

MICRO FRONTENDS



source: <https://experiencenomad.com/leo-villareal-buckyball-buckminster-fuller-buckyballs/>

Speaker notes

- 1 hour interactive session
- brief overview followed by some examples
- Ask questions!
- (Assignments)

CODE.STAR*

PASSIONATE PROGRAMMERS. POWERED BY ORDINA



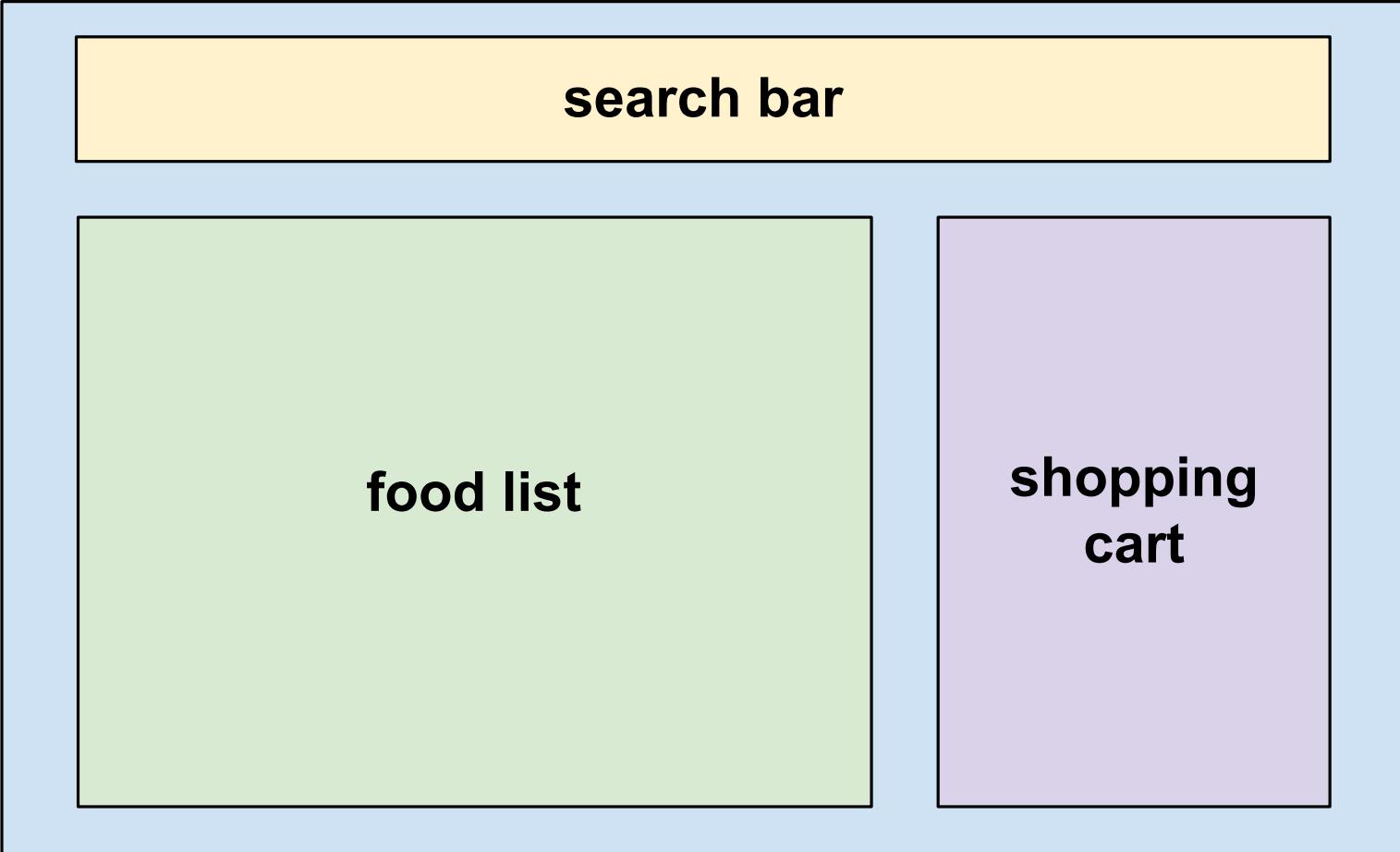
github.com/mdvanes

source: https://unsplash.com/photos/0o_GEzyargo

MICRO WHAT?

