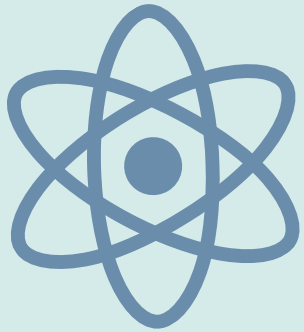
NILS HARTMANN | OLIVER ZEIGERMANN

EINSTIEG IN React



LEHMANNS MEDIA HAMBURG | SEPTEMBER 2016

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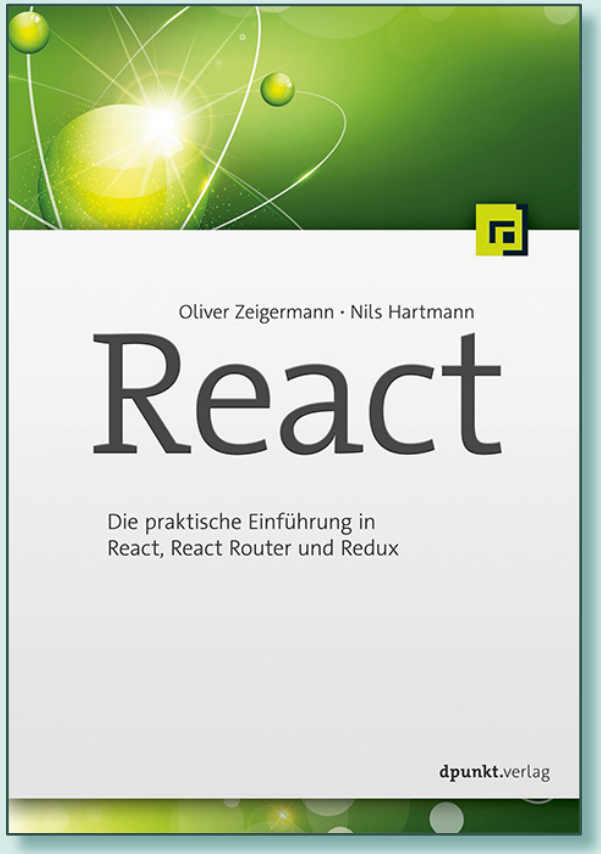
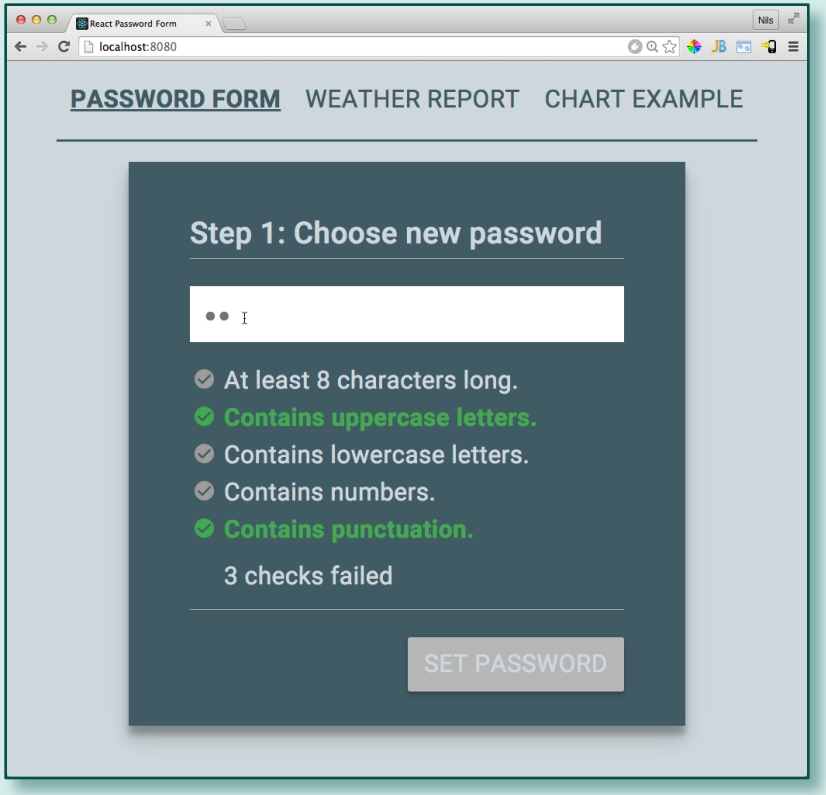


HTTP://REACTBUCH.DE

SINGLE PAGE APPLICATIONS

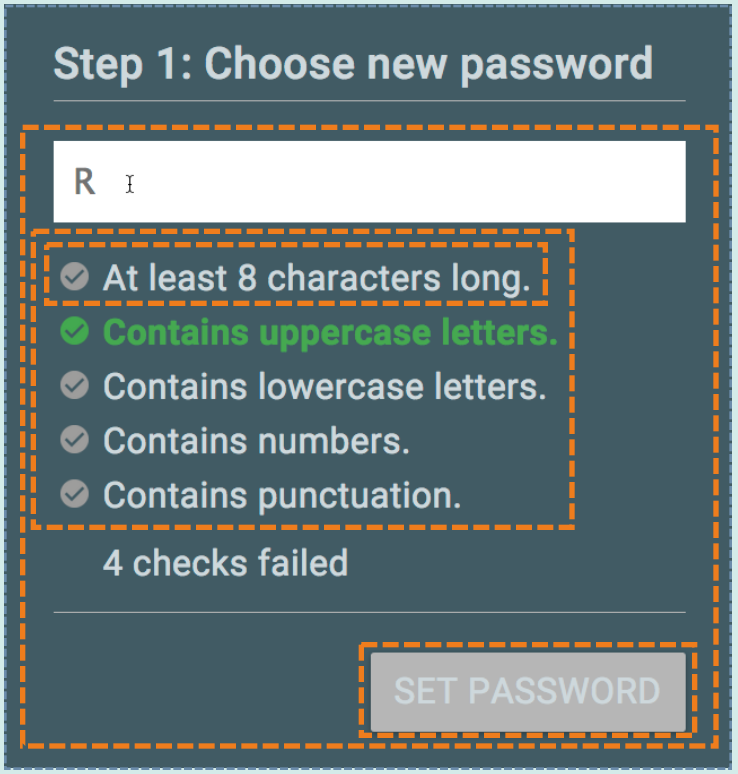
React



Code: https://github.com/nilshartmann/react-example-app

Demo: https://nilshartmann.github.io/react-example-app/

BEISPIEL ANWENDUNG




```
<PasswordView>
  <PasswordForm>
    <input />
    <CheckLabelList>
      <CheckLabel />
      <CheckLabel />
    </CheckLabelList>
    <Label />
    <Button />
  </PasswordForm>
</PasswordView>
```

