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App Development – The Basic Gist

COMPASS NUM-APP

13.04.2021

Objectives

After this session, you should be able to answer these questions:

- What is the Frontend in the context of the NUM-Compass project?
- Why is React Native the current choice for implementing said Frontend?
- What other technologies are being used to create the client?
- What are app states?
- What is hot reloading and why should I care?

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Frontend: a Recap

NUM-App:
The Frontend

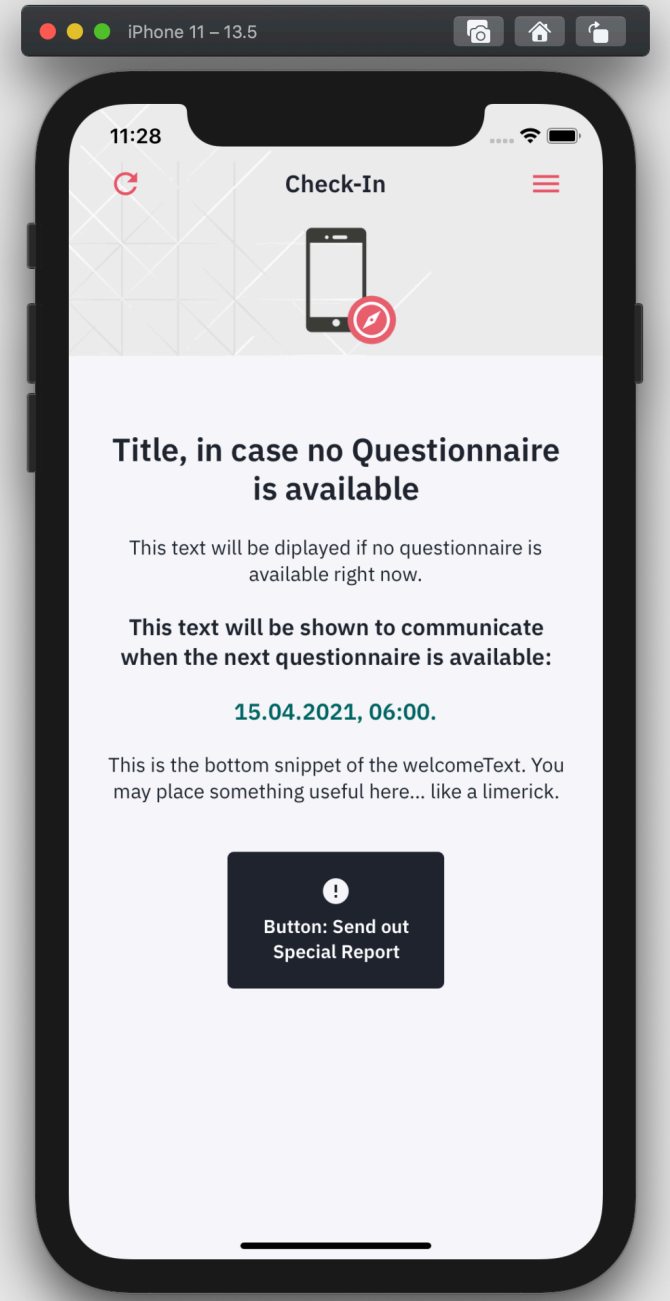
The frontend refers to the app provided to the user that allows the interaction with a conducted study. It basically is:

- the entry point for the user
- the interface with the user

There are several ways to approach a project like this one, frontend-wise:

- Web Platforms
- Progressive Web App
- Native Apps
- Cross Platform Apps

For the NUM-Compass project the Cross Platform approach was chosen with React Native being the deployed technology.



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NUM-App:
The Cross Platform Approach

The NUM-App is supposed to be:

- Easy to set up for development
- Easy to get “Store Ready”
- Available at the most prominent platforms (iOS & Android)…
- … ideally at the same time
- Easy to maintain with a single codebase without the need for multiple development teams

React Native provides a developing experience much like in a web development project. In fact, it is based on one of the most used web development libraries currently in use: React.

This allows developers with experience in web development to create an maintain native apps on Android and iOS.

