goto;

GOTO AARHUS 2022

#GOTOaar

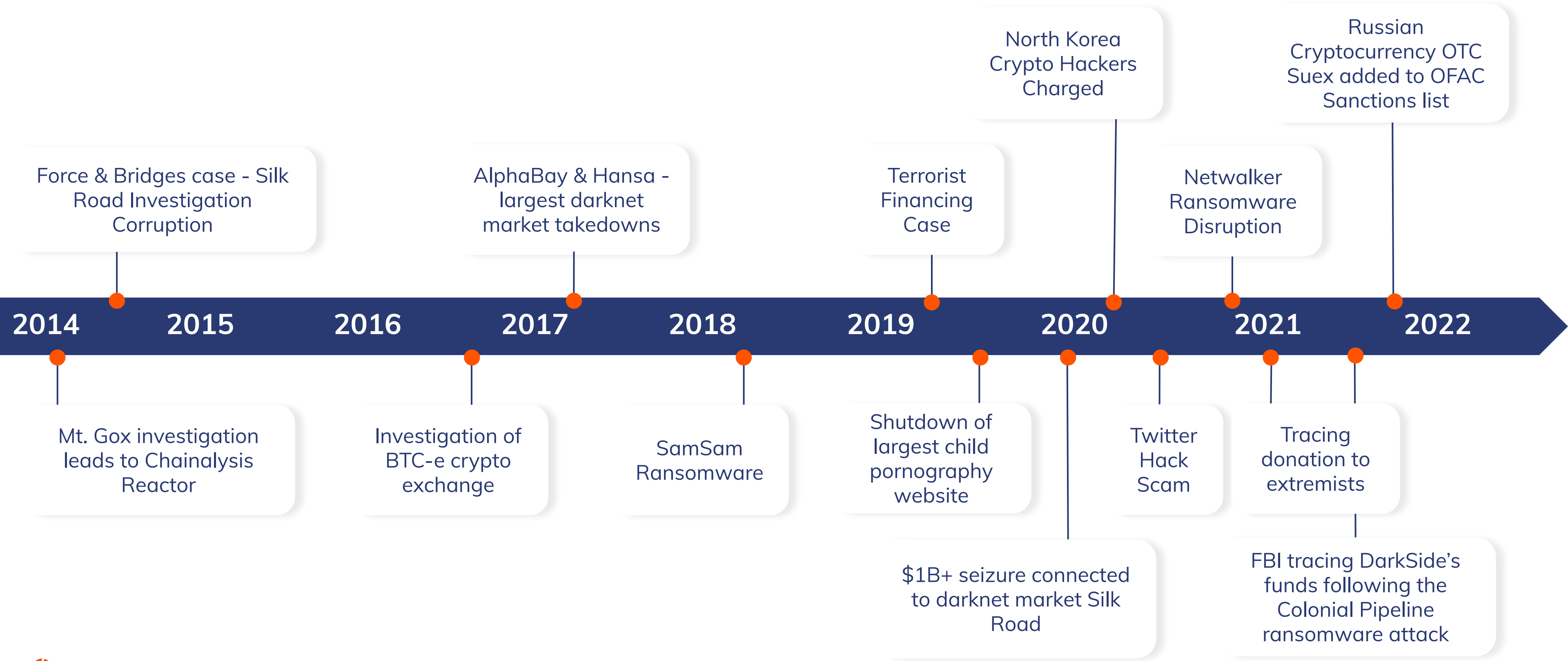
Chainalysis

React in Angular
- How to have your cake and eat it too

GOTO Aarhus

Ben Gabriel Pedersen

Chainalysis


2014
Mt. Gox investigation leads to Chainalysis Reactor
Force & Bridges case - Silk Road Investigation Corruption
2015
2016
Investigation of BTC-e crypto exchange
2017
AlphaBay & Hansa - largest darknet market takedowns
2018
SamSam Ransomware
2019
Terrorist Financing Case
Shutdown of largest child pornography website
$1B+ seizure connected to darknet market Silk Road
2020
North Korea Crypto Hackers Charged
Twitter Hack Scam
2021
Netwalker Ransomware Disruption
Tracing donation to extremists
FBI tracing DarkSide's funds following the Colonial Pipeline ransomware attack
Russian Cryptocurrency OTC Suex added to OFAC Sanctions list
2022

This is me

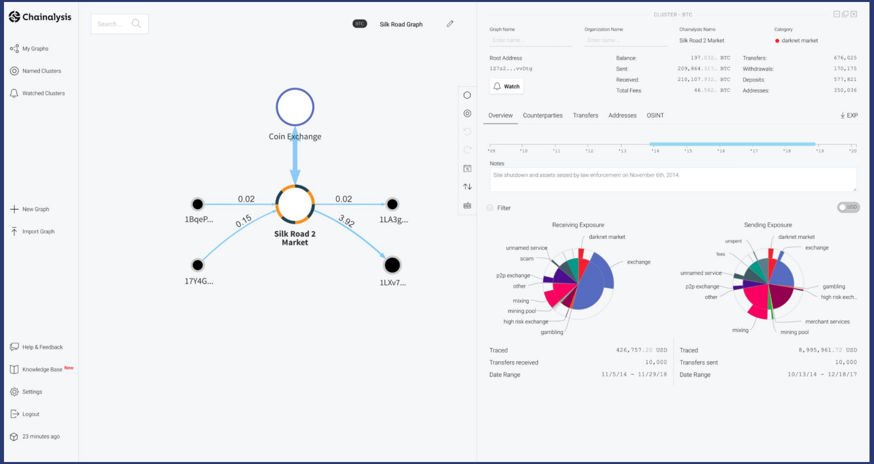
Ben Gabriel Pedersen

I am a software and tech enthusiast who love to do and build things which brings joy to people.

I love a bit of boardgames, the random LARP and am continuously failing to get back into yoga.

I have had the pain of supporting IE7.

What we do in Aarhus



Graph Name: Enter name ...
Organization Name: Enter name ...
Chainalysis Name: Silk Road 2 Market
Category: darknet market

Root Address: 1Z7z2...vvDtg

Balance:	197.032... BTC	Transfers:	676,025
Sent:	209,864.317... BTC	Withdrawals:	170,175
Received:	210,107.932... BTC	Deposits:	577,821
Total Fees:	46.582... BTC	Addresses:	350,036

Notes: Site shutdown and assets seized by law enforcement on November 6th, 2014.

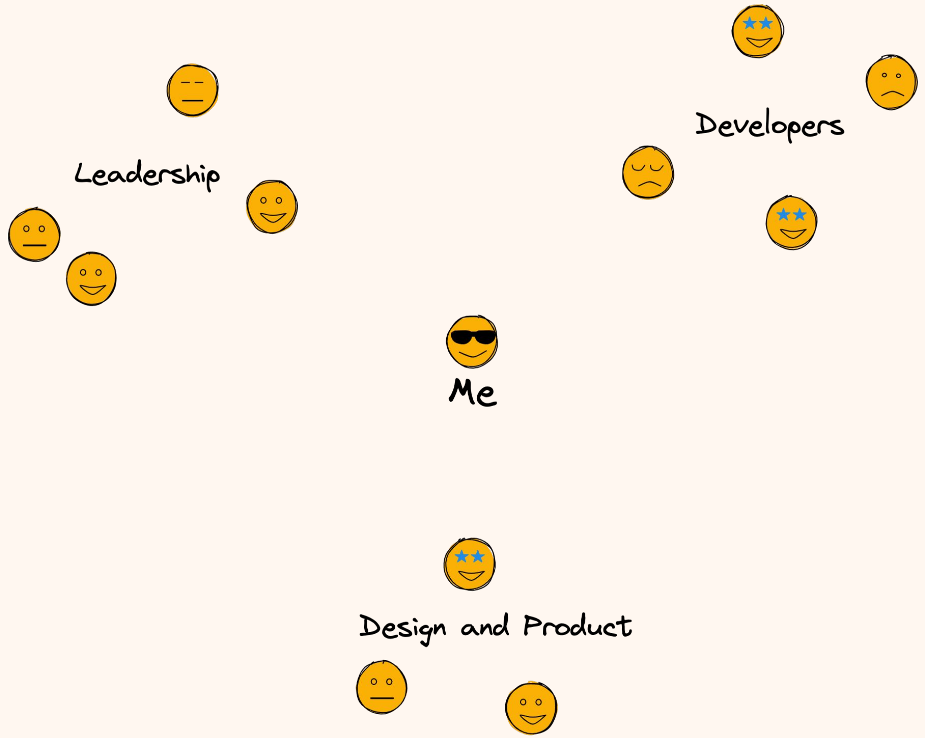
Traced	426,757.20 USD	Traced	8,995,961.72 USD
Transfers received	10,000	Transfers sent	10,000
Date Range	11/5/14 - 11/29/18	Date Range	10/13/14 - 12/18/17

