February 9, 2018

Developing React Apps with Grails 3

ocitraining.com

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OCI
12140 Woodcrest Exec. Dr., Ste. 250
Saint Louis, MO 63141 USA

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- Team includes Grails co-founders and subject matter experts from around the globe
- Lead sponsor at G&G conferences around the globe
- 25+ updates and releases to the framework in the past 9 months
- Grails 3.3 GA released July 2017

Software Engineering Training

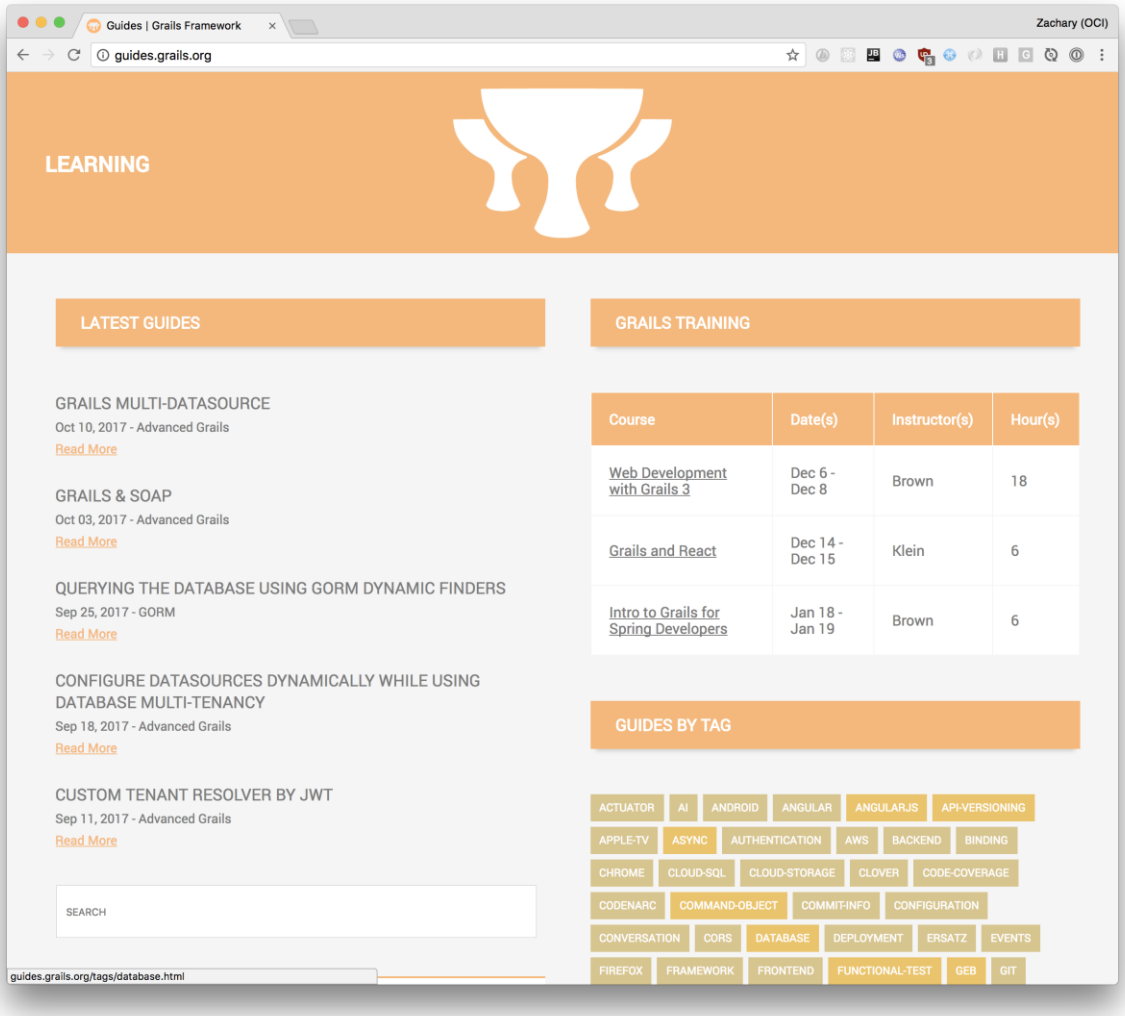
- 24+ years experience
- Over 50,000 trained
- 150 current courses
- More than 40 instructors on staff
- All training delivered by practitioners and SMEs in their respective fields
- Customized to fit your specific needs
- Flexible training delivery
- Training assessments

Introductions

- About your Instructor
  - Web developer since 2010
  - Joined OCI Grails team in 2015
  - Developing with React since 2015
  - Author of the React, React-Webpack, and Vue profiles for Grails

@zacharyaklein

https://guides.grails.org



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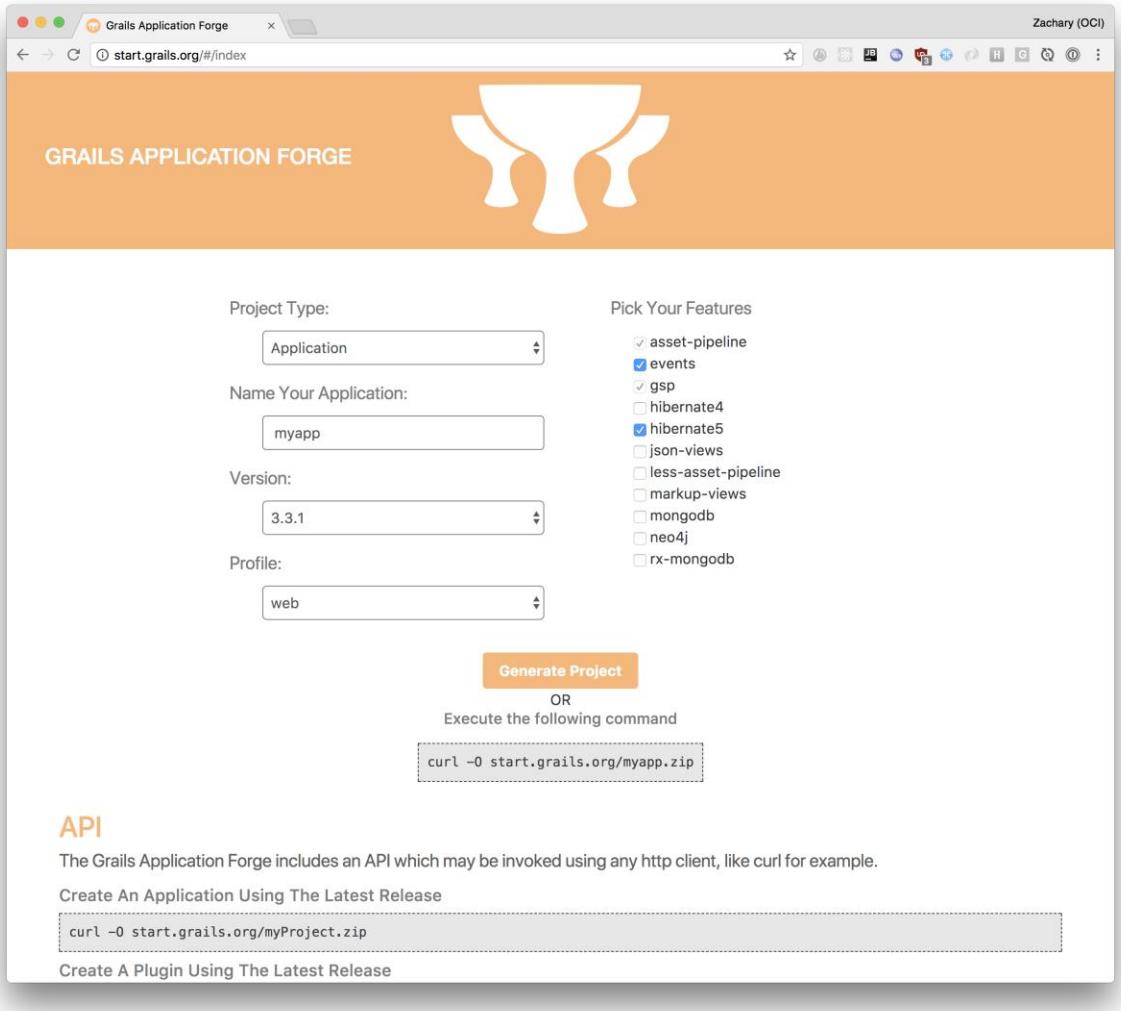
https://start.grails.org



https://start.grails.org
HTTP-based API

Create An Application Using The **Latest Release**

```
curl -O start.grails.org/myProject.zip
```

Create A **Plugin** Using The Latest Release

```
curl -O start.grails.org/myPlugin.zip -d type=plugin
```

Specify A Grails **Version**

```
curl -O start.grails.org/myProject.zip -d version=3.3.2
```

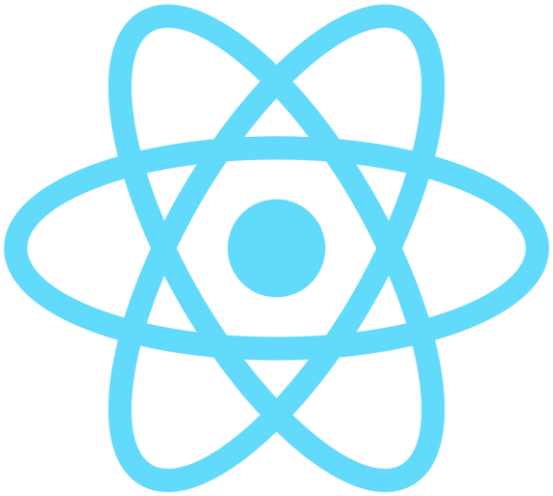
Specify A Grails **Profile**

```
curl -O start.grails.org/restPproject.zip -d profile=react
```

Webinar Overview

- What is React?
  -  Overview of React and front-end dev tools
- Approaches to Developing React with Grails
  -  Asset Pipeline
  -  Hybrid Web App
  -  Multi-Project Build
- Using the React Profile
-  Spring Security REST
- ~~Unified Deployment~~

What is React?



What is React?

```
import React from ‘react’
import ReactDOM from ‘react-dom’


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

What is React?