Speaker notes

- First part also for back-end, last part more for front-end
- For back-end: what is monolith?
- Where is the threshold for a monolith?
- How do you prevent monolith? Solutions?
- Who is at a project that uses micro services? Why do they use it?
- Front-end: Who is (or has been) at a project with more than 10 devs? More than 50? More than 200?
- Back-end: How would you apply micro services to the front-end?
- Micro services vs Micro Frontends
- MFEs are: any range of solutions to integrate a collection of smaller frontends into one application
(<https://mdworld.nl/micro-frontends-in-a-nutshell>)
- MFEs are not new



search bar

food list

**shopping
cart**

Speaker notes

- How would you build this?
- What are weak points of this solution?

[Go to order form](#)

Speaker notes

Hyperlinks

- code is duplicated
- visible reloads when navigating
- no communication between micro apps

a webdevelopment blog,
since 2003

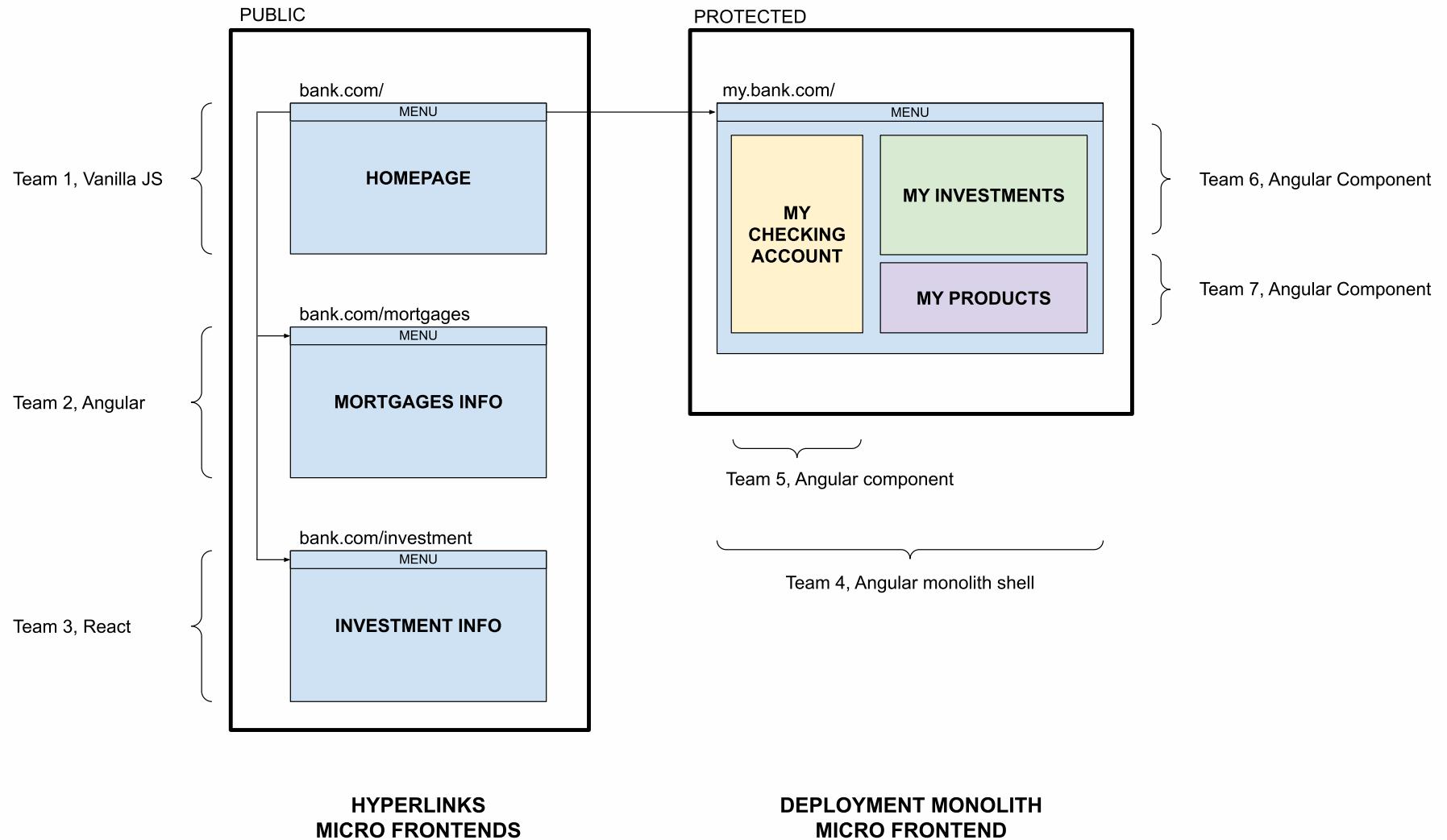
0x132f	am·diam·	61	6
0x1337	Code·404	43	6
0x1347	Page·not	50	6
0x134f	·found··	20	6