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NUM-App:
React Native 1/5

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React Native uses JavaScript, which is one of the worlds most popular programming languages. This is a big advantage, as both iOS and Android support JavaScript. These are some of the benefits of using React Native:

- The same code in React Native can be used for both iOS and Android.
- React Native has a huge community support. It has many third-party plugins and frameworks that can be utilized to build a unique app.
- From the time React Native has been launched, there is a great stability and constant development.
- The use of JavaScript allows for reuse of code used in web development projects.
- It provides Hot Reloading!
- It’s close* to native performance, feel & look

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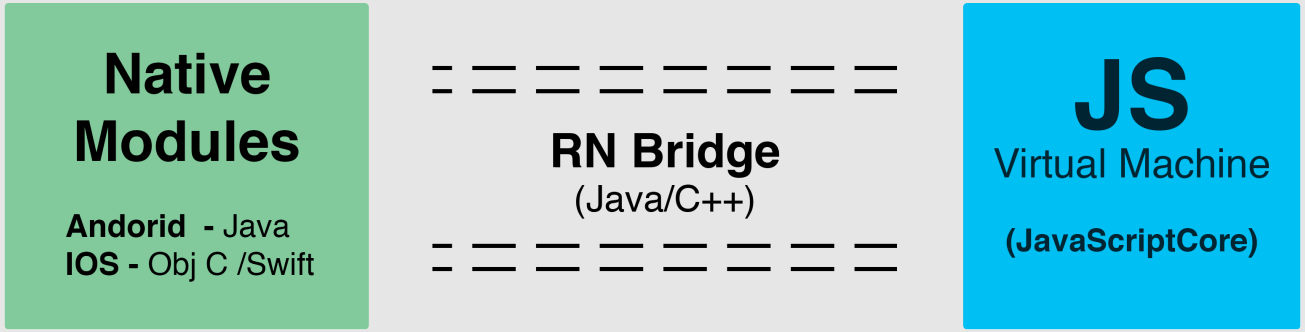
NUM-App:
React Native 2/5

There are mainly three parts to the React Native platform:

- Native Code/Modules: Most of the native code in case of iOS is written in Objective C or Swift, while in the case of Android it is written in Java or Kotlin.
- JavaScript VM: The JS Virtual Machine that runs all JavaScript code.
- React Native bridge is a C++/Java bridge which is responsible for the communication between the native- and the JavaScript-components.



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NUM-App:
React Native 3/5

- React Native applications are written using a mixture of JavaScript and XML-like markup, known as JSX
- While building, the React Native “bridge” invokes the native rendering APIs in for iOS or Android. Thus, the application will render using real mobile UI components, providing the appropriate look and feel.
- React Native also exposes JavaScript interfaces for platform APIs, so a React Native app can access platform features like the camera, or the user’s location.

Component in ReactJS

```
import React from 'react';

class Slide extends React.Component {
  render() {
    const { title, body } = this.props;

    return (
      <div>
        <h2>{title}</h2>
        <p>{body}</p>
      </div>
    );
  }
}
```

Component in React Native

```
import React, { View, Text } from 'react-native';

class Slide extends React.Component {
  render() {
    const { title, body } = this.props;

    return (
      <View>
        <Text>{title}</Text>
        <Text>{body}</Text>
      </View>
    );
  }
}
```

