HOMEplus Smart Home System

**Product Plan**

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Table of Contents

[**Introduction**](#_5gmrje1mf94i) **4**

[Purpose](#_caedcv7iyqtx) 4

[Definitions, Acronyms and Abbreviations](#_ej8pygn8c55v) 4

[References](#_3znysh7) 4

[**Product Plan Overview**](#_11xyh3u38sdg) **4**

[Product Description](#_vxfx10iizyk7) 4

[Product Constraints/Boundaries](#_sb4v3kfaqwzl) 4

[**Implementation Outline**](#_59nlj2dynfov) **4**

[Features Matrix](#_xl36li6n19rh) 4

[Requirements Prioritization Matrix](#_gtug5mr2yez) 5

[Tools and COTS/FLOSS Software](#_yhioi39ng9nc) 9

[Required Effort Estimate](#_y56de9ntqxbg) 9

[Development Schedule Estimate](#_z3ku2e4hy0l8) 9

[Project Cost Estimate](#_b9bie9d1zrbj) 10

[End-User Hardware Expected Costs](#_oo2llhjwcxt) 10

[Possible Risks](#_4g0h0bkkv1y6) 10

# Introduction

## 

## Purpose

The purpose of this document is to develop a long-term plan for the development of the HOMEplus smart home system. This document should be used in conjunction with the Vision Document and the SRS Use Case Specifications.

## Definitions, Acronyms and Abbreviations

* CI – Continuous Integration
* hub - Main processing unit for the HOMEplus smart home system

## References

To gain a better understanding of the project, view the Vision document and the SRS.

# Product Plan Overview

## 

## Product Description

The HOMEplus smart home system is designed to add a high level of convenience to the user’s life. The system will accomplish this by utilizing a HOMEplus hub that will have the functionality to interact with smart features throughout the home including: lighting, temperature, outlets, locks and home inventory. Utilizing these features, a user will be able to have a more energy efficient and convenient lifestyle. These systems will also be remotely accessible through web and mobile applications.

## Product Constraints/Boundaries

* HOMEplus will only provide the user with convenience and is not designed to be used as a home security system.
* HOMEplus will only be as convenient a product as the amount of hardware that is interfaced with the system. The more hardware installed, the more convenient the home experience.

# Implementation Outline

## 

## Features Matrix

The following table lists features from most important to least

|  |  |  |
| --- | --- | --- |
| ID | Name | Description |
| FET-1 | HOMEplus hub | This will be the main control for the smart home system. It will be a hardware device the size of an average tablet that will be able to be freestanding but also has a wall mounted home port in the home. This will be where a user sets all preferences including lighting for vacation, power saving and daily use, temperature, and voice shortcuts. The HOMEplus hub will be the main processing unit in charge of learning and adapting to user preferences. It will also be the main line of communication to the server. |
| FET-2 | Web/Mobile Application | The web/mobile applications will have similar functionality as the HOMEplus hub, but remotely. It will not have the processing requirements as that of the hub. |
| FET-3 | Temperature Control | Temperature preferences and modification will be able to be made at the main hub as well as through the web/mobile apps. |
| FET-4 | Light Functionality | Lights can dim/brighten according to user preferences including: lights on when user movement detected, lights off when no movement detected, sleep mode, vacation mode. Lights will be wifi (via the hub or web/mobile app) and voice enabled. |
| FET-5 | Smart Lock System | The smart lock system will consist of wifi enabled deadbolt locks on all exterior doors including any garage, shed and barn doors. All locks will have code unlock functionality along with voice recognition. The smart lock will log times that users come and go and communicate with the HOMEplus hub to manipulate the home temperature in preparation for a user coming home. |
| FET-6 | Smart Outlets | Smart outlets will allow the user to access outlets throughout the house via wifi (through main hub or web/mobile app) and voice activation. These will also be affected by power saving mode as well as vacation mode. Outlets will be able to be given shortcuts/nicknames for quick activation. |
| FET-7 | Voice Activated Speakers | Speakers, both hardlined into the home and standalone, will have the ability to hear voice command and output sound as well. |
| FET-8 | Main Entry Door Motion Camera | A main entry door motion camera will be tied in with a doorbell to stream to application to monitor deliveries/uninvited guests. |