WIEDERVERWENDBARE KOMPONENTEN

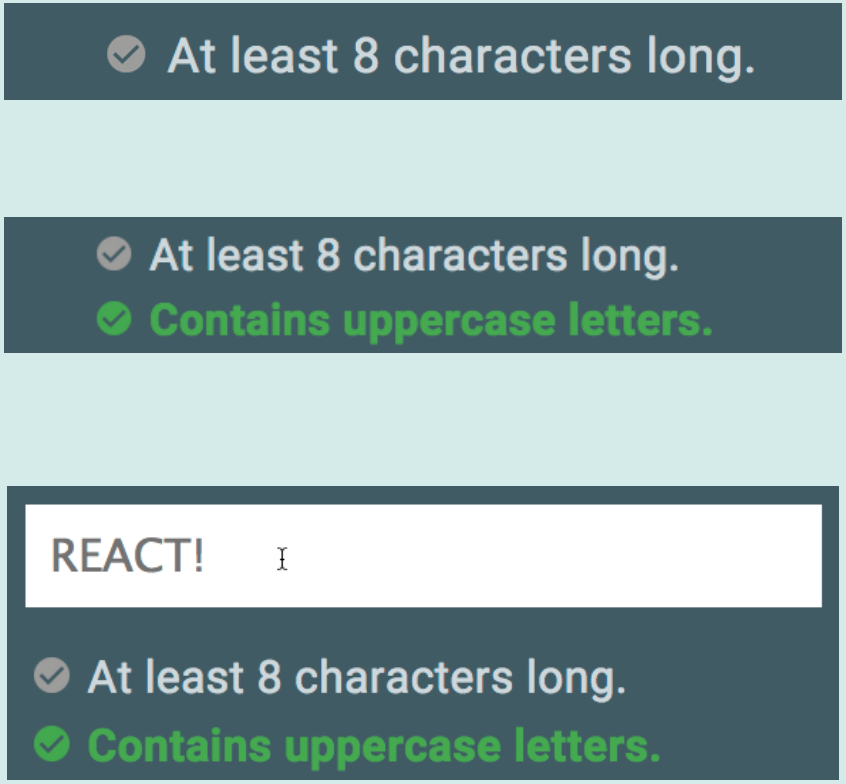

```
<Application>
  <Navigation />
  <ViewContainer>
    <PasswordView>
      . . .
      . . .
    </PasswordView>
  </ViewContainer>
</Application>
```

ANWENDUNGEN AUS KOMPONENTEN KOMPONIERT

React-Komponenten

- werden deklarativ beschrieben
- bestehen aus Logik und UI
- keine Templatesprache
- werden immer komplett gerendert

- können auf dem Server gerendert werden („universal webapps“)


At least 8 characters long.
At least 8 characters long.
Contains uppercase letters.
REACT!
At least 8 characters long.
Contains uppercase letters.

DIE JSX SPRACHERWEITERUNG

Anstatt einer Template Sprache: HTML in JavaScript integrieren

- Erlaubt Schreiben von HTML-artigen Ausdrücken im JavaScript-Code
- Wird zu regulärem JavaScript Code compiliert (z.B. Babel, TypeScript)
- Optional

JSX

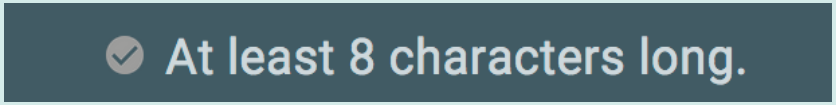
```
const name = 'Lemmy';
const greeting = <h1>Hello, {name}</h1>;
```

Übersetztes JavaScript

```
var name = 'Lemmy';
var greeting = React.createElement('h1', null, 'Hello, ', name);
```

EINE REACT KOMPONENTE: ALS FUNKTION

Komponente CheckLabel

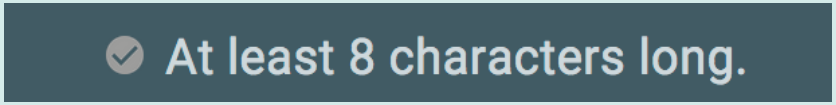


Komponentenfunktion

JSX

```
function CheckLabel() {
  return <div
    className="CheckLabel-unchecked">
    At least 8 characters long.
  </div>;
}
```

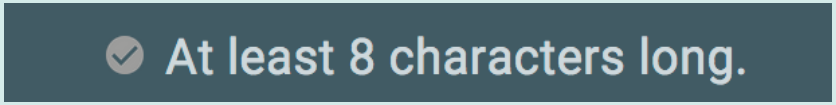
KOMPONENTE EINBINDEN



index.html

```
<html>
  <head>. . .</head>
  <body>
    <div id="mount"></div>
  </body>
  <script src="dist/dist.js"></script>
</html>
```

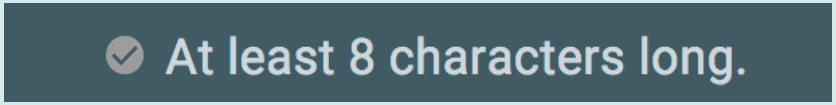
KOMPONENTE EINBINDEN



app.js

```
import React from 'react';
import ReactDOM from 'react-dom';

import CheckLabel from './CheckLabel';

ReactDOM.render(
  <CheckLabel />,
  document.getElementById('mount')
);
```

