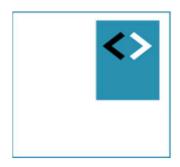


### React Fundamentals Module – React Router



Peter Kassenaar – info@kassenaar.com



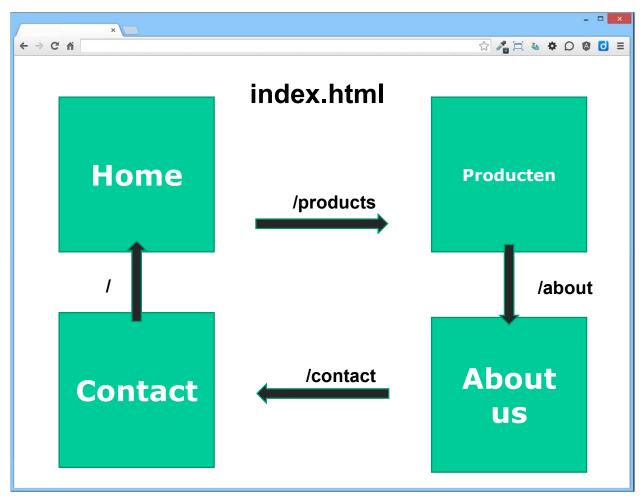
# Routing in your application

Reflecting the state of your application in the URL

"React Router is the standard routing library for React. React Router keeps your UI in sync with the URL. It has a simple API with powerful features like lazy loading, dynamic route matching and location transition."

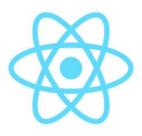
https://www.freecodecamp.org/news/beginners-guide-to-react-router-4-8959ceb3ad58/

#### Routing architecture and goal



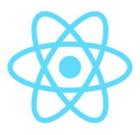
- Make use of SPA principle
- Making deep links possible

#### Routing capabilities / characteristics

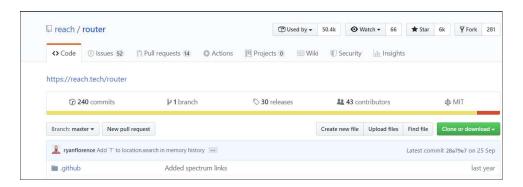


- Update URL when changing to routes/components
- Nested routes/view mapping
- Modular, component based router configuration
- Route params, query, wildcards
- View transition effects
- Link with automatic active CSS classes to denote active route
- HTML5 history mode
- Extensive API

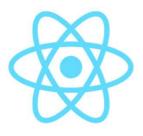
#### **React Router**



- Most popular choice: react-router
  - Created and maintained by team at <u>reacttraining.com</u>
- Also popular: Reach Router
  - Is now integrated with react-router
  - https://github.com/reach/router
  - Status don't use for newer projects.

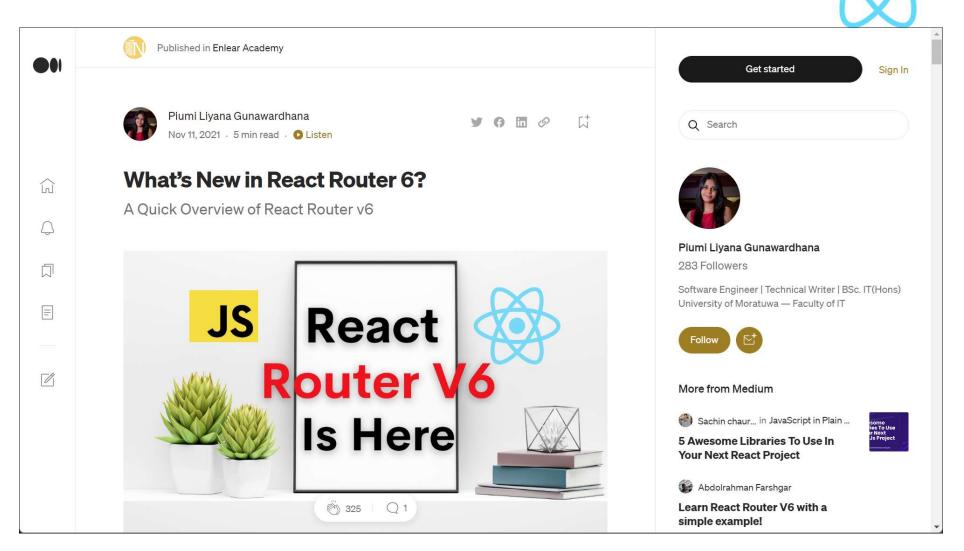


#### **Version numbers**



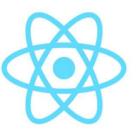
- React Router v3 Hardly used anymore
- React Router v4 Still very popular
  - used a lot
- React Router v5 'intermediate' version
- React Router v6 Current version
  - use in new projects

### Background info - new in React Router 6

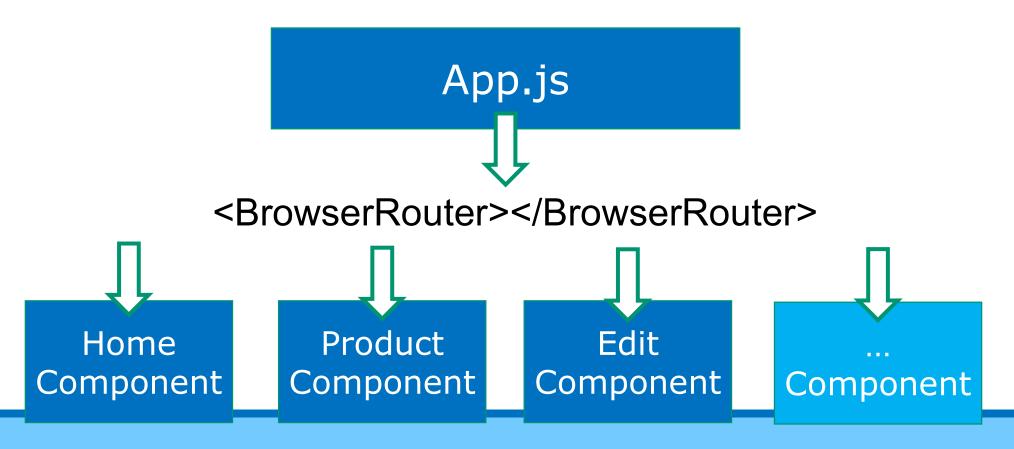


https://enlear.academy/whats-new-in-react-router-6-e34e451e5285

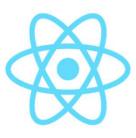
#### Routing – every route is a Component



