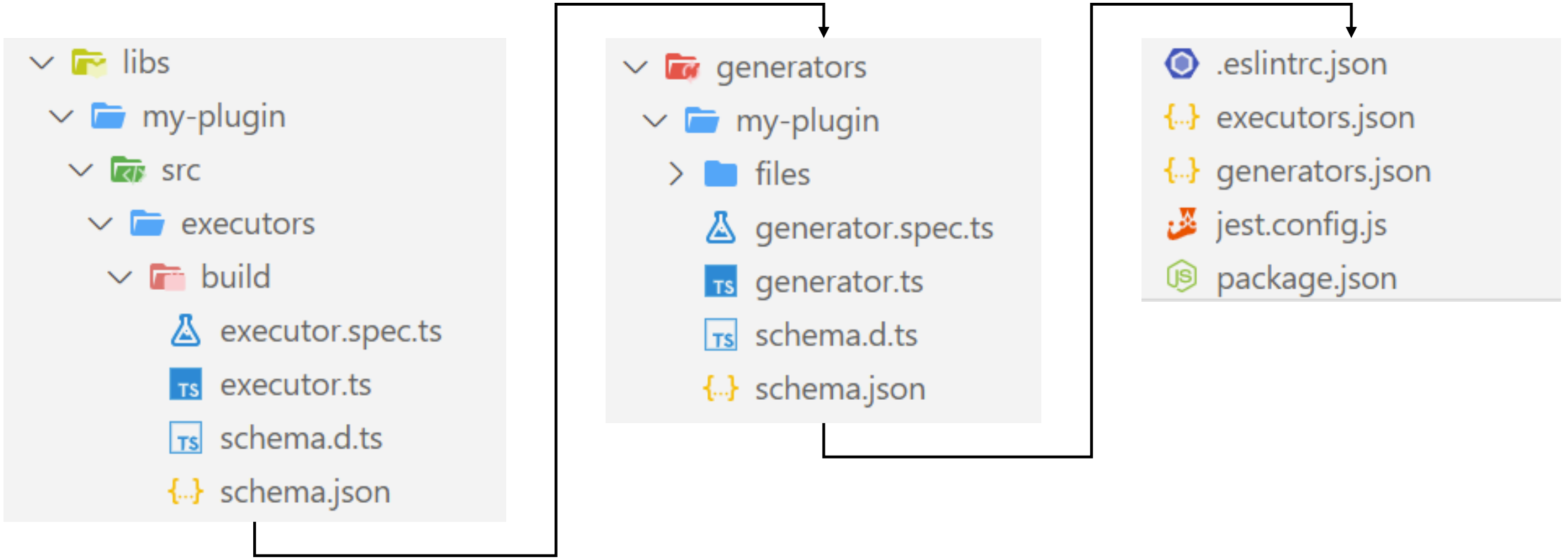
```
npm i @nrwl/nx-plugin

nx generate @nrwl/nx-plugin:plugin my-plugin
```

Building Blocks in Plugins



Folder Structure



Execute Generators

```
nx g @workspace-name/plugin-name:generator-name ...params...

nx g @flight-workspace/my-plugin:data-lib ...params...
```

Execute Generators/ Executors

```
nx run app-or-lib-name:target-name

nx run flight-app:demo-executor
```

target in project.json

DEMO

LAB

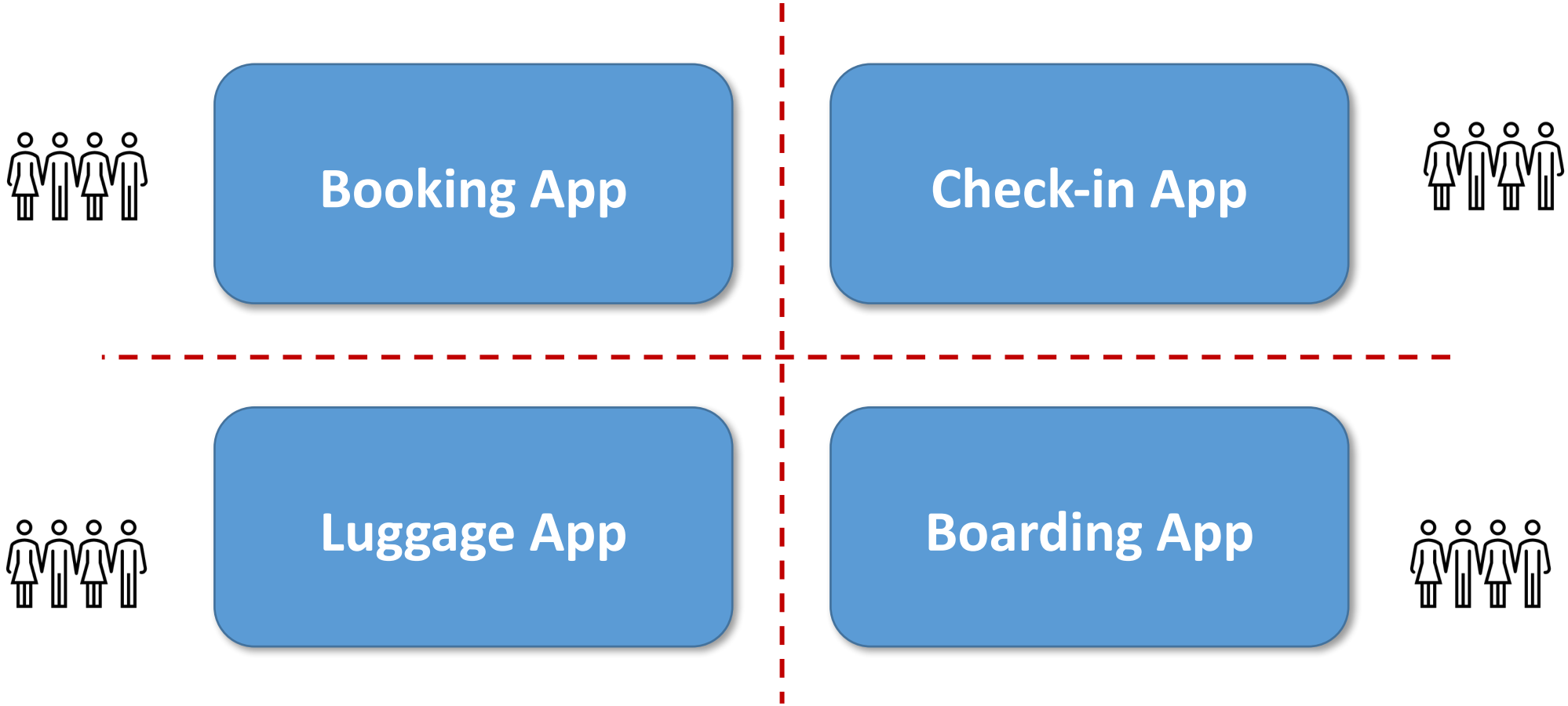
Finegrained Libraries

- Unit of recompilation
- Unit of retesting
- Access restrictions
- Information Hiding
- Easy: Just *ng g lib …*
- Future replacement for NgModules?