Speaker notes

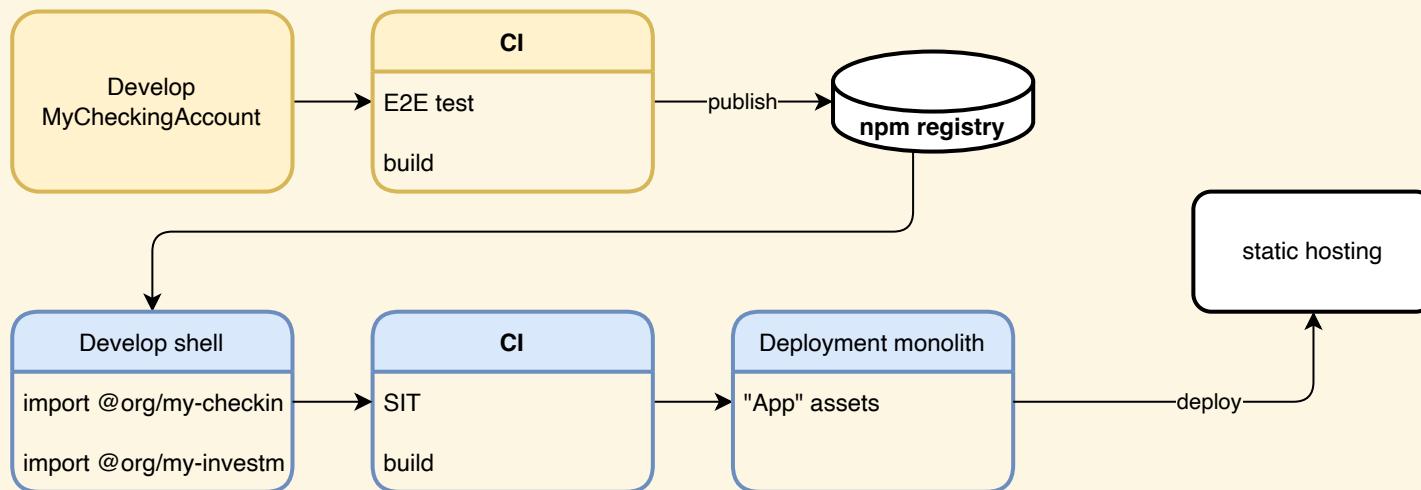
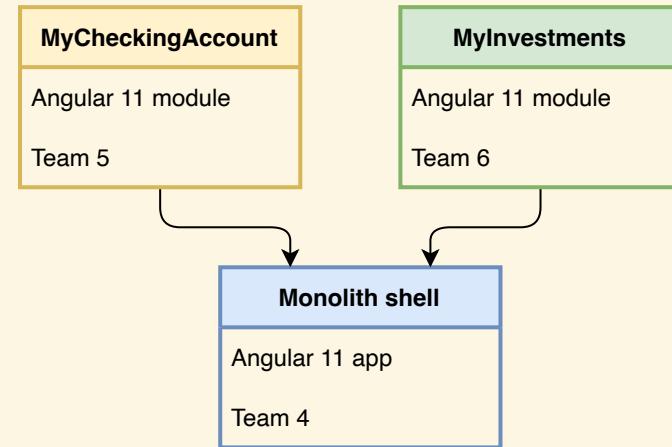
iframes:

- needs special code to inject (404)
- bottom: unsafe (clickjacking, frame-ancestors disabled)
- isolation (e.g. Angular & React, or CSS classes)
- limited responsive design



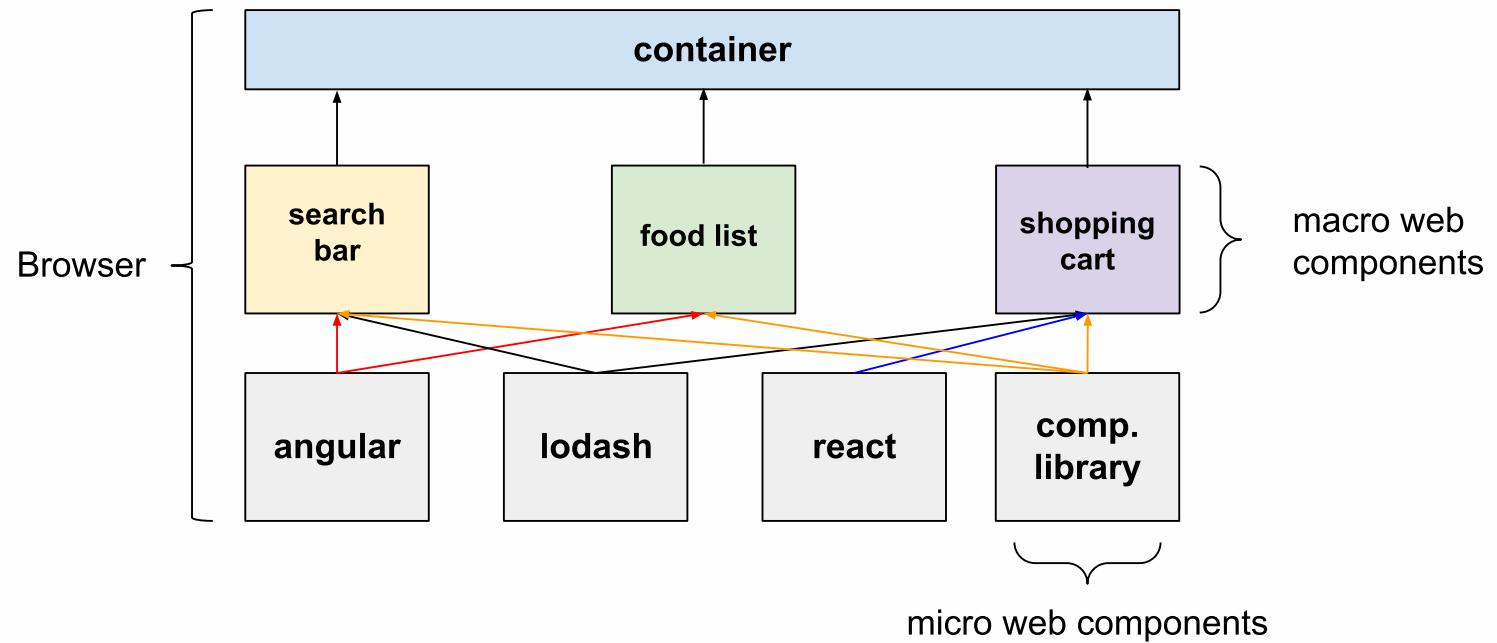
Speaker notes

- MFE types can and will be combined!



