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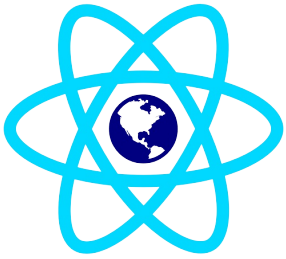

Workshop *react-geo - mapping mit React*

Welcome to the **react-geo - mapping mit React** workshop. This workshop is designed to give you a comprehensive overview of react-geo as a library of geo-related application components available in combination with React, antd and OpenLayers.

> If you want to visit this page on your own device or to print the PDF version, you can download the workshop materials here.

Setup

The following instructions and exercises assume that you have some requirements fulfilled on your local machine. Please check if you have the consequent packages installed:

- A suitable text editor, e.g. the lightweight Atom editor.
- NodeJS in version 8 or higher.

All set? Then, lets' go!

Overview

This workshop is presented as a set of modules. In each module you will perform tasks designed to achieve a specific goal for that module. Each module builds upon lessons learned in previous modules and is designed to iteratively build up your knowledge base.

- Basics - Dive into the basics of EcmaScript 6, React and npm.
- First steps - Learn how to create your own React app and how to include react-geo in it.
- A taste of react-geo components - Extend your application with some react-geo components.
- Higher order components / Provider - Have a look at more advanced components.

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Basics

npm

npm is the package manager for Node.js and the world's largest software registry (more than 600k packages) with approximately 3 billion downloads per week. You can use npm to

- Adapt packages to your apps, or incorporate them as they are.
- Download standalone tools you can use right away.
- Run packages without downloading using npx.
- Share code with any npm user, any where.
- Restrict code to specific developers.
- Form virtual teams (orgs).
- Manage multiple versions of code and code dependencies.
- Update applications easily when underlying code is updated.
- Discover multiple ways to solve the same puzzle.
- Find other developers who are working on similar problems.

Install packages with npm

The most common way to install new packages with npm is via the CLI. To install a package simply type:

`npm install packagename`

package.json

The command `npm init` in your project folder opens a interactive dialogue to establish a npm project. The result is the `package.json` including all important settings, scripts and dependencies of your project.

```
{
  "name": "name_of_your_package",
  "version": "1.0.0",
  "description": "This is just a test",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "repository": {
    "type": "git",
    "url": "http://github.com/yourname/name_of_your_package.git"
  },
  "author": "your_name",
  "license": "ISC"
}
```

Please check the npm docs for further information.

ES6

ES (ECMAScript) is a trademarked scripting-language specification created to standarize JavaScript. AS the name suggests, ES6 (later renamed to ES2015) is the sixth edition and came with significant new syntax for writing complex applications, including classes and modules. Some Browsers do not (or only partially) support ES6, but the ES6 code can be transpiled in ES5, which enjoy a broader compability.

JavaScript frameworks and libraries to build modern web-applications are written in ES6.

React

React is a modern and open-source JavaScript library for building user interfaces based on ES6. Originally, it has been developed by a software engineer at Facebook and it still being maintained by Facebook (among others).

React allows developers to create large web-applications that use data and can change over time without reloading the page. It aims primarily to provide speed, simplicity, and scalability. React processes only user interfaces in applications. This corresponds to View in the Model-View-Controller (MVC) pattern, and can be used in combination with other JavaScript libraries or frameworks in MVC, such as AngularJS.

The smallest React example looks like this:

```
ReactDOM.render(
  <h1>Hello, world!</h1>,
  document.getElementById('root')
);>
```

Check the docs and Tutorial for more information.

JSX

React components are typically written in JSX, a JavaScript extension syntax allowing quoting of HTML and using HTML tag syntax to render subcomponents. HTML syntax is processed into JavaScript calls of the React framework. Developers may also write in pure JavaScript. An example of JSX code:

```
import React from 'react';

class App extends React.Component {
  render() {
    return (
      <div>
        <p>Header</p>
        <p>Content</p>
        <p>Footer</p>
      </div>
    );
  }
}

export default App;
```

Syntatic sugar for React

First steps

Now that we have set up our development setup and learned the basics about React and EcmaScript 6, we will start by creating a simple React based webapplication by the use of create-react-app, that will include a simple react-geo component. This application will be extended towards a fully functional mapping application little by little later on.