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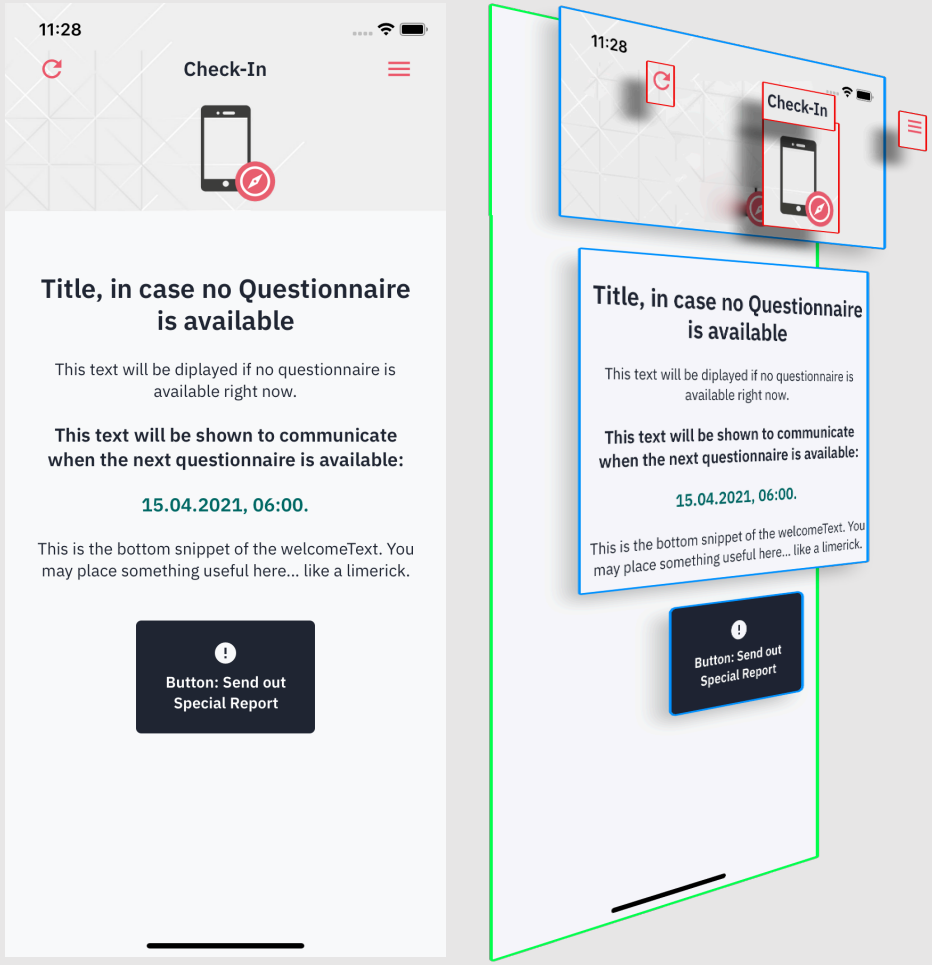
NUM-App:
React Native 4/5



React Native, like ReactJS, allows the developer to create simple components that can be stacked on top of each other.

Each component consists of:

- A visual representation layer (Template)
- A logic layer (Controller)
- A data layer (App State or Props)

The app state basically consists of all mutable data that affects a component. For example:

- The string that is being used on a button label
- The color of a button
- The size of an UI-Element

If the state changes, the UI will be updated automatically!

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NUM-App:
React Native 5/5

Basic Lifecycle Example

The user interacts with the App and triggers a controller action.

Example: The user activates a button to update the current userdata.

The controller executes the action.

Example: The function behind the button sends a call to the backend requesting the new userdata.

The new data is being persisted within the app state.

Example: The call to the backend provided a new user profile. This profile is now being stored by the app state.

Because the app state was updated, the UI needs to be too. React Native refreshes the affected components.

Example: The new profile in the state contains a new username that needs to be displayed. Every component that uses the username will now be rerendered (because their content changed)