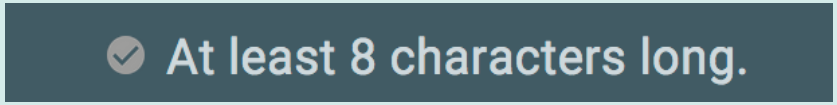
KOMPONENTEN: PROPERTIES




```
{
 checked: false,
 label: ‘At least 8 characters long.’
}
```

```
function CheckLabel(props) {
  return <div
    className=
   {props.checked?'CheckLabel-checked':'CheckLabel-unchecked'}>
    {props.label}
  </div>;
}
```

KOMPONENTEN: PROPERTIES




```
function CheckLabel(props) {
  . . .
}
```

Properties beschreiben

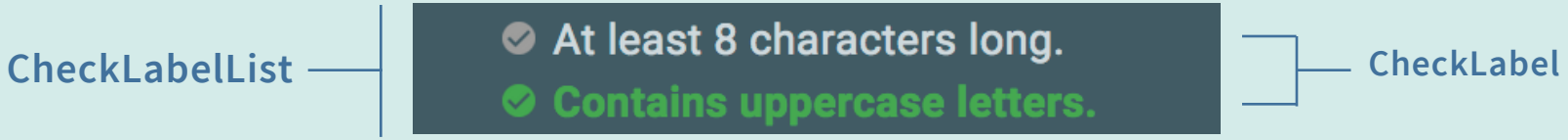
```
CheckLabel.propTypes = {
  label:   React.PropTypes.string.isRequired,
  checked: React.PropTypes.bool
};
```

Überprüfung zur Laufzeit

```
▶Warning: Failed propType: Required prop `label` was not specified   main.js:12889
in `CheckLabel`. Check the render method of `CheckLabelList`.
```

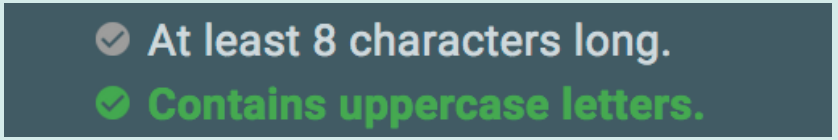
KOMPONENTEN VERWENDEN

- Komponenten sind zusammensetzbar




```
function CheckLabelList() {
  return <div>
    <CheckLabel checked={false}
       label='At least 8 characters long' />
    <CheckLabel checked={true}
       label='Contains uppercase letters.' />
  </div>;
}

function CheckLabel(props) {
  // . . .
}
```

BEISPIEL: KOMPONENTENLISTEN




```
checks: [
  { checked: false, label: 'At least 8 characters long.' },
  { checked: true,  label: 'Contains uppercase letters' }
]
```

```
function CheckLabelList(props) {
  return <div>
    {props.checks.map(c => <CheckLabel
                             label={c.label}
                             checked={c.checked}
                             key={c.label} />)
    }
  </div>;
}
```

KOMPONENTEN KLASSEN

ECMAScript 2015 Klasse

Properties über Konstruktor (optional)

Lifecycle Methoden (optional)

Render-Methode (pflicht)

Properties über **props** Objekt

```
class CheckLabelList extends React.Component {
  constructor(props) {
    super(props);
  }

  componentDidMount() { . . . }
  componentWillReceiveProps() { . . . }
  shouldComponentUpdate() { . . . }

  render() {
    return <div>
      {this.props.checks.map(c => <CheckLabel . . ./>)}
   </div>;
  }
}
```

