

Software Architecture

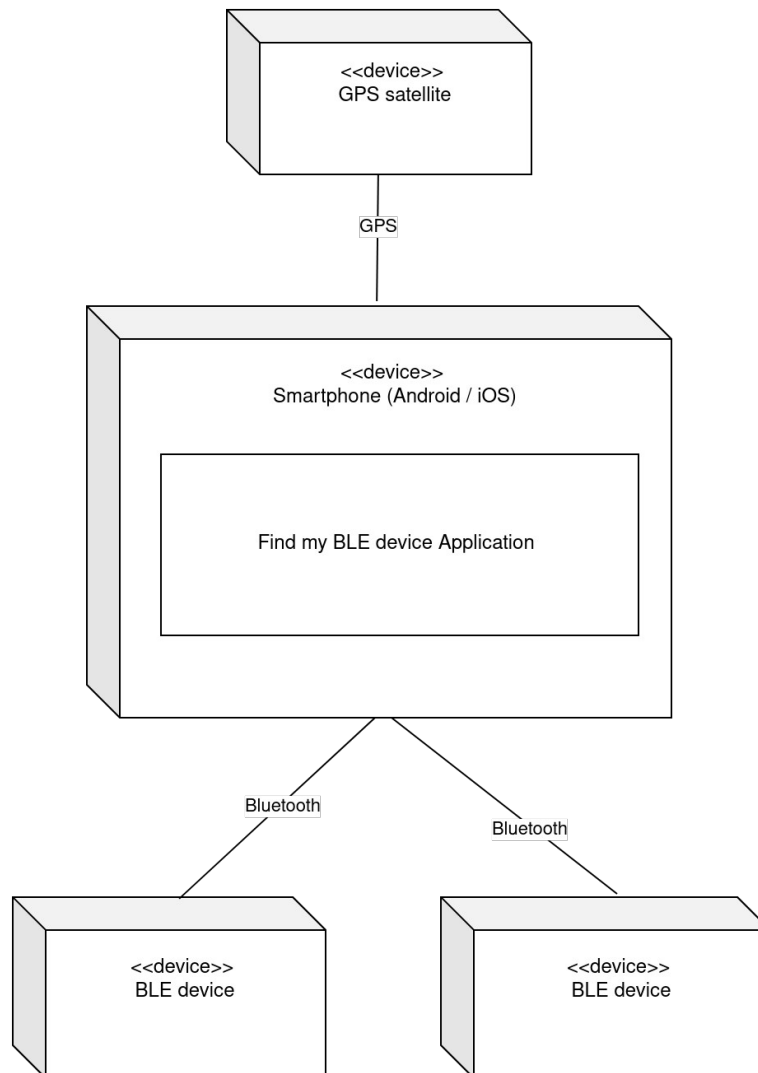
AMOS SS2022

Project 5 - Find my hearing aid



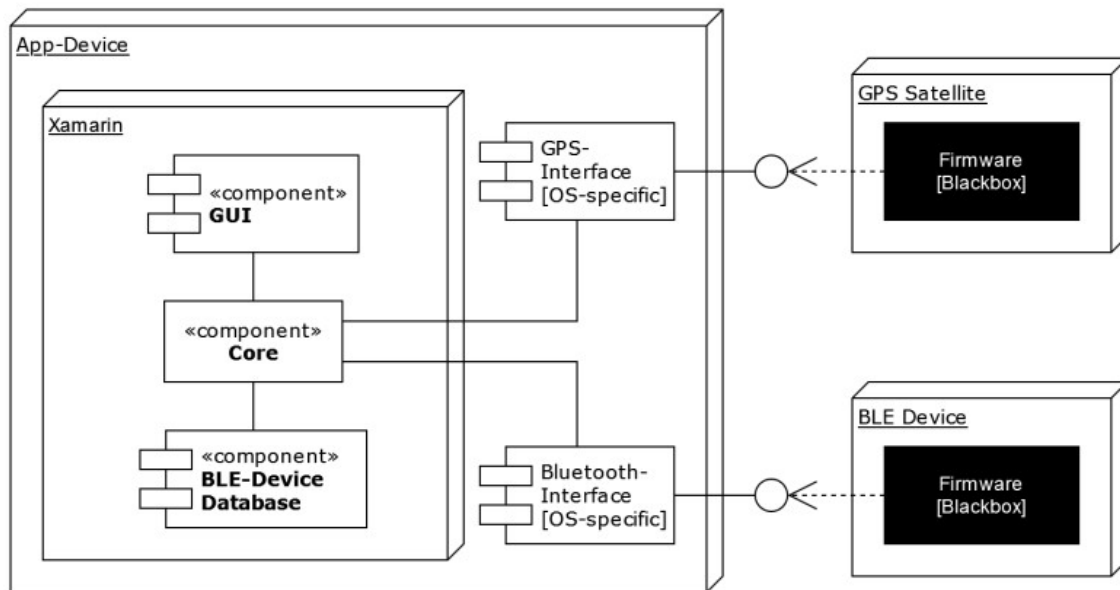
Find my BLE device

Runtime Components



The overall goal of the project, is to develop an application, to track BLE devices. If there is a Bluetooth connection it should approximate the distance between your smartphone and the device, based on the signal strength. The other use case is to save the latest location before the device disconnects, to find lost ones. To obtain these functionalities the project is divided into the following runtime component. The core part is the “Find my BLE device” application. The supportive platforms are either Android or iOS. The smartphone communicates with BLE devices via Bluetooth. The application can save at least two Bluetooth devices. In order to show your current location and save the latest position of your BLE device the app uses the smartphones internal GPS antenna to receive the current location.

Code Components



Our App is based on the Xamarin Framework, which allows us to build for both, Android and iOS devices. It uses the respective software-interfaces of the OS to communicate to a BLE (Bluetooth Low Energy) device and the GPS satellite system. The App itself consist of three parts:

The core component contains the core functionality and manages the communication between all other components.

The BLE device database is used to permanently store information about selected BLE devices, most importantly their label and the location they were last connected at.

The GUI component either displays information gathered from the previous components, or guides the user in finding one or multiple specific BLE device(s).

Technology Stack

Smartphone App

- Programming language: C#, XAML
- Android app: Xamarin Forms
- iOS app: Xamarin Forms
- Database: SQLite

Development

- IDE / Text editor: Visual Studio (recommended, not mandatory)
- Version control: Git
- Build tools: GitHub Actions (CI / CD)
- Bluetooth test devices: Arduino
- Linter: SonarLint

Descriptions

Xamarin Forms

Xamarin Forms is a platform independent GUI solution based on Microsoft .NET. It compiles to a native application for each of the supported platforms. The technology was a requirement of our stakeholder and enables the team to support both popular mobile platforms by writing a single application.

SQLite

SQLite is the most prominent relational database used on mobile devices.

Visual Studio

Visual Studio is an IDE developed by Microsoft and officially the only supported tool to develop Xamarin Applications with.

GitHub Actions

GitHub Actions enables developers to automatically build, test, and deploy software projects hosted on GitHub via a CI/CD pipeline.