First steps

As a matter of course we could start this workshop by creating a React based webapplication by hand, but as you could imagine this would be a tough job for starters. So we want to dive into react-geo directly without the need to stick together all development tools to get a webapp running. Thankfully there is a project available, that we can use to generate an application for us (even without any configuration!): create-react-app.

Creating a new application is easy. Just navigate to a folder of your choice and create a new app named *my-app* inside this directory with:

```
npx create-react-app my-app
```

This will take while, but finally you will see a list of commands you can run inside the created folder. Now switch to the project's folder with:

```
cd my-app
```

Finally we can start the development server with:

```
npm start
```

To view the application in your browser please open http://localhost:3000/.

WebPack erklären

- App.js editieren --> hotreload

Hallo Welt!

```
import React, { Component } from 'react';
import logo from './logo.svg';
import './App.css';

class App extends Component {
  render() {
    return (
      <div className="App">
        <header className="App-header">
          <img src={logo} className="App-logo" alt="logo" />
          <h1 className="App-title">Hallo Welt!</h1>
        </header>
        <p className="App-intro">
            Hallo Welt!
        </p>
      </div>
    );
  }
}

export default App;
```

Include react-geo dependency

`react-geo` is published at https://www.npmjs.com/ and can be integrated and installed in your *my-app* application via basic `npm` commands.

Add react-geo dependency

To add the dependency `react-geo` please navigate to your project's folder (if not already done) and execute:

```
npm i @terrestris/react-geo
```

This will add the latest version of `react-geo` to your local `package.json` file (into the `dependencies` section) and download the distributed version of the library to the `node_modules` directory.

Add Ant Design und OpenLayers dependencies

You may have noticed that the step from above has produced some warnings, which include `react-geo`:

```
npm WARN @terrestris/react-geo@5.6.0 requires a peer of antd@~3.0 but none is installe
npm WARN @terrestris/react-geo@5.6.0 requires a peer of ol@~4.0 but none is installed.
```

`npm` provides several techniques to express the type of a dependency of a project. While dependencies are used to directly specify packages needed to *run* your application's code (e.g. a front-end library like Bootstrap), devDependencies are reserved to specify packages needed to *build* your application's code (e.g. test harnesses like Jest or transpilers like Babel). However, under some conditions, one wants to express the *compatibility* of a certain package with the host package and npm calls this dependency a peerDependencies. Ususally this is used to express the dependency of a plugin inside this host package or similiar. In `react-geo` we need to have `antd`, `ol` and `react` defined as peer dependencies due to scope issues, because all of them were usually referenced by the host package/the application itself in a certain version. As `npm` handles dependencies hierachically including those packages in `react-geo` twice would lead to two different dependencies available in your application at runtime. To share the dependencies between your host application and `react-geo`, we advice `react-geo` to use the depencies given by the host package.

To met these requirements we have to install the requested peer dependenies by ourselfs with:

```
npm i antd ol
```

Now we're ready to make use of all `react-geo` components and utilities inside our *my-app* application.

Erste Komponente

SimpleButton

Ein einfacher Button. Beispiele

```
<SimpleButton onClick={() => {alert('huhu');}}/>
```