ZUSTAND VON KOMPONENTEN

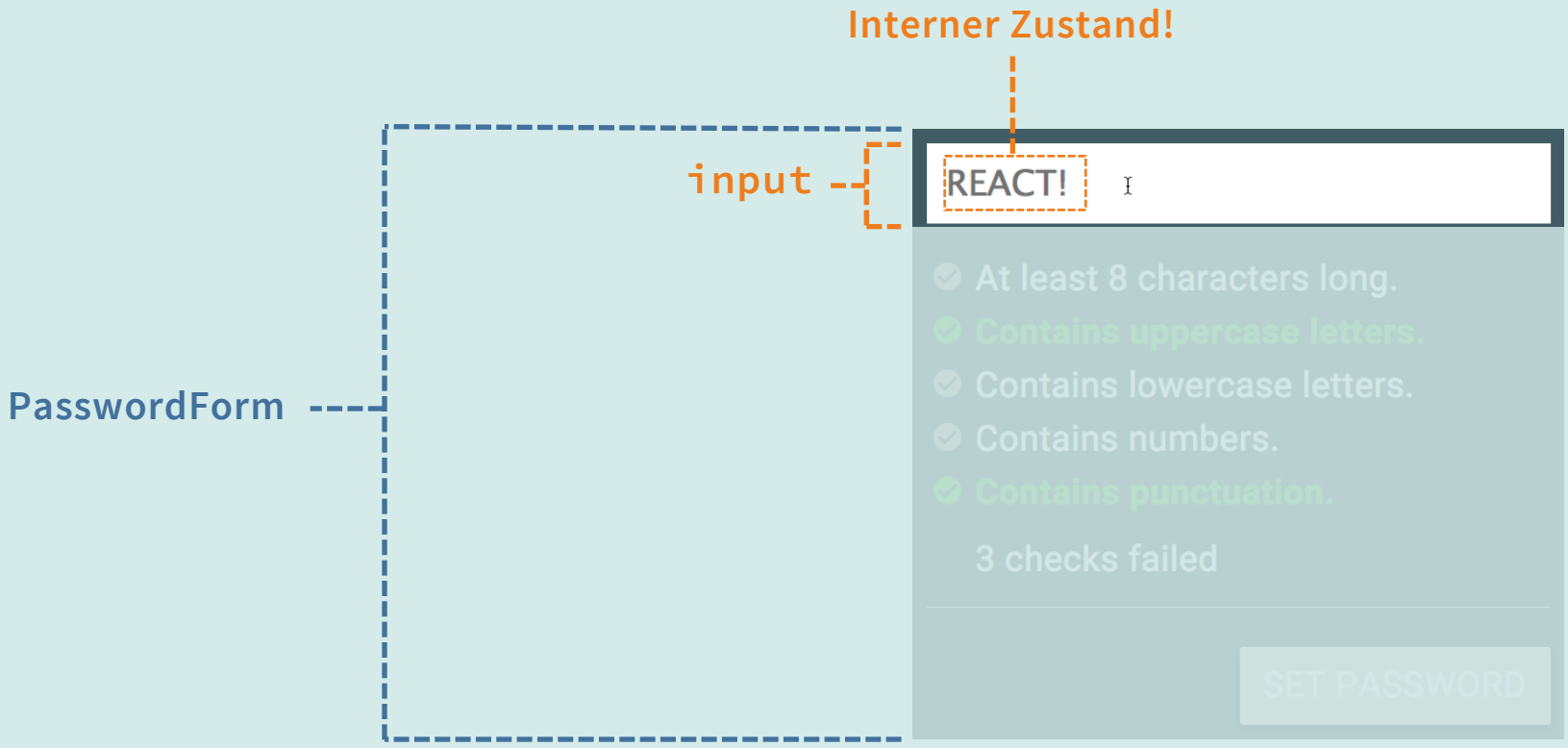
Zustand („state“): Komponenten-intern

- Beispiel: Inhalt von Eingabefeld, Antwort vom Server
- Objekt mit Key-Value-Paaren
- Zugriff über this.state / this.setState()
- Nur in Komponenten-Klassen verfügbar
- **this.setState() triggert erneutes Rendern**
    - auch alle Unterkomponenten

Zum Vergleich: Properties

- Von außen übergeben
- Unveränderlich
- Zugriff über this.props (Key-Value-Paare)

BEISPIEL: EINGABEFELD



BEISPIEL: EINGABEFELD

1. Input mit Wert aus State befüllen
2. Event Listener

```
class PasswordForm extends React.Component {
  render() {
   return <div>
     <input
       value={this.state.password}
       onChange={e=>this.onPasswordChange(e.target.value)}
     />
     . . .
   </div>;
  }

  onPasswordChange(newPassword) {
    this.setState({password: newPassword});
  }
}
```

ZUSTAND: EINGABEFELD

1. Input mit Wert aus State befüllen
2. Event Listener

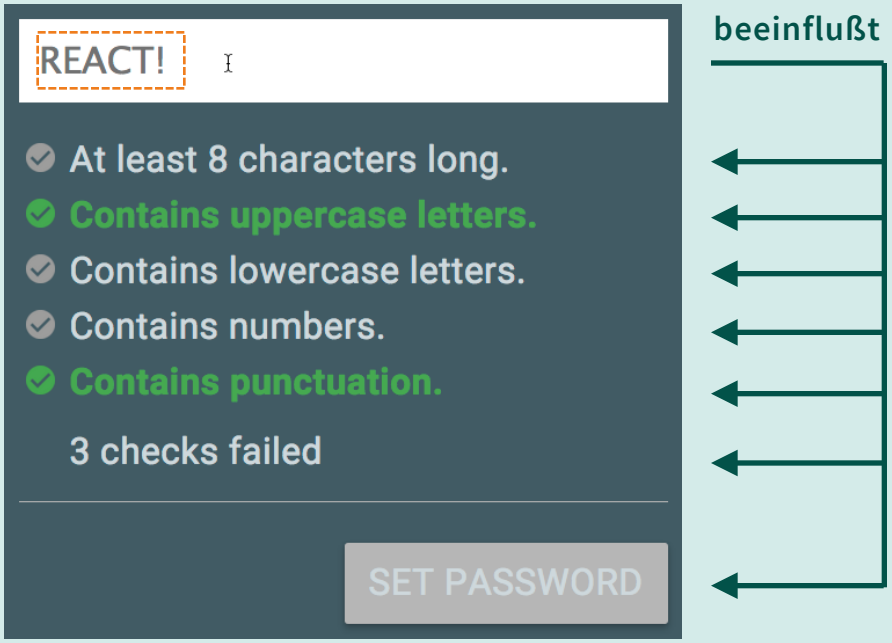
```
class PasswordForm extends React.Component {
  render() {
   return <div>
     <input
       value={this.state.password}
       onChange={e=>this.onPasswordChange(e.target.value)}
     />
     . . .
   </div>;
  }

  onPasswordChange(newPassword) {
    this.setState({password: newPassword});
  }
}
```