- App.js gets a main menu (typically in its own component :-)
- Components are injected in <BrowserRouter></BrowserRouter>

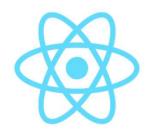


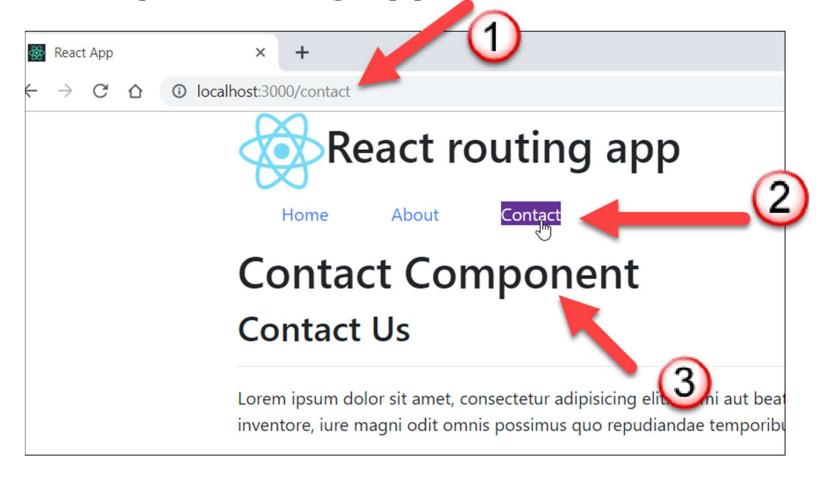
#### **Routing in Components**



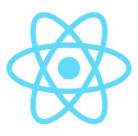
- Components can have their own router configs
  - Child routes
  - Nested routes
- They are loaded at runtime, when the component is loaded.
- No central routing configuration table like in Angular and Vue

### What are we going to build – a simple routing app for starters

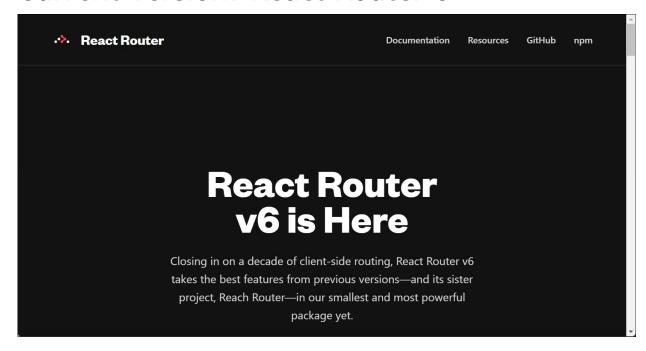




#### **Routing Versions**

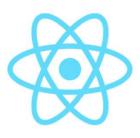


- Previously: React Router 4, React Router 5
  - Mainly used in existing projects
  - Some breaking changes with v6.
- Current version: React Router 6



https://reactrouter.com/

#### Steps in creating routing for your app

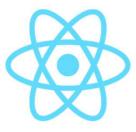


- 1. Create a new app, or start from existing app
- 2. Install react-router
- 3. Update App.js or index.js with <BrowserRouter> to use routes
- 4. Create the main navigation
- 5. Create components, to be shown inside the routes
- 6. Create the basic routes

It is React, so everything is a component. Including

<MainNavigation /> and <Routes />

#### 2. Install the router



- We're using a new project, created with CRA
- Install the correct version

npm install react-router-dom@6

```
PS C:\Users\Gebruiker\Desktop\router-tutorial npm install react-router-dom@6

npm WARN @apideck/better-ajv-errors@0.3.3 requires a peer of typescript@>= 2.7 but r

npm WARN fork-ts-checker-webpack-plugin@6.5.2 requires a peer of typescript@>= 2.7 but r

lf.

npm WARN tsutils@3.21.0 requires a peer of typescript@>=2.8.0 || >= 3.2.0-dev || >= 3.3.

3.6.0-beta || >= 3.7.0-dev || >= 3.7.0-beta but none is installed. You must install peen npm WARN optional SKIPPING OPTIONAL DEPENDENCY: fsevents@2.3.2 (node_modules\fsevents):

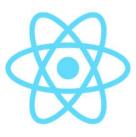
npm WARN notsup SKIPPING OPTIONAL DEPENDENCY: Unsupported platform for fsevents@2.3.2: v

"arch":"x64"})

+ react-router-dom@6.3.0

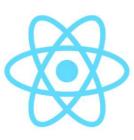
added 3 packages from 1 contributor and audited 1430 packages in 5.081s
```

#### 3. Use <BrowserRouter> element

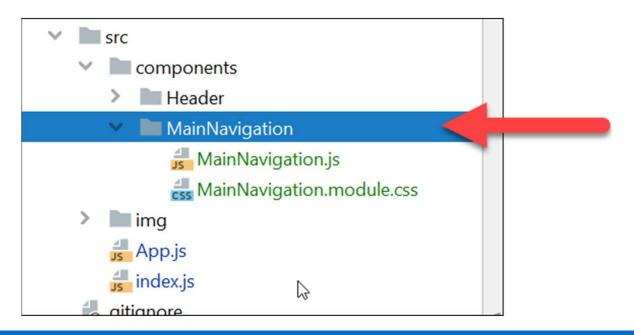


- Update index.js (or App.js) to use the routes.
- Note the usage of <BrowserRouter>
  - This is the top level component for every routing app
  - Remember to import from the correct libraries

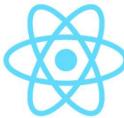
#### 4. Create the main navigation



- Choice: single component holding the main navigation
  - Also valid: having the navigation inside a component for nested/child routes
- Optional: having a CSS module for navigation styles