```
import React from ‘react’
import ReactDOM from ‘react-dom’


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

JSX

```
import React from ‘react’
import ReactDOM from ‘react-dom’

class Greeting extends React.Component {
  render() {
    return <h1>Hello, {this.props.name}!</h1>;
  }
}

ReactDOM.render(
  <Greeting name=‘G3 Summit’ />,
  document.getElementById('root')
);
```

JSX

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

class Greeting extends React.Component {
  render() {
    return <h1>Hello, {this.props.name}!</h1>;
  }
}

ReactDOM.render(
  <Greeting name='G3 Summit' />,
  document.getElementById('root')
);
```

name

body?

name

props?

JSX

```
class Greeting extends React.Component {
  render() {
    return(
      React.createElement('div', {},
        React.createElement('h1', {}, “Greetings, ${this.props.name}"),
        React.createElement('ul', {},
          React.createElement('li', {},
            React.createElement('a', {href: ‘edit'},
              ‘Edit this greeting’)
            ),
          React.createElement('li', {},
            React.createElement('a', {href: 'reset'},
              ‘Reset this greeting')
        )
      )
    );
  }
}

ReactDOM.render(
  React.createElement(Greeting, {name: ‘G3 Summit'}, null),
  document.getElementById('root')
);
```

JSX

```
class Greeting extends React.Component {
  render() {
    return (<div>
      <h1>Hello, {this.props.name}!</h1>
      <ul>
        <li><a href='edit'>Edit this greeting</a></li>
        <li><a href='reset'>Reset this greeting</a></li>
      </ul>
    </div>);
  }
}

ReactDOM.render(
  <Greeting name='G3 Summit' />,
  document.getElementById('root')
);
```

What is React?

"**React is only the view layer. We're only in one concern.** React only knows how to render markup. It doesn't know where your data came from, how it's stored, or how to manipulate it. What concerns are being violated?"

-Andrew Ray

Source: http://blog.andrewray.me/youre-missing-the-point-of-jsx/

JSX

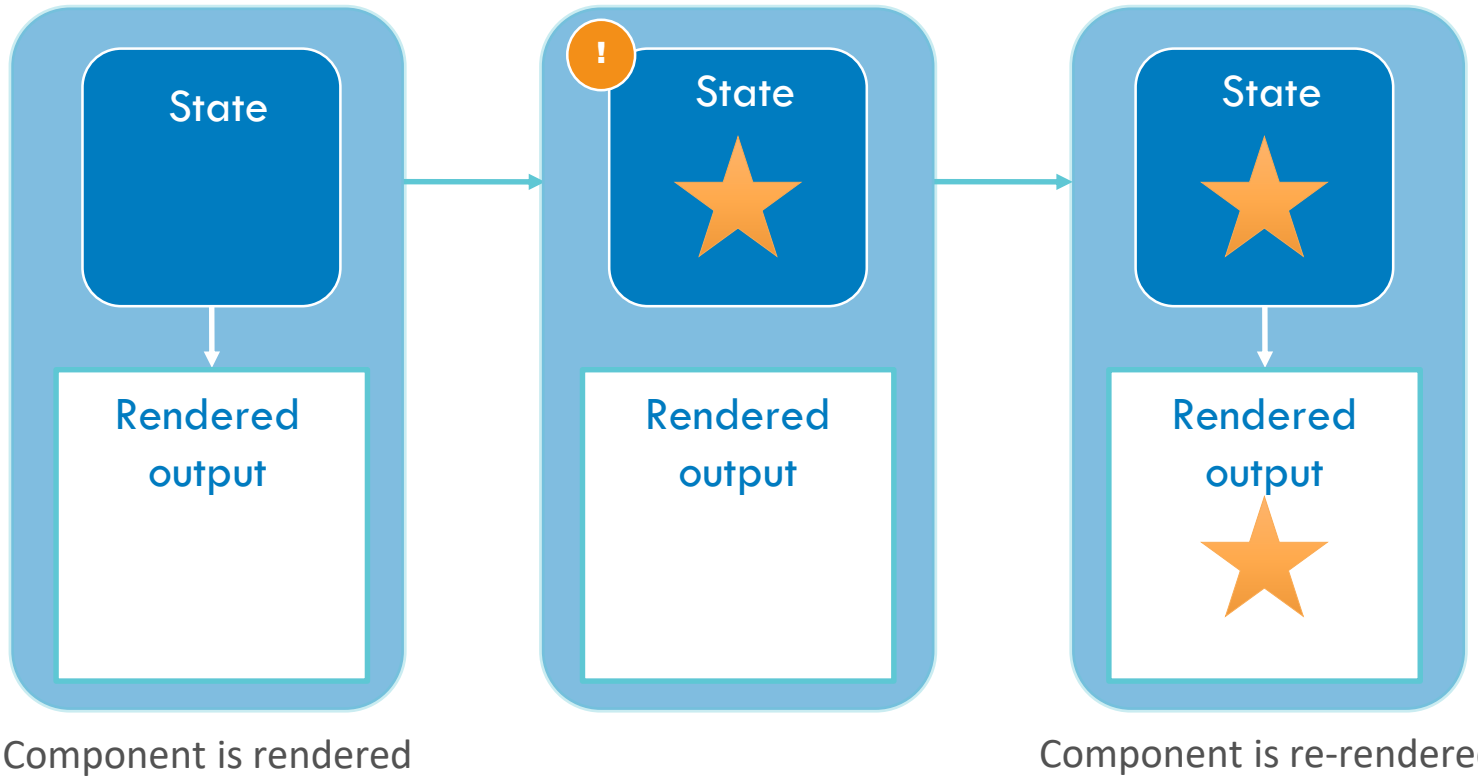
```
render() {
  return <div className=“list-container”>
    <ul>JSX Examples</ul>
      <li>Here’s an expression: {3 + 3}</li>
      <li>State property: {this.state.myProperty}</li>
      <li>Function call: {myFunc()}</li>
      <li><button onClick={this.myEventHandler}>
        Function reference: </button></li>

      {myItemList.map(item => <li>{item}</li>)}

    </ul>
  </div>;
```

Component State

```
class Greeting extends React.Component {
  constructor() {
        super();

        this.state = {
          greetings: ['Hello', 'Salutations', 'Ho there']
        }
  }

  render() {
    const greetings = this.state.greetings;
    const randomGreeting = greetings[Math.floor(Math.random() * greetings.length];

    return(
      <h1>{randomGreeting}, {this.props.name}</h1>
    );
  }
}

ReactDOM.render(<Greeting name='G3 Summit' />, document.getElementById('root'));
```

Component State

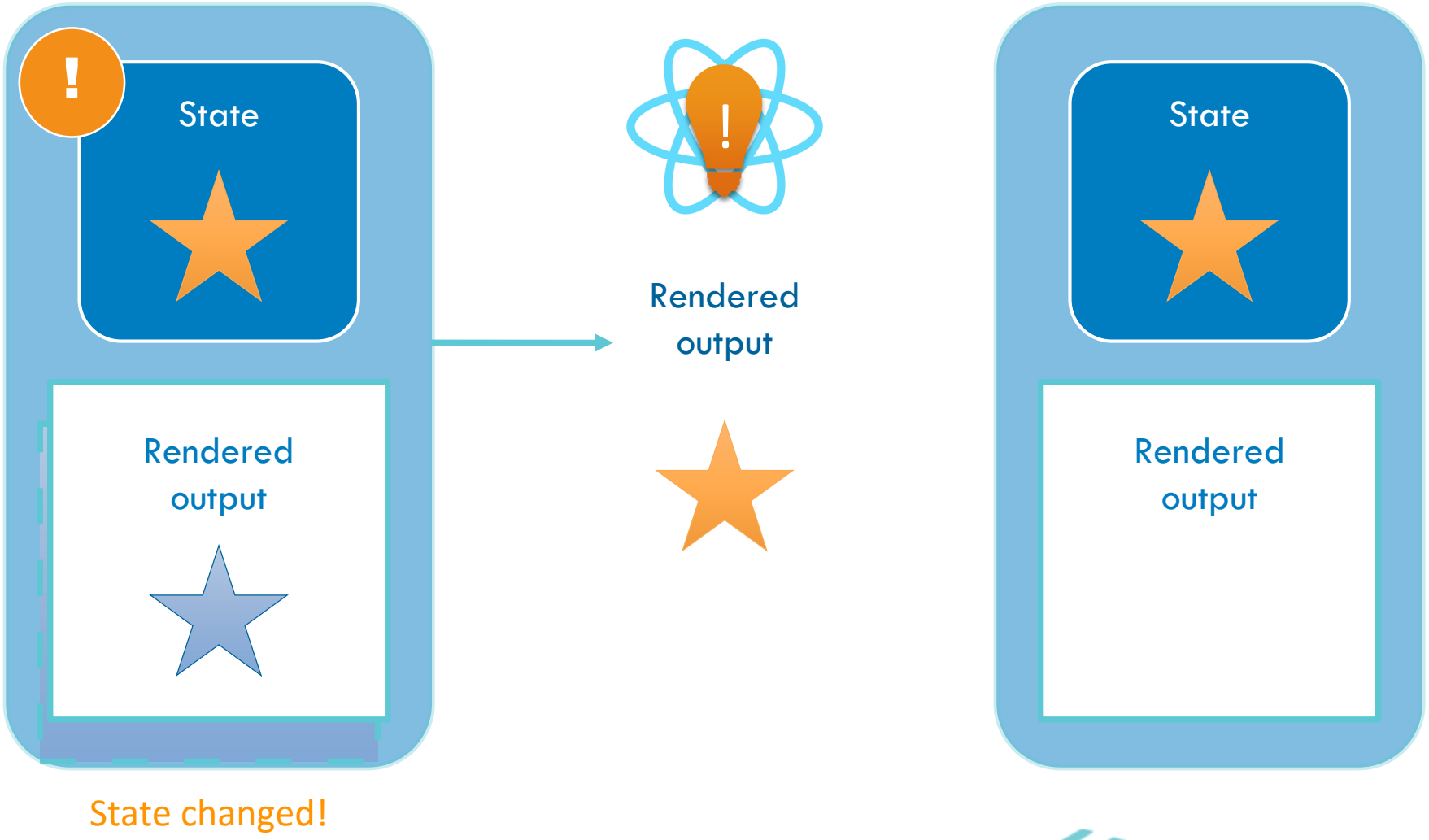
```
this.state = { ... }
```



Component is rendered

Component is re-rendered

Virtual DOM



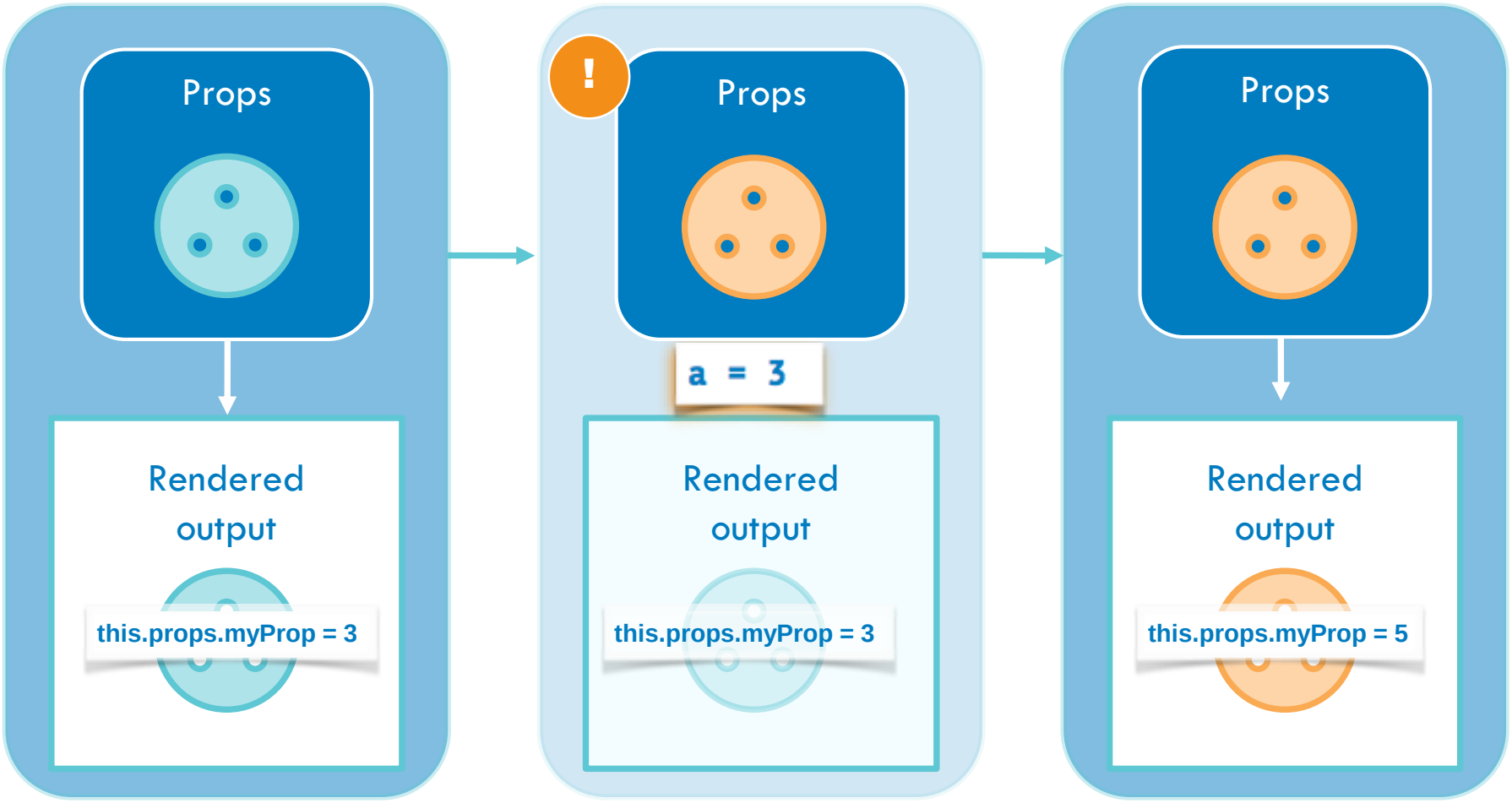
Component Props