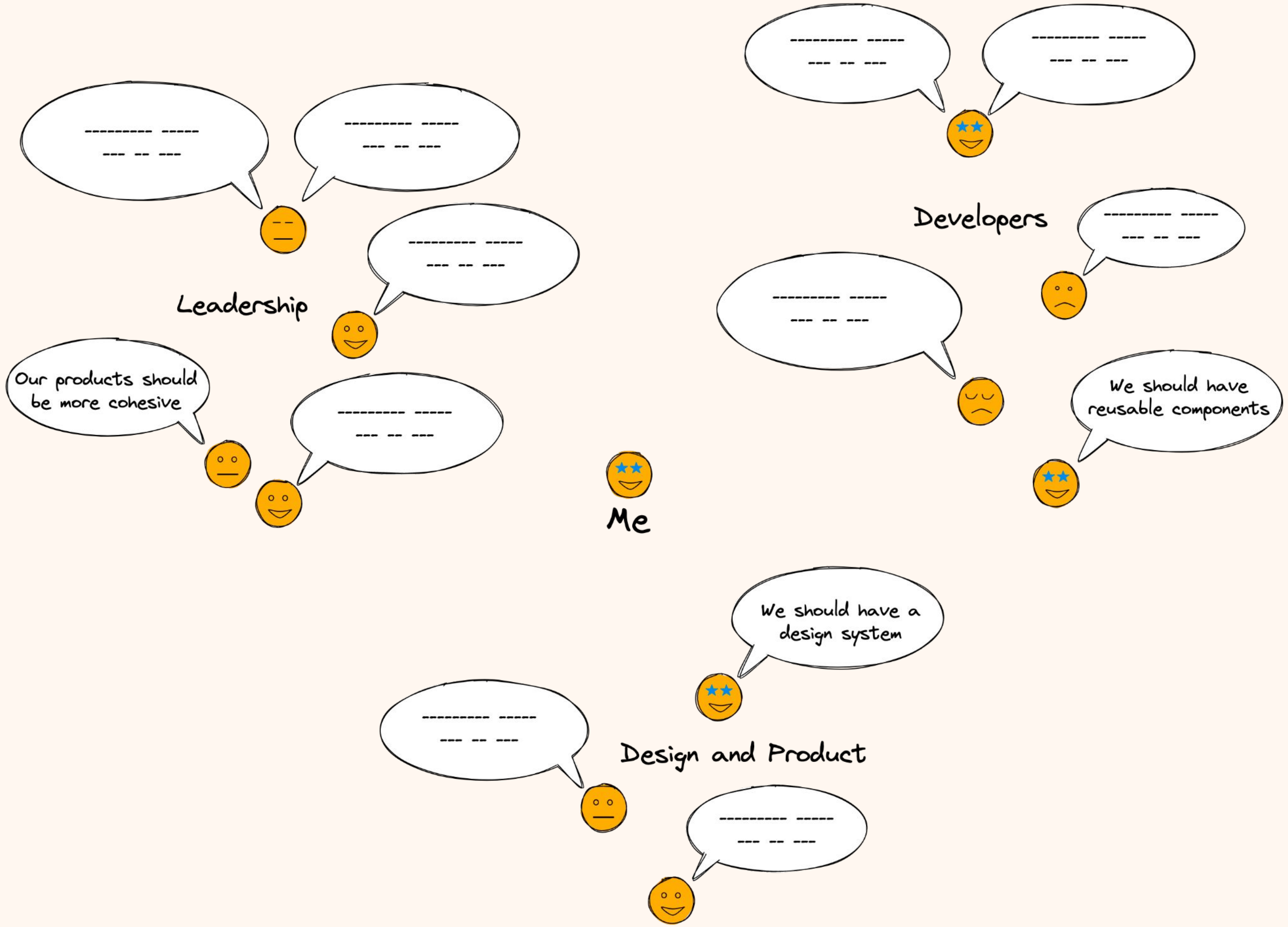
Reactor

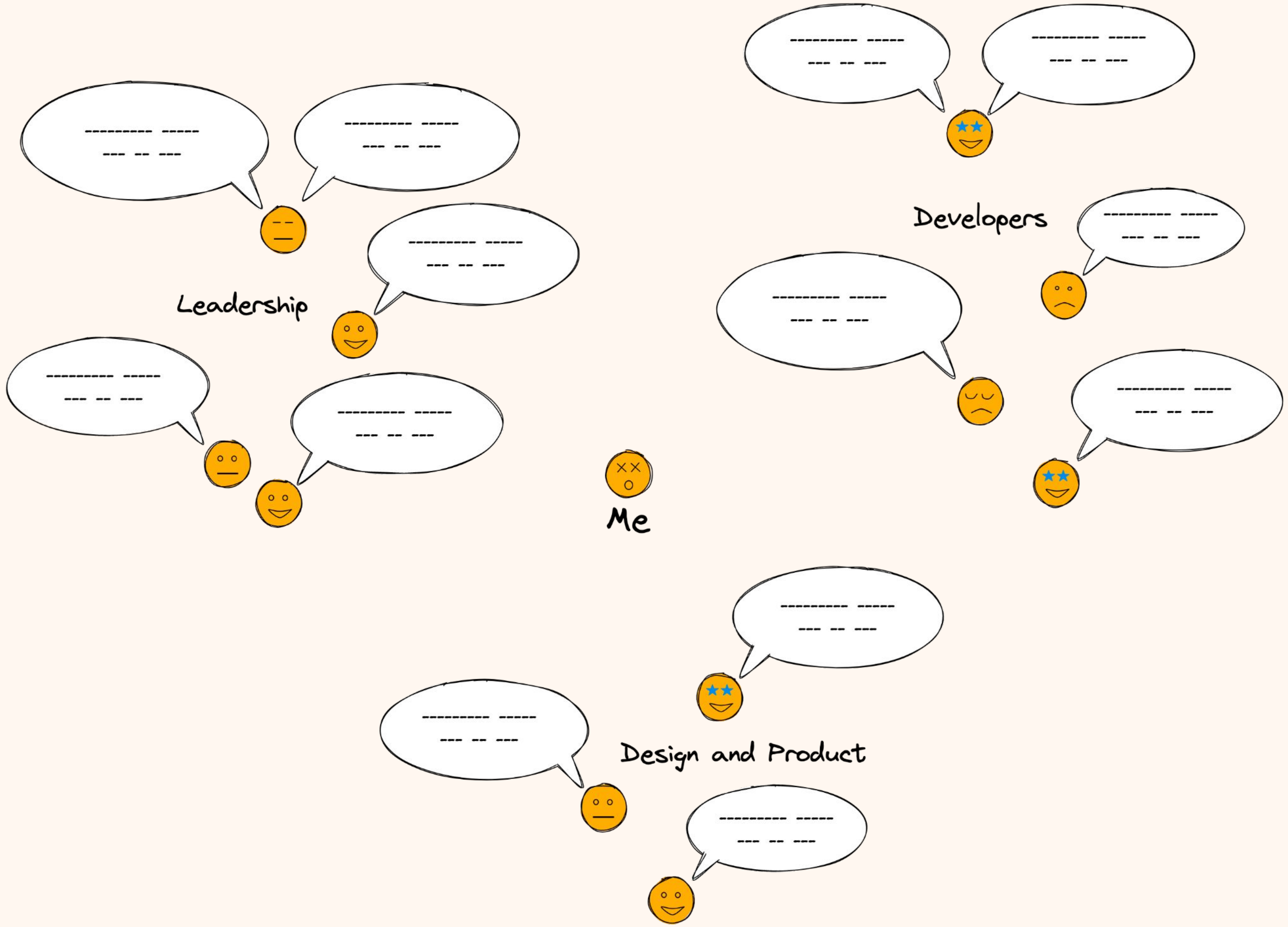
At Chainalysis Aarhus we build a tool for investigating Crypto crimes.