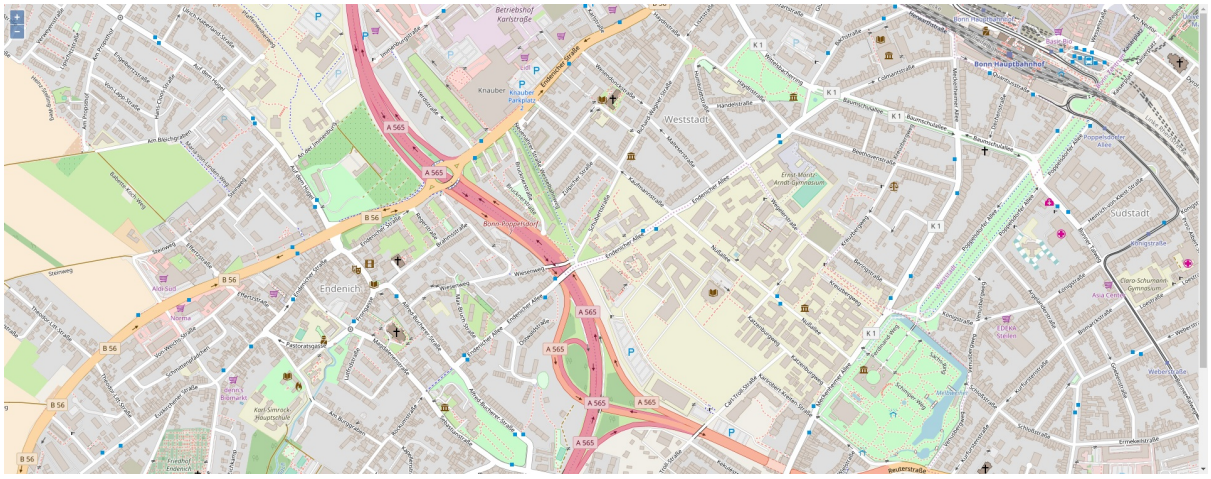
Zur Verwendung des `SimpleButton` muss die entsprechende Klasse importiert werden.

> Um die Komponenten korrekt darzustellen müssen die stylesheets von Ant Design und react-geo importiert werden.
>
> Hinweis auf import syntax (css, svg, …).


```
import React, { Component } from 'react';
import logo from './logo.svg';

import './App.css';
import 'antd/dist/antd.css';
import './react-geo.css';

import {
  SimpleButton
} from '@terrestris/react-geo';

class App extends Component {
  render() {
    return (
      <div className="App">
        <header className="App-header">
          <img src={logo} className="App-logo" alt="logo" />
          <h1 className="App-title">Hallo Welt!</h1>
        </header>
        <p className="App-intro">
            <SimpleButton
              onClick={() => {alert('huhu');}}
            >
              Hallo Welt!
            </SimpleButton>
        </p>
      </div>
    );
  }
}
```

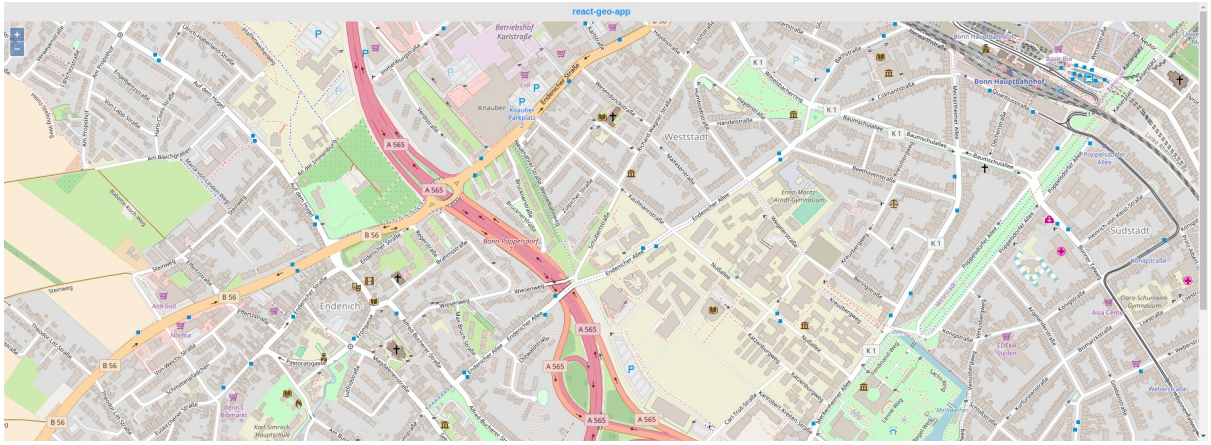
Kartenapplikation mit react-geo Komponenten