Neu rendern

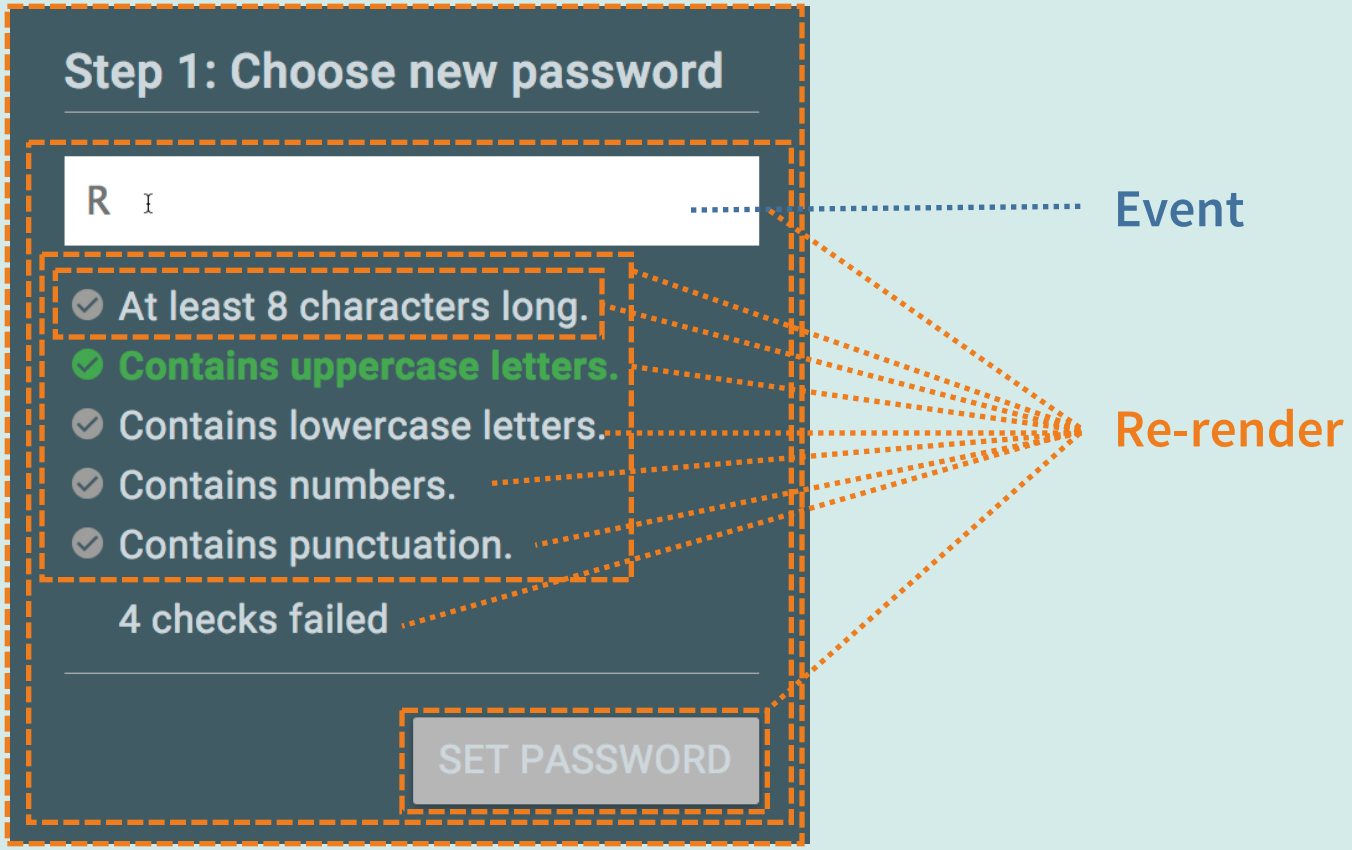
Event

3. Zustand neu setzen

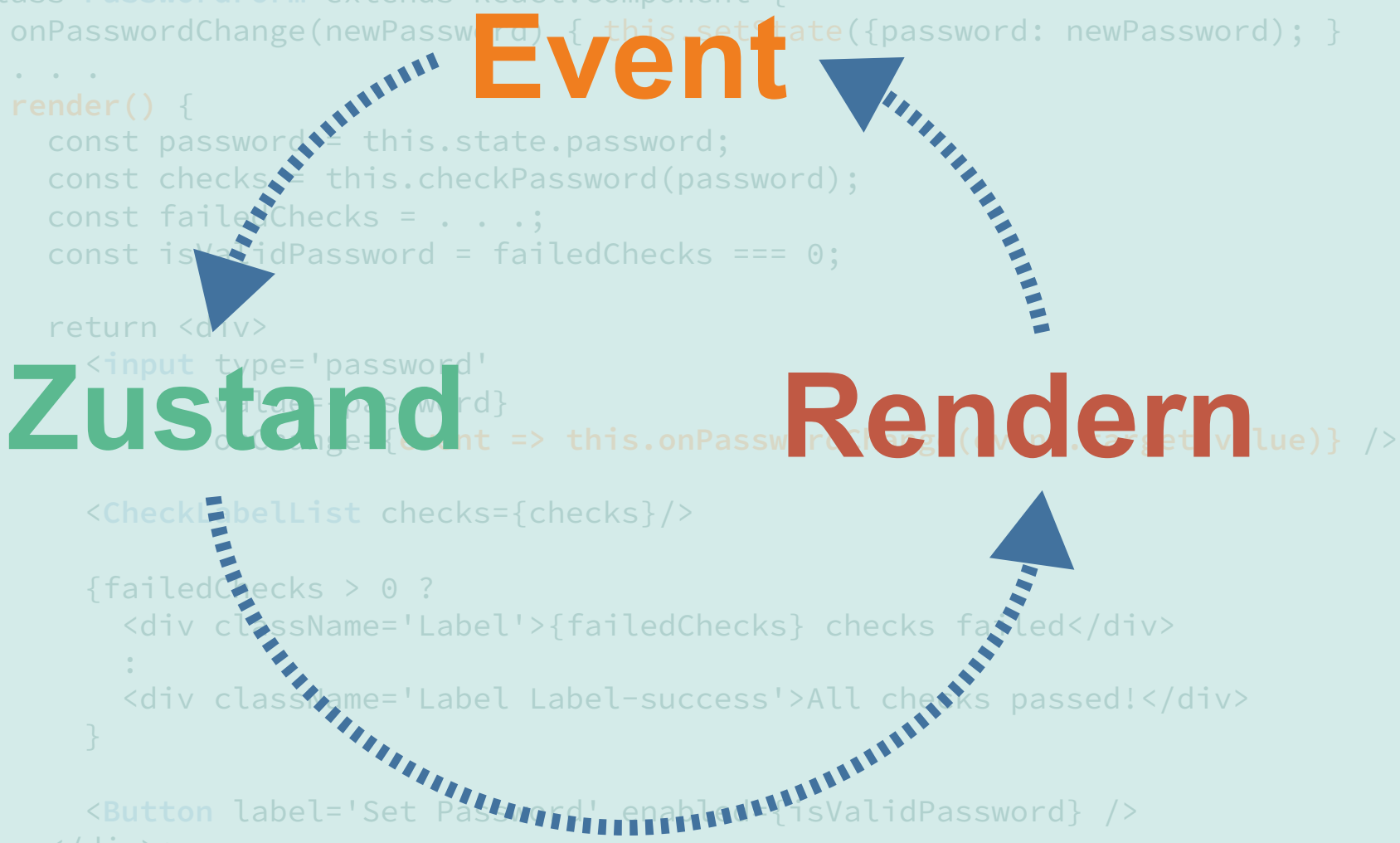
Beispiel: Password Formular



GANZ EINFACH: ALLES RENDERN

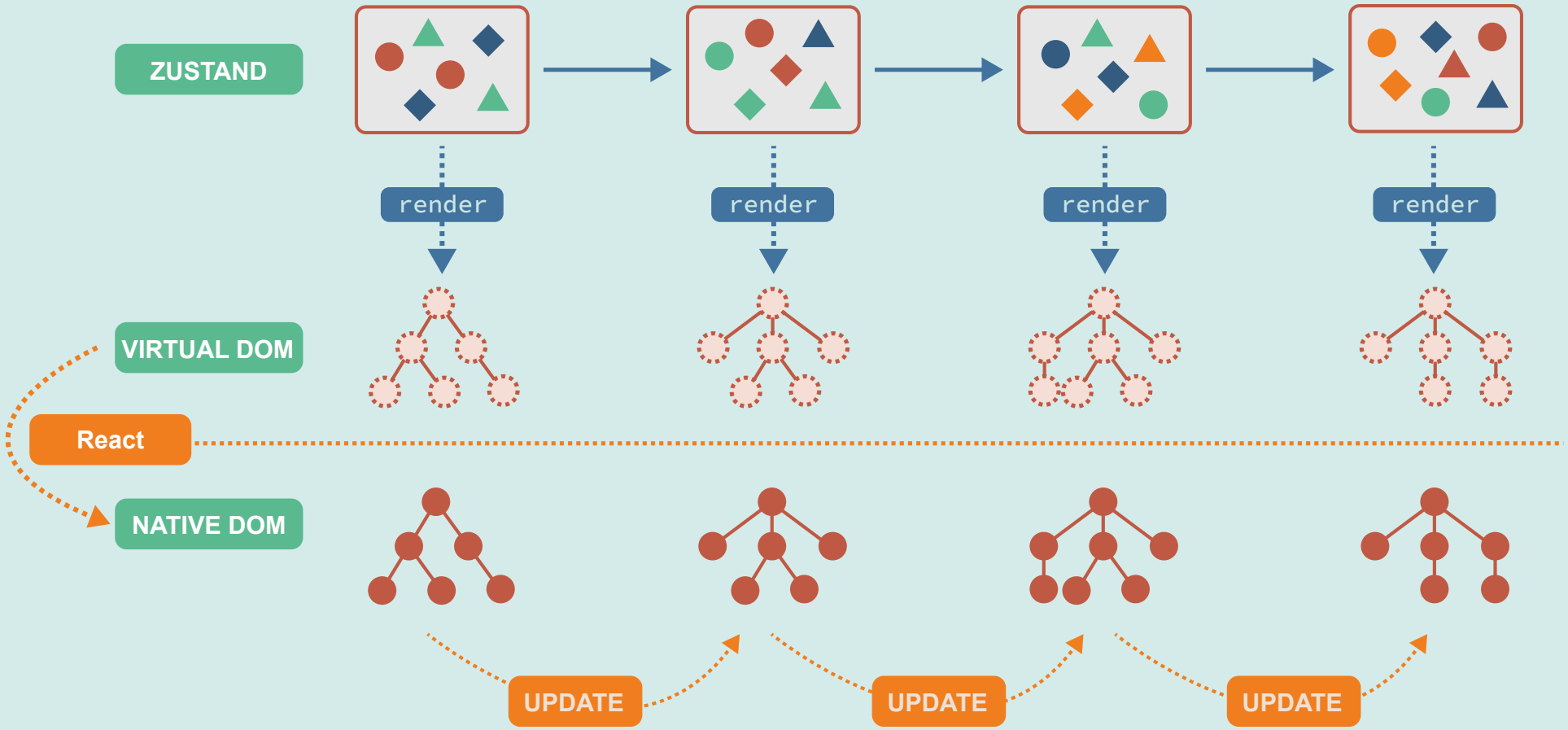


REACT: UNI DIRECTIONAL DATAFLOW



RESPOND TO EVENTS & RENDER UI

HINTERGRUND: VIRTUAL DOM