Micro Frontends?

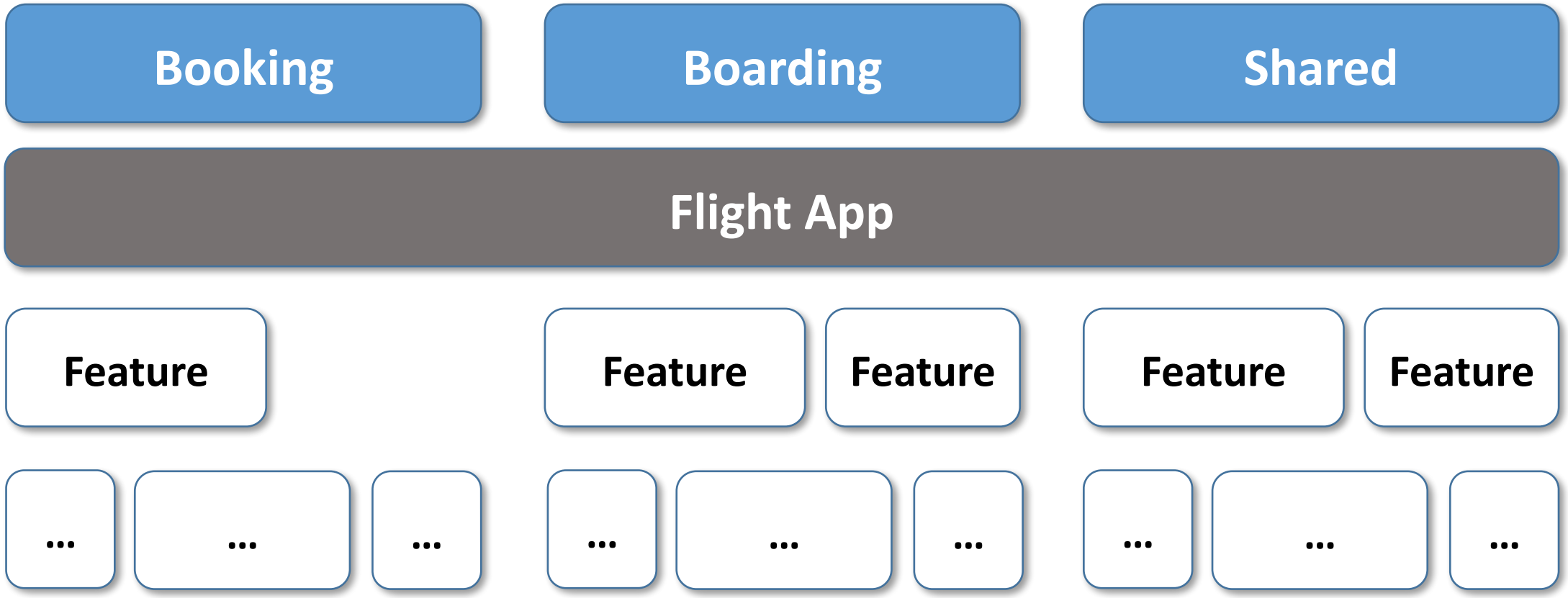
Short outlook

Microfrontends

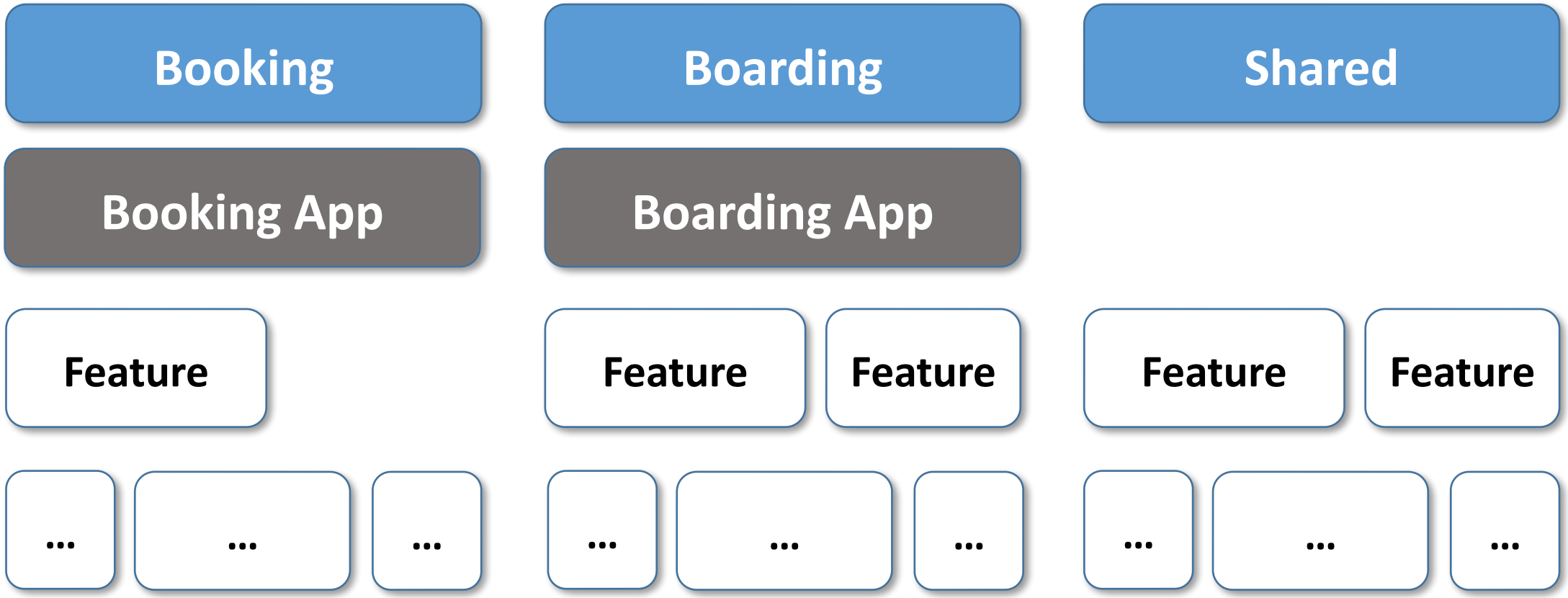


Microfrontends
are first and foremost
about **scaling teams!**