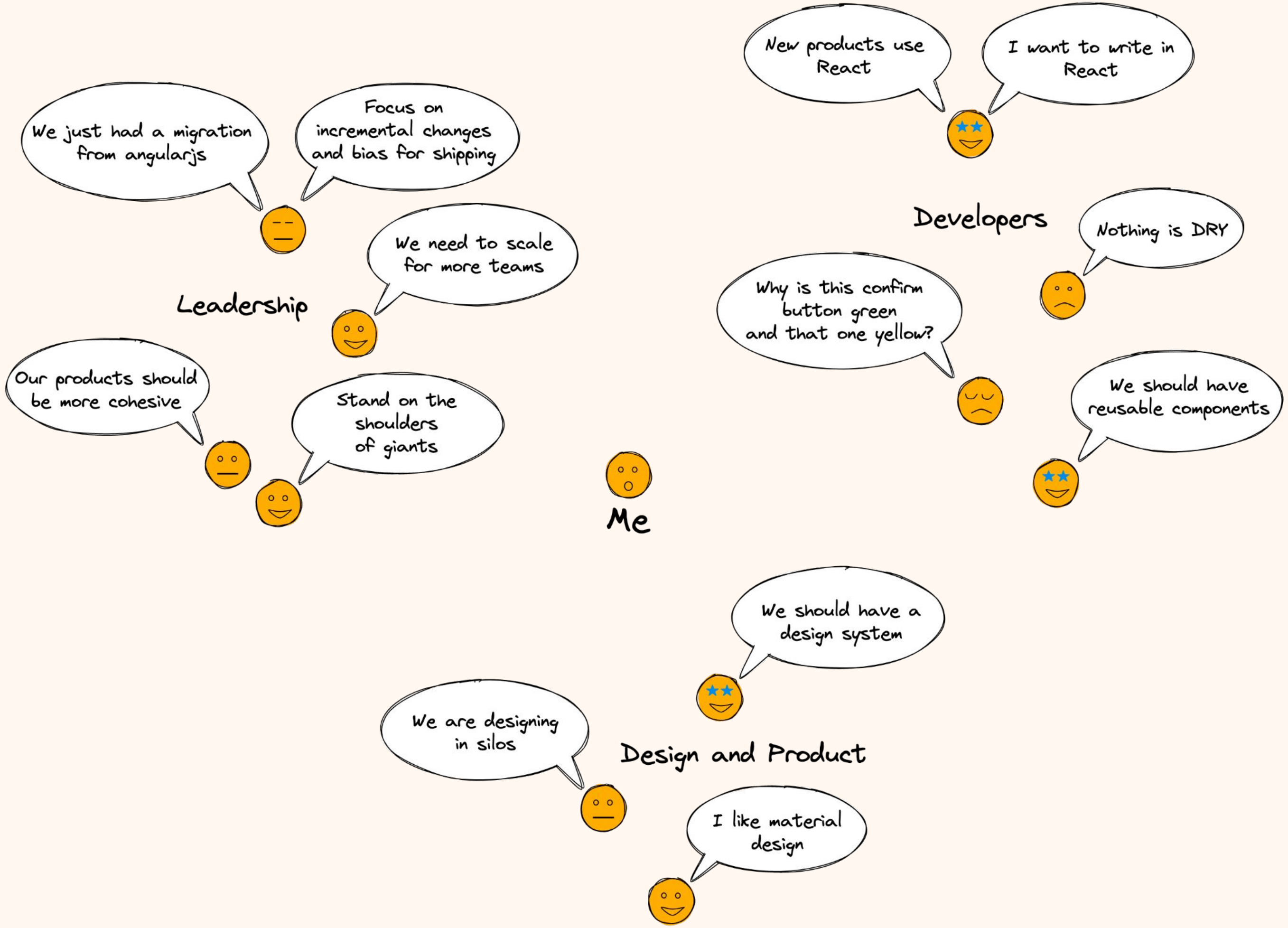
We work with multiple teams and designers over many time-zones.

We are growing a lot!


Leadership
Developers
Me
Design and Product


Leadership
Our products should be more cohesive
Developers
We should have reusable components
Me
We should have a design system
Design and Product


Leadership
Developers
Me
Design and Product

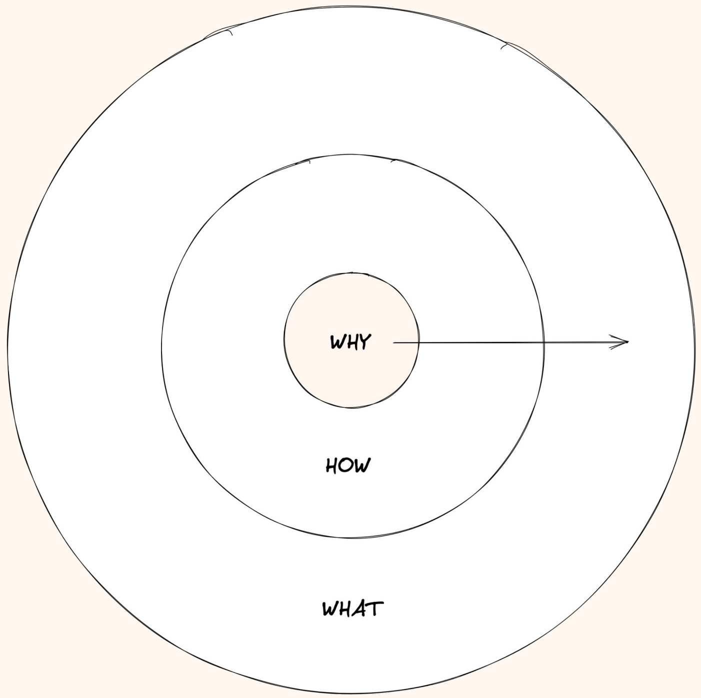

Leadership
We just had a migration from angularjs
Focus on incremental changes and bias for shipping
We need to scale for more teams
Our products should be more cohesive
Stand on the shoulders of giants
Developers
New products use React
I want to write in React
Nothing is DRY
Why is this confirm button green and that one yellow?
We should have reusable components
Me
Design and Product
We should have a design system
We are designing in silos
I like material design

Start With Why

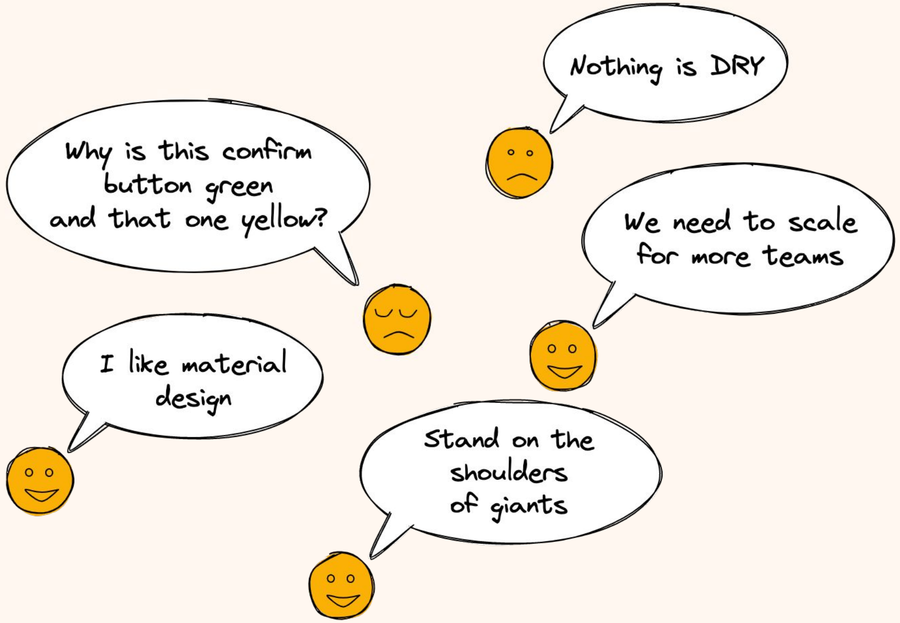
Why
What is your cause? What pains are you addressing?

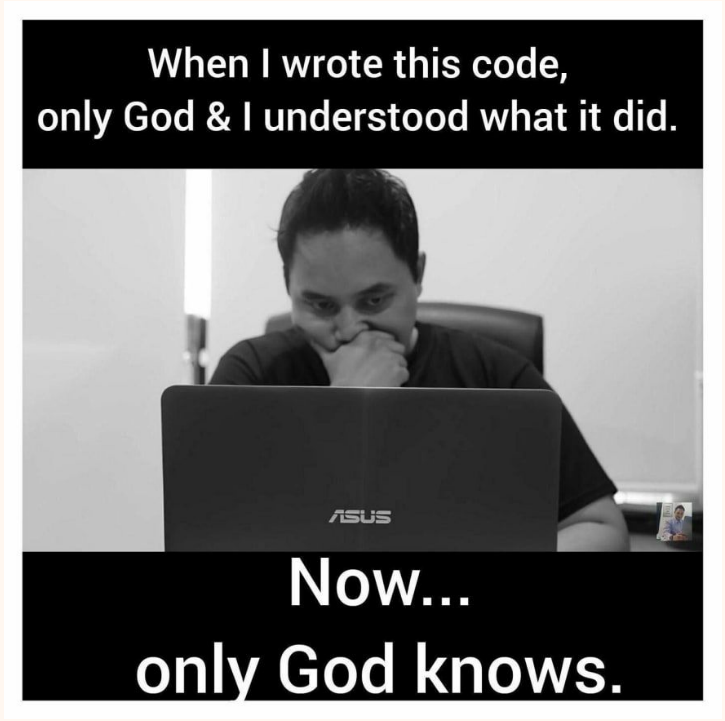
How
Specific actions taken to realise your why.