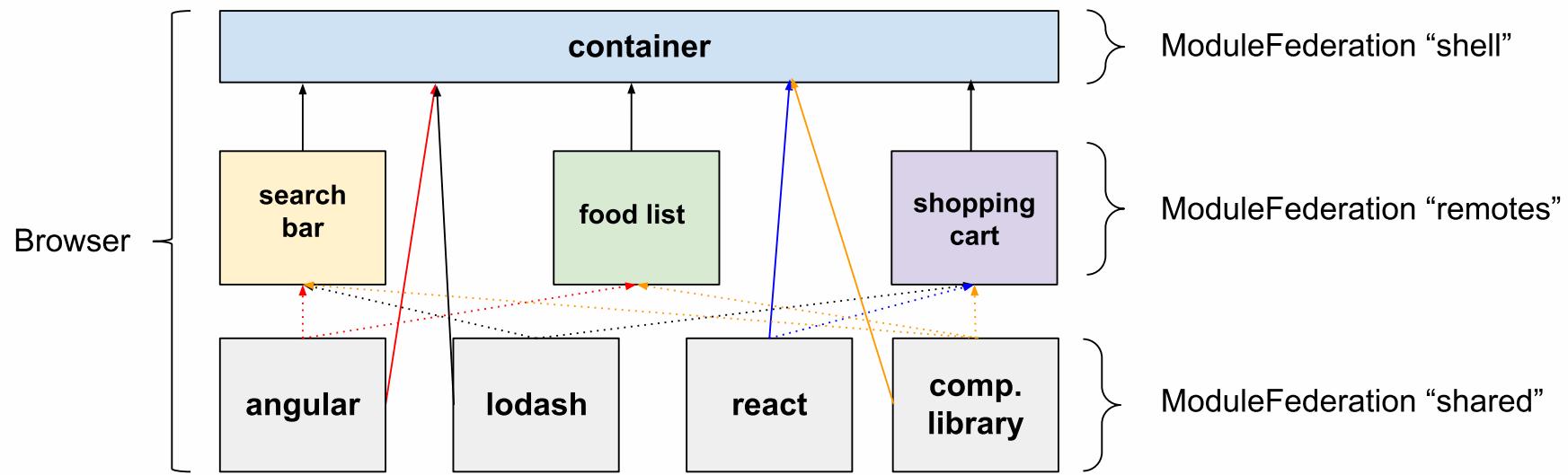
Speaker notes

- How (deployment) monoliths?
- Example, can be done in many ways
- Without registry (bash scripts, mono repo)
- Clearly defined responsibilities (testing, pipelines)



Speaker notes

- Micro vs Macro Web Components
- Angular Elements
- Shadow DOM
- Resource duplication (e.g. lodash in diagram)