HINTERGRUND: VIRTUAL DOM

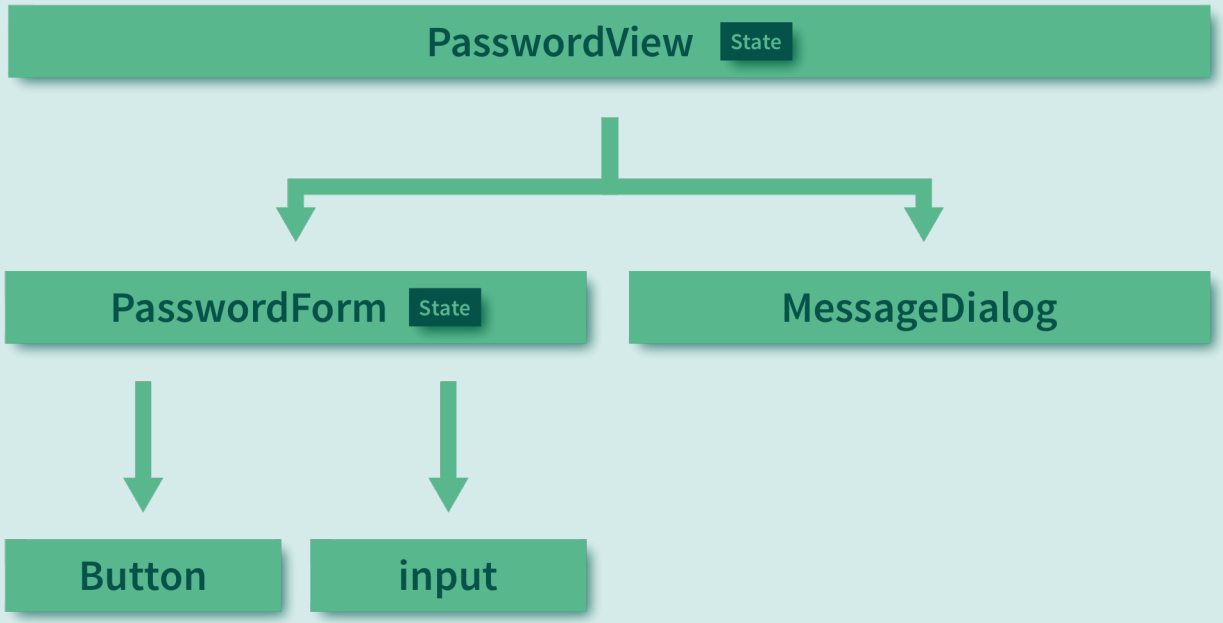
Virtual DOM

- Render-Methode liefert ein virtuelles DOM-Objekt zurück
- Trennung von Darstellung (DOM) und Repräsentation (virtueller DOM)

Vorteile

- Erlaubt performantes neu rendern der Komponente
- Ausgabe in andere Formate (z.B. String) möglich