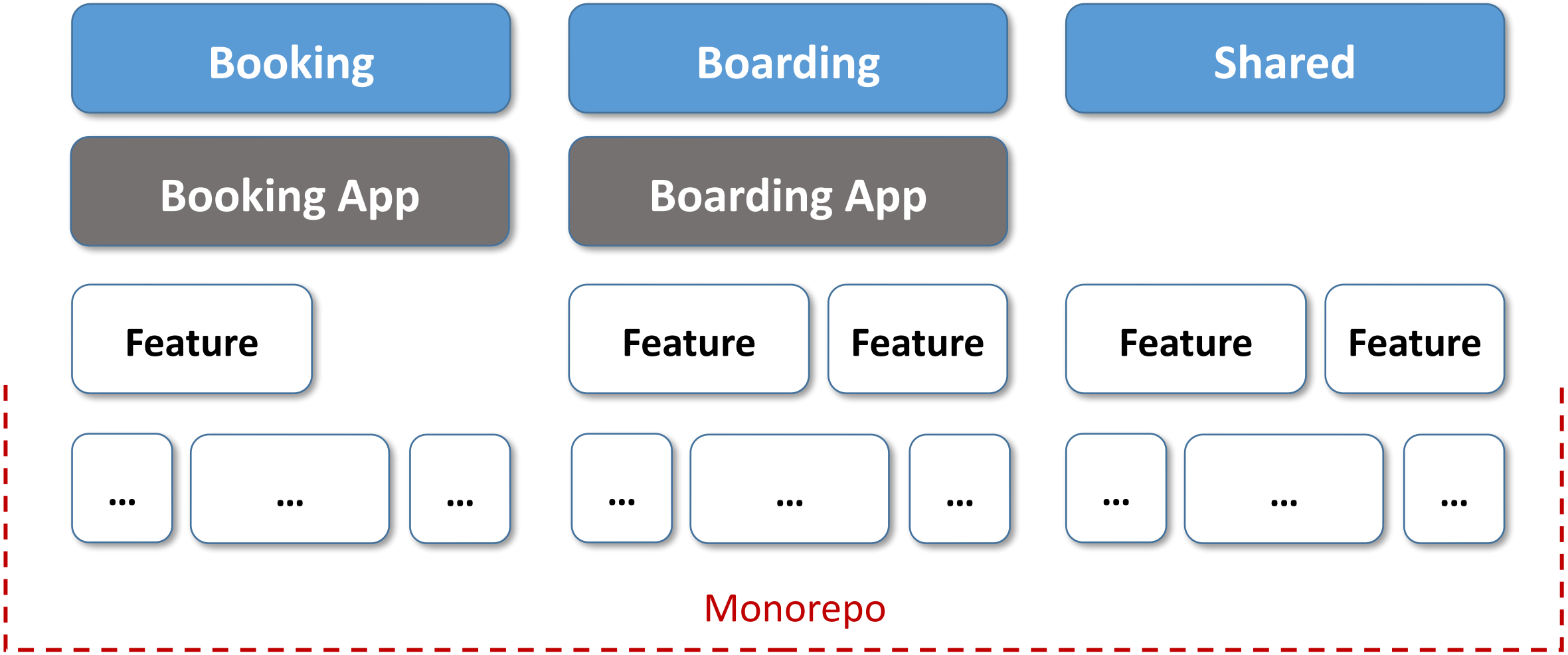
Deployment Monolith



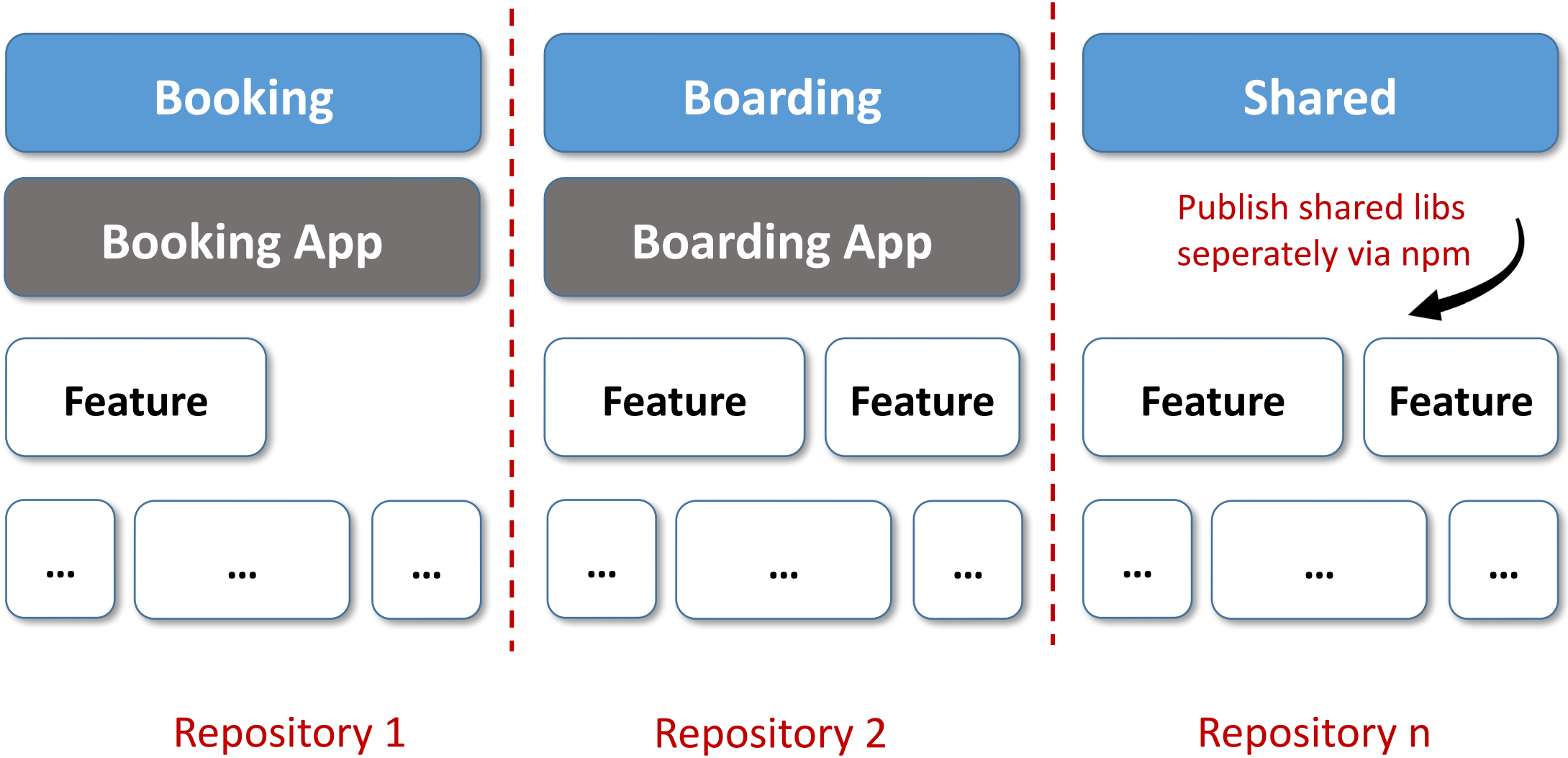
Microfrontends



Option 1: One App per Domain



Option 2: One Monorepo per Domain

