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LoRaWAN Lamb Link

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BEng (H) in Software and Electronic Engineering

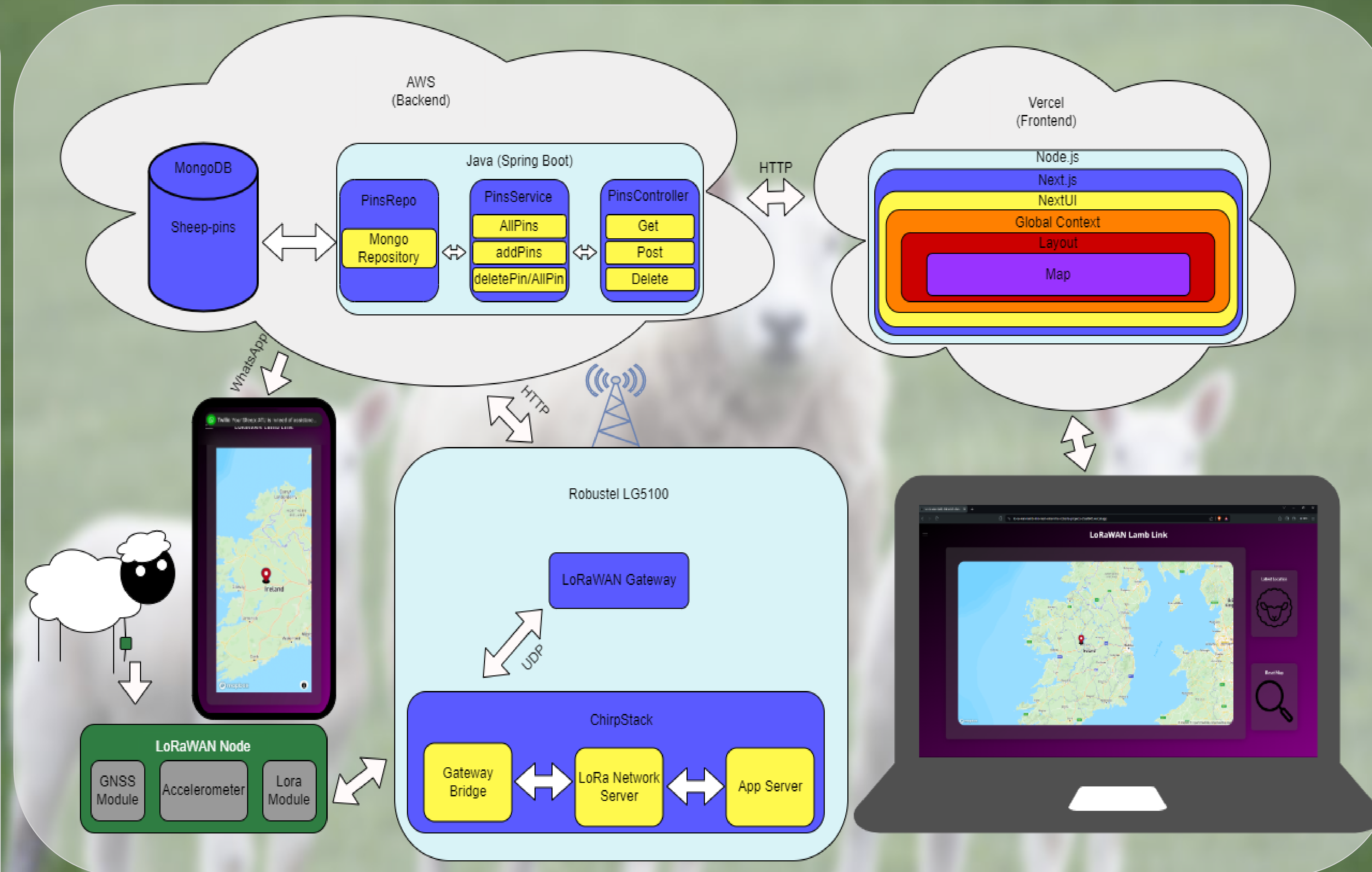


Introduction

LoRaWAN Lamb Link aims to map out the location sheep have grazed in by using a device that features GNSS as well as LoRaWAN, a low-power and long-range wireless technology. An accelerometer will detect sheep in need of assistance and will alert the farmer through a WhatsApp message.

The STEVAL ASTRA1B is the LoRaWAN node used in this project. It will send the data collected from the GNSS and accelerometer components to the LoRaWAN Gateway at set intervals.

A Robustel LG5100 LoRaWAN gateway hosts a ChirpStack server which will receive data from the gateway and send it to a Spring Boot backend hosted on an EC2 AWS server. A WhatsApp alert is sent using Twilio when frames sent to the backend contain consecutive indications of a sheep in a compromised position. This backend features a MongoDB database for storing data. The Next.js frontend hosted on Vercel uses RESTful API calls to access data from the backend and display it on a map component.



Results

ATU 07/04/2024, 17:31:16
Status: Needs assistance

ATU 07/04/2024, 17:31:33
Status: Needs assistance

ATU 07/04/2024, 17:32:17
Status: Needs assistance

ATU 07/04/2024, 17:42:30
Status: Ok

LoRaWAN Lamb Link

Status: Needs assistance

ATU 07/04/2024, 16:56:13
Status: Needs assistance

ATU 07/04/2024, 16:56:46
Status: Needs assistance

ATU 07/04/2024, 17:29:34
Status: Needs assistance

ATU 07/04/2024, 17:30:40
Status: Needs assistance

ATU 07/04/2024, 17:31:13
Status: Needs assistance

ATU 07/04/2024, 17:31:16
Status: Needs assistance

ATU 07/04/2024, 17:31:33
Status: Needs assistance

ATU 07/04/2024, 17:32:17
Status: Needs assistance

ATU 07/04/2024, 17:42:30
Status: Ok

Latest Location

Reset Map

Your Sheep: ATU is in need of assistance. View Location: <https://lo-ra-wan-lamb-link-next.vercel.app/> 17:32

Your Sheep: ATU is back up. View Location: <https://lo-ra-wan-lamb-link-next.vercel.app/> 17:42

Message

Technologies

- **LoRaWAN** to send data in an energy efficient manner.
- **C** to programme the LoRaWAN node.
- **Next.js** to develop the frontend.
- **Node.js** to execute frontend code.
- **Java** to develop Spring Boot backend.
- **AWS** to host the backend.
- **Vercel** to host the frontend.
- **MongoDB** for storing and retrieving sheep data.
- **Twilio** to send WhatsApp messages.

Features

- Complete LoRaWAN network.
- User-friendly frontend scaled for PC monitor and mobile phone screens.
- Sheep location and well-being tracking.
- WhatsApp messaging including link to animal location when a sheep in need of assistance is detected.