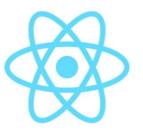


#### Using the <Link /> element

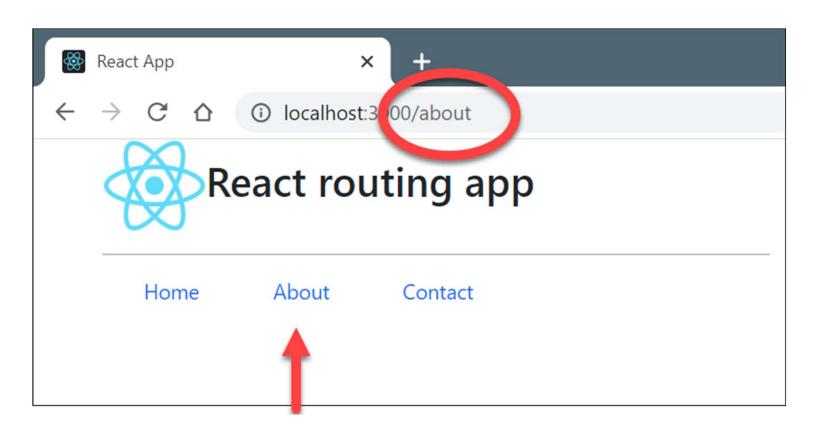


```
import React, {Component} from 'react';
import {Link} from "react-router-dom";
class MainNavigation extends Component {
   render() {
       return (
           <div>
               <l
                   <1i>>
                       <Link to="/">Home</Link>
                                                        <Link /> to navigate to routes
                   <1i>>
                       <Link to="/about">About</Link>
                   <1i>>
                       <Link to="/contact">Contact</Link>
                   </div>
       );
export default MainNavigation;
```

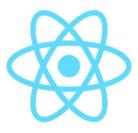
#### **Routing now works!**



No components are show yet, but URL is updated



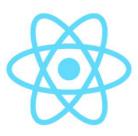
#### **5. Create Components**



We are using simple components w/ some text

```
class Contact extends Component {
class Home extends Component {
                                                          render() {
   render() {
                                                             return (
      return (
                                                                <div>
         <div>
                                                                   <h1>Contact Component</h1>
            <h1>Home Component</h1>
                                                                   <div>Contact us:</div>
         </div>
                                                                </div>
                       class About extends Component
                          render() {
                             return (
                                 <div>
                                    <h1>About Component</h1>
                                    <div>Our Mission</div>
                                 </div>
```

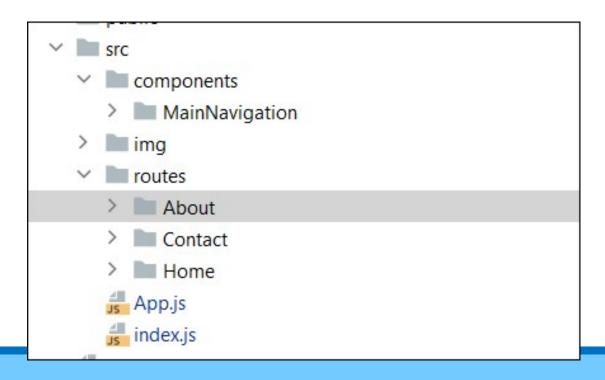
#### **Directory Structure**



You can place files whereever you want.

We choose a folder called /routes here

you will also see /pages, /views, /partials, etc



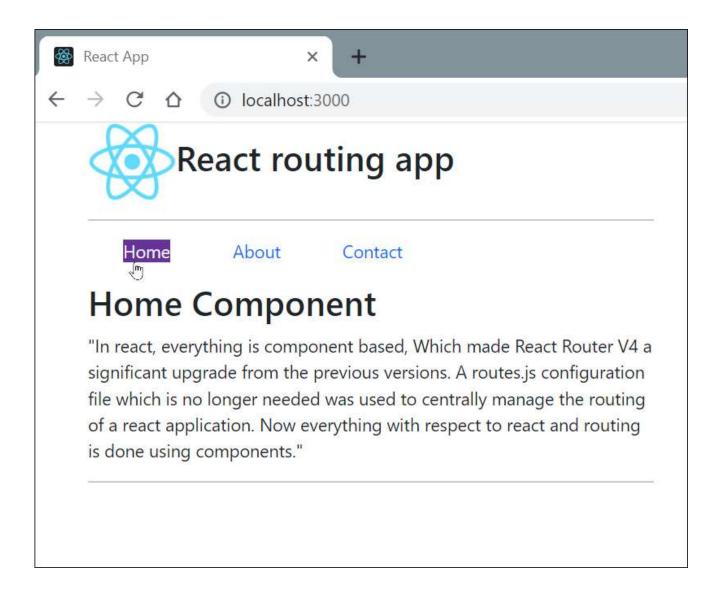
#### **6. Create basic routes**

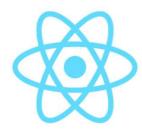


- Tell React Router which component is loaded at which Route.
- Use the <Routes /> and <Route /> Element from reactrouter-dom
- In React Router 6, Always nest a <Route /> inside a
   <Routes /> element

```
// import routing stuff
import {Routes, Route} from "react-router-dom";
                                                             Imports
// components to be shown inside the router
import Home from "./routes/Home/Home";
import About from "./routes/About/About";
import Contact from "./routes/Contact";
                                                         Valid routes and
function App() {
                                                          components to
    return (
                                                               load
        <div className="container">
            (...)
            <Routes>
                <Route path='/' element={<Home/>}/>
                <Route path='/about' element={<About/>}/>
                <Route path='/contact' element={<Contact/>}/>
            </Routes>
        </div>
    );
}
export default App;
```

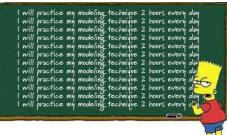
#### Result





#### Workshop

- 1. Use your own app OR create a new app from scratch
- Add routing to it. Make sure you use v6.
- Divide the components over different routes
- Maybe you are passing props. You can do that as usual
- 2. OR: Work from the example project
- Add a new component (<Products />) to it
- Add a <Route> and a <Link> to that new component, make
   sure it is accessible from the <MainNavigation>
- Example ../600-routing-basics

