Developer Guide

Bluetooth Low Energy Tracker (BLU)

Version 1.0
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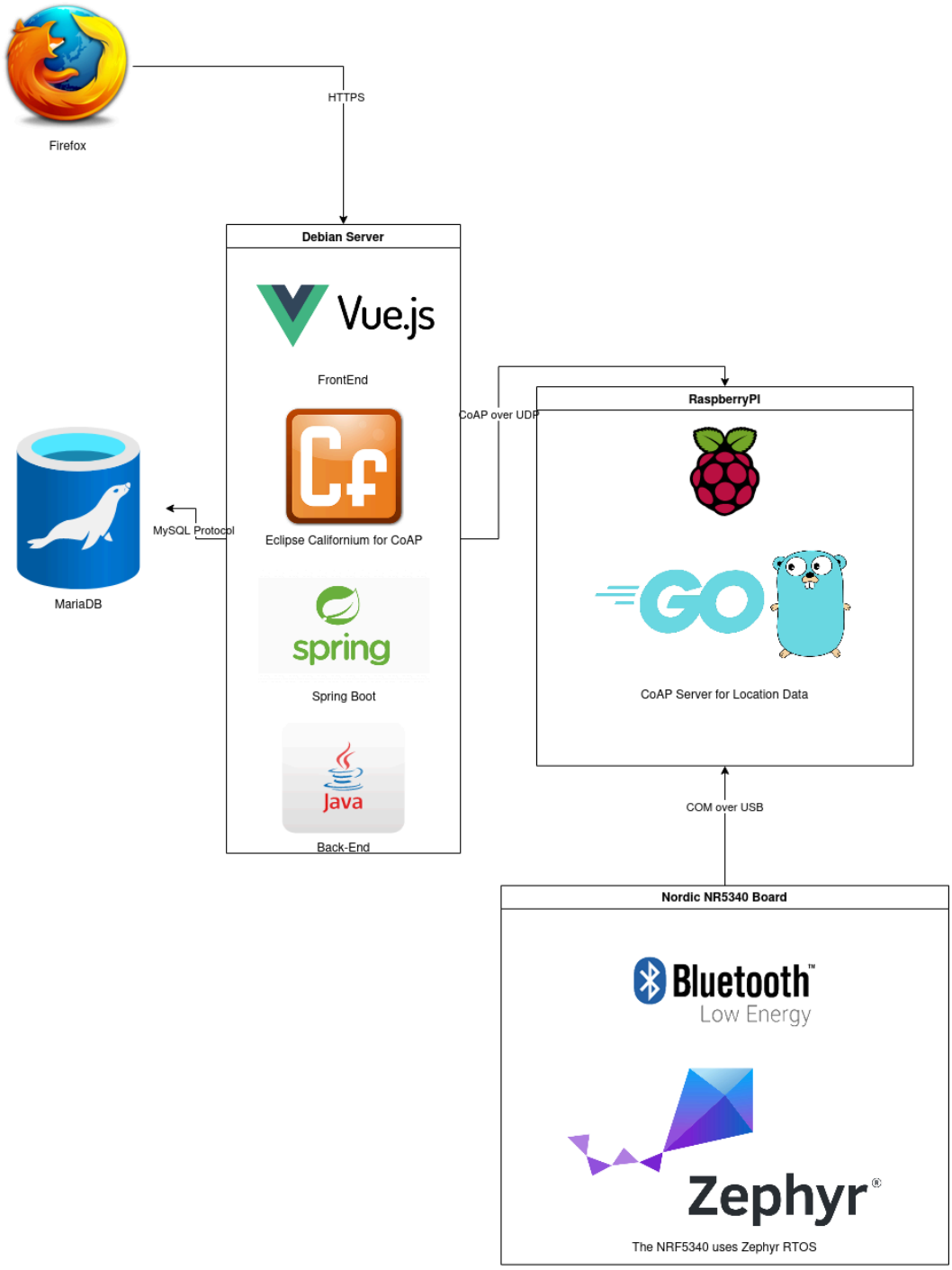
Overview

BLU is a Bluetooth low-energy device tracking software that allows users to track their own devices in a room and get respective location and path data. The system is made up of many components and spans multiple software domains including front-end development for web browsers, back-end development for website servers, as well as embedded system development for our nrf5340 boards.

This document will give you an overview of our project's architecture to get a quick understanding of what's being used, how it's being used, and how to implement it.

Project Components



Front-End	Back-End	Embedded Board
The front end will be implemented with Vue.JS It is the primary interaction point of the user with our system	The website's back end will be made using Java Spring Boot. The backend will serve content to our front as well as interact with the NRF boards using CoAP.	The embedded boards will be coded in C with the Nordic SDK. The boards will host CoAP services to allow retrieval of their location information. This may be done through the Raspberry Pi and a simple program that reads through COM port output.

Project Documentation Resources

The following are documents that outline the designs of BLU:

- Feature List - List of specified features for BLU
    - Feature List
- Requirements Model - Various models that BLU has such as the stakeholder and goal model. There is also the system vision, functional/nonfunctional requirements, as well as the conceptual database.
    - Requirements Model
- Design Specifications - Basic structure of BLU and some of the highlights of its most important features. Also shows the database design.
    - Design Specifications

Base Requirements

This project uses the following software:

1. Debian 12
    a. Our system will target Debian 12 for all capable processors including our Raspberry Pi.
2. Firefox
    a. Firefox is the default browser of Debian 12
3. Vue.JS
    a. To implement our front-end
4. MariaDB
    a. MariaDB is the default MySQL database implementation for Debian 12
5. Java SpringBoot
    a. For our website back-end
6. Nordic SDK
    a. For programming our Nordic boards
7. Golang
    a. For implementing the CoAP interface between our Nordic board and the website.

Our system is going to use multiple libraries and frameworks. The most notable are going to be Java Spring Boot, Eclipse Californium for a CoAP server implementation, go-coap for the Raspberry Pi, zephyr os for our boards

Hardware Requirements

For our receiver to retrieve the proper information and support a proper connection, the project will require the following:

- 4xNordic NRF5340 DK Boards
- 1xRaspberry Pi 3B or any higher version
- 1xDebian Machine of any supported architecture

These are the minimum requirements needed. You can include additional NRF Boards to increase the scalability of the boundaries!

How to Install

Most of the installation will happen through Debian packages which we will distribute.

Use apt-get install ./package-name.deb to install the respective packages on Debian systems

For installation of the firmware, we will provide hex files and you will need a J-Link and respective software to install it on your board

Contributing to Project Development

A GitHub repository for this project is located in the following link:

https://github.com/Sampre13/Bluetooth-Tracking-Device

There are going to be four different git repositories for which we do our work

1) Front End Project with Vue JS
2) Back End Project with Java Spring Boot
3) Raspberry Pi CoAP Server
4) Nordic Board Firmware

This may seem like a lot but the Raspberry Pi CoAP server will probably not be very large, it just needs to hold a buffer and send out location data when requested.

Developer Support

For further support, contact the following developers:

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