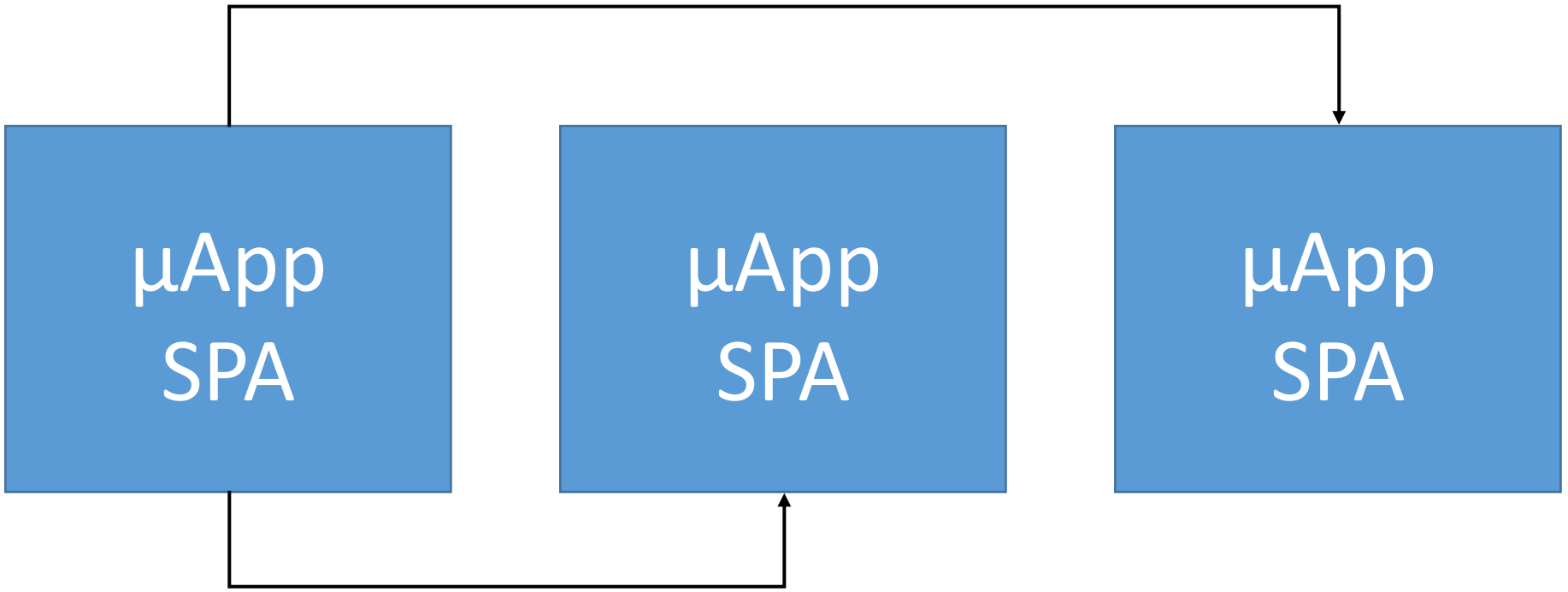


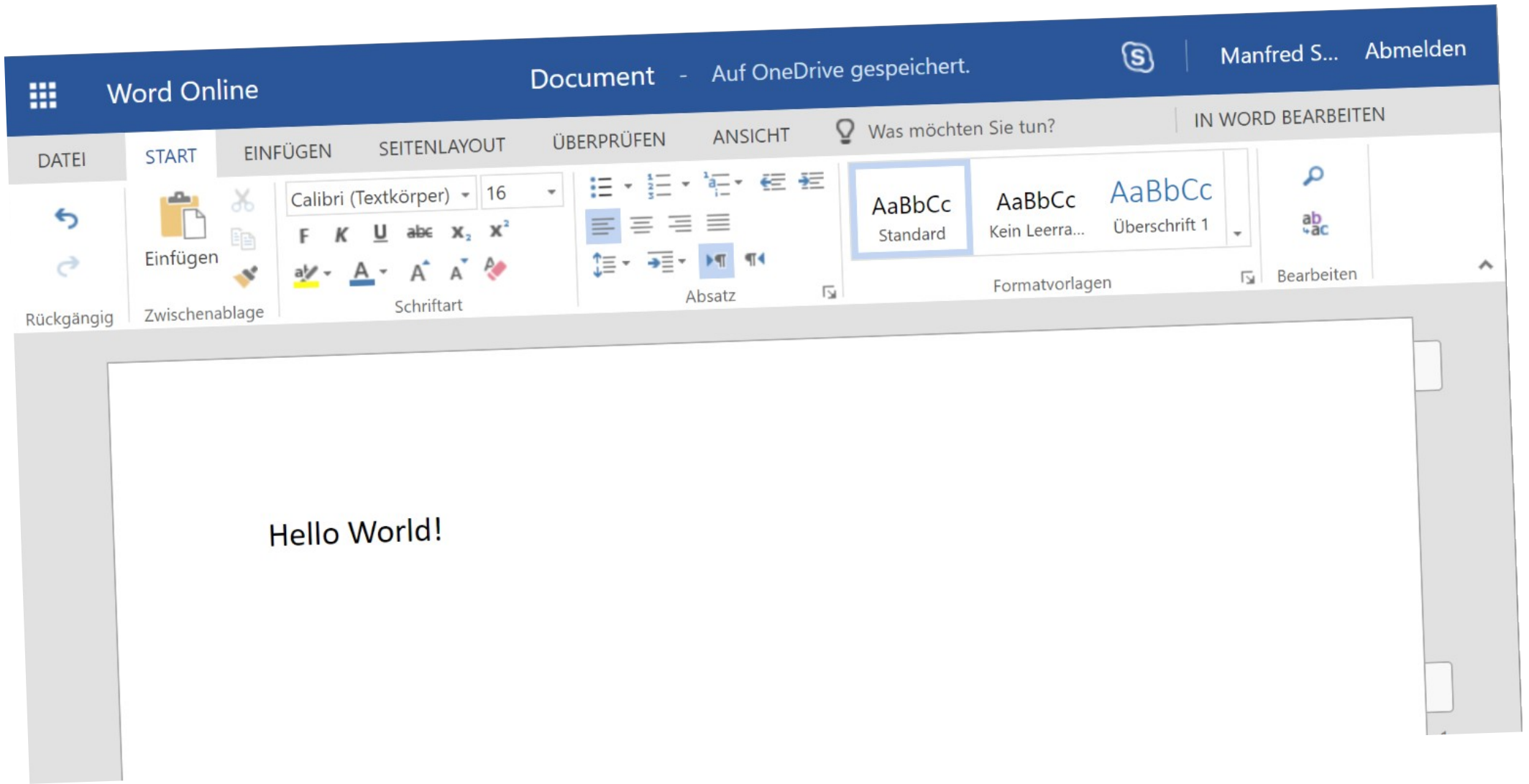
Benefits

- **Autonomous Teams**
- Separate Development
- Separate Deployment
- Own architecture decisions