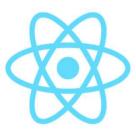




# Styling the active link

Emphasizing the current route in the UI, based on a URL match

#### **Special CSS class names**

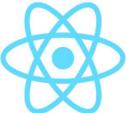


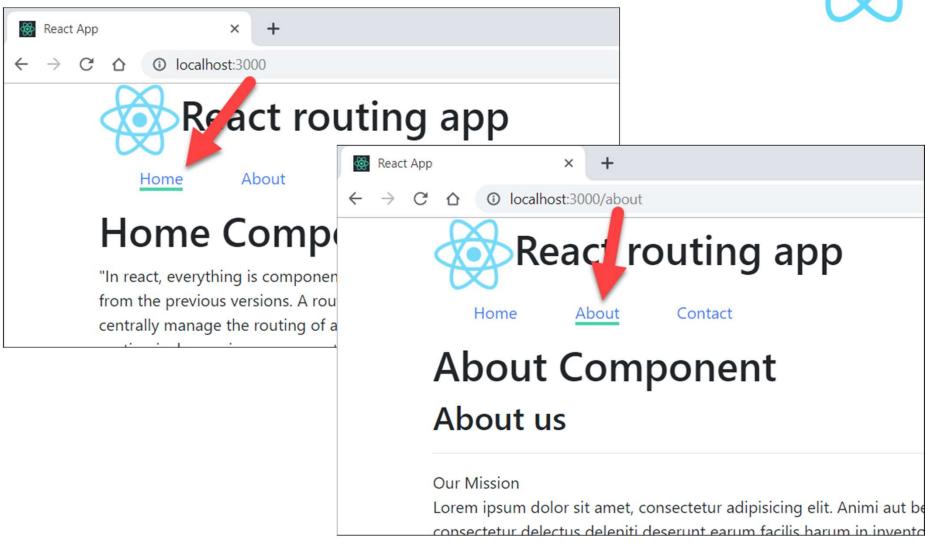
- When using <NavLink> instead of <Link>, we can
   assign a special class activeRoute to the element
- You can write CSS for that
  - Global CSS or a CSS module
  - For instance a class .activeRoute (but you can name it any way you like)

```
.activeRoute {
    border-bottom: 3px solid #09d3ac;
}
.inactiveRoute {
    border-bottom: 3px solid transparent;
}
```

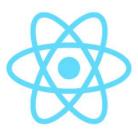
#### Update Main navigation, use <NavLink>

#### Result





#### **Alternative approach**



- Create a custom <Link> component, use
   useMatch() and useResolvedPath() hooks
- React Router/Stackblitz example



### Example, creating <CustomLink /> element

```
Editor
                                                                                                                  Preview
                                                                                                                           Both
□ ... C
       import * as React from "react";
       import {
        Routes,
        Route,
        Outlet,
        Link,
        useMatch,
        useResolvedPath,
       } from "react-router-dom";
       import type { LinkProps } from "react-router-dom";
                                                                                             Running start command
       export default function App() {
 12
        return (
 13
                                                                                           Booting WebContainer
                                                                                           Installing dependencies
Terminal
                                                                                           C Running start command
 > Network: use `--host` to expose
 ready in 1502ms.
```

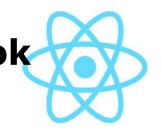
https://stackblitz.com/github/remix-run/react-router/tree/main/examples/custom-link?file=src%2FApp.tsx



# Navigating from code

Activating another Route from JavaScript

#### React Router v6 has a useNavigate hook



Navigate to other routes from code (NOT from 
 <Link> or <NavLink />)

- Use function components
- import useNavigate() hook
- Call hook from a <button>, or <a href>.

```
import {useNavigate} from 'react-router-dom'
const About = () => {
     const navigate = useNavigate();
      return (
           <div>
                  <h3>Navigating programatically</h3>
                   <button
                         className="btn btn-info"
                         onClick={() => navigate('/contact')}>
                         Navigate to Contact, using JavaScript
                   </button>
                                                                                                 Contact
                                                                                   Home
                                                                                          About
            </div>
                                                                                About Component
                                                                                About us
export default About
                                                                                Our Mission
                                                                                Lorem ipsum dolor sit amet, consectetur adipisicing elit. Animi aut
                                                                                beatae blanditiis commodi consectetur delectus deleniti deserunt earum
                                                                                facilis harum in inventore, iure magni odit omnis possimus quo
                                                                                repudiandae temporibus.
                                                                                Navigating programatically
                                                                                 Navigate to Contact, using JavaScript
```

#### Workshop

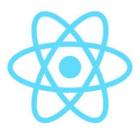
- 1. Use your own app OR create a new app from scratch
- Create an 'active link' class and use it with <NavLink />
- Create a button and navigate from code using JavaScript
- 2. OR: Work from the example project
- Give the Active route class a different styling and make sure it works. Also inspect the rendered HTML
- Create a button on the Contact component to navigate to the Home page.
- Example ../610-active-link-and-code



# Using Route Parameters

Passing detail parameters to the next view

#### **Route Parameters**

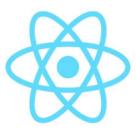


- Creating Master/Detail Views
- Select a country|product|employee|etc on the first page and pass the selection to the next page

#### Steps:

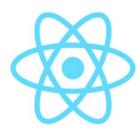
- 1. Update <Link> or <NavLink> to send parameters
- 2. (Optional: create a 404/FileNotFound/NoMatch component)
- 3. Create a <Link /> with dynamic parameters.
- 4. Create/Update a DetailComponent to receive parameters
- 5. Fetch Details and show them in the UI