What
What do you do? The result of Why. Proof.

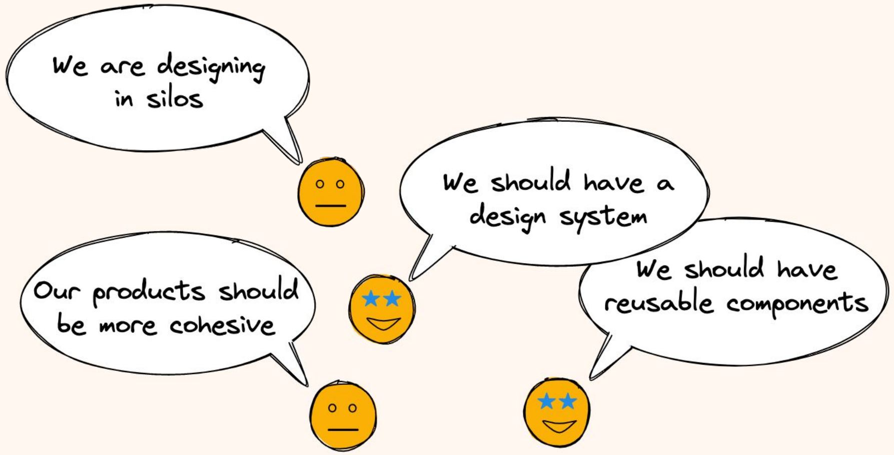


The Pains - Growing

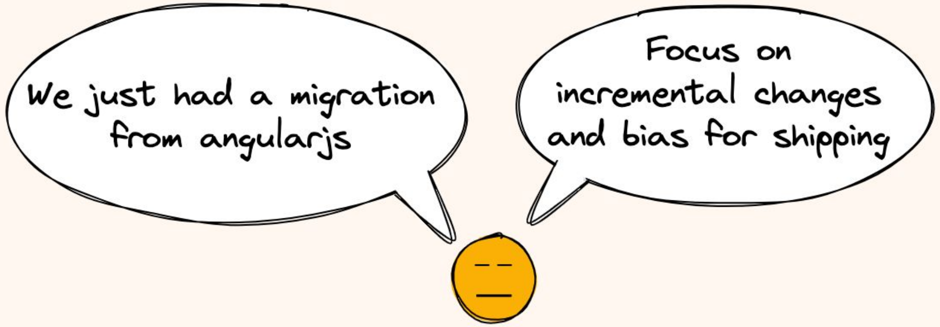

Nothing is DRY
Why is this confirm button green and that one yellow?
We need to scale for more teams
I like material design
Stand on the shoulders of giants

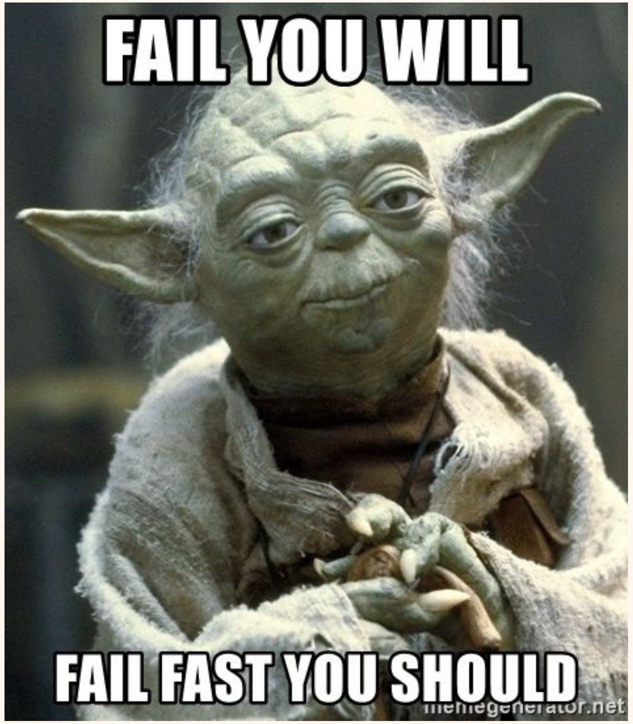

When I wrote this code, only God & I understood what it did.
Now... only God knows.

The Pains - UX + DX

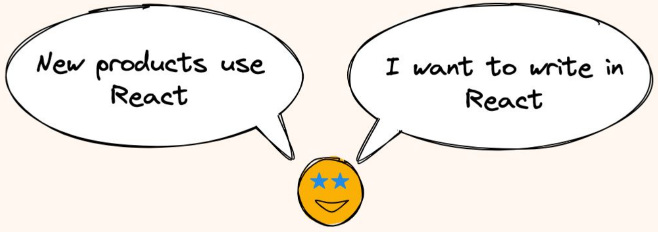

We are designing in silos
We should have a design system
Our products should be more cohesive
We should have reusable components

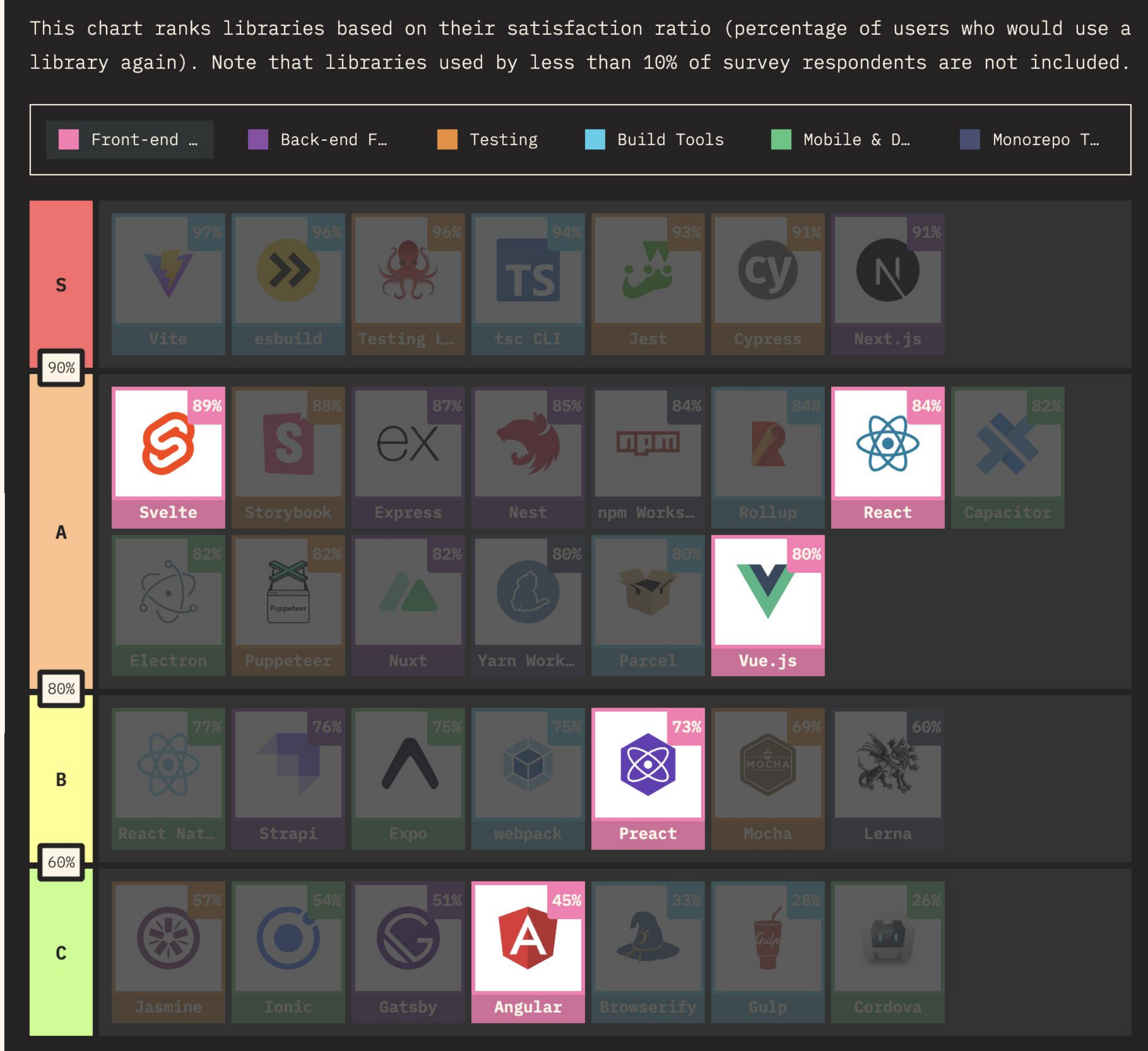
The Pains - Past Experience


We just had a migration from angularjs
Focus on incremental changes and bias for shipping