Speaker notes

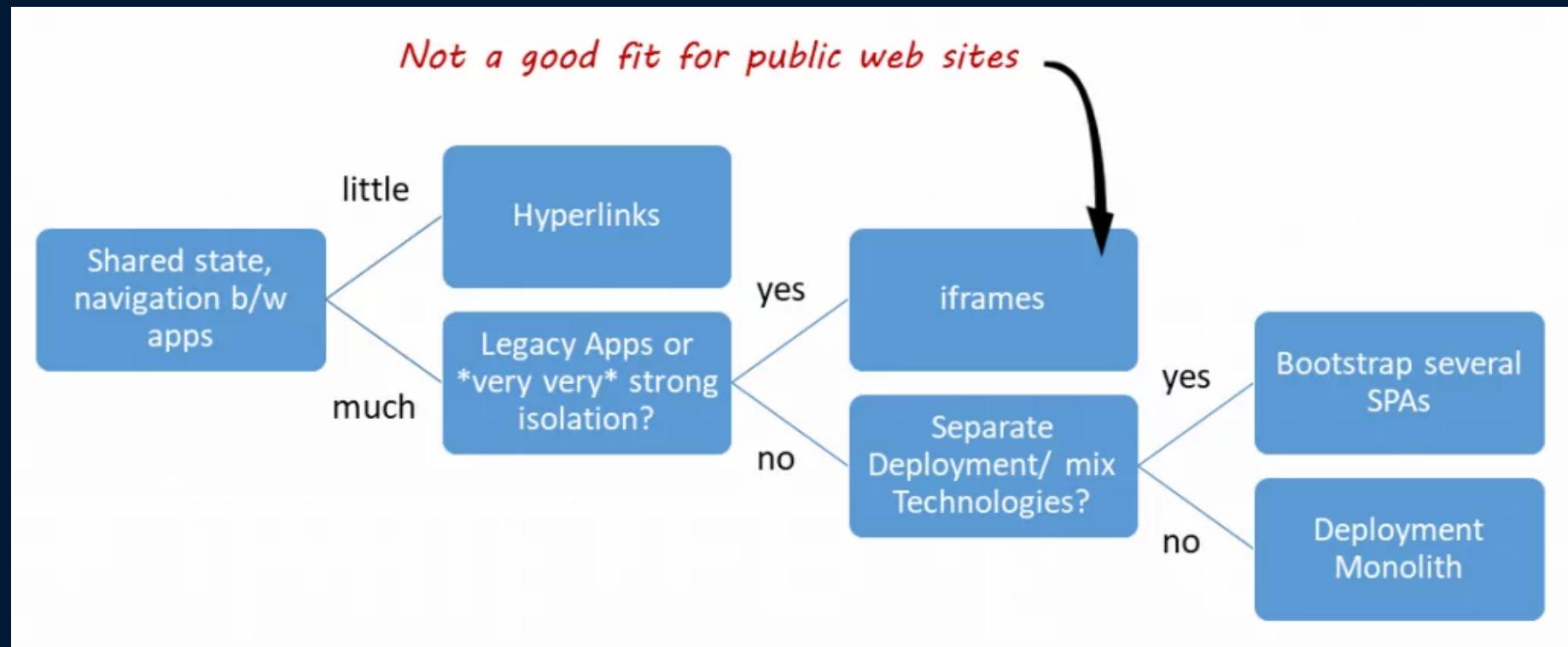
- Disadvantages are mentioned later in Demo slides (needs "webpack 5", immature libs, requires abstraction layer)

- hyperlinks
- iframes
- deployment monolith
- Web Components
- Module Federation

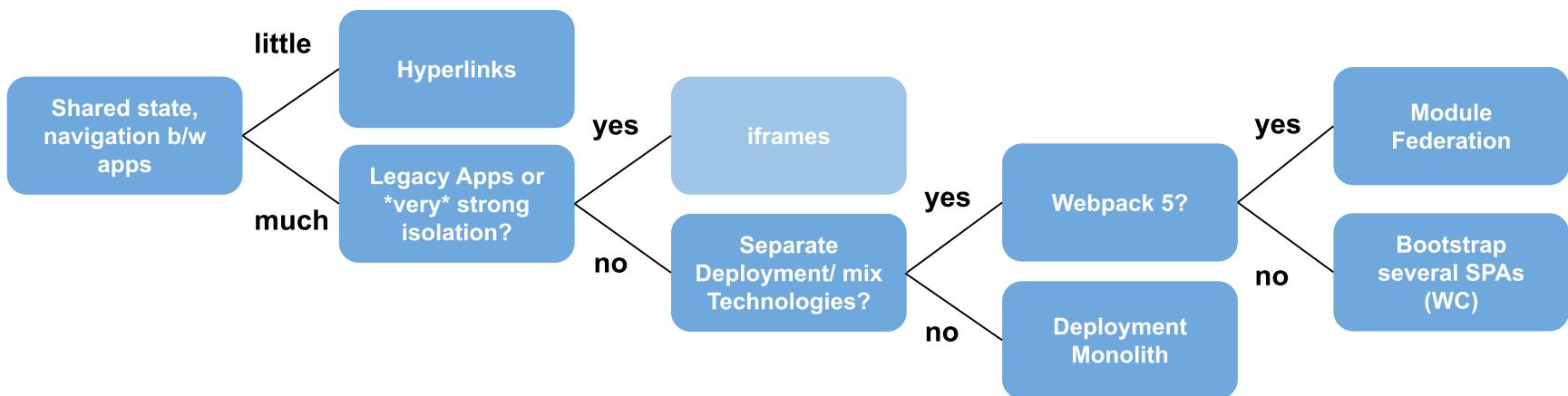
WWMSD?