#### **0. Prepare Home component**

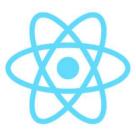


- Showing a list of countries
- Import countryData.js and prepare state as usual

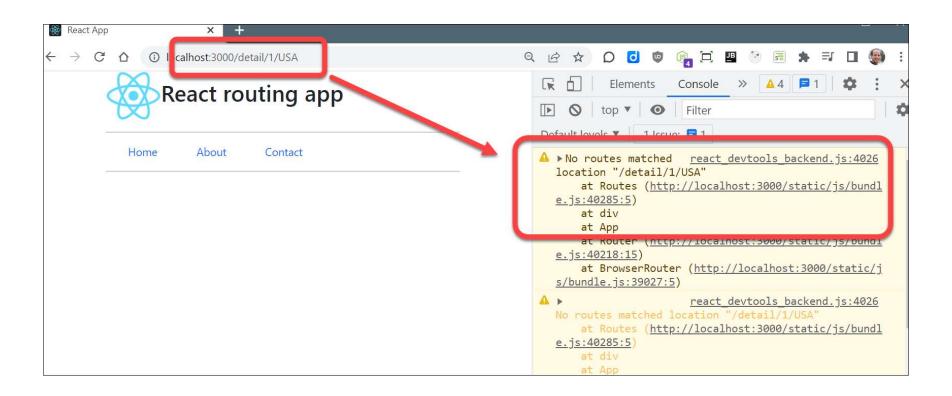
# 1. Sending the parameters



#### That didn't work out well...



 Link is constructed, Params are send, but no matching route!

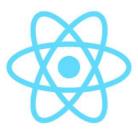


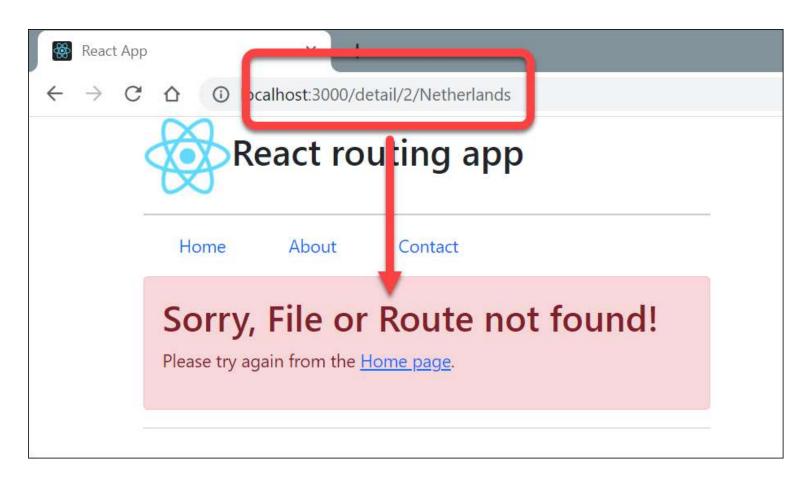
# 2. Optional - create FileNotFound component

- Add/Create a <FileNotFound /> component
- Add a NoMatch-route:

```
// FileNotFound.js
import {Link} from "react-router-dom";
const FileNotFound = ()=>{
    return(
        <div className="alert alert-danger">
            <h1>Sorry, File or Route not found!</h1>
            >
                Please try again from the <Link to="/">Home page</Link>
            </div>
                                <Routes>
        default FileNotFound
export
                                    <Route path='*' element={<FileNotFound />}/>
                                </Routes>
```

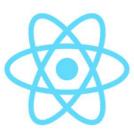
#### Result





(P.S. - alway add the FileNotFound route last!)

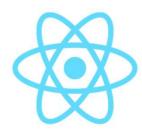
#### 3. Create a route to detail page



- Add a <Route /> to show a new Detail Component
- Note the colon /:id and /:name. These are the dynamic parameters

<Route path="/detail/:id/:name" component={CountryDetail}/>

# 4. Create detail component



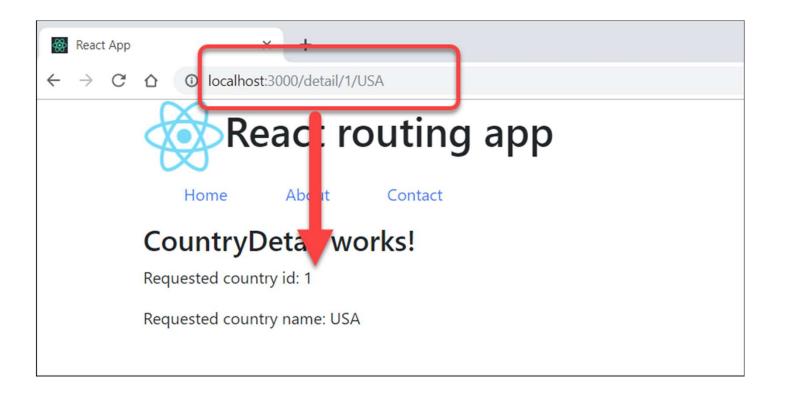
```
import countryData from "../../data/CountryData";
import {useParams} from "react-router-dom";
const CountryDetail = () => {
   let params = useParams();
   const countries = countryData.countries;
   const id = params.id;
   const getCountry = id => countries.find(c => c.id === +id)
   const country = getCountry(id);
   return (
       <div>
           <h3>Details for country</h3>
           className="list-group">
              id: {country.id}
              (...)
           </div>
   );
export default CountryDetail;
```

Retrieve
dynamic
parameters
from
useParams()

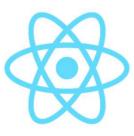
hook

#### 4. Show Results in the UI





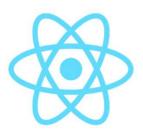
#### **Show Country data**



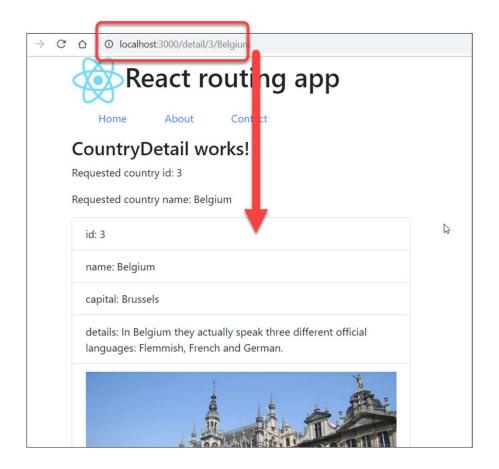
- Grab the data (for now: local, to get the correct country)
  - You know how to fetch data from an API from the previous module
- Look for the data based on the id

```
const getCountry = id => countries.find(c => c.id === +id)
const country = getCountry(id);
```