- Own technology descisions

Integration via Hyperlinks

UI Composition w/ Hyperlinks





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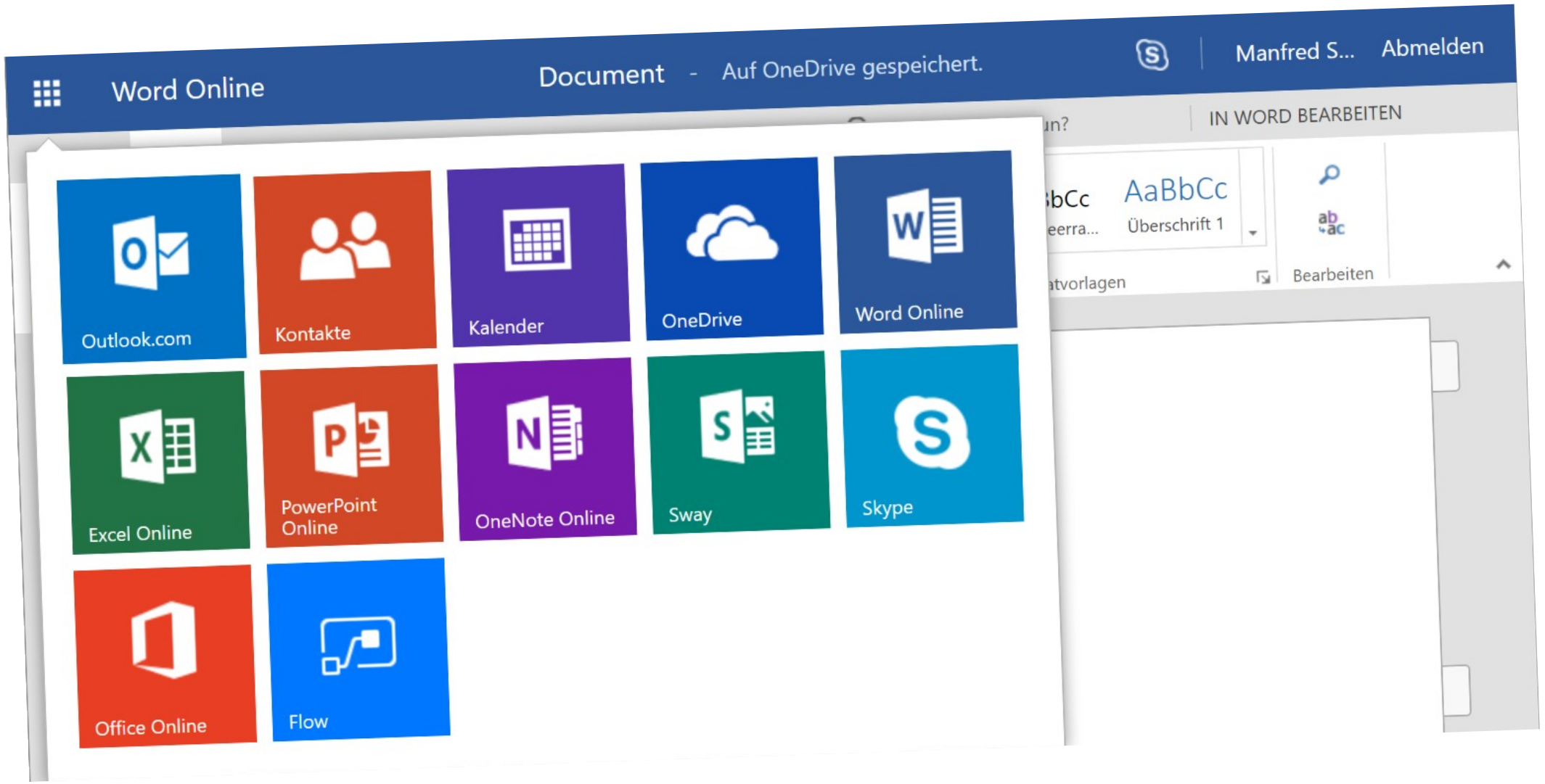

