Lab 2 - Sapphire Sounds Requirements and Specifications

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1 Introduction

This Software Requirements Specification (SRS) provides an overview of the Sapphire Sounds noise monitoring system. The introduction of this document outlines the purpose, scope, references and overview of this document. It also defines any necessary definitions, acronyms or abbreviations.

1.1 Purpose

The purpose of this Software Requirements Specification (SRS) document is to define the requirements and overall structure of the Sapphire Sounds application. This document serves as a reference for developers, testers, and stakeholders by describing the intended functionality, behavior, and interfaces of the system.

1.2 Scope

Sapphire Sounds is a web-based desktop and mobile platform designed to monitor noise levels in multi-unit residential properties using decibel sensors. Its goal is to provide objective evidence for resolving tenant noise complaints while maintaining user privacy. The system collects decibel data (without recording audio), generates timestamped reports for property managers, and notifies tenants when their noise exceeds established thresholds. Noise compliance will be incentivized via a rewards system within the system.

1.3 Definitions, Acronyms, and Abbreviations

- **dB (Decibel):** A unit to measure the intensity of sounds.
- **Noise Event:** An occurrence when decibel thresholds are reached for a specific duration. Used for reporting.
- **Noise Sensor:** A physical device that monitors sound levels without recording audio.
- **Report:** A structured report generated by the system, detailing the noise event.
- **Threshold:** A predefined decibel level, which if exceeded, will trigger a noise event.
- **Tenant:** A resident or occupant of a shared or multi-unit housing space using the system to manage and monitor noise activity.

1.4 References

American Public Health Association. (2021, October 25). Noise as a public health hazard. https://www.apha.org/policy-and-advocacy/public-health-policy-briefs/policy-database/2022/01/07/noise-as-a-public-health-hazard

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1.5 Overview

The remainder of this SRS document provides a detailed description of the Sapphire Sounds system. Section 2 describes the overall product perspective, functionality, user characteristics, constraints, assumptions and dependencies.

2 Overall Description

This section provides a high-level overview of the Sapphire Sounds noise monitoring system. This includes the Product Perspective, Product Functions, User Characteristics, Constraints, Assumptions and Dependencies.

2.1 Product Perspective

Sapphire sounds is a web application consisting of both an application layer and a hardware layer. The application layer consists of a React.js frontend, a Node.js backend and a Postgres database. The hardware components consist of a Raspberry Pi Zero W with an integrated Wi-Fi chip to act as the central controller that collects and offloads decibel readings, as well as an I2C Decibel Sound Level Meter to measure the environmental noise levels. The basic architecture is described in Figure 1.

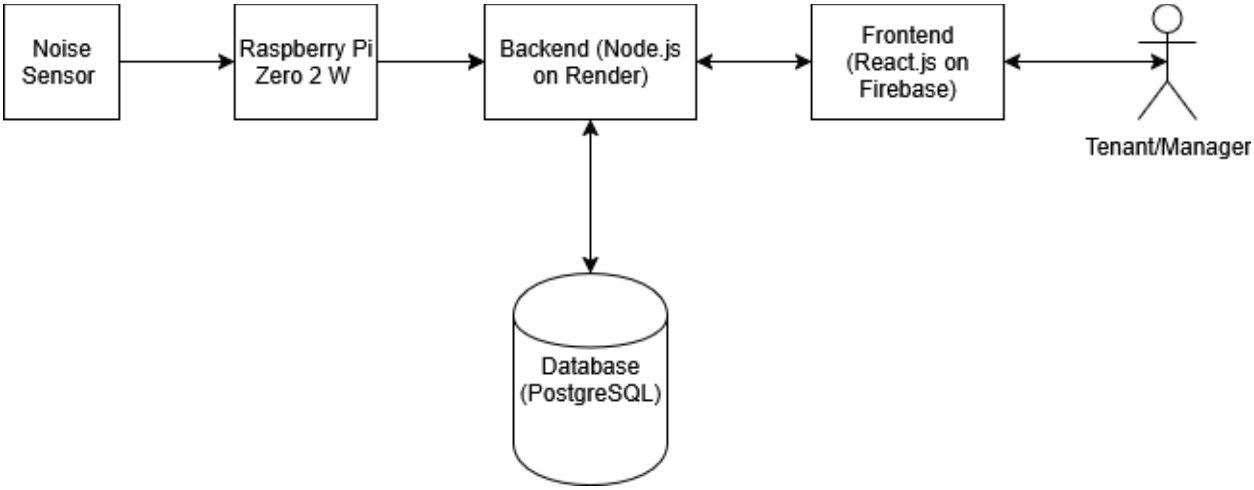

Figure 1: Sapphire Sounds Basic Architecture

2.2 Product Functions

The main functions of *Sapphire Sounds* include:

- **Noise Monitoring:** Sensors collect decibel readings continuously.
- **Threshold Detection:** The system identifies and logs events that exceed specified decibel levels.
- **Tenant Notifications:** Real-time alerts are sent to tenants when their noise levels surpass thresholds.
- **Reporting:** The system generates timestamped noise reports for property managers.
- **Rewards System:** Tenants are incentivized for maintaining consistent compliance with noise thresholds.
- **Privacy Protection:** No audio recordings are made; only decibel data is stored.

2.3 User Characteristics

The main user roles for Sapphire Sounds are Tenants and Property Managers.

- Tenants monitor their own noise levels via the mobile or desktop interface. They will receive alerts if there is a violation of compliance. They will also be able to see their potential rewards for maintaining compliance.
- Property Managers have access to reports of noise events. They are able to create rewards using the rewards system and also have the ability to edit properties and assign/remove tenants to those properties.

2.4 Constraints

N/A

2.5 Assumptions and Dependencies

N/A