```
let value = “hello”; //could also pass in a literal value

<MyComponent prop={value} /> //this.props.prop = “hello”
```

```
let a = 1;
let b = 2;

<MyComponent prop={a + b} /> //this.props.prop == 3
```

```
const myFunc = (a, b) => a + b;

<MyComponent prop={myFunc} /> //this.props.myFunc(1, 2) == 3
```

Component Props

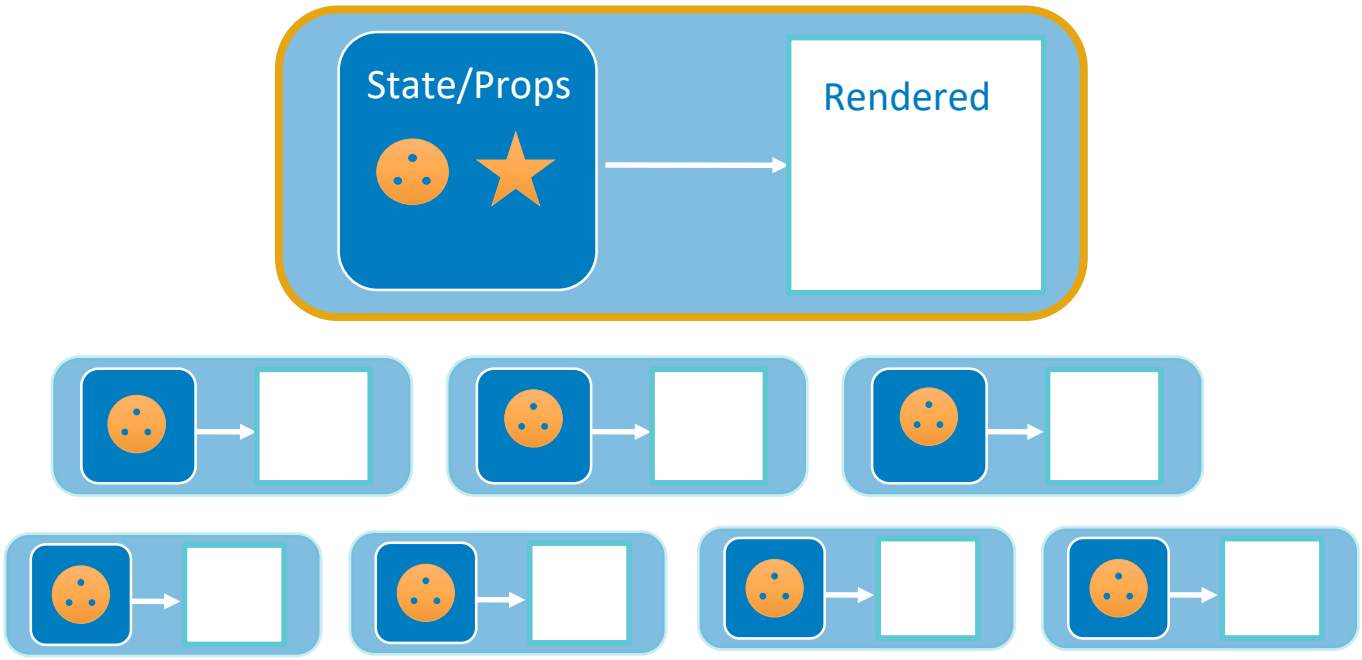


Component is rendered

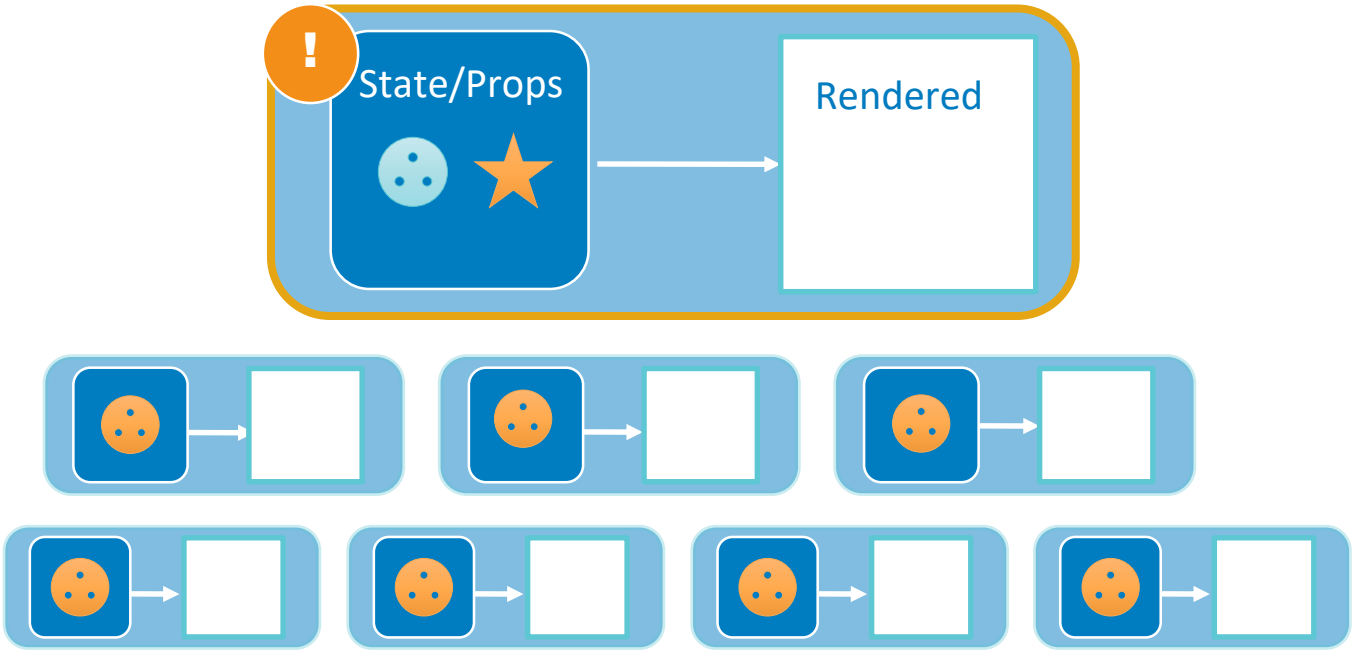
Props changed

Component is re-rendered

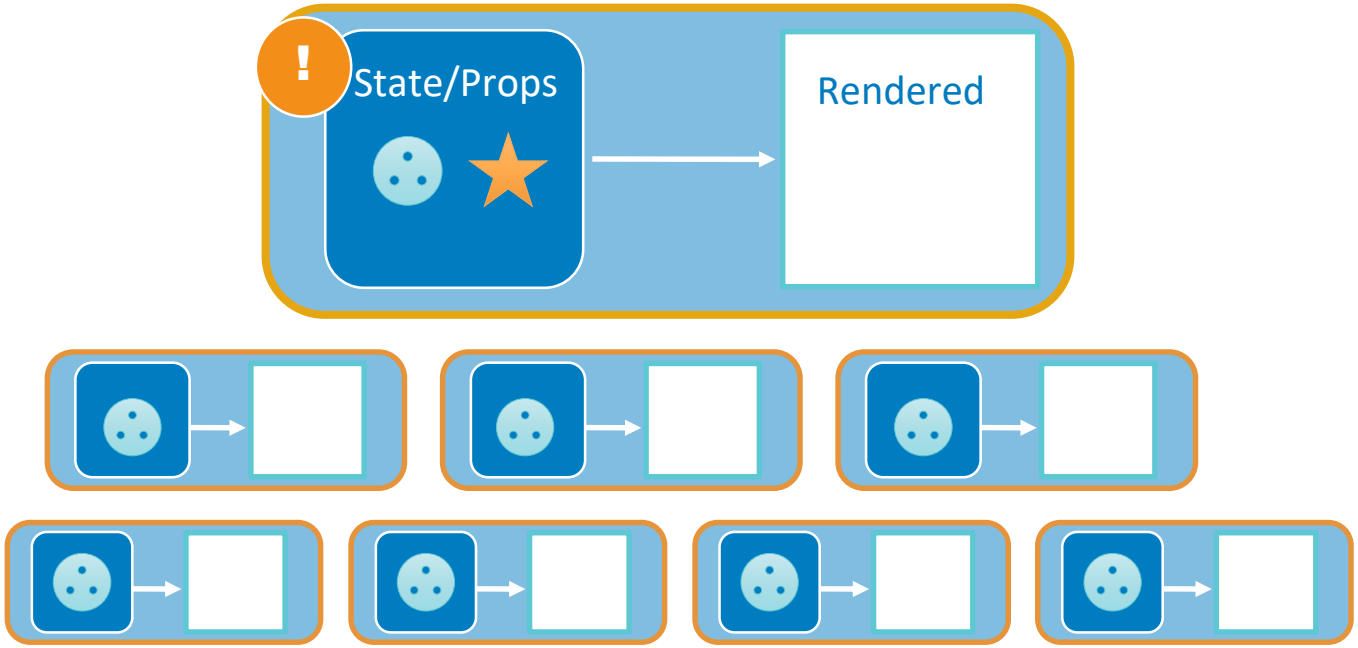
Component Hierarchy



Component Hierarchy

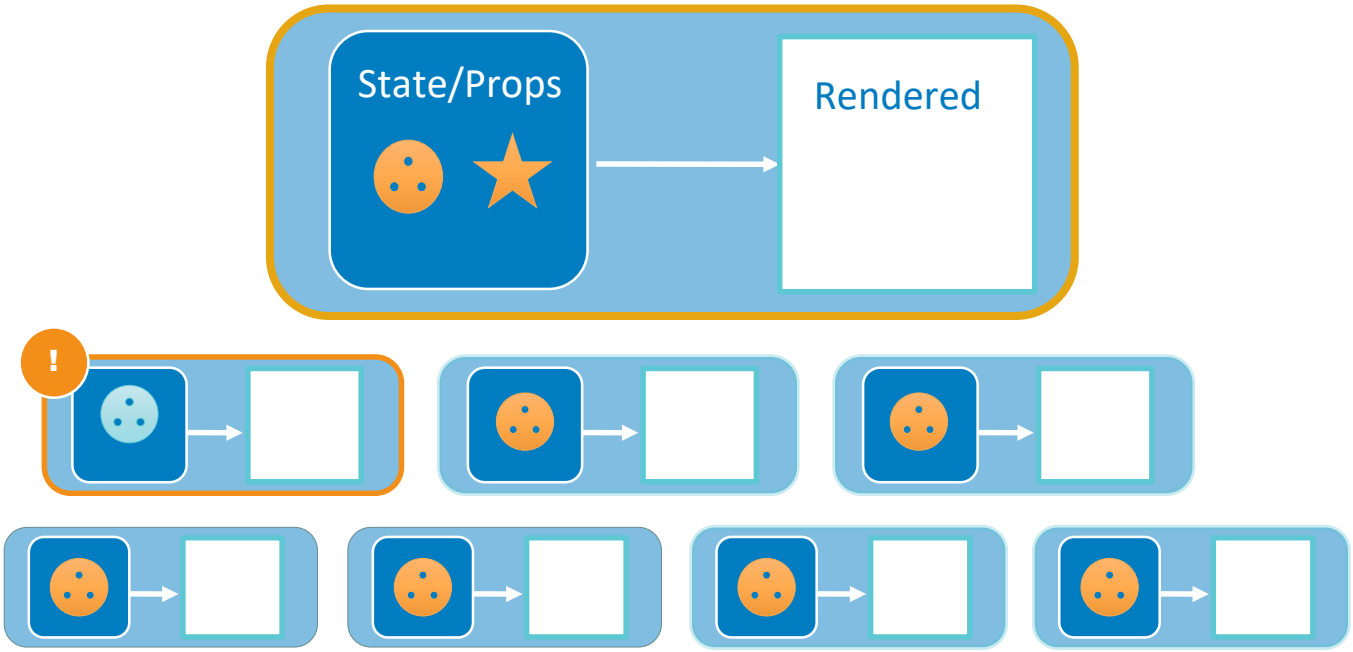


Component Hierarchy

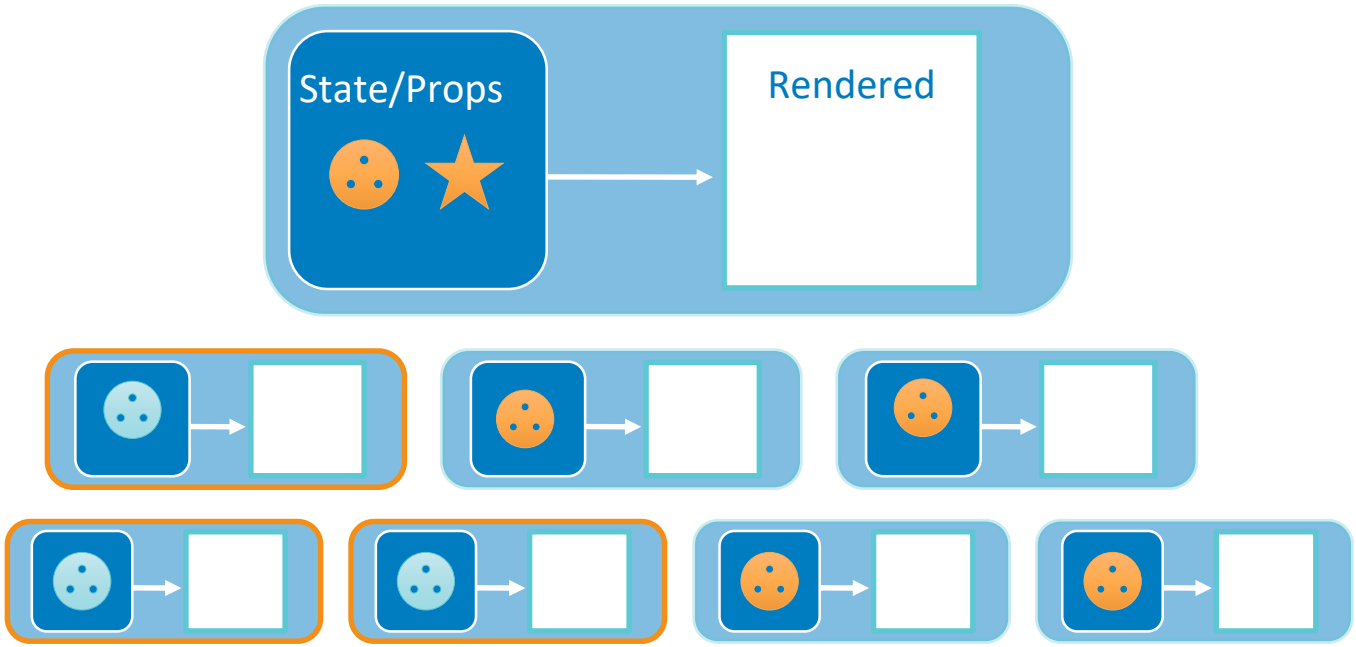


React will re-render all affected child components

Component Hierarchy



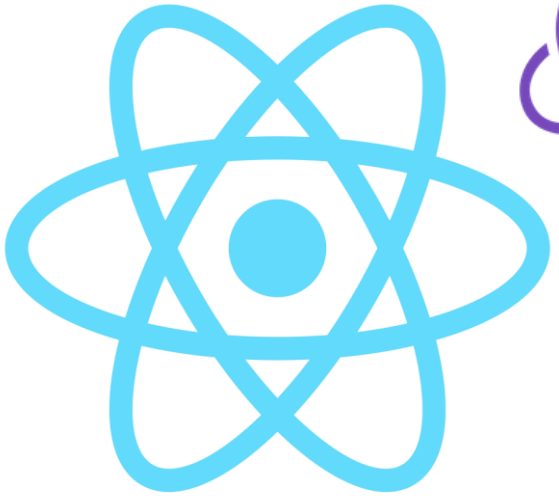
Component Hierarchy



Child components re-rendered

React Ecosystem

React is a small, focused library by design, but there's plenty of options for augmentation.



Redux

IMMUTABLE

fetch

axios

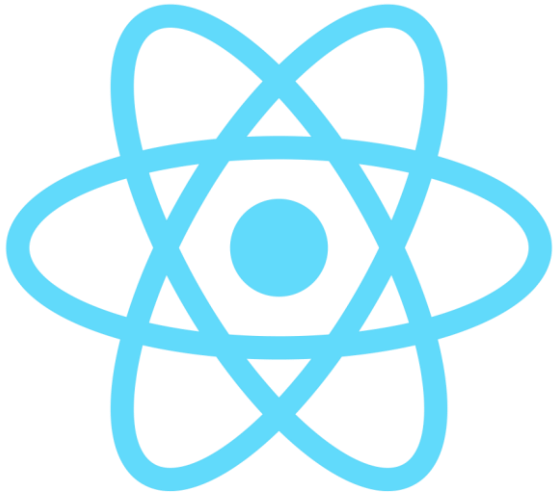
React Ecosystem

- https://www.toptal.com/react/navigating-the-react-ecosystem*
- https://medium.freecodecamp.org/how-to-navigate-the-react-js-ecosystem-without-getting-lost-43db14b00e08
- https://github.com/enaqx/awesome-react
- https://github.com/xgrommx/awesome-redux

* Somewhat out of date, but most of the libraries mentioned are still popular options

Build Tooling

React can be used standalone but is more commonly used in a node.js environment.



Why Use React & Grails?

Many features make Grails ideally suited to serve as a backend for Single Page Applications.

- GORM
- Convention/Configuration
- Spring Boot
- Profiles
- Plugins
- Gradle
- URL mappings
- JSON views
- Hypermedia
- GORM for GraphQL
- WebSockets

Approaches Using React with Grails

- Asset Pipeline

- Hybrid Web App

- Multi-Project Build

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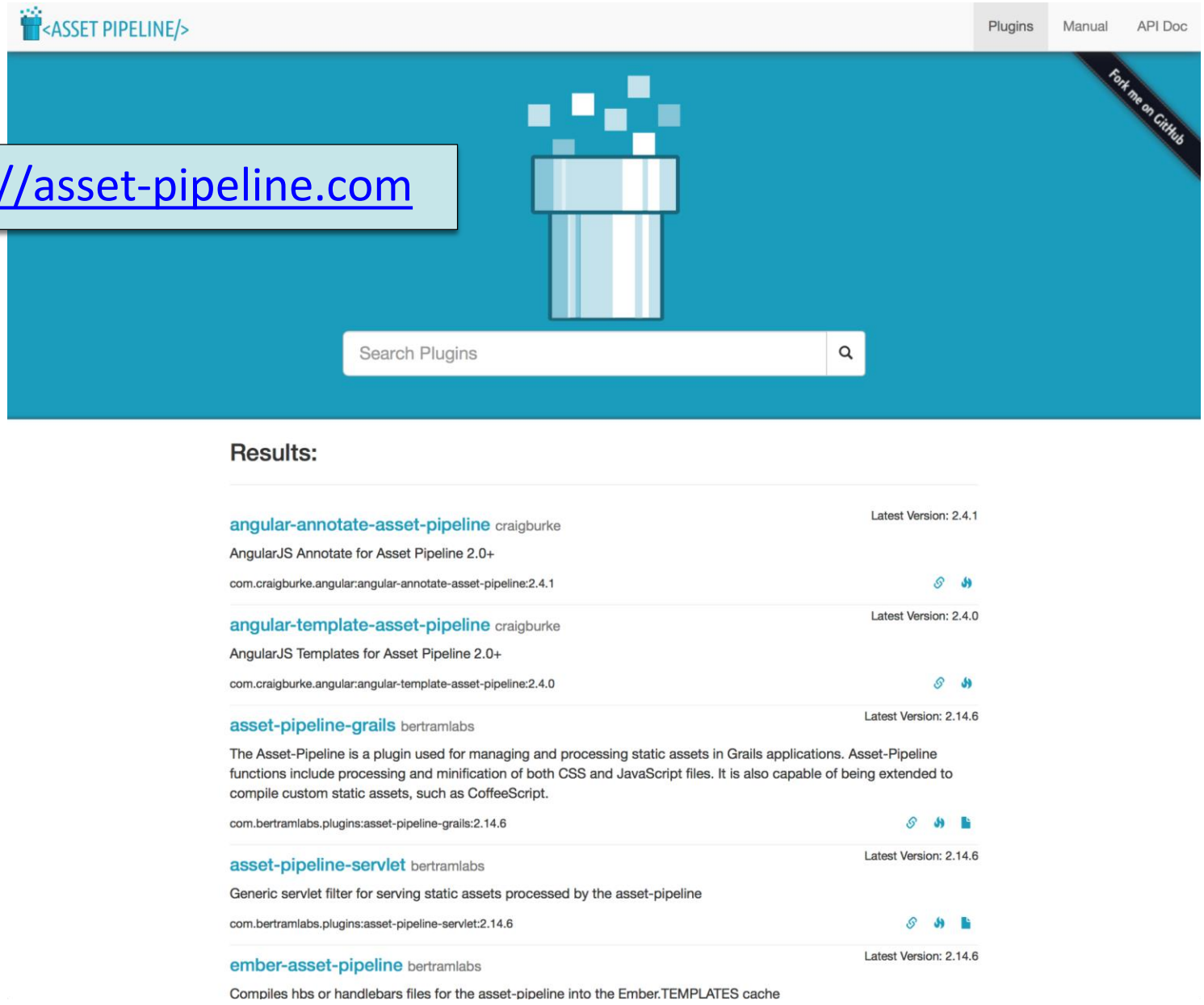