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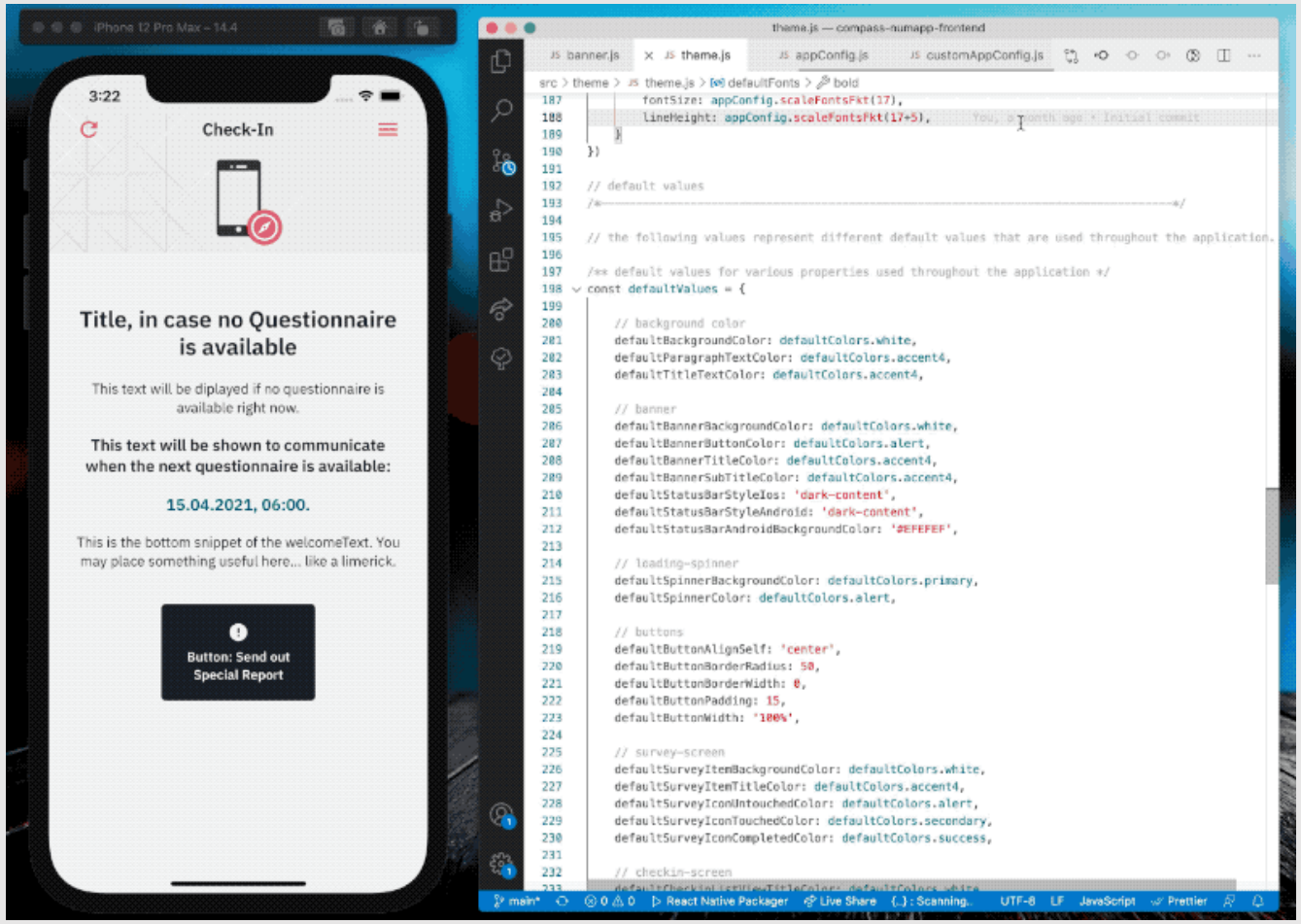
NUM-App:
Hot Reloading



- Any change detected within the JavaScript code will trigger a re-build.
- This encourages a trial-and-error approach as new concepts and ideas can instantly (or at least very fast) be tested.
- This approach can also be used to just get familiar with the code - we call this Explorative Deconstruction. Try to intentionally destroy a component to see what the consequences are – but remember to reverse the damage!

NUM-App:
Other Technologies needed

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These are other technologies and apps needed to create the NUM-App. In most cases it is enough to set these up once.

- Node.js (the runtime, used to actually build the app)
- Node Package Manager (used to install and maintain additional packages with Node.js)
- Watchman (triggers a re-build if a JavaScript file is changed/updated)
- Java Development Kit (used to compile the native Android-Code)
- XCode (provides the means to build the iOS-App)
- iOS Simulator (simulates an Apple device)
- Android SDK (provides the means to build the Android app)
- Android Emulator (emulates an Android Device)