MapComponent




```
import React, { Component } from 'react';

import './App.css';
import 'ol/ol.css';
import 'antd/dist/antd.css';
import './react-geo.css';

import OlMap from 'ol/map';
import OlView from 'ol/view';
import OlLayerTile from 'ol/layer/tile';
import OlSourceOsm from 'ol/source/osm';

import {
  MapComponent
} from '@terrestris/react-geo';

const layer = new OlLayerTile({
  source: new OlSourceOsm()
});

const center = [ 788453.4890155146, 6573085.729161344 ];

const map = new OlMap({
  view: new OlView({
    center: center,
    zoom: 16,
  }),
  layers: [layer]
});

class App extends Component {
  render() {
    return (
      <div className="App">
        <MapComponent
          map={map}
        />
      </div>
    );
  }
}

export default App;
```

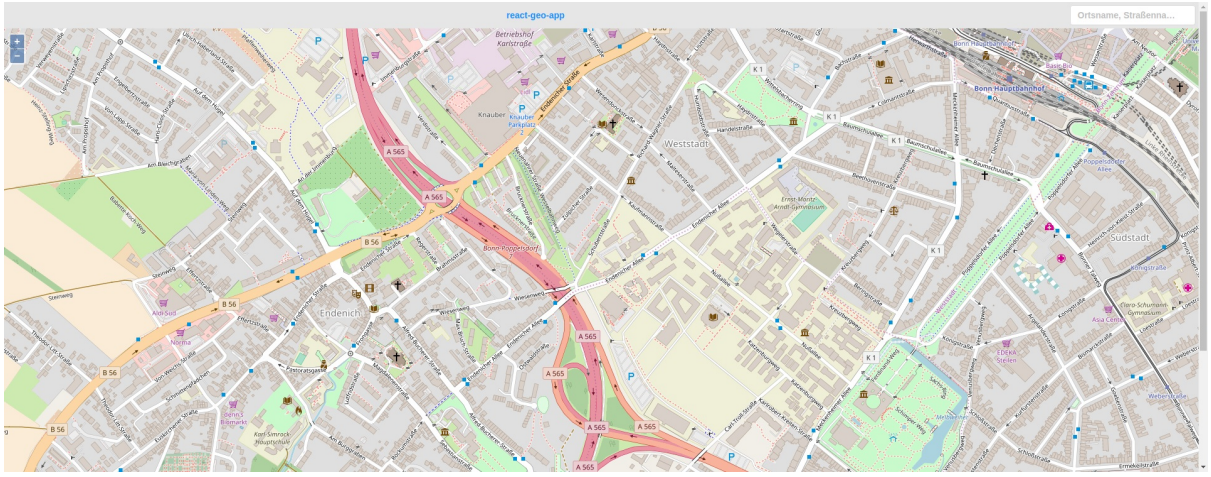
Titlebar




```
import React, { Component } from 'react';

import './App.css';
import 'ol/ol.css';
import 'antd/dist/antd.css';
import './react-geo.css';

import OlMap from 'ol/map';
import OlView from 'ol/view';
import OlLayerTile from 'ol/layer/tile';
import OlSourceOsm from 'ol/source/osm';

import {
  MapComponent,
  Titlebar
} from '@terrestris/react-geo';


const layer = new OlLayerTile({
  source: new OlSourceOsm()
});

const center = [ 788453.4890155146, 6573085.729161344 ];

const map = new OlMap({
  view: new OlView({
    center: center,
    zoom: 16,
  }),
  layers: [layer]
});

class App extends Component {
  render() {
    return (
      <div className="App">
        <Titlebar className="titlebar">
          react-geo-app
        </Titlebar>
        <MapComponent
          map={map}
        />
      </div>
    );
  }
}
```

```
export default App;
```