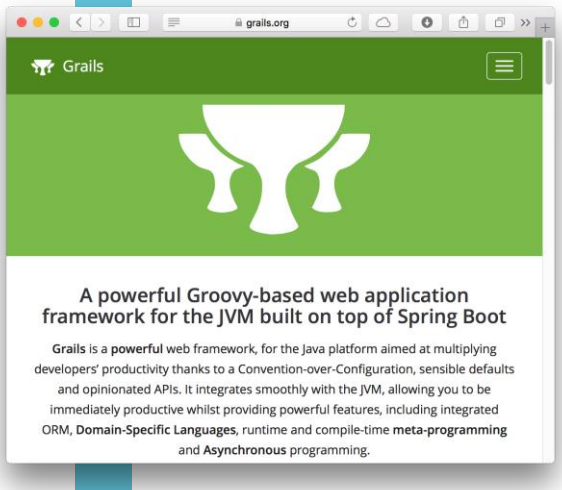
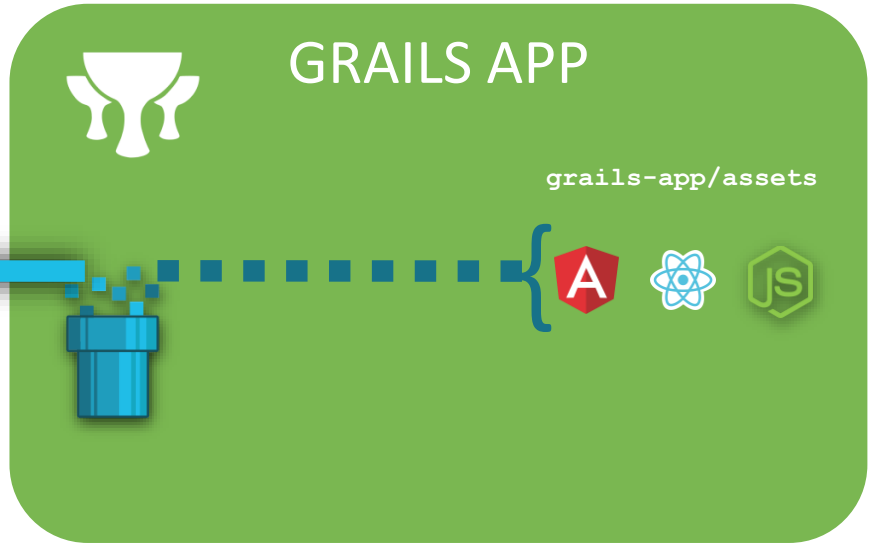
Asset Pipeline

- Core Grails Plugin
- Extensible with many plugins available
- Works well with **client-dependencies** plugin
- Natively processes React/JSX (no node.js tooling)
- Efficient and performant
- Familiar to many Grails developers
- Provides minification, source maps, compression
- Strong Grails community support



Asset Pipeline





DEMO

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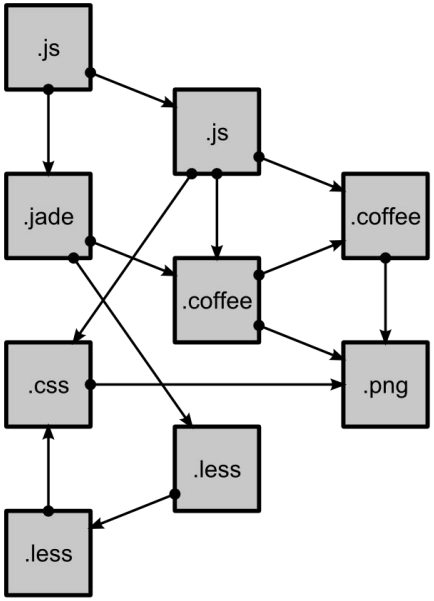
Hybrid Web App

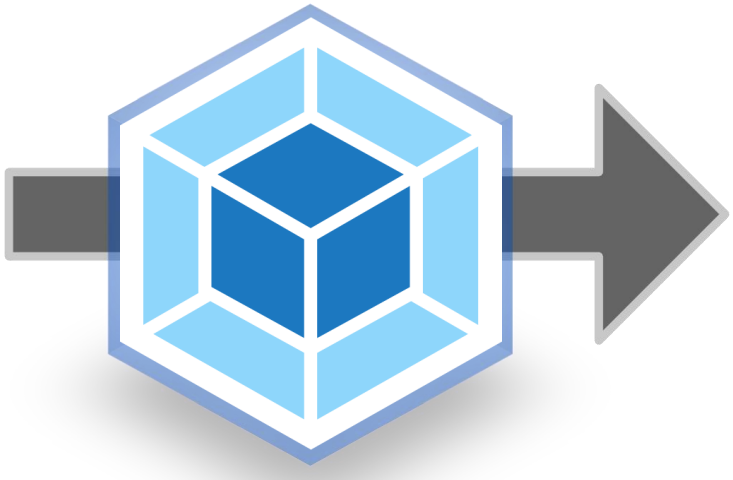
- Merge front-end project with Grails project
- Leverage native JavaScript build tools (webpack)
- Leverage Gradle Node Plugin
- Serve JavaScript via Asset Pipeline
- Can be used alongside GSPs
- Best approach for server-side rendering
- Analogous to the JHipster stack (Spring Boot + Angular)

Webpack

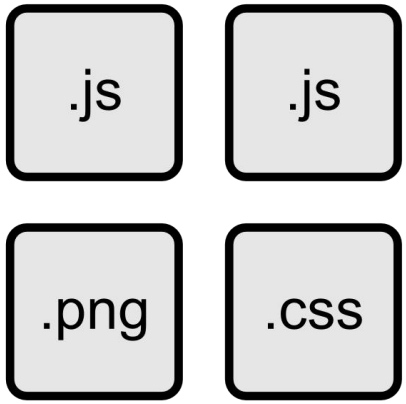
- JavaScript Module bundler
- Supports hundreds of asset types
- Links/bundles dependencies in JavaScript apps
- Extremely configurable (sometimes too much)
- Builds a dependency graph from one or more “entries”
- Outputs a (optionally minified, “chunked”) bundle
- Supports hot-reloading



modules
with dependencies



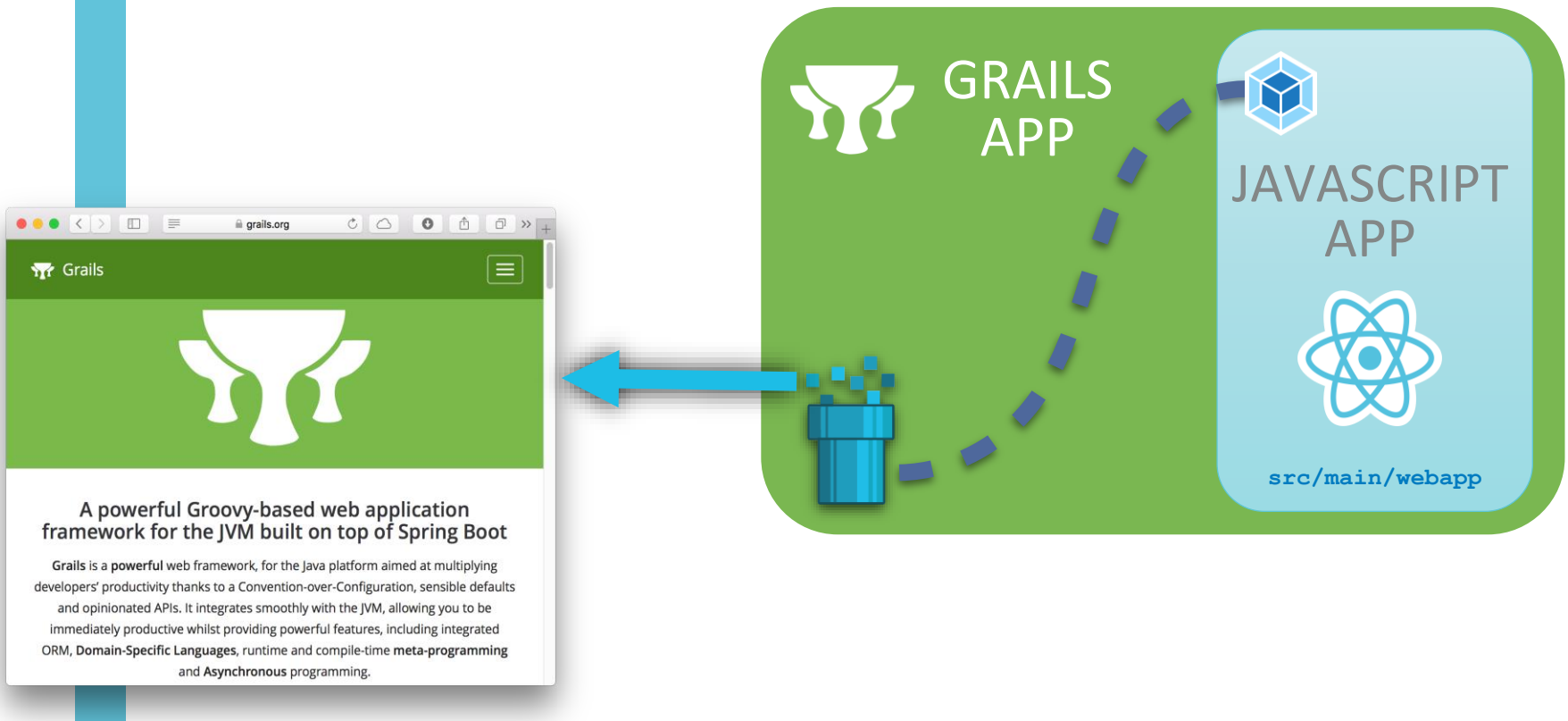
webpack
MODULE BUNDLER



static
assets

JavaScript Module bundler
Supports hundreds of asset types
Links/bundles dependencies in JavaScript apps
Extremely configurable (sometimes too much)
Builds a dependency graph from one or more “entries”
Outputs a (optionally minified, “chunked”) bundle
Supports hot-reloading

Hybrid Web App Approach

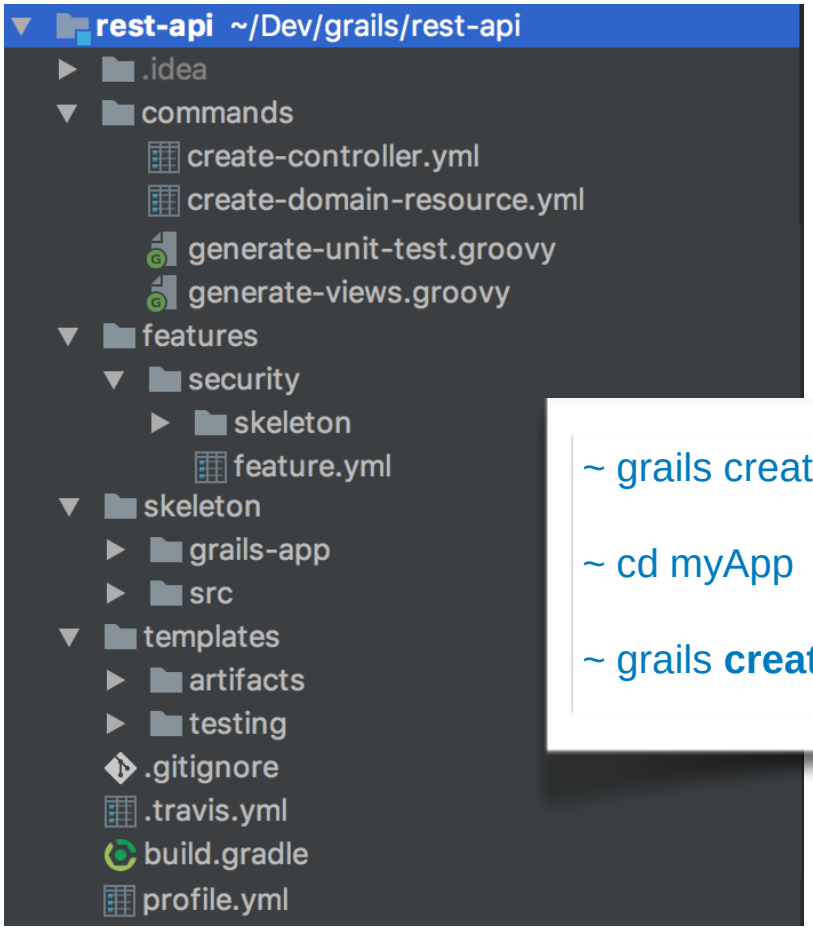


Application Profiles

- Include default config, plugins, project structure
- Custom commands/scripts for code-generation
- Optional "features" allow further control of the generated project
- Profile inheritance
- Packaged/resolved as Maven dependencies