#### **Show Country Details in UI**

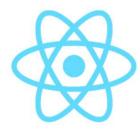


Create DetailComponent as usual

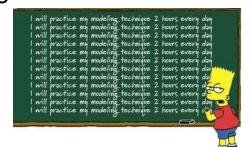


../examples/620-routing-parameters

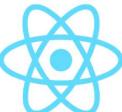
#### Workshop

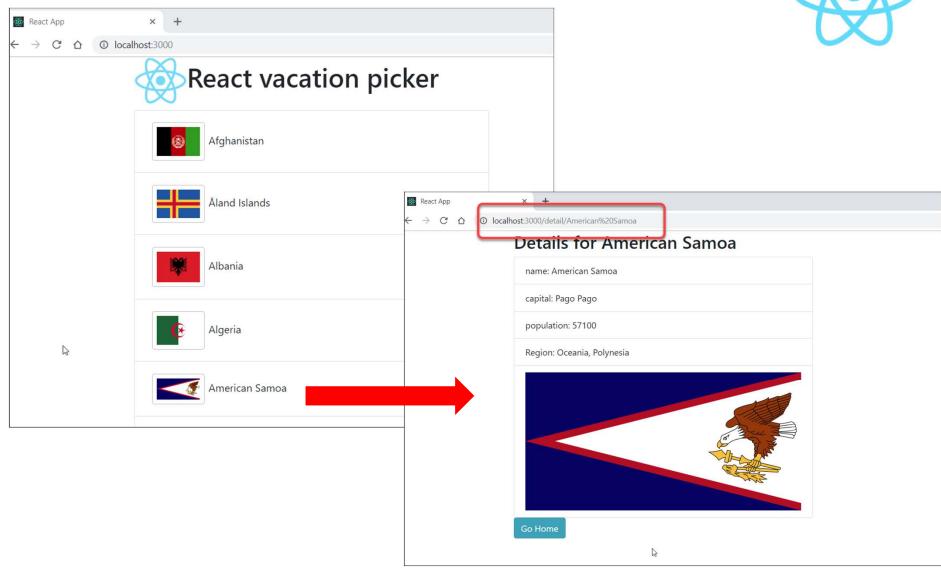


- Study the example project
- See how routing parameters work.
- Try some differerent parameters, or adding/removing a parameter – CREATE THIS IN YOUR OWN PROJECT
- Example ../620-routing-parameters
- OR: Work from example ../500-api-call
  - Add routing to the project
  - Clicking on a specific country from the API navigates to a detail component, which shows and fetches country details
  - (solution: ../workshops/50-routing-api)



# Sample result from the workshop

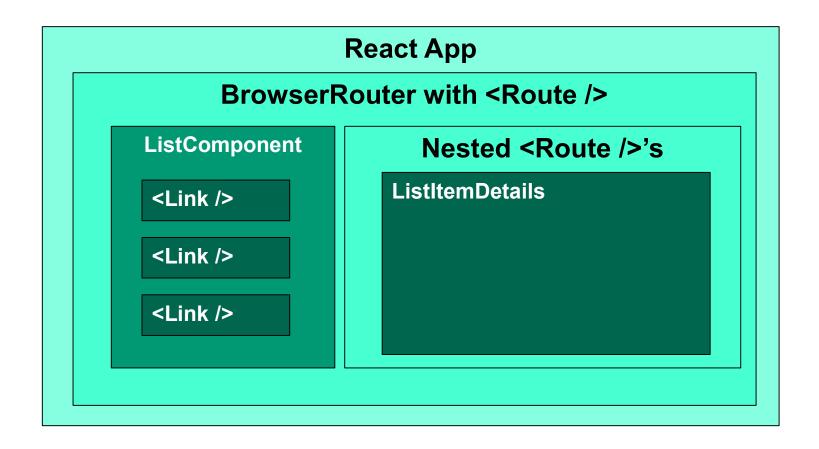






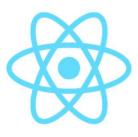
# **Nested Routes**

#### What are nested router views?



Show router links inside another routed component, but still update the URL

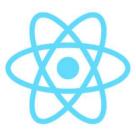
# Adding a nested router



- The <Route /> is just a component, so you can place it inside other components
  - And, if necesarry conditionally.
  - In example app: <Home />
- React does not have an array of 'child'routes in the main routing table, like other frameworks

Invalid in React!

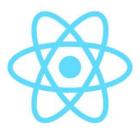
#### 1. Create nested routes



<Route /> in Home component.

If the URL matches, the
component renders. Otherwise
the route returns null

# 2. Add <Outlet /> to the component



- Import, and use <Outlet /> in the component that contains the nested route
  - In our case: <Home />

Add the <Outlet />
tag. It shows the nested
routes

```
import countryData from "../../data/CountryData";
import {Link, Outlet} from "react-router-dom";
const Home = () => {
    const countries = countryData.countries;
    return (
        <div className="row">
            <div className="col">
                <h1>Home Component</h1>
                <h2>List of countries</h2>
            </div>
            <div className="col">
               <Outlet />
            </div>
        </div>
export default Home
```

### 3. Clearing the route



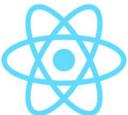
- Various ways. We simply navigate back to <Home />
- Import and assing useNavigate() hook, as before

```
import {Link, Outlet, useNavigate} from "react-router-dom";

const Home = () => {
    const countries = countryData.countries;
    const navigate = useNavigate();
    ...
}
```

```
<button onClick={()=>navigate('/')}
    className="btn btn-info">Clear</button>
```