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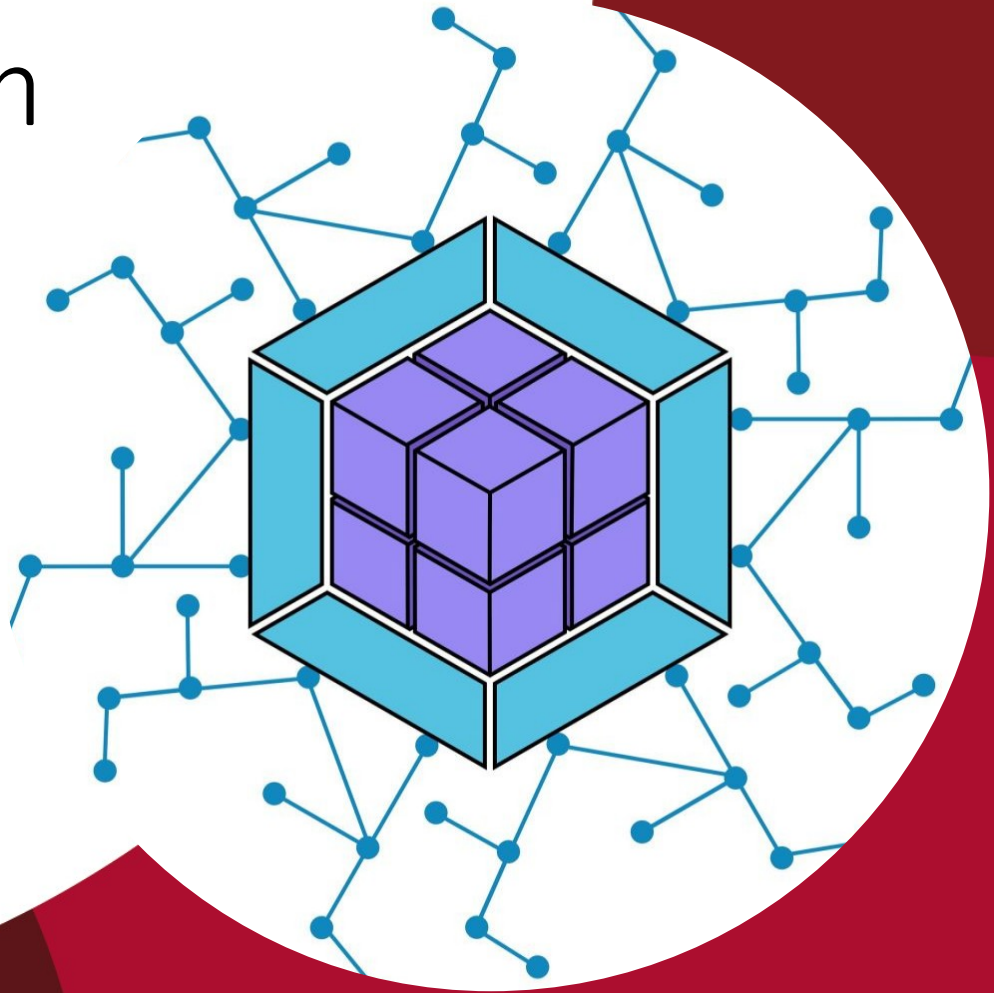
Integration via
Shell

Providing a (SPA based) Shell

Webpack 5
Module Federation



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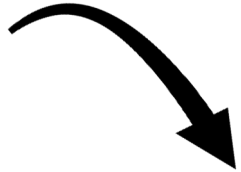
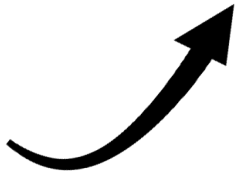
Idea

Does not work with
webpack/ Angular CLI

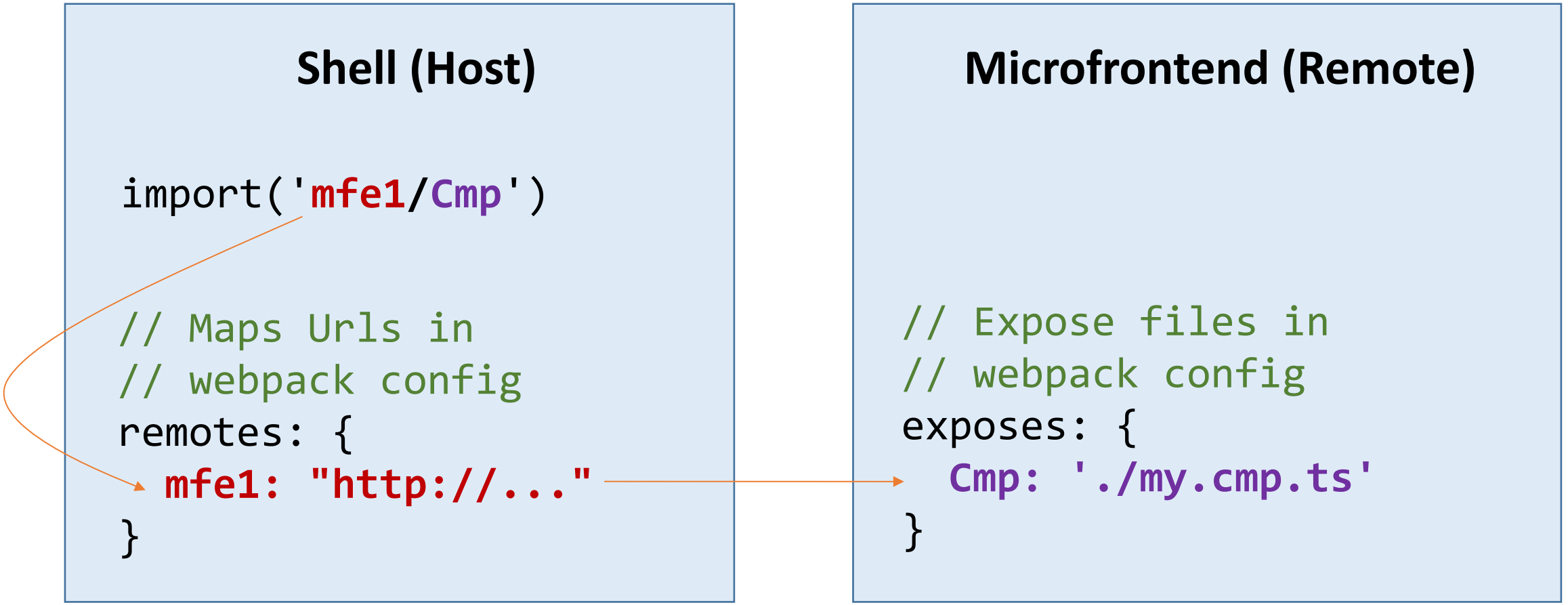


```
const Component = import('http://other-app/xyz')
```