```
grails create-profile myProfile
```

Application Profiles



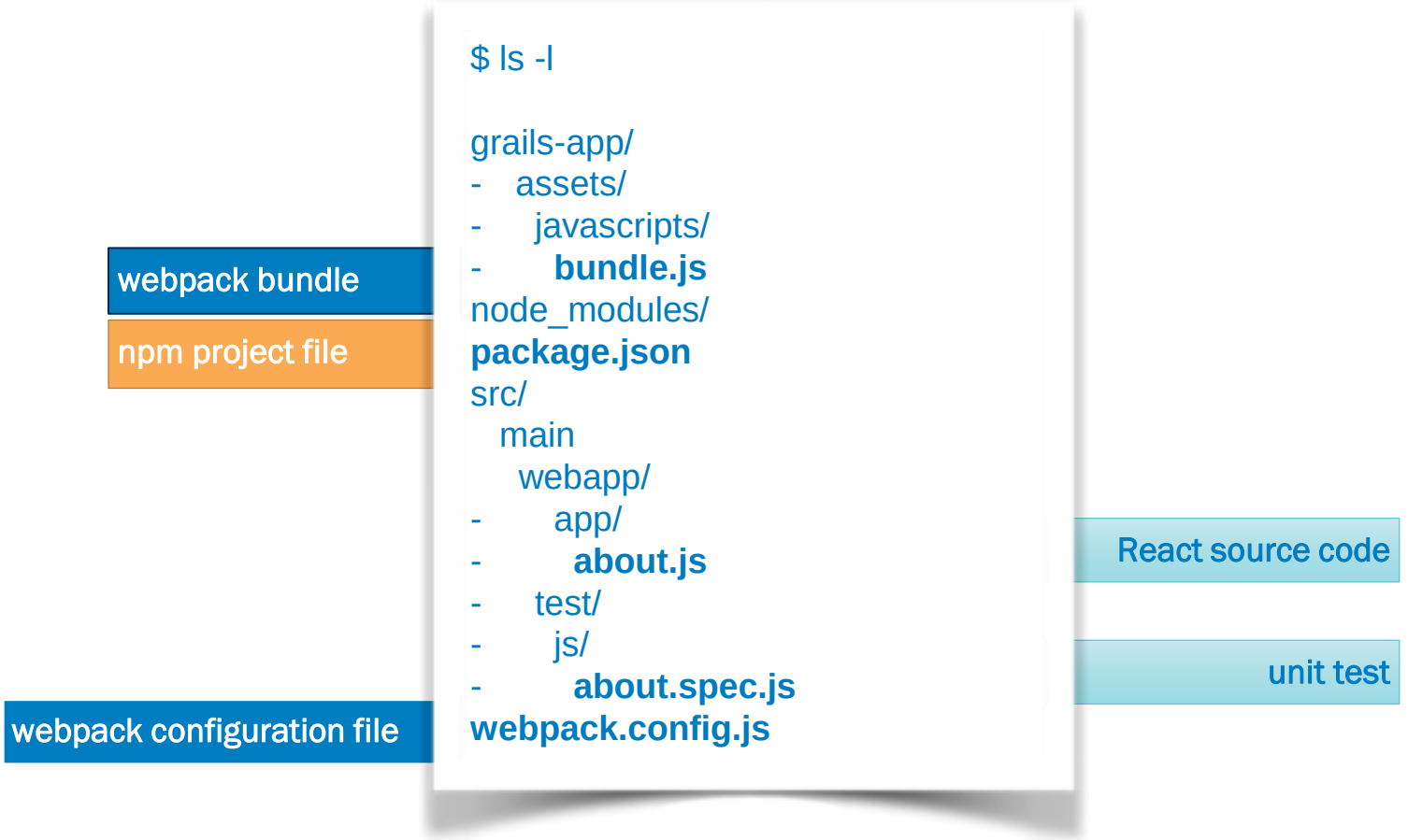