[What Would Manfred Steyer Do?]





- <https://www.angulararchitects.io/en/aktuelles/a-software-architects-approach-towards/>



Speaker notes

- you don't want iframes
- instead of "Webpack 5?" you can also read "I want to deduplicate shared resources and to have easier navigation/state integration"
- Webpack alternatives (Rollup, Vite, esbuild), check MF support - Vite does! <https://github.com/module-federation/module-federation-examples/blob/master/vite-react-simple/vite-react/vite.config.ts>

Find components /

PRIMARY BUTTON

[Introduction](#)[AppComponent v1.1.0](#)[Example](#)

ATOMS

[AlertComponent](#)[IconComponent](#)[Example](#)[Paper](#)[PrimaryButton](#)[Example](#)[RatesTable](#)

TEMPLATES

[AppTemplate](#)

MOLECULES

[LoadingButton](#)[Example](#)

SERVICES

[Message Service](#)

Controls (2)

Actions

Story

✖

⟳

Name

Control

label

Primary Button

INPUTS

disabled

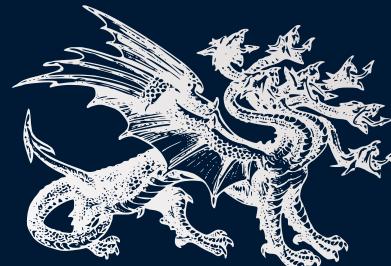
False

True

Speaker notes

- Familiar with Component Libraries/Storybook?
- Make sense to improve reusability of components

MONOREPOS



Lerna



Speaker notes

Why Monorepos?

- What is a monorepo
- Can contain multiple FE/BE apps
- DX: don't have to link component library
- DX: less toolchain maintenance (lint/jest)
- Disadvantages:
- Can be slow when misconfigured (also see Affected)
- Access control for teams between sub projects must be done by only allowing MRs

Micro Frontends



Speaker notes

- And CLI/scaffolding

portfolio MicroApp Wrapper

PORTFOLIO

This is a remote micro app loaded with Module Federation.

portfolio MicroApp Wrapper

PORTFOLIO

This is a remote micro app loaded with Module Federation.

Date	Balance	Value
1-1-2020	0.12345 BTC	€20000,00
1-1-2015	0.12345 BTC	€200,00
1-1-2012	0.12345 BTC	€2,00

Speaker notes

- (This is just a fallback for when site offline)
- Show that previous slide is live by using button

```
1 // apps/portfolio/webpack.config.js
2 output: {
3   uniqueName: "portfolio",
4   publicPath: "auto",
5 },
6 ...
7 plugins: [
8   new ModuleFederationPlugin({
9     name: "portfolio",
10    filename: "remoteEntry.js",
11    exposes: {
12      "./Module": [
13        "apps/portfolio/src/app/remote-entry/entry.module.ts",
14      ],
15    }
16  })
17 ]
```

Speaker notes

- note "name" and "exposes"
- publicPath is path used for assets
- 'auto' uses e.g. self.location

```
1 // src/index.ts
2 import('./bootstrap'); // Async!
3 // src/bootstrap.js
4 ...
5 ReactDOM.render(<App/>, document.getElementById('root'));
6
7 // or for Angular in main.ts
8 import { platformBrowserDynamic } from
9   '@angular/platform-browser-dynamic';
10 platformBrowserDynamic().bootstrapModule(AppModule)
```

Speaker notes

- Segue to explain bootstrap.js
- You will most of the time see such a bootstrapping "layer"
- async boundary for Webpack to produce a chunk that can be consumed with module federation

```
1 // apps/portfolio/src/app/remote-entry/entry.module.ts
2 @NgModule({
3   declarations: [RemoteEntryComponent],
4   imports: [
5     BrowserModule,
6     UiModule,
7     RouterModule.forChild([
8       {
9
10      path: '',
11
12      component: RemoteEntryComponent,
13      },
14    ]),
15  ]
```

Speaker notes

- Nothing special!