- Kann auf dem Server gerendert werden (Universal Webapps)
- Kann ohne DOM/Browser getestet werden

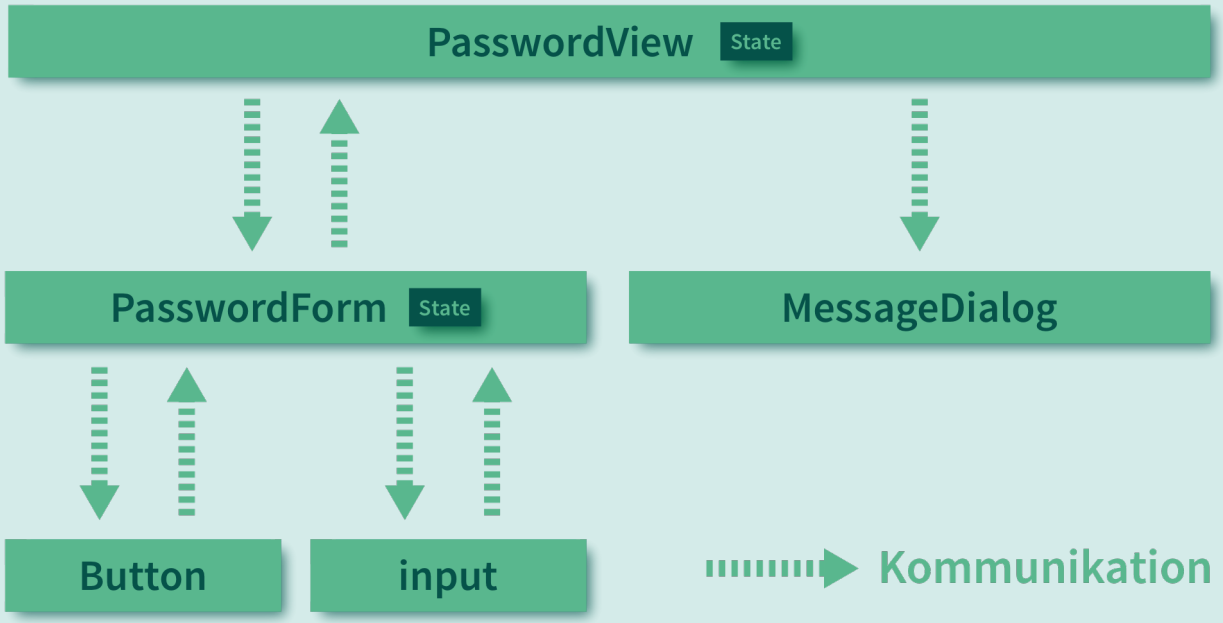
KOMPONENTENHIERARCHIEN



Typische React Anwendungen: Hierarchisch aufgebaut

- State möglichst weit oben („Container Komponenten“)
- Mehrere Komponenten mit State möglich
  - Beim neu rendern bleibt State erhalten