```
~ grails create-app myApp -profile rest-api

~ cd myApp

~ grails create-controller MyRestfulController
```

React-Webpack Profile

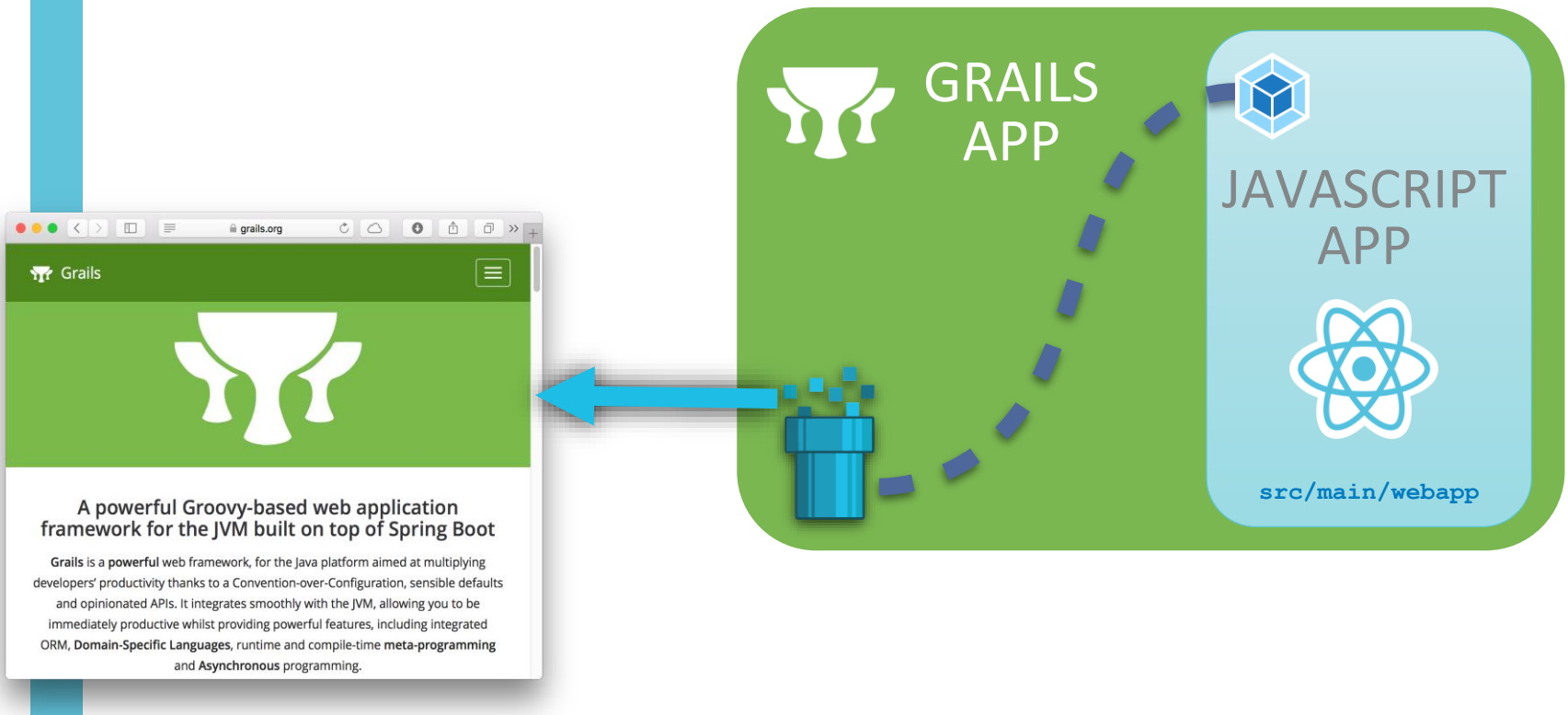
- React, ReactDOM etc.., installed via npm
- Webpack configured to process React code and output to `grails-app/assets/javascripts`
- React code lives in `src/main/webapp`
- gradle-node plugin installed, custom tasks to run webpack on app startup/packaging
- Sample React code and unit tests included

grails create-app myReactApp —profile react-webpack
OR
curl -O start.grails.org/myapp.zip -d profile=react-webpack

React-Webpack Profile



React-Webpack Profile



DEMO

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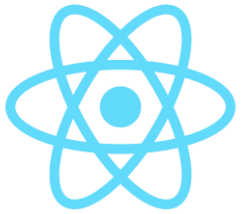
Multi-Project Build

- Separate projects for front-end app and Grails app
- Optionally leverage Gradle's multi-project builds
- Depends on CORS (native support in Grails 3.2+)
- Minimal coupling between front and back-end apps
- Client can point to any server
- Allows separate front- and back-end teams to work independently
- Allows use of all JavaScript build tools and community support

```
grails create-app myReactApp —profile react
```


create-react-app



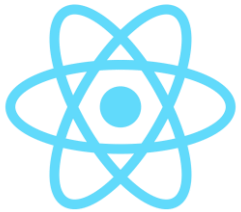
"Create React App is a new officially supported way to create single-page React applications. It offers a modern build setup with no configuration."

Source: https://facebook.github.io/react/blog/2016/07/22/create-apps-with-no-configuration.html

- Generates fully standalone React app
- Pre-configures webpack and Babel
- Provides scripts for starting app, building public bundle, running tests
- Simple, rapid dev workflow with an easy "exit strategy"