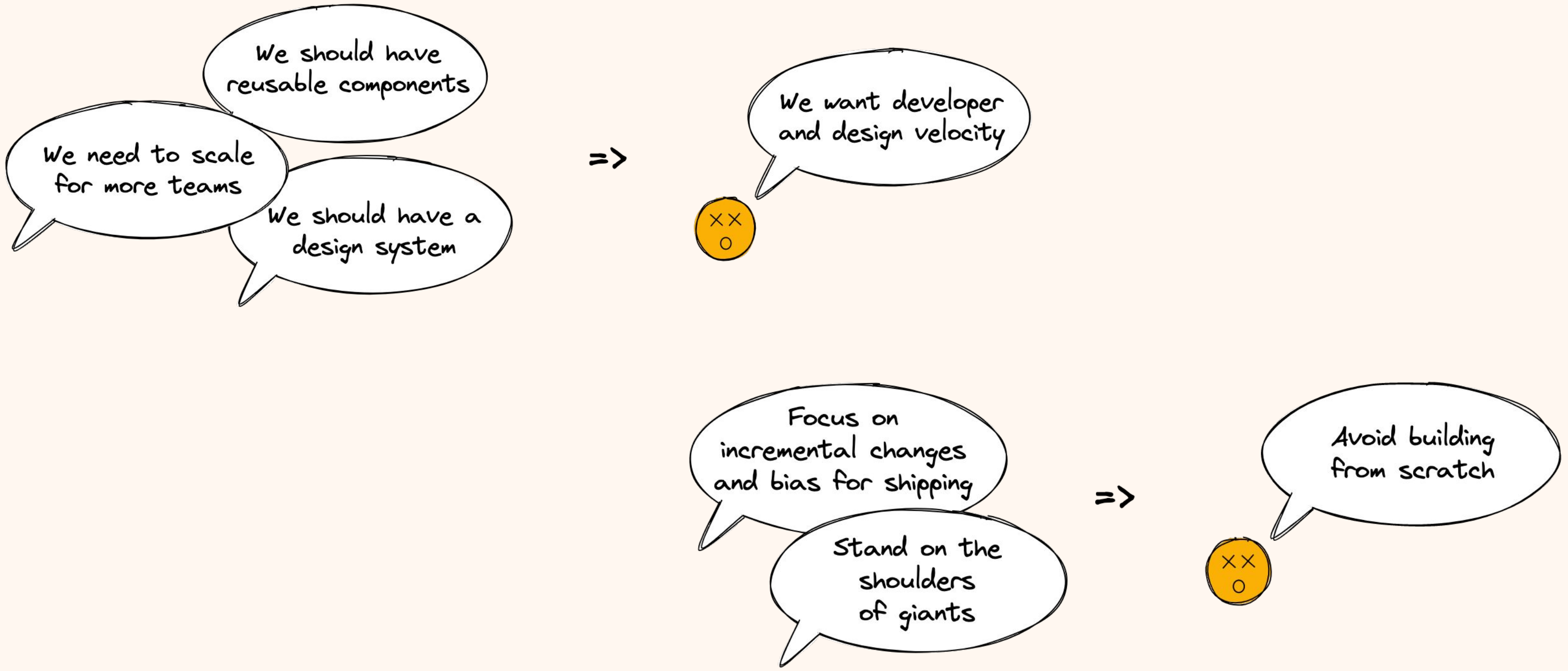
The Pains - React



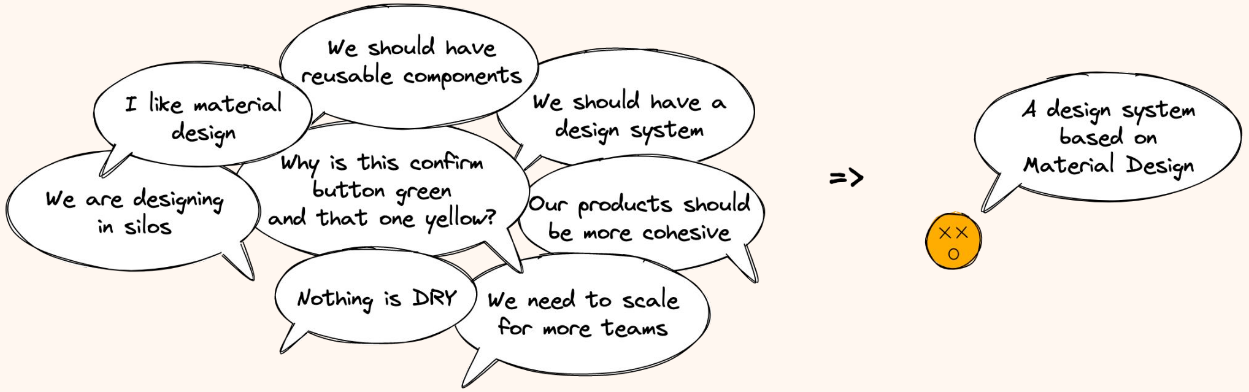

This chart ranks libraries based on their satisfaction ratio (percentage of users who would use a library again). Note that libraries used by less than 10% of survey respondents are not included.

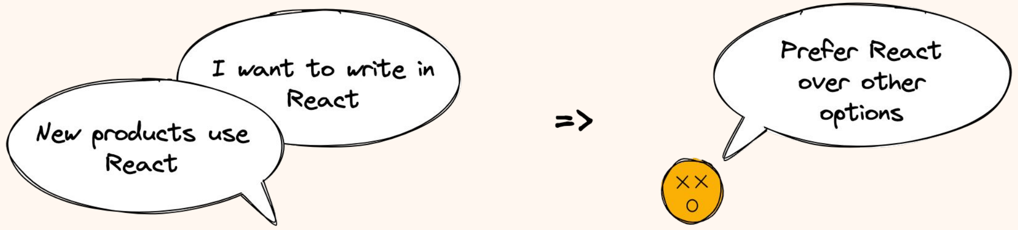
Chainalysis

Framing the challenge


We should have reusable components
We need to scale for more teams
We should have a design system
=>
We want developer and design velocity
Focus on incremental changes and bias for shipping
Stand on the shoulders of giants
=>
Avoid building from scratch

Framing the challenge


We should have reusable components
I like material design
We should have a design system
Why is this confirm button green and that one yellow?
We are designing in silos
Our products should be more cohesive
Nothing is DRY
We need to scale for more teams
=>
A design system based on Material Design