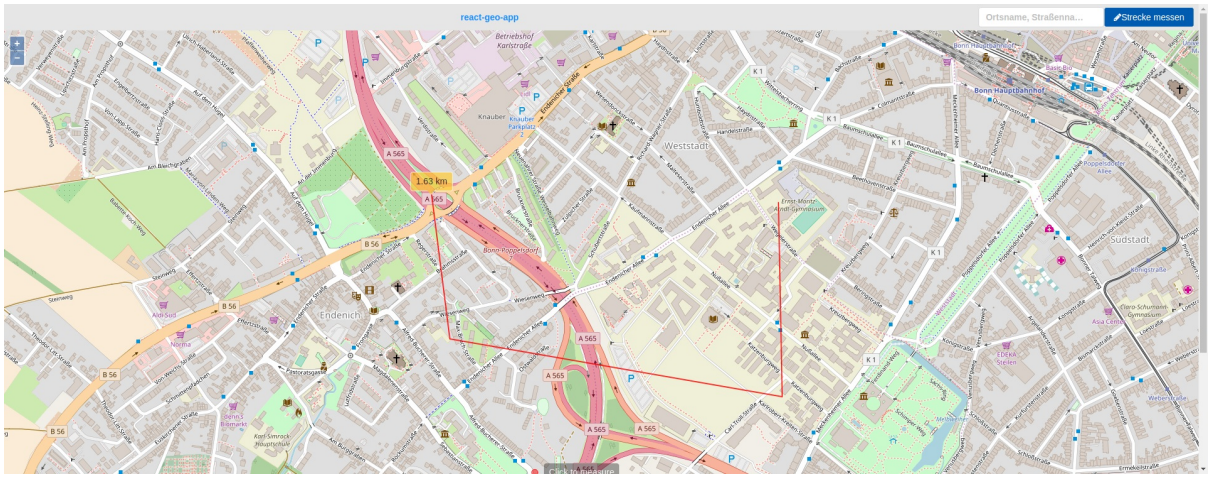
NominatimSearch




```
import React, { Component } from 'react';

import './App.css';
import 'ol/ol.css';
import 'antd/dist/antd.css';
import './react-geo.css';

import OlMap from 'ol/map';
import OlView from 'ol/view';
import OlLayerTile from 'ol/layer/tile';
import OlSourceOsm from 'ol/source/osm';

import {
  MapComponent,
  NominatimSearch,
  MeasureButton,
  Titlebar
} from '@terrestris/react-geo';


const layer = new OlLayerTile({
  source: new OlSourceOsm()
});

const center = [ 788453.4890155146, 6573085.729161344 ];

const map = new OlMap({
  view: new OlView({
    center: center,
    zoom: 16,
  }),
  layers: [layer]
});

class App extends Component {
  render() {
    return (
      <div className="App">
        <Titlebar className="titlebar" tools={[
            <NominatimSearch
              key="search"
              map={map}
            />,
            <MeasureButton
              key="measureButton"
```

```
              name="line"
              map={map}
              measureType="line"
            >
          ]}>
          react-geo-app
        </Titlebar>
        <MapComponent
          map={map}
        />
      </div>
    );
  }
}

export default App;
```

MeasureButton




```
import React, { Component } from 'react';

import './App.css';
import 'ol/ol.css';
import 'antd/dist/antd.css';
import './react-geo.css';

import OlMap from 'ol/map';
import OlView from 'ol/view';
import OlLayerTile from 'ol/layer/tile';
import OlSourceOsm from 'ol/source/osm';

import {
  MapComponent,
  NominatimSearch,
  MeasureButton,
  Titlebar
} from '@terrestris/react-geo';


const layer = new OlLayerTile({
  source: new OlSourceOsm()
});

const center = [ 788453.4890155146, 6573085.729161344 ];

const map = new OlMap({
  view: new OlView({
    center: center,
    zoom: 16,
  }),
  layers: [layer]
});

class App extends Component {
  render() {
    return (
      <div className="App">
        <Titlebar className="titlebar" tools={[
            <NominatimSearch
              key="search"
              map={map}
            />,
            <MeasureButton
              key="measureButton"
```

```
              name="line"
              map={map}
              measureType="line"
              icon="pencil"
            >
              Strecke messen
            </MeasureButton>
          ]}>
          react-geo-app
        </Titlebar>
        <MapComponent
          map={map}
        />
      </div>
    );
  }
}

export default App;
```

```
<LayerTree
  map={map}
/>
```