```
~ npm install -g create-react app
~ create-react-app myApp
~ cd myApp; npm start
```

React Profile

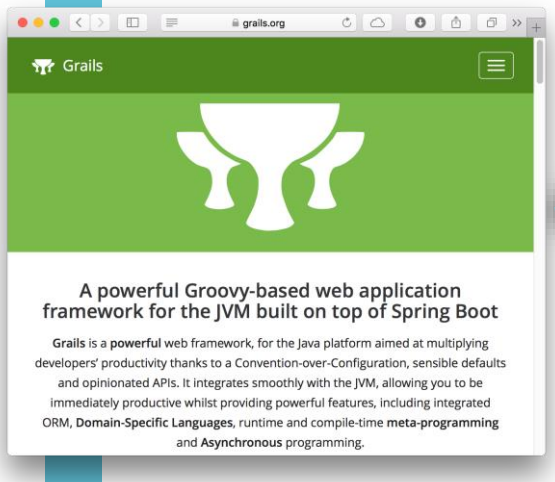


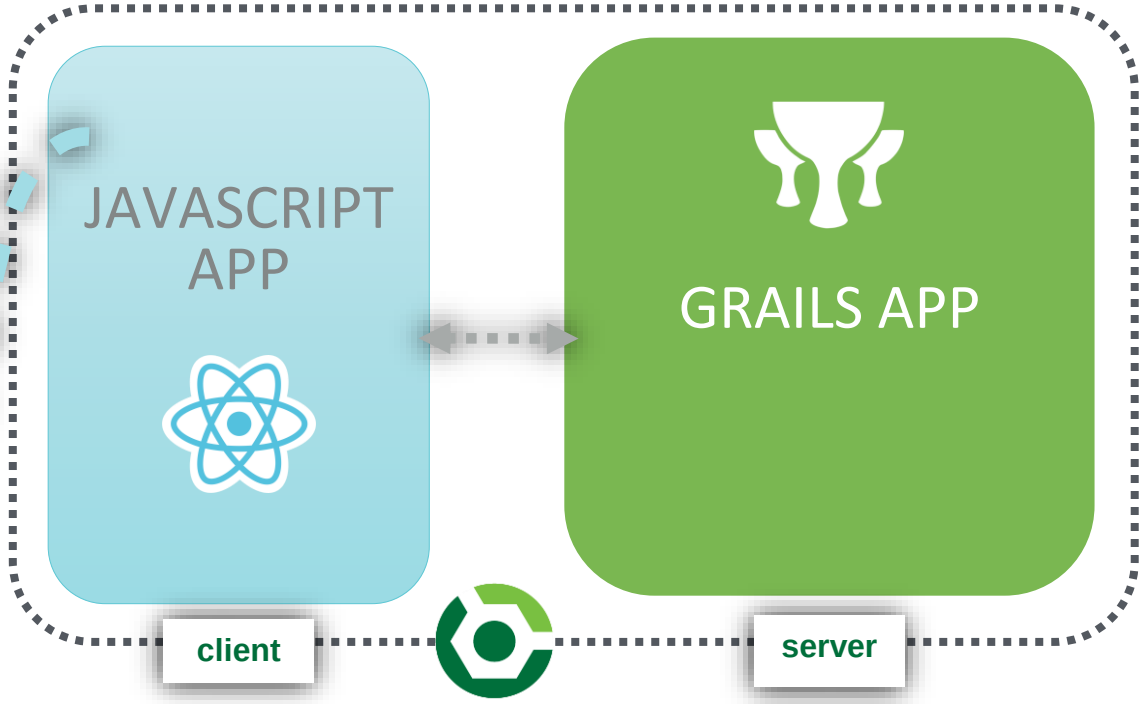
React Profile generates a multi-project Gradle build with:

- A React app (generated via `create-react-app`) as client project
- A Grails 3 app (`rest-api` profile) as server project
- Gradle-node tasks defined within client project to run npm/yarn scripts (start, build, test, and eject)
- Client app serves default React index page built with react-bootstrap, with app data retrieved from server via REST call

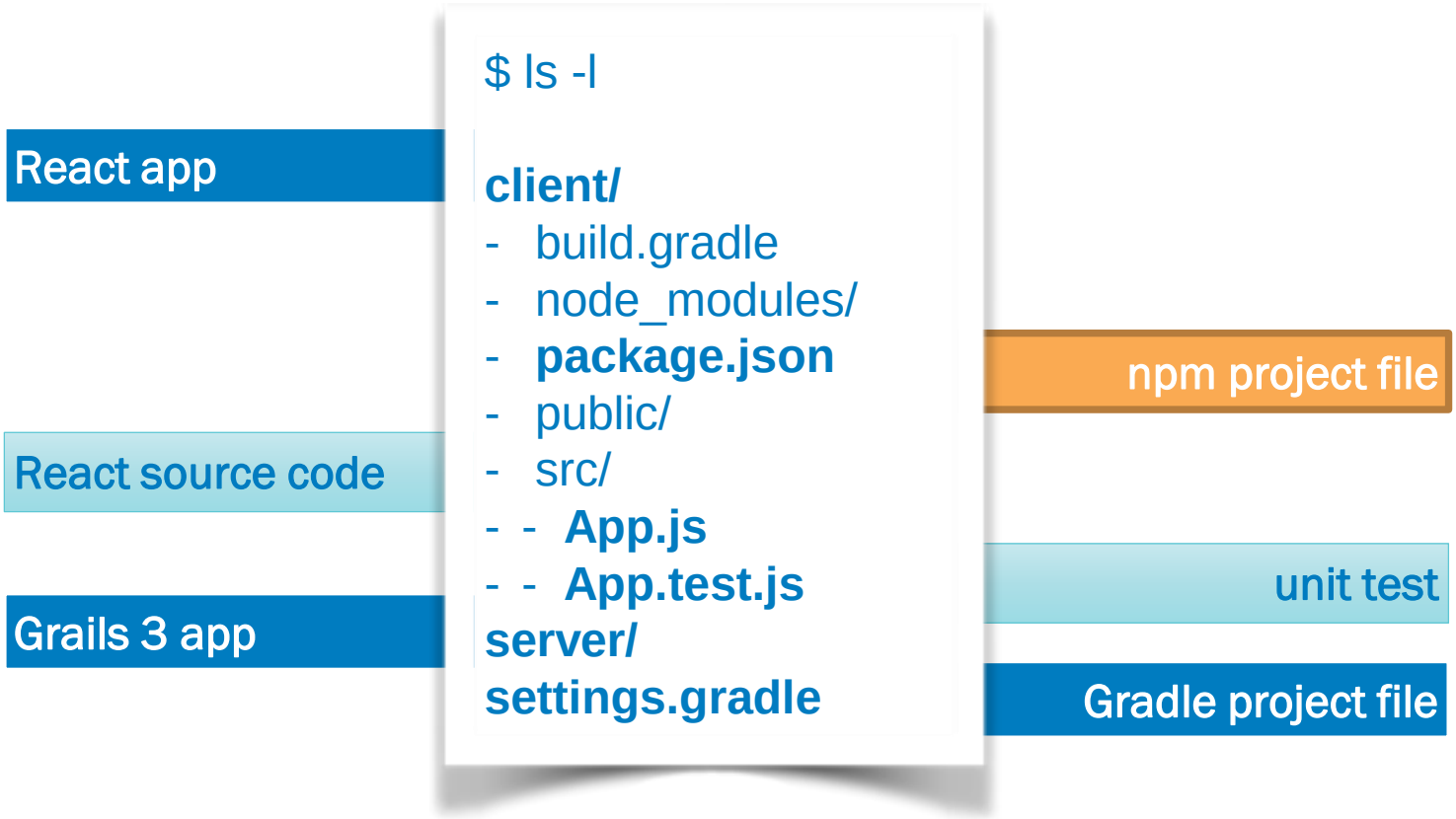
```
grails create-app myReactApp —profile react
OR
curl -O start.grails.org/myapp.zip -d profile=react
```

React Profile





React Profile



DEMO

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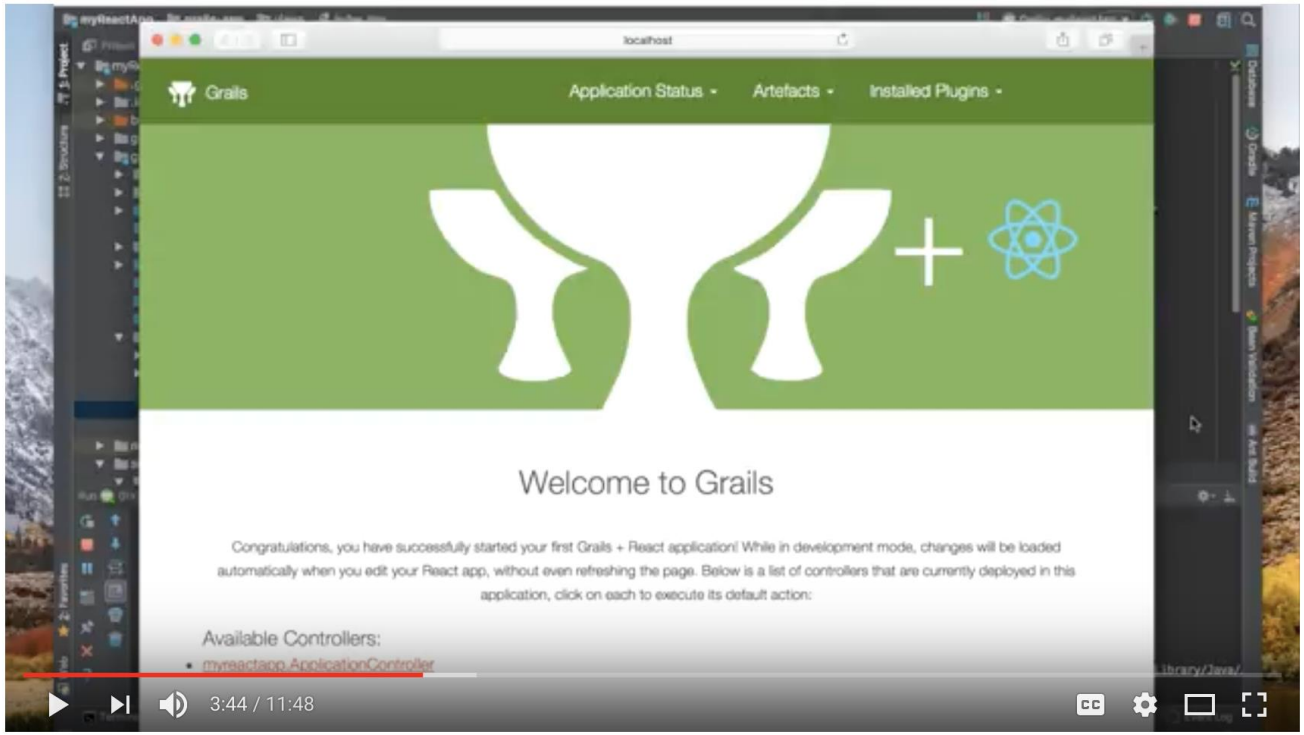
Grails Quickcast: React Profile



Grails Quickcast #8 - Grails React Profile

https://www.youtube.com/watch?v=JVLn7kWkjp0

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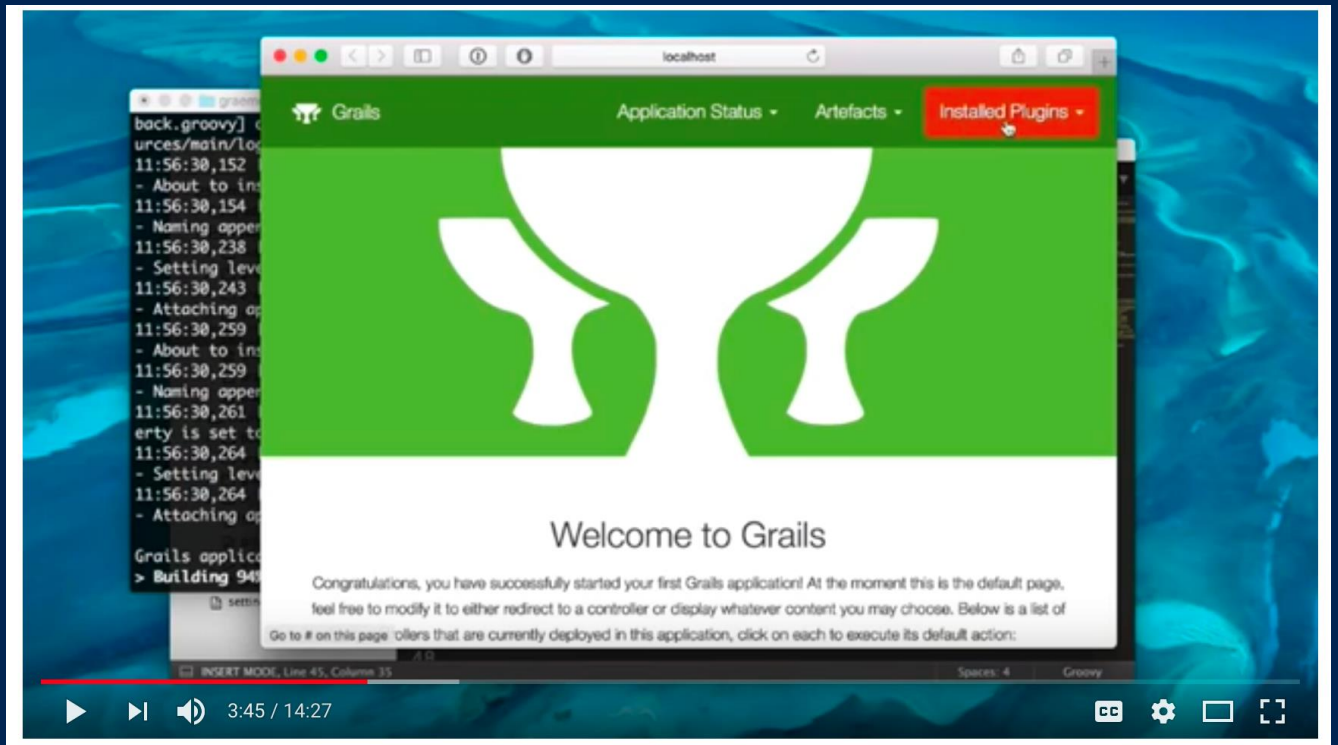
Grails Quickcast: Multi-project Build



Grails Quickcast #3 - Multi Project Builds

https://www.youtube.com/watch?v=yNA0ce5fG9s

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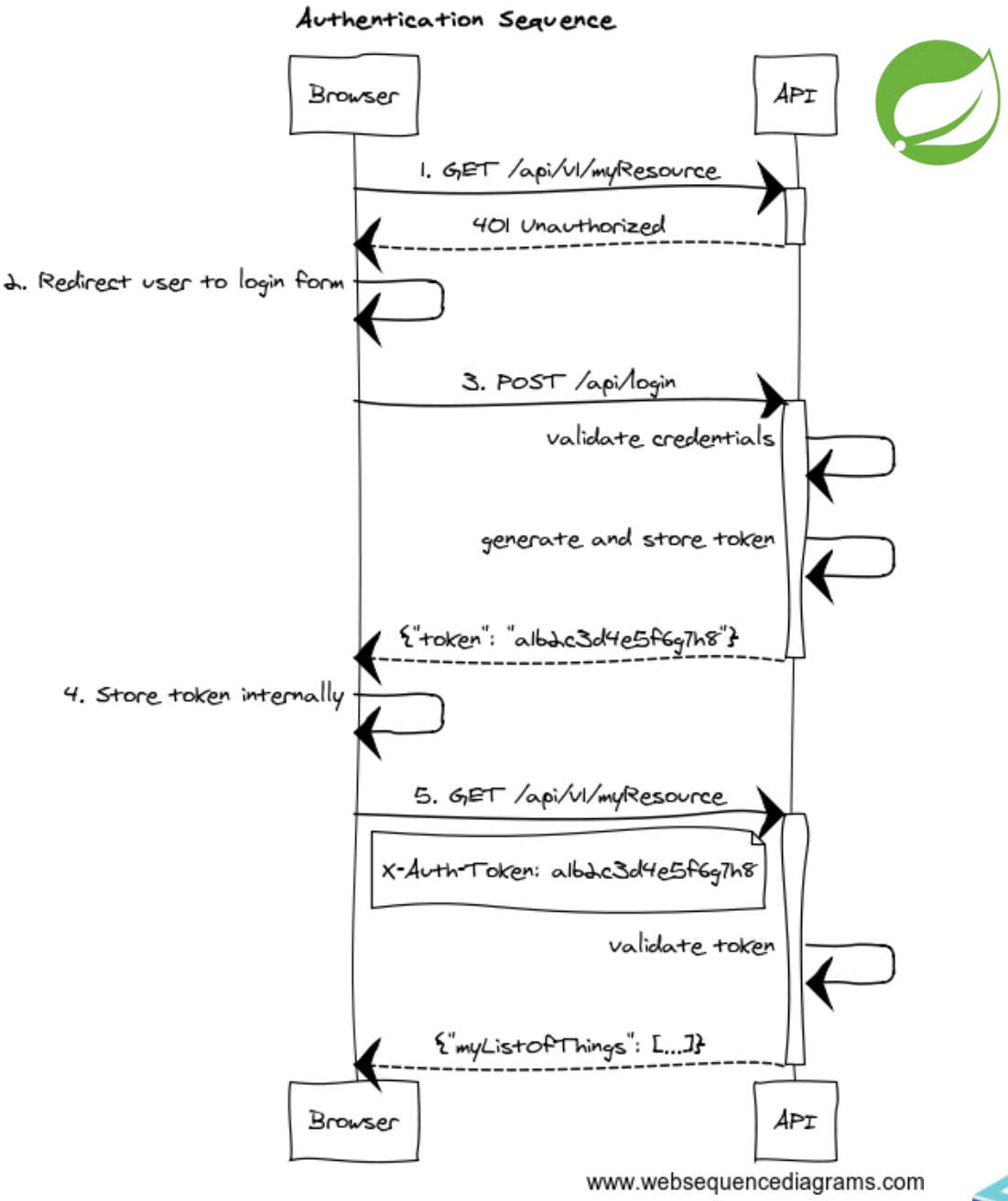
Spring Security REST

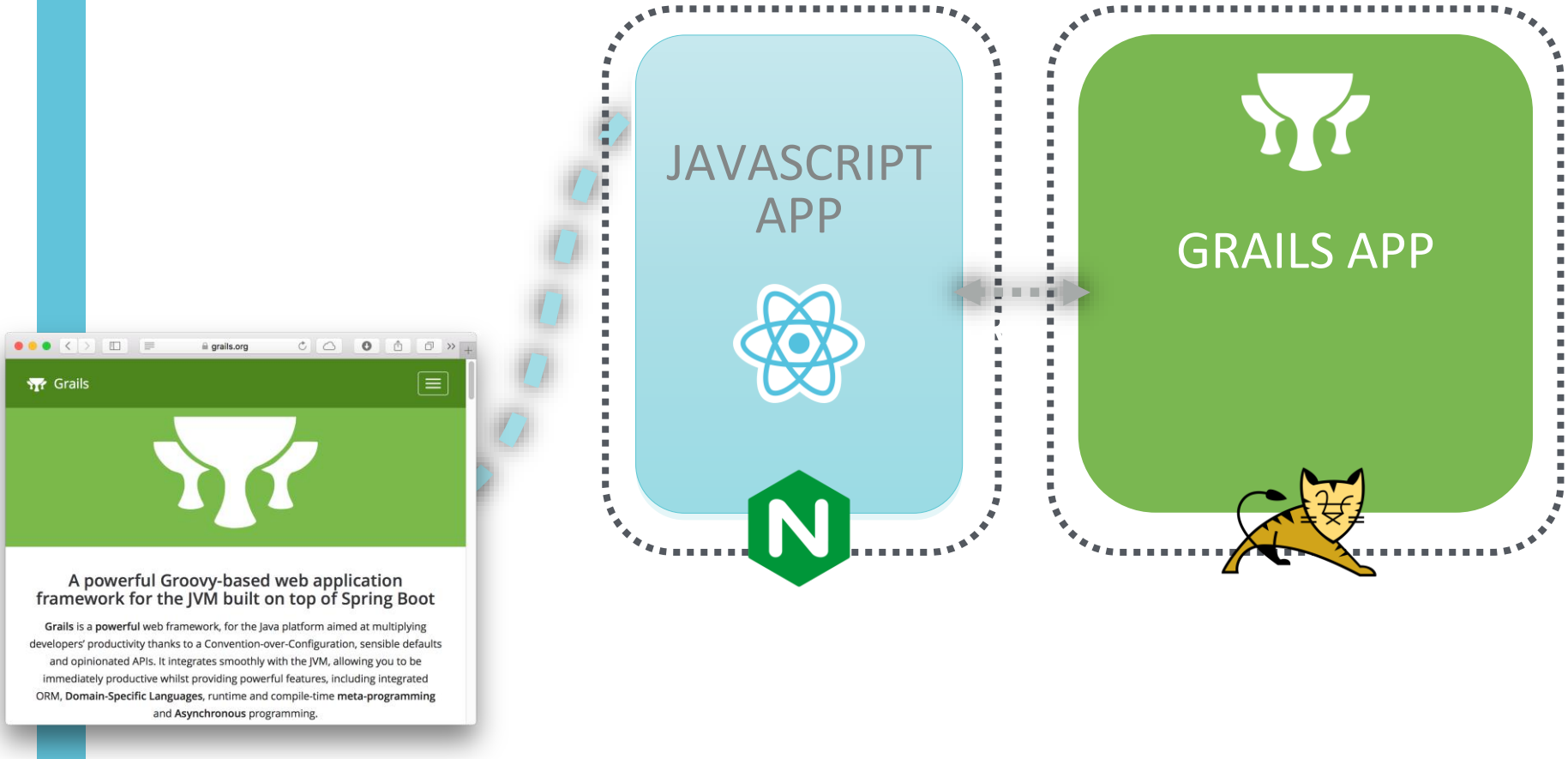
- Extends Spring Security Core
- OCI-supported
- Adds support for stateless, token-based, auth
- Designed to secure restful APIs
- Supports multiple token types/storage strategies, including JWT, Memcache, GORM, Redis, and custom