Framing the challenge

A design system based on Material Design

Prefer React over other options

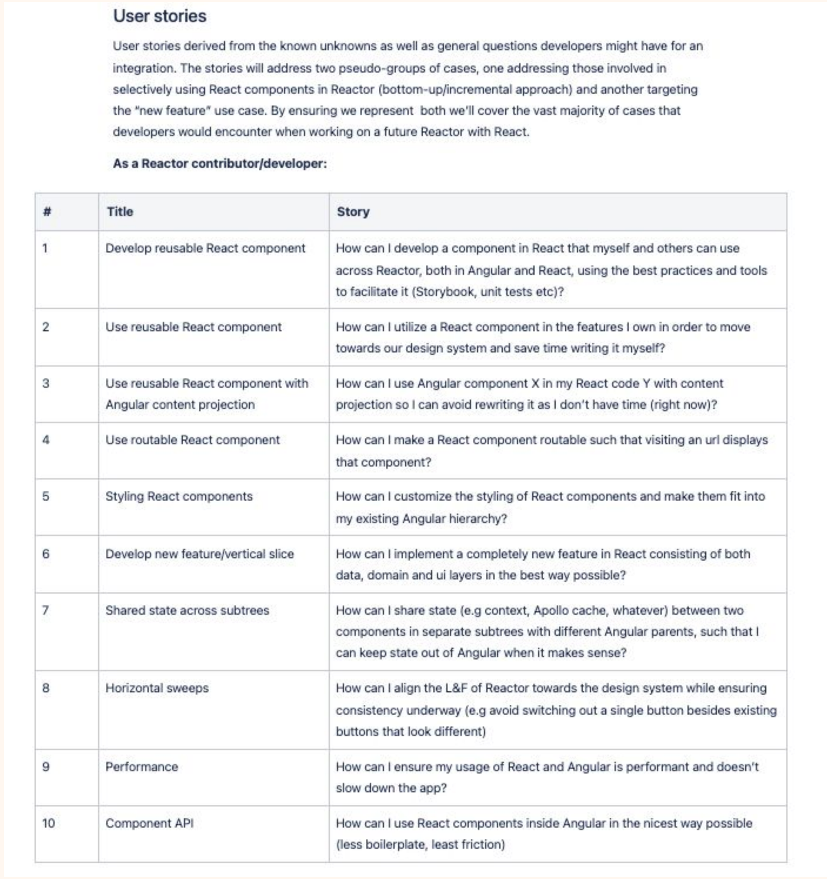
Avoid building from scratch

We want developer and design velocity

Reactangular!?

Exploring the solutions

- Micro-frontends
- Web components
- React components
- Some combination of the above?



User stories

User stories derived from the known unknowns as well as general questions developers might have for an integration. The stories will address two pseudo-groups of cases, one addressing those involved in selectively using React components in Reactor (bottom-up/incremental approach) and another targeting the "new feature" use case. By ensuring we represent both we'll cover the vast majority of cases that developers would encounter when working on a future Reactor with React.

As a Reactor contributor/developer:

#	Title	Story
1	Develop reusable React component	How can I develop a component in React that myself and others can use across Reactor, both in Angular and React, using the best practices and tools to facilitate it (Storybook, unit tests etc)?
2	Use reusable React component	How can I utilize a React component in the features I own in order to move towards our design system and save time writing it myself?
3	Use reusable React component with Angular content projection	How can I use Angular component X in my React code Y with content projection so I can avoid rewriting it as I don't have time (right now)?
4	Use routable React component	How can I make a React component routable such that visiting an url displays that component?
5	Styling React components	How can I customize the styling of React components and make them fit into my existing Angular hierarchy?
6	Develop new feature/vertical slice	How can I implement a completely new feature in React consisting of both data, domain and ui layers in the best way possible?
7	Shared state across subtrees	How can I share state (e.g context, Apollo cache, whatever) between two components in separate subtrees with different Angular parents, such that I can keep state out of Angular when it makes sense?
8	Horizontal sweeps	How can I align the L&F of Reactor towards the design system while ensuring consistency underway (e.g avoid switching out a single button besides existing buttons that look different)
9	Performance	How can I ensure my usage of React and Angular is performant and doesn't slow down the app?
10	Component API	How can I use React components inside Angular in the nicest way possible (less boilerplate, least friction)

Global style issues

We thought we could use shadow DOM for encapsulating MUI styling.

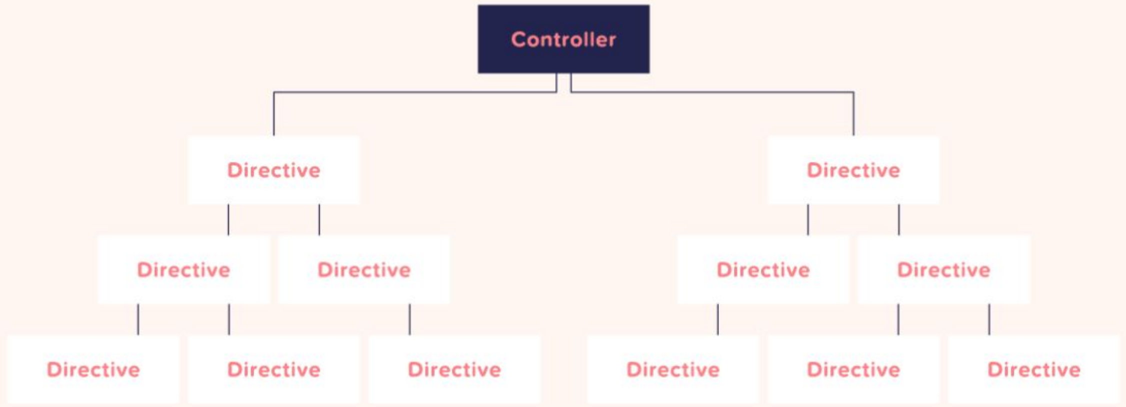
We were wrong.

EVERYTHING THE LIGHT TOUCHES IS THE DOM AND YOU CAN STYLE IT
BUT WHAT'S THAT SHADOWY PLACE OVER THERE?
THAT IS THE SHADOW DOM

Bottom up, Incremental Changes

Presentational components first

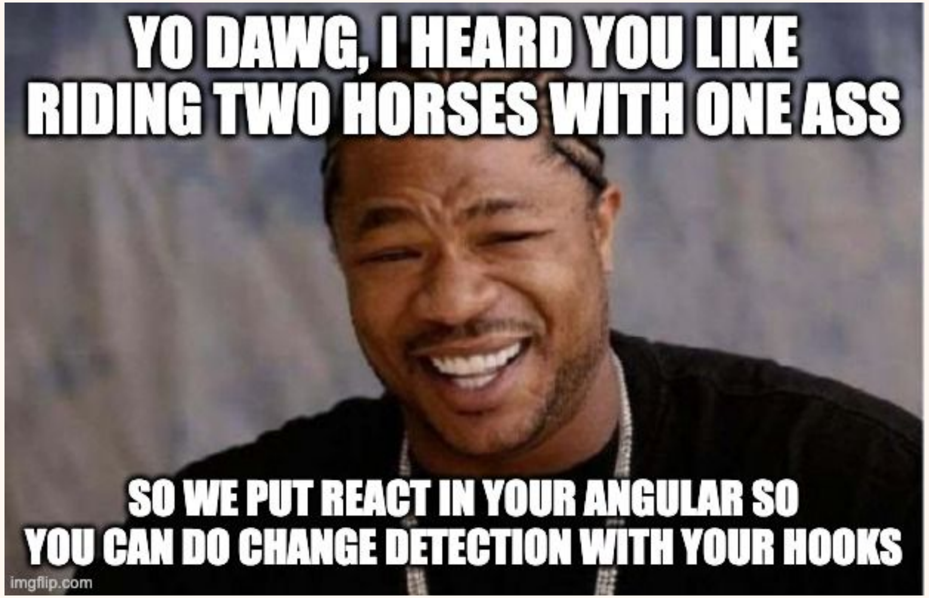
This way we can change the leaf components first, and then, if desired, move upwards.



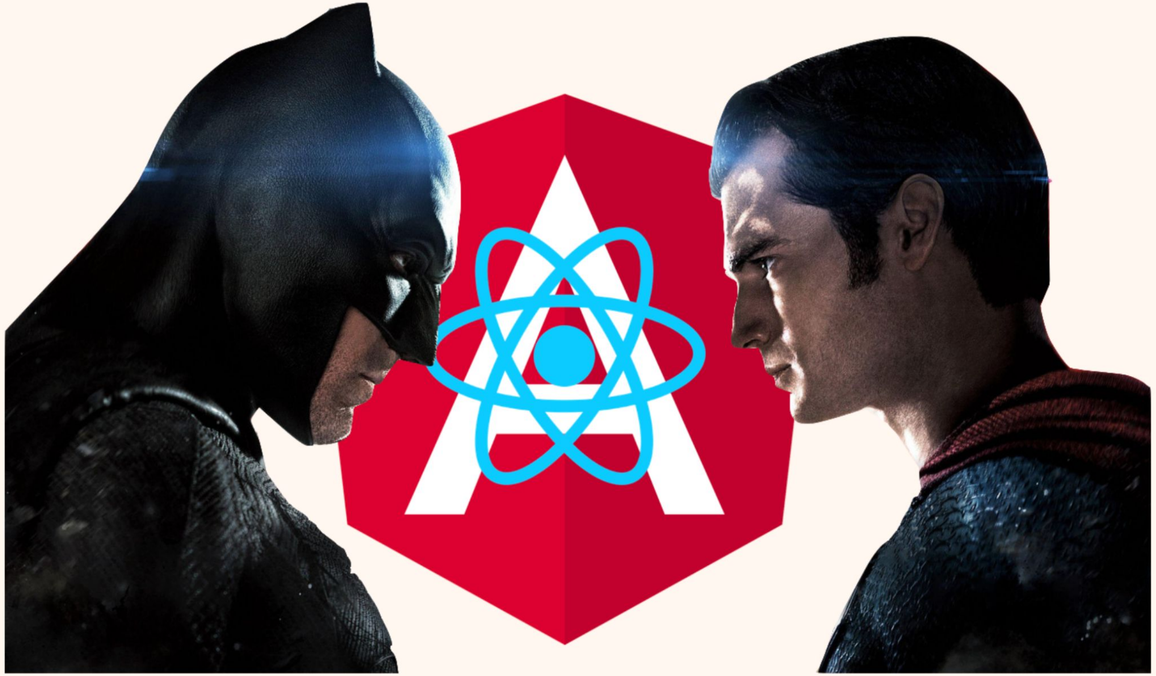
So can you have your cake and eat it too?