Nx Reference



ERROR Remote component can't be loaded, because
ModuleFederation is not configured for Storybook yet.
Instead, visit <https://code-star.github.io/nx-reference-shell/>
to see ModuleFederation integration.

Nx Reference



ERROR Remote component can't be loaded, because ModuleFederation is not configured for Storybook yet. Instead, visit <https://code-star.github.io/nx-reference-shell/> to see ModuleFederation integration.

Exchange rates

[GET NEW EXCHANGE RATE](#)

Exchange rates

Time	EUR / BTC
13:57:10	46726.62323558134

INFO SHARED-BtcRateService: fetched rate

A reference example monorepo with Nx + Storybook + Atomic Design in Angular

Made by [Codestar](#)

Speaker notes

- (This is just a fallback for when site offline)
- Show that previous slide is live by using button

```
1 // apps/demo/webpack.config.js
2 new ModuleFederationPlugin({
3   remotes: {
4     portfolio: `portfolio@http://localhost:4201/remoteEntry.js`
5   },
6 }) ,
```

Speaker notes

- This ("demo") is the shell app

```
1 // apps/demo/src/app/app.module.ts
2 @NgModule({
3   ...
4   imports: [
5     ...
6     RouterModule.forRoot([
7       {
8         path: '',
9         loadChildren: () =>
10           import("portfolio/Module").then(
11             (m) => m.RemoteEntryModule),
12       }
13     ])
14 })
15 
```

Speaker notes

- Lazy import()
- Router
- path can be used to only load on specific routes
- In Angular with Router, in React with React.lazy()
- MF with everything possible, but with Nx, Angular is easiest
- Nx/Angular uses library from Manfred

Nx Reference



PORTFOLIO

This is a remote micro app loaded with Module Federation

```
1 // apps/demo/webpack.config.js
2 const deps = require('./package.json').dependencies;
3 ...
4 new ModuleFederationPlugin({
5   remotes: { ... },
6   shared: {
7     ...deps,
8     "@angular/core": {
9       singleton: true,
10      requiredVersion: '12.2.11',
11      strictVersion: true },
12   ...
```

Speaker notes

- shared for deduplication (recall the lodash dep with macro web components)
- spread from package.json (this way the shell versions are leading)
- singleton for libs with shared global state
- strictVersion: rejects version if not requiredVersion (error, otherwise warning)

- React MF with CRA
- <https://github.com/module-federation/module-federation-examples/blob/master/cra/host/modulefederation.config.js>
- <https://github.com/module-federation/module-federation-examples/blob/master/cra/host/src/App.js>

Speaker notes

- MF adoption is improving. Support in CRA with CRACO
- With Nx, Angular MF is easiest. This is example with CRA without Nx
- Lerna + CRA + CRACO
- craco-module-federation plugin

```
// app-01/src/pages/svelte-page.jsx
import loadApp from 'app_04/loadApp';
...
if (mountEl.current.innerHTML.length === 0) {
  loadApp('app_04', name);
}

// app-01/webpack.config.js
app_04: 'app_04@http://localhost:3004/remoteEntry.js',

// app-04/webpack.config.js
exposes: {
  './App': './src/main.js',
  './loadApp': './src/loadApp.js',
}
```

Speaker notes

- Svelte and Lit in React
- <https://github.com/module-federation/module-federation-examples/blob/master/comprehensive-demo/app-01/src/pages/svelte-page.jsx>
- mountEl + loadApp
- loadApp could be expanded to have callbacks to handle navigation/app state synchronisation!
- it is possible to always add this intermediate layer, but when host & remote both React, not needed.

- <https://github.com/code-star/nx-reference>
- <https://mdworld.nl/micro-frontends-in-a-nutshell>
- <https://github.com/module-federation/module-federation-examples>

Speaker notes

- Nx repo with Module Federation from the examples before
- Overview article about Micro Frontends
- Plenty of MF examples
- Bi-directional (shell includes remote, remote includes from shell)
- Nested navigation / routing
- shared-context (React)
- Redux with injectReducer <https://github.com/module-federation/module-federation-examples/tree/master/redux-reducer-injection>