Verwendung einer OpenLayers LayerGroup

```
const layerGroup = new OlLayerGroup({
  name: 'Layergroup',
  layers: [
    new OlLayerTile({
      name: 'Food insecurity layer',
      minResolution: 200,
      maxResolution: 2000,
      source: new OlSourceTileJson({
        url: 'https://api.tiles.mapbox.com/v3/mapbox.20110804-hoa-foodinsecurity-3month.json?secure',
        crossOrigin: 'anonymous'
      })
    }),
    new OlLayerTile({
      name: 'World borders layer',
      minResolution: 2000,
      maxResolution: 20000,
      source: new OlSourceTileJson({
        url: 'https://api.tiles.mapbox.com/v3/mapbox.world-borders-light.json?secure',
        crossOrigin: 'anonymous'
      })
    })
  ]
});

<LayerTree
  layerGroup={layerGroup}
  map={map}
/>
```

Weitere Beispiele hier

Higher order components

- siehe facebook.

`MapProvider` / `mappify`

- erläuterungen....

```
import React, { Component } from 'react';

import './App.css';
import 'ol/ol.css';
import 'antd/dist/antd.css';
import './react-geo.css';

import OlMap from 'ol/map';
import OlView from 'ol/view';
import OlLayerTile from 'ol/layer/tile';
import OlSourceOsm from 'ol/source/osm';

import {
  MapComponent,
  NominatimSearch,
  MeasureButton,
  Titlebar,
  MapProvider,
  mappify
} from '@terrestris/react-geo';

const MappfiedNominatimSearch = mappify(NominatimSearch);
const MappifiedMeasureButton = mappify(MeasureButton);
const Map = mappify(MapComponent);

const layer = new OlLayerTile({
  source: new OlSourceOsm()
});

const center = [ 788453.4890155146, 6573085.729161344 ];

const map = new OlMap({
  view: new OlView({
    center: center,
    zoom: 16,
  }),
  layers: [layer]
});

class App extends Component {
  render() {
    return (
      <div className="App">
        <MapProvider map={map}>
          <Titlebar className="titlebar" tools={[
              <MappfiedNominatimSearch
                key="search"
              />,
              <MappifiedMeasureButton
                key="measureButton"
                name="line"
                measureType="line"
                icon="pencil"
              >
                Strecke messen
              </MappifiedMeasureButton>
            ]}>
            react-geo-app
          </Titlebar>
          <Map/>
        </MapProvider>
```

```
        </div>
      );
    }
}

export default App;
```

`VisibleComponent` / `isVisibleComponent`

```
import React from 'react';
import { render } from 'react-dom';
import { Button } from 'antd';
import { isVisibleComponent } from '../../index.js';

// Enhance (any) Component by wrapping it using isVisibleComponent().
const VisibleButton = isVisibleComponent(Button);

// The activeModules is a whitelist of components (identified by it's names) to
// render.
const activeModules = [{
  name: 'visibleButtonName'
}, {
  name: 'anotherVisibleButtonName'
}];

render(
  <div>
    <VisibleButton
      name="visibleButtonName"
      activeModules={activeModules}
      type="primary"
      shape="circle"
      icon="search"
    />
    <VisibleButton
      name="notVisibleButtonName"
      activeModules={activeModules}
      type="primary"
      shape="circle"
      icon="search"
    />
    <VisibleButton
      name="anotherVisibleButtonName"
      activeModules={activeModules}
      type="primary"
      shape="circle"
      icon="poweroff"
    />
  </div>,
  document.getElementById('exampleContainer')
);
```