Vision Documentation

Smart House

Revision History

Date	Version	Description	Author
08/02/26	1.0	Laying down foundation of the vision	Katerina Arvay, Dario Ostojic, Andre Sandblom

Product Overview- Server & Database Subsystem

1. System concept

1.1 Stakeholders

The primary stakeholders of the Server and Database subsystem are the development teams responsible for other Smart House components, including device controllers, user interfaces, and automation services. Additional stakeholders include system administrators and course instructors who evaluate the design and implementation. End users, such as homeowners, are indirect stakeholders who rely on this subsystem for stable and reliable system behavior.
This might change after first meeting with stakeholder.

1.2 Introduction

The Server and Database subsystem represents the core backend of the Smart House system. It functions as a centralized platform that enables communication, coordination, and data persistence for distributed smart house devices. The subsystem is designed to support an interactive house environment by managing system state and acting as a mediator between devices and higher-level services.

2. System Purpose and Responsibilities

The main purpose of the Server and Database subsystem is to provide a dependable backbone for the Smart House system. Its responsibilities include coordinating interactions between components, maintaining consistent system state, and ensuring that data is persistently stored and retrievable. By centralizing these responsibilities, the subsystem reduces complexity in individual devices and improves overall system maintainability.

2.1 API-based Coordination

The Server and Database subsystem exposes a set of well-defined service interfaces that allow communicating units and simulated devices to authenticate users, register devices and control or observe house functionality. The server acts as the single source of truth for the house state, ensuring that all clients and devices see the same, up-to-date information. All interactions with house devices - such as switching lights, activating alarms, or retrieving sensor values - are routed through the server, which validates commands and enforces access rules to prevent conflicting updates and unauthorized actions.

3. Technical Overview

The Server and Database subsystem is designed as a backend service that operates continuously within the smart house environment. It is responsible for handling concurrent communication with multiple components and managing structured system data.

3.1 General Characteristics

* Centralized coordination of smart house components
* Persistent storage of device states, configurations, and system data
* Support for concurrent interactions from multiple devices and services
* Designed for extensibility as new devices are added

* Exposes a centralized API for authentication, device control and state observation

3.2 Normal Operation Mode

During normal operation, the server receives requests and events from connected components, processes them, and updates the system state accordingly. Device states and relevant events are stored in the database to ensure consistency across the system. This mode represents the standard operational behavior of the Smart House system.

3.3 Fault and Recovery Handling

The subsystem is designed to handle temporary device disconnects and server restarts without loss of critical system data. Stored data enables the system to recover its last known state and continue operation when normal conditions are restored.

4. Basic Requirements

This subsystem must support reliable communication, persistent data storage, and coordinated interaction between smart house components. A detailed list of functional and supplementary requirements is specified in the corresponding requirements documents.