Fitbit Summer School - Introduction

18.06.2019

fitbit

Objectives

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- At the end of this course you'll have hands-on experience in building step by step a complete IoT solution
- Create an Android app that
  - collects data from a sensing device
  - sends data to your cloud services
  - shows data to the user in a friendly manner
- On the server backend:
  - create a microservice that stores data sent by clients (mobile device) and helps retrieve it
  - deploy it in "the cloud"

What you'll learn - Android track

- Create a basic Android app using the main components of this framework

- Learn to code both the UI and backend of your app

- Learn about Bluetooth and Bluetooth LE communication

- Integrate your app with third party libraries

- Understand the design and codebase of existing apps (the Nordic Thingy app)

What you'll learn - Android track (continued)

- Server communication between your app and cloud service (Retrofit API)

- Locally store your data using platform specific components and databases (Room API)

- Components' lifecycle awareness

- Unit test your code using JUnit and Mockito

- Security practices for protecting your app and users' data

- Coding style and clean code design practices

What you'll learn - Cloud track

- A lot of buzzwords to brag about (DI, ORM, microservices, NoSql, Docker, Kubernetes)
- How to quickly span a "Hello World" microservice using a framework (and why you should not go rogue)
- How to choose a storing solution for your data (Sql/NoSql)
- How to store & read your data

What you'll learn - Cloud track (continued)

- How to deploy it "out there"

- How to make sure it keeps running (monitoring)

Sessions overview

Proposed System Architecture

Cloud deployed microservice

fetch rq

response

Phone

IoT thing generic

store/fetch rq

response
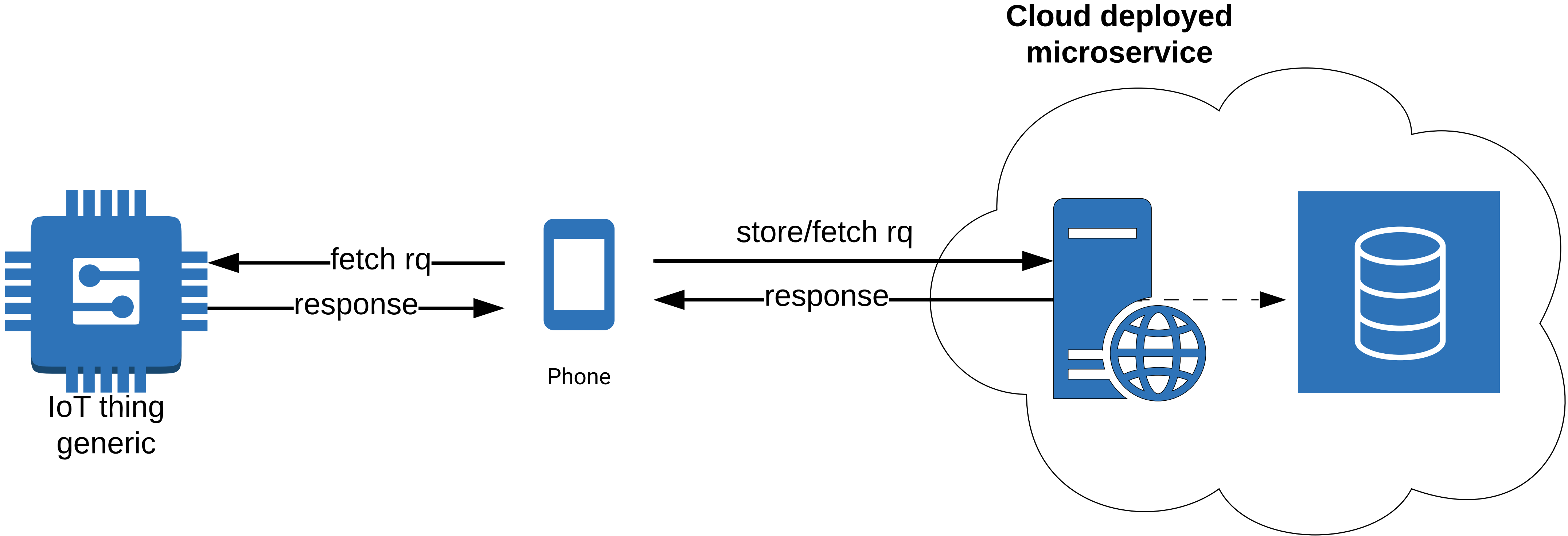
Android Sessions

1. Android Fundamentals
   a. Create your own activities, intents and services
   b. Build a simple app that uses the Android framework's Bluetooth API
2. Networking
   a. Secure network calls using the framework's API
   b. Use Retrofit and GSON
3. Bluetooth Low Energy communication
   a. Protocol concepts - services, characteristics
   b. Integrate Nordic's library into your app to get data from the Nordic board
4. Data management
   a. Internal & external storage
   b. Shared Preferences
   c. Store data in databases using Room library

Cloud Sessions

1. Cloud fundamentals
   a. Why Cloud? What are "backends" for?
   b. How to choose a data storage solution
   c. How to choose a communication protocol
2. Data management
   a. Communicate with database
   b. Choosing the right schema
   c. Coding patterns for accessing data
3. Deployment
   a. How to make your code available to the world
4. Monitoring
   a. Instrument your code
   b. Evaluate its performance, live

Let's get started!