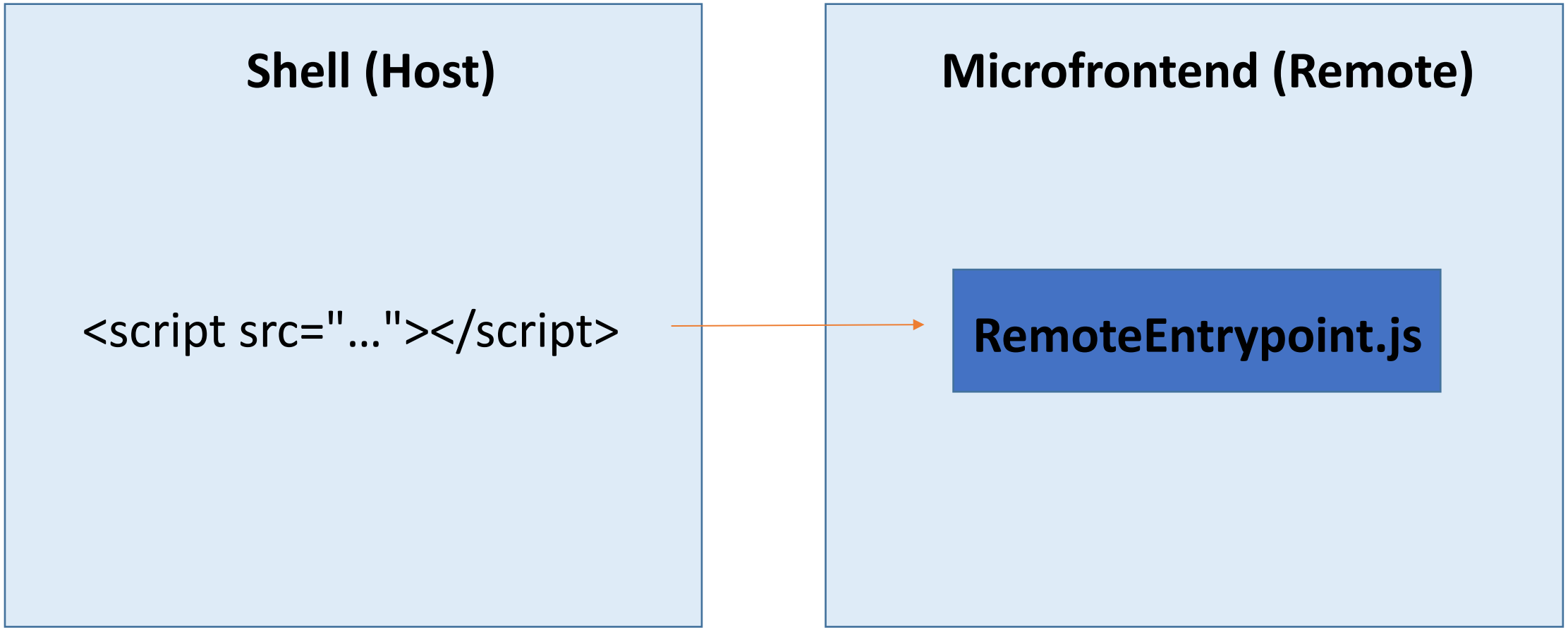
Even lazy parts must be
known at compile time!



Webpack 5 Module Federation



How to Get the Microfrontend's URL?



How to Share Libs?

Shell (Host)

```
shared: [
  "@angular/core", "..."
]
```

Microfrontend (Remote)

```
shared: [
  "@angular/core", "..."
]
```

Dealing with Version Mismatches

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Default Behavior

Selecting the highest compatible version

Default Behavior

Conflict: No highest compatible version

Example

- Shell: my-lib: ^10.0
- MFE1: my-lib: ^10.1
- MFE2: my-lib: ^9.0
- MFE3: my-lib: ^9.1

Result:

- Shell and MFE1 share ^10.1
- MFE2 and MFE3 share ^9.1

Configuring Singletons

```
shared: {
  "my-lib": {
    singleton: true
  }
}
```

11.0 ✓ 10.1 ✗

Configuring Singletons

```
shared: {
  "my-lib": {
    singleton: true,
    strictVersion: true // Error instead of warning!
  }
}
```

11.0  10.1 

Relaxing Version Requirements

```
shared: {
  "my-lib": {
     requiredVersion: ">=1.0.1 <11.1.1"
  }
}
```

Federated Angular: Angular, CLI, & Module Federation

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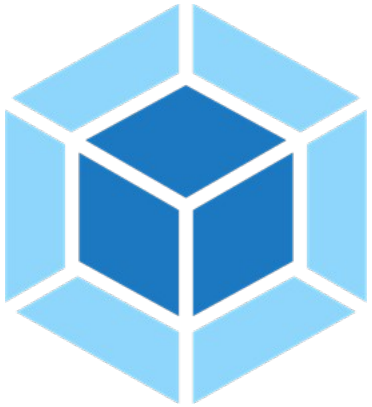
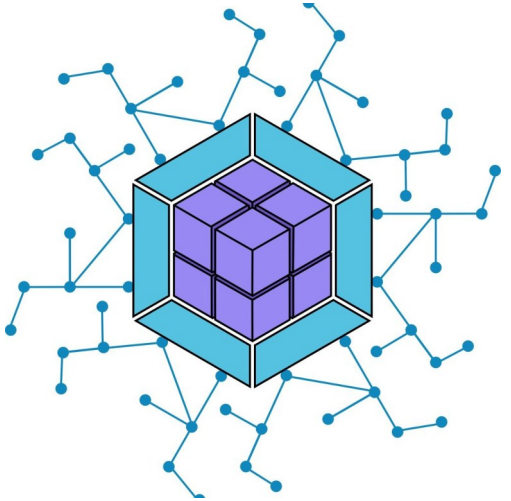
?



webpack

Angular CLI



Module Federation
Configuration

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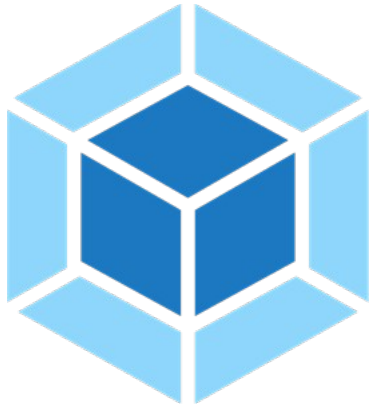
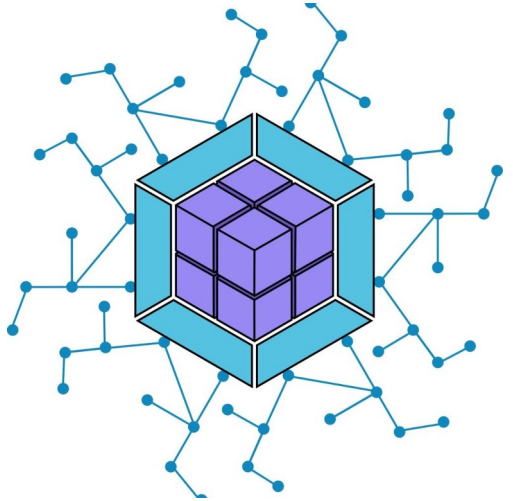
Custom Builder

Angular CLI



webpack



Module Federation
Configuration

@angular-architects/module-federation

1.0.2 • Public • Published 18 hours ago

Readme | Explore BETA | 3 Dependencies

Features

- ✅ Generates the skeleton for a Module Federation config.
- ✅ Installs a custom builder to enable Module Federation.
- ✅ Assigning a new port to serve (`ng serve`) several projects at once.