Or are just we doubling the cognitive load?

- Chasing two rabbits, catching none?
- Robbing Peter to pay Paul?
- Between a rock and a hard place?
- Falling between two stools?
- Walking and chewing gum at the same time?
- A servant to two masters?
- Betwixt and between?
- Riding two horses with one ass?
- Multitasking to a standstill?


YO DAWG, I HEARD YOU LIKE RIDING TWO HORSES WITH ONE ASS
SO WE PUT REACT IN YOUR ANGULAR SO YOU CAN DO CHANGE DETECTION WITH YOUR HOOKS
imgflip.com

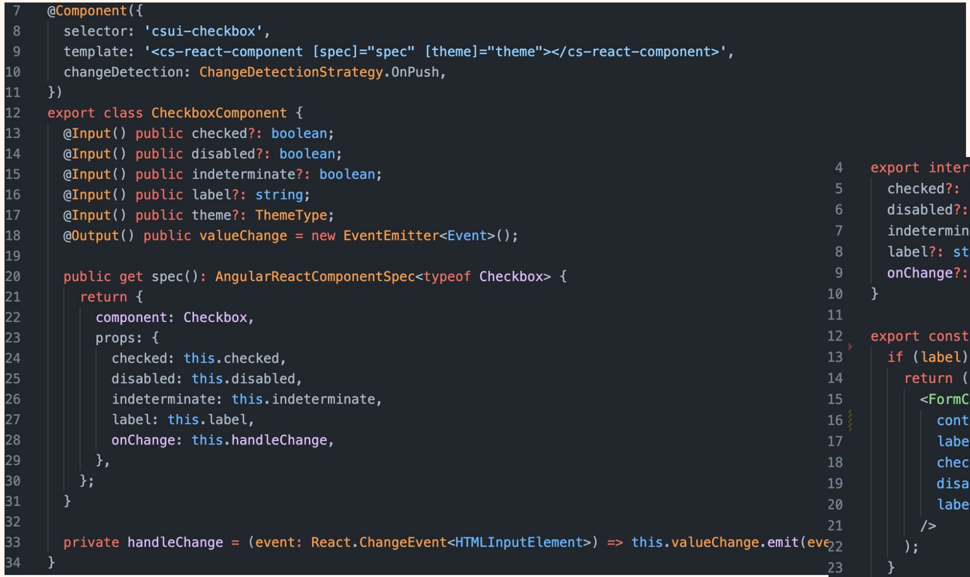
Reactangular!



Chainalysis

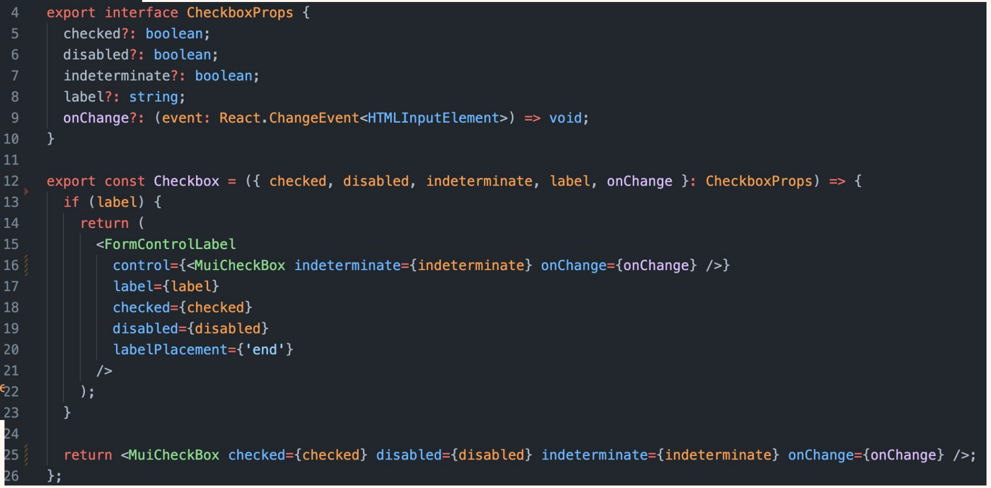
Putting React in Angular

Angular component



```
@Component({
  selector: 'csui-checkbox',
  template: '<cs-react-component [spec]="spec" [theme]="theme"></cs-react-component>',
  changeDetection: ChangeDetectionStrategy.OnPush,
})
export class CheckboxComponent {
  @Input() public checked?: boolean;
  @Input() public disabled?: boolean;
  @Input() public indeterminate?: boolean;
  @Input() public label?: string;
  @Input() public theme?: ThemeType;
  @Output() public valueChange = new EventEmitter<Event>();

  public get spec(): AngularReactComponentSpec<typeof Checkbox> {
    return {
      component: Checkbox,
      props: {
        checked: this.checked,
        disabled: this.disabled,
        indeterminate: this.indeterminate,
        label: this.label,
        onChange: this.handleChange,
      },
    };
  }

  private handleChange = (event: React.ChangeEvent<HTMLInputElement>) => this.valueChange.emit(eve
}
```

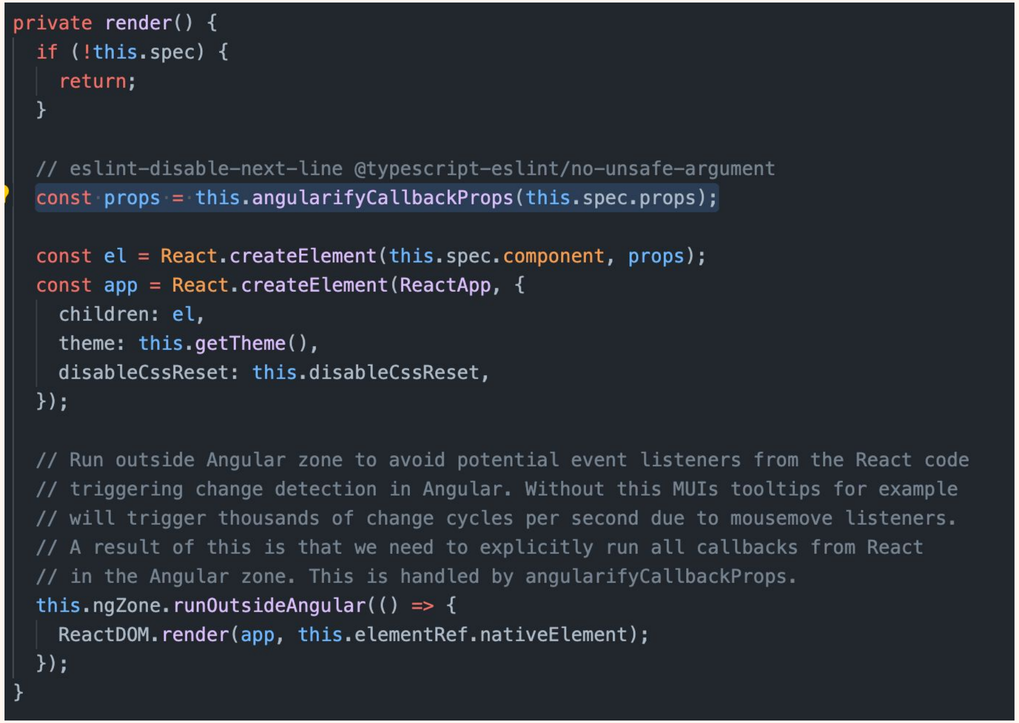
React component



```
export interface CheckboxProps {
  checked?: boolean;
  disabled?: boolean;
  indeterminate?: boolean;
  label?: string;
  onChange?: (event: React.ChangeEvent<HTMLInputElement>) => void;
}

export const Checkbox = ({ checked, disabled, indeterminate, label, onChange }: CheckboxProps) => {
  if (label) {
    return (
      <FormControlLabel
        control={<MuiCheckBox indeterminate={indeterminate} onChange={onChange} />}
        label={label}
        checked={checked}
        disabled={disabled}
        labelPlacement={'end'}
      />
    );
  }

  return <MuiCheckBox checked={checked} disabled={disabled} indeterminate={indeterminate} onChange={onChange} />;
};
```