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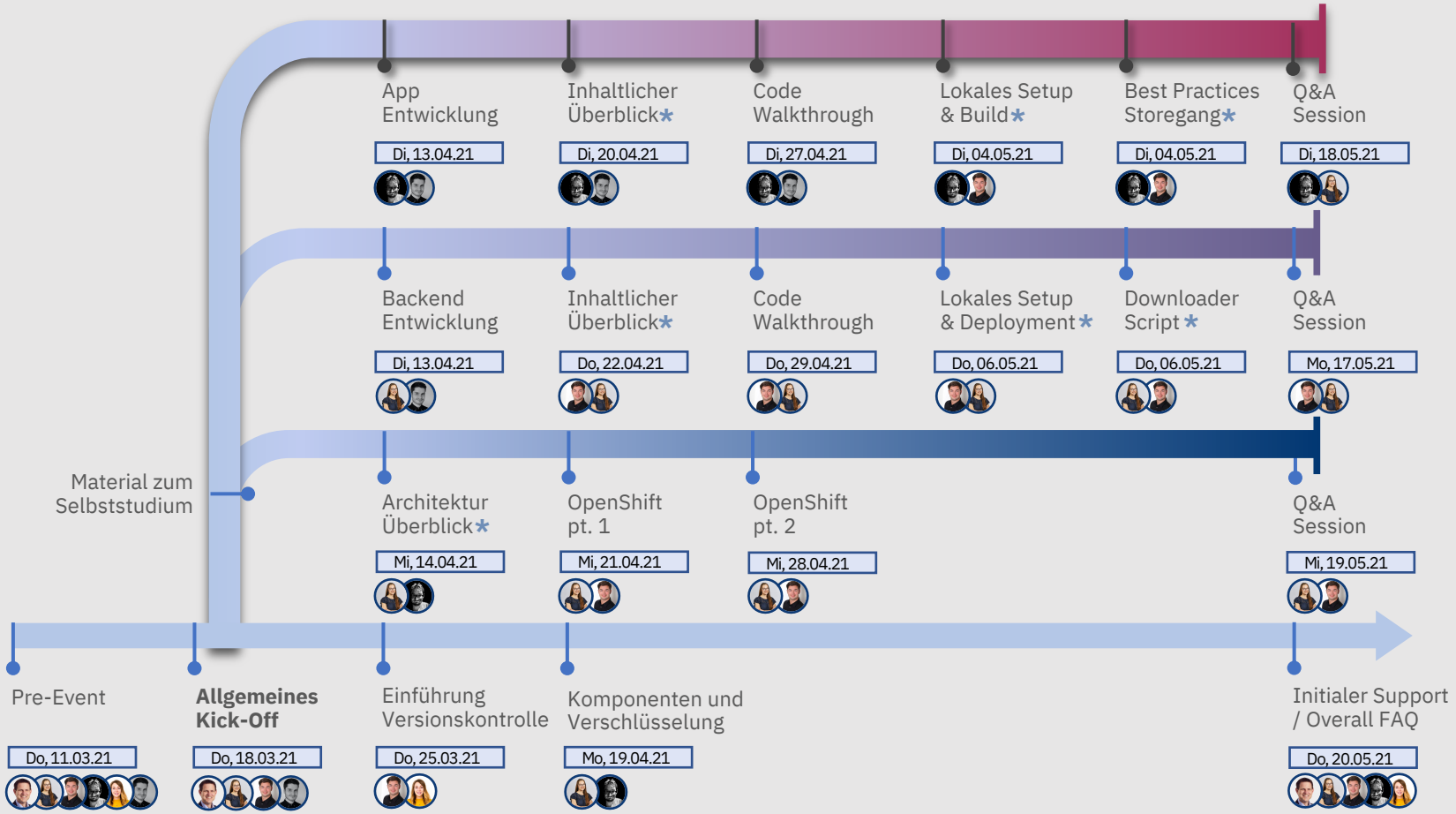
Outlook on Frontend Contributor Track

Backend Contributor Track

Frontend Contributor
Backend Contributor
Platform Contributor
Overall
Generalist *



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Links

Links

React Native

- https://reactnative.dev/
- https://reactnative.dev/docs/getting-started

NumApp

- https://github.com/NUMde/compass-numapp-frontend
- https://github.com/NUMde/compass-numapp-frontend/tree/main/docs

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Q&A

Q&A

What questions do you have?

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