```
compile 'org.grails.plugins:spring-security-rest:2.0.0.M2'
```

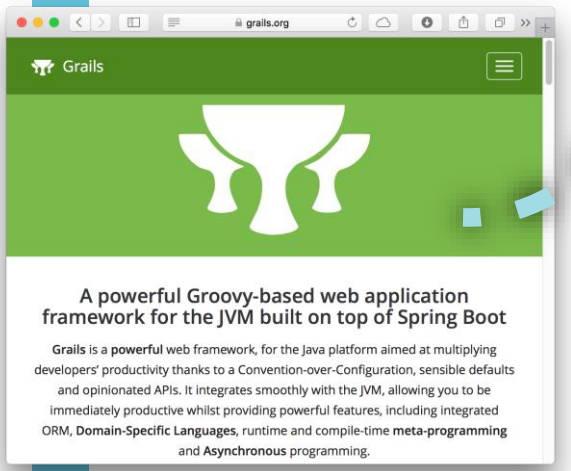


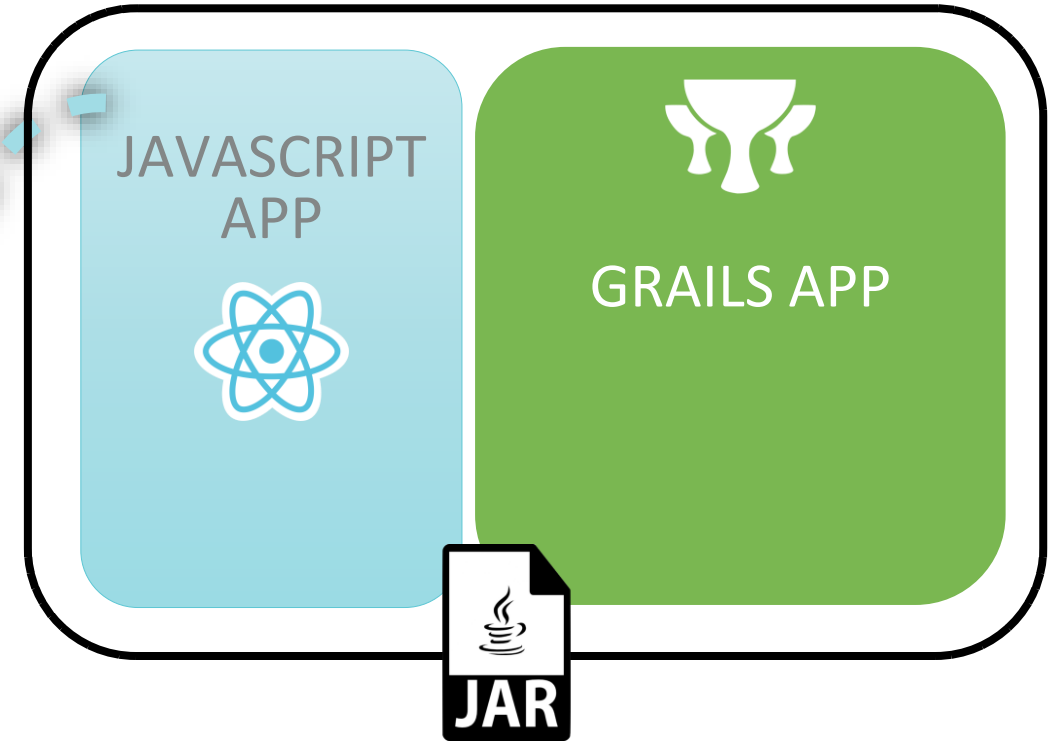
DEMO

Combined Deployment



Combined Deployment






```
java -jar myapp.jar
```

Online Grails Training Workshops

We offer a variety of live, instructor-led workshops, conveniently delivered as short sessions by Grails co-founder, Jeff Scott Brown and other members of the Groovy and Grails team.

Keep your eyes open for announcements of upcoming courses!

- Introduction to REST Services with Grails 3
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Grails Community Information

grailsblog.objectcomputing.com

grails.org

github.com/grails

grails.signup.team

objectcomputing.com/products/grails

grailstraining.com

@grailsframework

@objectcomputing

#grailsfw

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Groovy Community Information

groovy.apache.org

groovy-lang.org

dev@groovy.apache.org

groovycommunity.com

github.com/apache/groovy

users@groovy.apache.org

objectcomputing.com/training/catalog/groovy-programming

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Contact Us

Zachary Klein

Software Engineer, Grails Team

info@ocitraining.com

Jen Wiese

Manager, Training and Workforce Development

wiesej@objectcomputing.com

(314) 579-0066

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