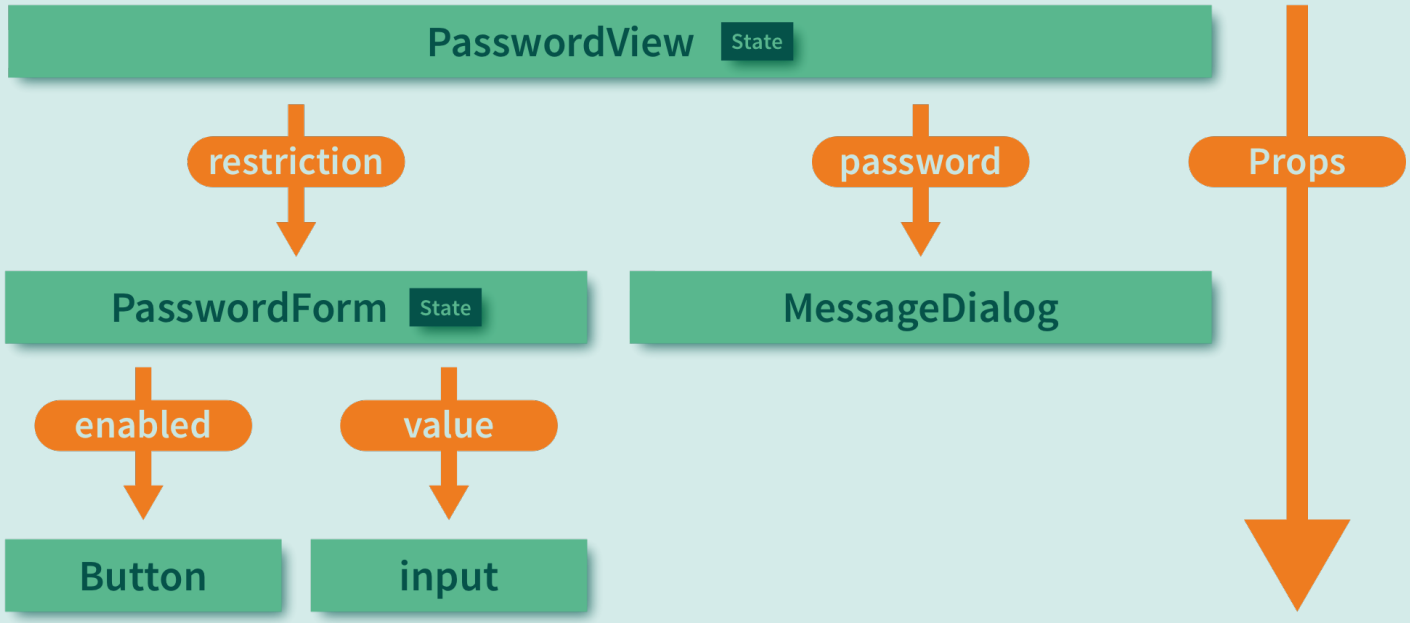
KOMMUNIKATION ZWISCHEN KOMPONENTEN



Typische React Anwendungen: Hierarchisch aufgebaut

- State möglichst weit oben („Container Komponenten“)
- Mehrere Komponenten mit State möglich
  - Beim neu rendern bleibt State erhalten
- Wie wird kommuniziert?

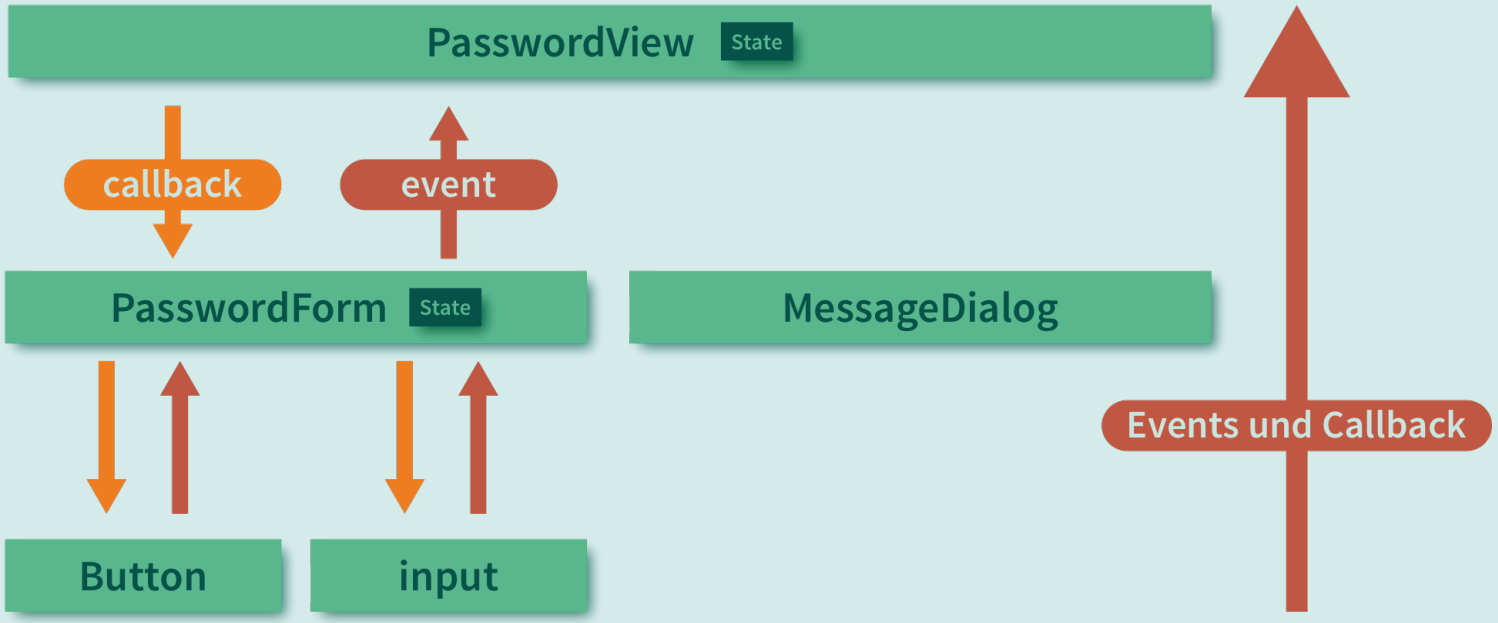
KOMMUNIKATION: PROPERTIES



Von oben nach unten: Properties

```
<Button enabled={. . . }>Set Password</Button>
```

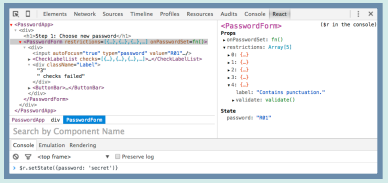
KOMMUNIKATION: EVENTS



Von unten nach oben: Events und Callbacks

- Callback-Funktion als Property
- Event: Aufruf der Callback-Funktion

ÖKOSYSTEM

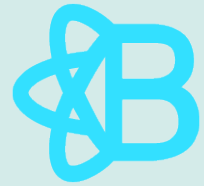


Developer Tools

material-design

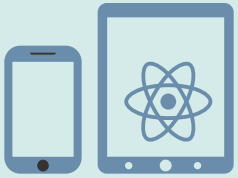
Flux Architekturpattern

Bootstrap



GraphQL & Relay

React Router



React Native

Fertige Komponenten

ZUSAMMENFASSUNG

React

- Nur View-Schicht (Komponenten)
  - Gut integrierbar mit anderen Frameworks
  - Einfache Migrationspfade möglich

- JSX statt Templatesprache („HTML in JavaScript“)

- Deklarative UI
  - Komponenten werden immer komplett gerendert
  - Kein 2-Wege-Databinding
  - Komponenten typischerweise organisiert in Hierarchien

Vielen Dank!

Fragen?

@NILSHARTMANN | @DJCORDHOSE