Putting React in Angular
(Outside the zone)

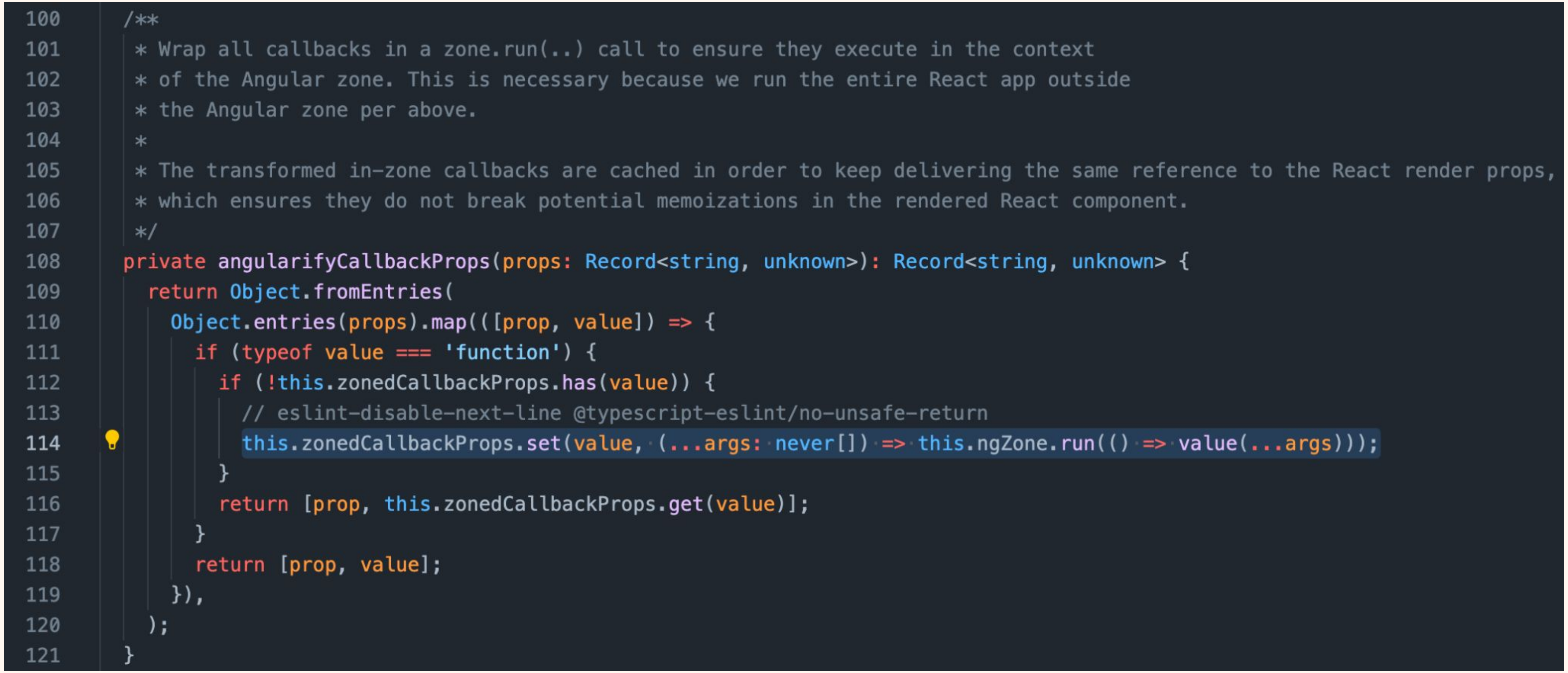
The glue in-between



```
private render() {
  if (!this.spec) {
    return;
  }

  // eslint-disable-next-line @typescript-eslint/no-unsafe-argument
  const props = this.angularifyCallbackProps(this.spec.props);

  const el = React.createElement(this.spec.component, props);
  const app = React.createElement(ReactApp, {
    children: el,
    theme: this.getTheme(),
    disableCssReset: this.disableCssReset,
  });

  // Run outside Angular zone to avoid potential event listeners from the React code
  // triggering change detection in Angular. Without this MUIs tooltips for example
  // will trigger thousands of change cycles per second due to mousemove listeners.
  // A result of this is that we need to explicitly run all callbacks from React
  // in the Angular zone. This is handled by angularifyCallbackProps.
  this.ngZone.runOutsideAngular(() => {
    ReactDOM.render(app, this.elementRef.nativeElement);
  });
}
```

Putting React in Angular

(Back into the zone)



```typescript
/**
 * Wrap all callbacks in a zone.run(..) call to ensure they execute in the context
 * of the Angular zone. This is necessary because we run the entire React app outside
 * the Angular zone per above.
 *
 * The transformed in-zone callbacks are cached in order to keep delivering the same reference to the React render props,
 * which ensures they do not break potential memoizations in the rendered React component.
 */
private angularifyCallbackProps(props: Record<string, unknown>): Record<string, unknown> {
  return Object.fromEntries(
    Object.entries(props).map(([prop, value]) => {
      if (typeof value === 'function') {
        if (!this.zonedCallbackProps.has(value)) {
          // eslint-disable-next-line @typescript-eslint/no-unsafe-return
          this.zonedCallbackProps.set(value, (...args: never[]) => this.ngZone.run(() => value(...args)));
        }
        return [prop, this.zonedCallbackProps.get(value)];
      }
      return [prop, value];
    }),
  );
}
```

What did we learn?

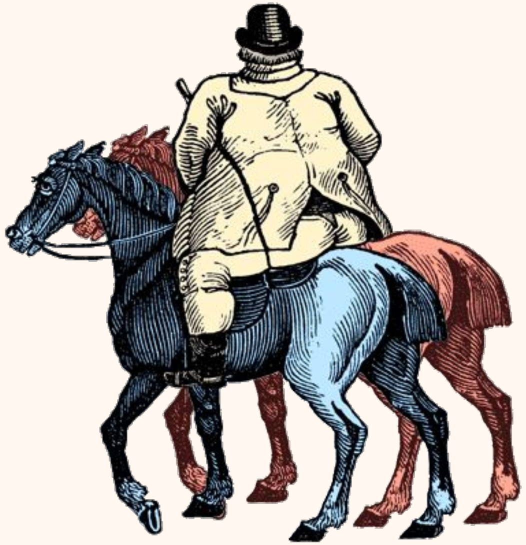
You might want to ask a bit before rejecting crazy ideas.

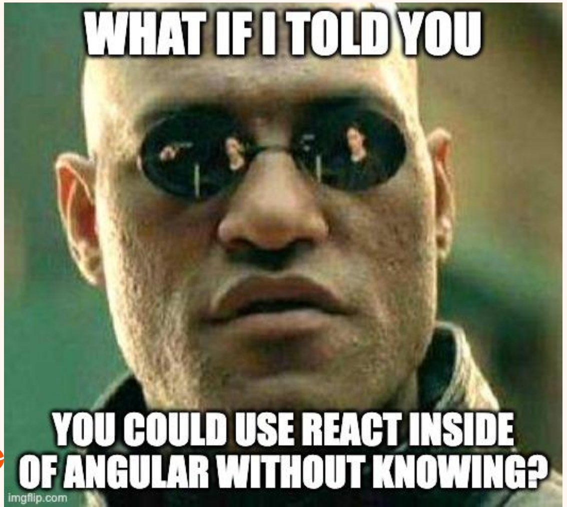
If you ask for the **why** of it, the reason.
And try to understand the **what** of it, the gist.
Then, you might come to agree with the **how** of it, the implementation.

What did we learn?

You might want to explain a bit before proposing crazy ideas.

If you explain the **why** of it, the reasons.
People will try to understand the **what** of it, the gist.
Then, they might come to agree with the **how** of it, the implementation.




WHAT IF I TOLD YOU
YOU COULD USE REACT INSIDE OF ANGULAR WITHOUT KNOWING?
imgflip.com

It's a lab within a lab

It's like Inception, so if it's confusing and stupid then so is everyone's favorite movie

I have a new framework down here
JavaScript Developers

Thank you!
Questions?

goto;

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#GOTOaar

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