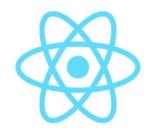
#### Result



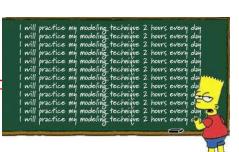
Home About Contact				
lome Componen	t			
ist of countries	<u> </u>			
Netherlands	React routing app	Ì		
Belgium				
Japan	Home About Contact			
Brazil	Home Component	Details for country		
Australia	List of countries	id: 1		
Clear	USA	React routing app		
	Netherlands	W and app		
	Belgium	Home About Contact		
	Japan	Home Component	Details for country	
	Brazil Australia	-	id: 4	
	Clear	List of countries	name: Japan	
		USA	capital: Tokyo  details: Japan was a closed community for thousands of years. Its capita Tokyo, is lit up by thousands of neon light signs at night	
		Netherlands		
		Belgium		
		Japan	patrice BONY	
		Brazil	パス III 15 15 15 15 15 15 15 15 15 15 15 15 15	
		Australia		

App works as expected

#### Workshop



- Study the example project.
- Do this for your own app with a list of data
  - Clicking on a listitem, shows the details in a nested route
- Example .../630-nested-routes
- OR: Work from your previous workshop
  - Clicking on a specific country from the API navigates to a detail component, which shows and fetches country details *inside a nested route*
- Study the React Router Example:
  - https://reactrouter.com/docs/en/v6/getting-started/tutorial#nested-
  - https://stackblitz.com/edit/github-agqlf5?file=src%2FApp.jsx

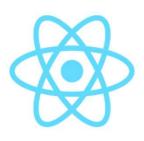




# Miscellaneous routing

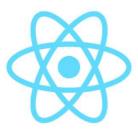
Using <Switch />, passing props and more

# **Various routing tips & tricks**



- Optional parameters
- Using render

#### **Search Params**



- You want some optional data to be added to the URL
- Use searchParams for that, in combination with navigate()
- For instance we added a population field to our data
  - But not all records have a population field
  - We only want to pass it, if it is known!

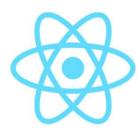
### **Sending searchParams:**

```
<a href="#" onClick={() => countryDetails(country)}>
    {country.name}
</a>

const navigate = useNavigate();

const countryDetails = (country) => {
    navigate({
        pathname: `${country.id}/${country.name}`,
        search: country.population ? `?population=${country.population}` : null
    })
}
```

#### **Receiving searchParams:**

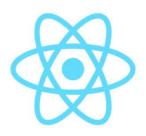


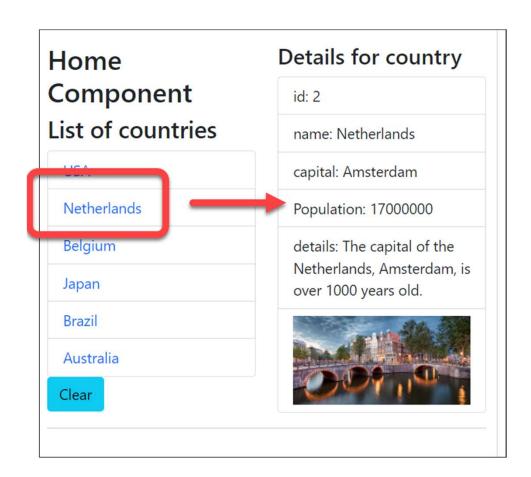
```
const [searchParams] = useSearchParams()
const population = searchParams.get('population');
```

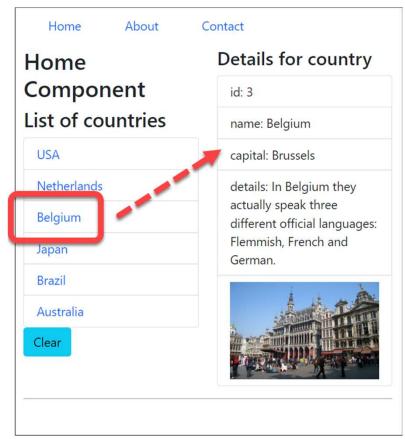


```
population &&
    className="list-group-item">
        Population: {population}

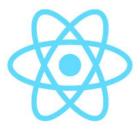
}
```







#### More info on search params





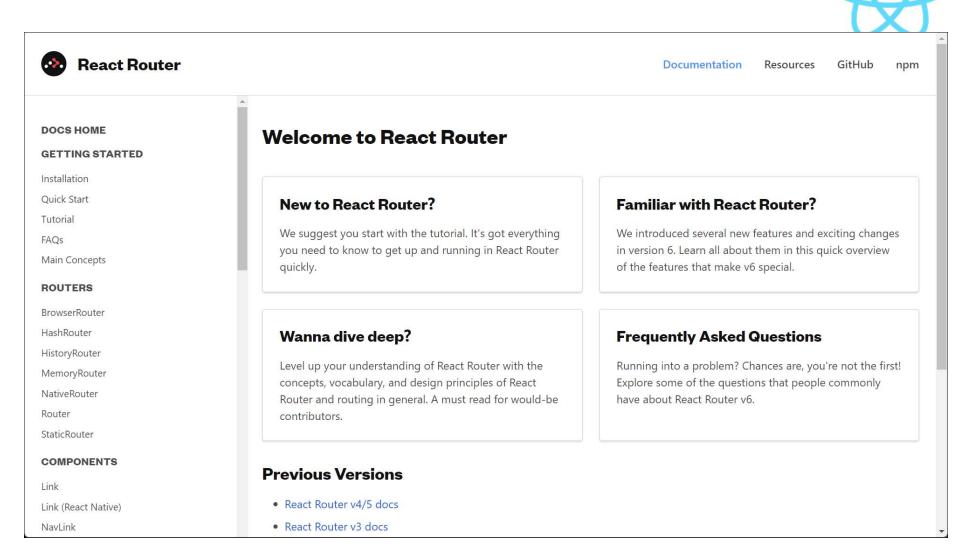
https://ultimatecourses.com/blog/query-strings-search-params-react-router
https://ultimatecourses.com/blog/navigate-to-url-query-strings-search-params-react-router



# More info

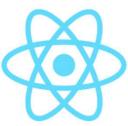
More info on React Router and techniques