@ManfredSteyer

Usage

1) ng add @angular-architects/module-federation
2) Adjust generated configuration
3) ng serve

Usage

1) npm i @angular-architects/module-federation -D
2) ng g @angular-architects/module-federation:init
3) Adjust generated configuration
4) ng serve

DEMO

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Multi Framework/ Version Solutions

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Abstracting Differences b/w SPA Frameworks

Wrap them into Web Components

Loading Web Components via Module Federation

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Module Federation

```
await import('other-app/web-cmp');
```

Module Federation

```
const rootElm = document.createElement('web-cmp')
document.body.appendChild(rootElm);

await import('other-app/web-cmp');
```

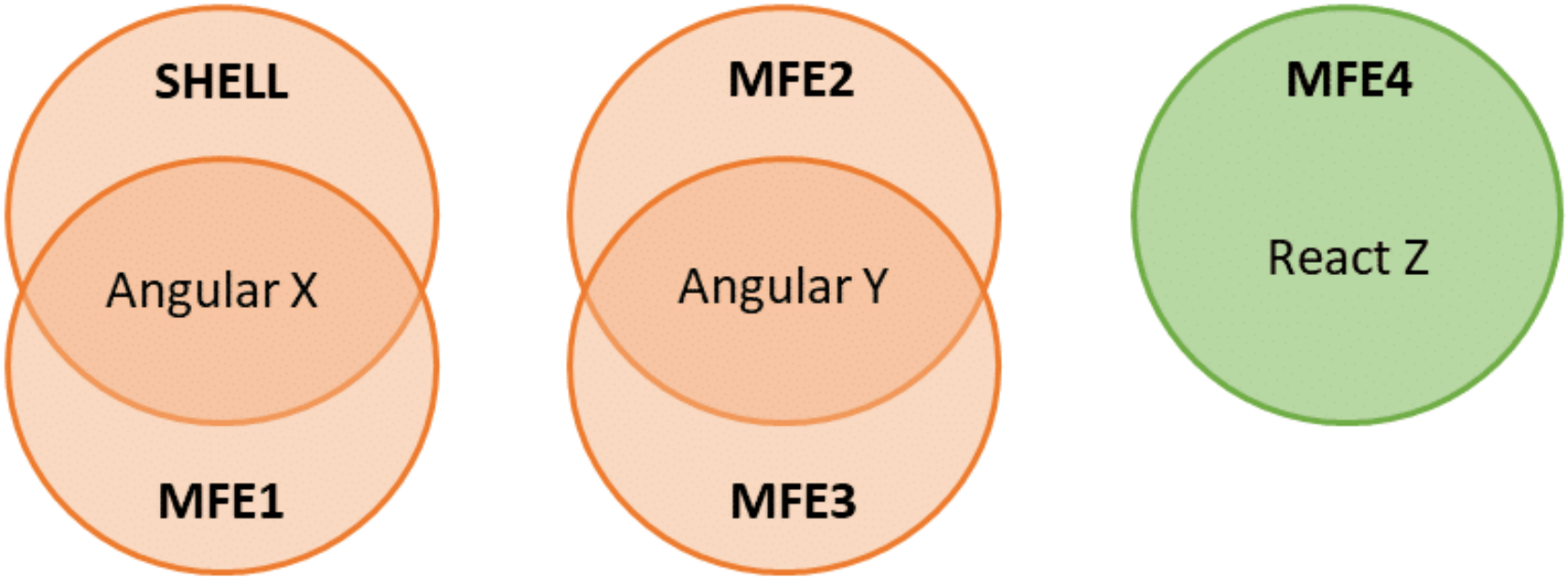
Routing to Another SPA?

WrapperComponent

```
const rootElm = document.createElement('web-cmp')
document.body.appendChild(rootElm);

await import('other-app/web-cmp');
```

Result



DEMO

https://red-ocean-0fe4c4610.azurestaticapps.net

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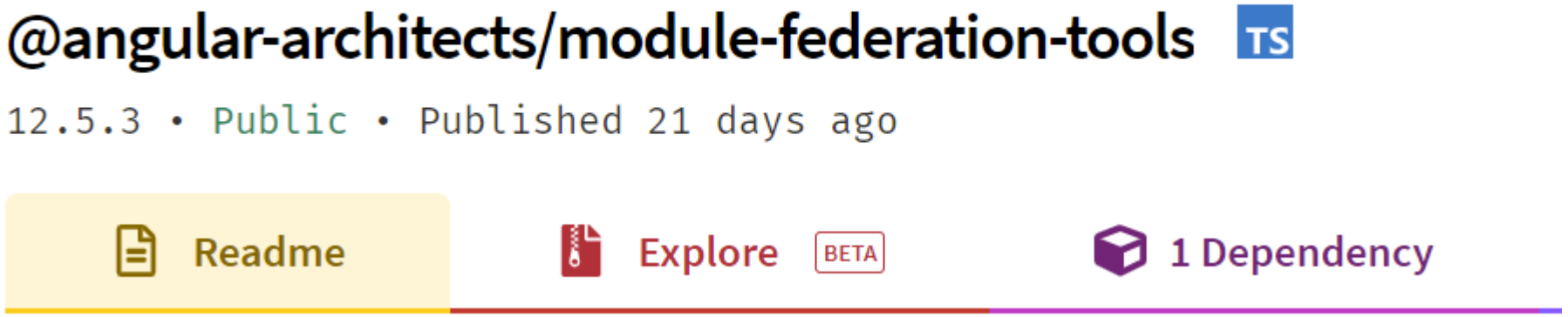
Challanges

- Bundle Size
- Multiple Routers
- Bootstrapping Several Angular Instances
  - Share Platform-Object when same version is reused
  - Share ngZone

Challanges & Solutions




Choosing a Solution

Some General Advice