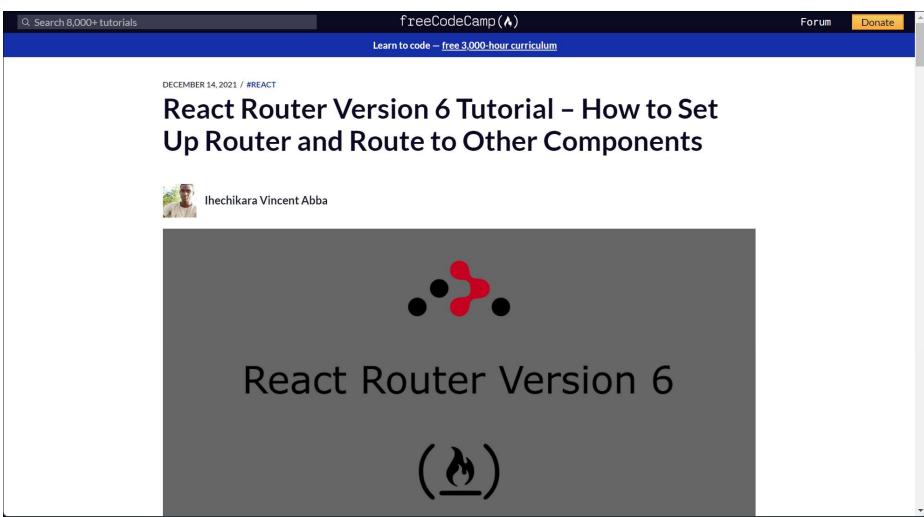
#### Official documentation



https://reactrouter.com/docs/en/v6

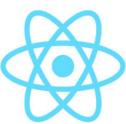
### FreeCodeCamp

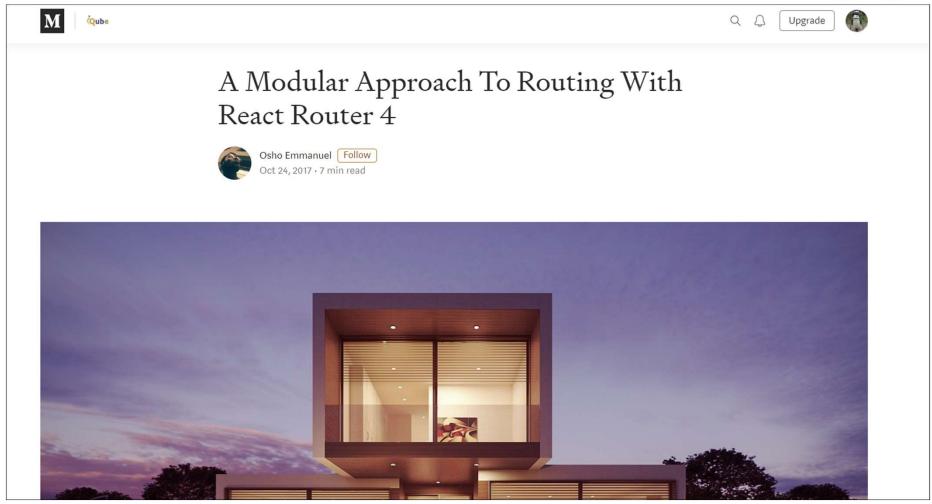




https://www.freecodecamp.org/news/how-to-use-react-router-version-6/

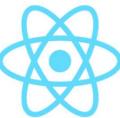
### Blogs and more (but mind the version number)...

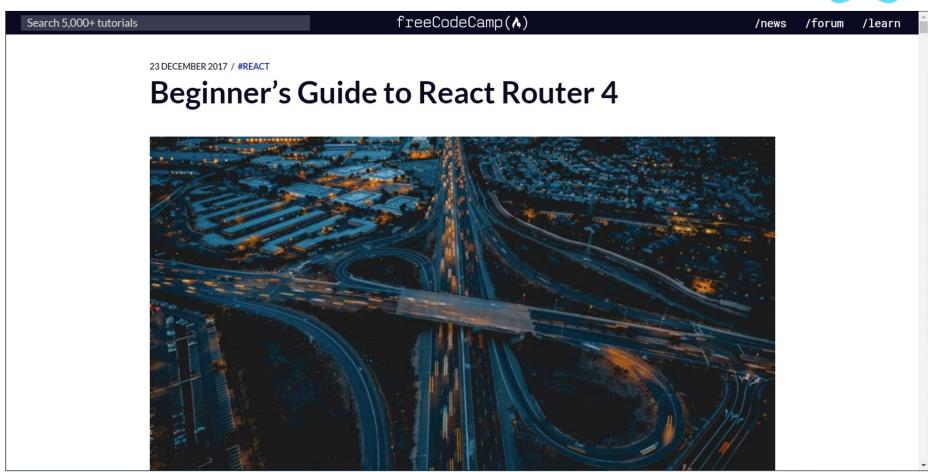




https://medium.com/iqube-bits/a-modular-approach-to-routing-with-react-router-4-d4a3db9f56ae

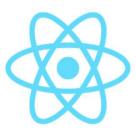
# **Beginner's Guide to React Router**





https://www.freecodecamp.org/news/beginners-guide-to-react-router-4-8959ceb3ad58/

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4.8 ★★★★★ 419 Reviews

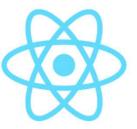
Updated 15 months ago

This course is **guaranteed** to be up to date.

For good reason, React Router is the most popular 3rd party library in the React ecosystem. If you're using React, odds are you're also using React Router. React Router v4 introduced a new dynamic, component based approach to routing. If you're used to static routing (like in Express, Angular, or Ember), this new paradigm might be difficult to grasp. The goal of this course is to tackle every scenario you might encounter when building an app with React Router so that when the time comes, you're ready. With over six hours of video, 18 different routing scenarios, and an entire real world project you'll build we can confidently say this course is the most comprehensive and effective way to

https://tylermcginnis.com/courses/react-router/

### Checkpoint



- You know how to install the router and how it works
- You are familiar with <BrowserRouter>, <Route>,
  <Link> and <NavLink>
- You can highlight the current route
- You can navigate from code
- You know how to handle route parameters
- You can create nested routes and components