## 

## Requirements Prioritization Matrix

The following table prioritizes the requirements in order according to business value, effort, and volatility.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **Name** | **Volatility** | **Priority** | **Effort** | **Business Value** |
| **HOMEplus hub:** | |  |  |  |  |
| R1 | Login Authentication | 15% | High | Med | High |
| R1.1 | The system will require that a user enters their login credentials before gaining access to system controls or settings. | 10% | High | Med | High |
| R1.1.1 | If a user enters incorrect login details, an error message will be displayed on the login page. | 0% | High | Low | High |
| R1.1.2 | If the user properly authenticates to the system, they will be directed to the main menu screen. | 0% | High | Low | High |
|  |  |  |  |  |  |
| R2 | Manage Smart Devices | 75% | High | High | High |
| R2.1 | The user will be able to select specific smart devices to control and manage device settings. | 65% | High | High | High |
| R2.2 | The hub will have the capability to interface with Smart Devices. | 65% | High | High | High |
| R2.2.1 | The HUB will send commands and updates to smart devices. | 65% | High | High | High |
| R2.2.2 | The HUB will receive status updates from smart devices. | 45% | High | Med | High |
|  |  |  |  |  |  |
| R2.3 | The hub will be able to interface with the server. | 65% | High | High | High |
| R2.3.1 | The HUB shall be able to receive commands and updates from the server. | 65% | High | High | High |
| R2.3.2 | The HUB shall update the server with any changes made by the user or alerts from devices. | 45% | High | Med | High |
|  |  |  |  |  |  |
| **Web/Mobile Application:** | |  |  |  |  |
| R1 | Login Authentication | 15% | High | Med | High |
| R1.1 | The system will require that a user enters their login credentials before gaining access to system controls or settings. | 10% | High | Med | High |
| R1.1.1 | If a user enters incorrect login details, an error message will be displayed on the login page. | 0% | High | Low | High |
| R1.1.2 | If the user properly authenticates to the system, they will be directed to the main menu screen. | 0% | High | Low | High |
|  |  |  |  |  |  |
| R2 | Manage Smart Devices | 75% | High | High | High |
| R2.1 | The user will be able to select specific smart devices to control and manage device settings. | 65% | High | High | High |
| R2.2 | The application will be able to interface with the HUB device or web server to relay commands. | 65% | High | High | High |
|  |  |  |  |  |  |
| R3 | Backend Server | 60% | High | Med | High |
| R3.1 | The server will be able to relay commands from the web or mobile application to the HUB device. | 50% | High | Med | High |
| R3.2 | The server will receive status updates from the HUB and relay them to the web/mobile application. | 60% | High | Med | High |
|  |  |  |  |  |  |
| **Temperature Control:** | |  |  |  |  |
| R1 | Remote Management | 20% | High | Low | High |
| R1.1 | The device shall receive commands for operation and control from the HUB. | 20% | High | Low | High |
| R1.2 | The device shall send status updates to the HUB. | 20% | High | Low | High |
|  |  |  |  |  |  |
| R2 | Temperature Control | 25% | High | Med | High |
| R2.1 | The device will be able to interface with commercial AC/Heater systems. | 20% | High | Med | High |
| R2.1.2 | The heating system and cooling system must not be able to be active at the same time. | 10% | High | Low | High |
| R2.2 | A user will be able to set temperature to a desired setting. | 25% | High | Med | High |
| R2.3 | The user can set a schedule for temperature settings to automatically adjust within increments of 30 minutes. | 25% | High | Med | High |
|  |  |  |  |  |  |
| **Light Functionality:** | |  |  |  |  |
| R1 | Remote Management | 10% | High | Low | High |
| R1.1 | The device shall receive commands for operation and control from the HUB. | 20% | High | Low | High |
| R1.2 | The device shall send status updates to the HUB. | 0% | High | Low | High |
|  |  |  |  |  |  |
| R2 | Light Control | 25% | High | High | High |
| R2.1 | The user can set zones for light management in order to turn all lights on/off in a room/zone. | 25% | High | High | High |
| R2.2 | The user can set a schedule for lights to automatically turn on/off within increments of 5 minutes. | 25% | High | High | High |
|  |  |  |  |  |  |
| **Smart Lock System:** | |  |  |  |  |
| R1 | Remote Management | 10% | High | Low | High |
| R1.1 | The device shall receive commands for operation and control from the HUB. | 20% | High | Low | High |
| R1.2 | The device shall send status updates to the HUB. | 0% | High | Low | High |
|  |  |  |  |  |  |
| R2 | Lock Control | 20% | High | Low | High |
| R2.1 | User can set a pin on the lock number pad in order to unlock the door. | 10% | High | Low | High |
| R2.2 | User can set a timer for the smart lock to automatically lock after an inactivity interval. | 20% | High | Med | High |
|  |  |  |  |  |  |
| **Smart Outlets:** | |  |  |  |  |
| R1 | Remote Management | 10% | High | Low | High |
| R1.1 | The device shall receive commands for operation and control from the HUB. | 20% | High | Low | High |
| R1.2 | The device shall send status updates to the HUB. | 0% | High | Low | High |
|  |  |  |  |  |  |
| R2 | Outlet Control | 20% | Med | Low | Med |
| R2.1 | The user can set zones for outlet management in order to turn all outlets on/off in a room/zone. | 10% | Med | Low | Med |
| R2.2 | The user can set a schedule for outlets to automatically turn on/off within increments of 5 minutes. | 20% | Med | Low | Med |
|  |  |  |  |  |  |
| **Voice Activated Speakers:** | |  |  |  |  |
| R1 | Remote Management | 10% | High | Low | High |
| R1.1 | The device shall receive commands for operation and control from the HUB. | 20% | High | Low | High |
| R1.2 | The device shall send status updates to the HUB. | 0% | High | Low | High |
|  |  |  |  |  |  |
| R2 | Speaker Control | 20% | High | High | High |
| R2.1 | The device will actively listen for voice commands. | 10% | High | High | High |
| R2.1.2 | The device will be able to identify user voices in order to activate upon specific keywords. | 20% | High | High | High |
|  |  |  |  |  |  |
| **Main Entry Door Motion Camera:** | |  |  |  |  |
| R1 | Remote Management | 10% | High | Low | High |
| R1.1 | The device shall receive commands for operation and control from the HUB. | 20% | High | Low | High |
| R1.2 | The device shall send status updates to the HUB. | 0% | High | Low | High |
|  |  |  |  |  |  |
| R2 | Camera Control | 20% | High | High | High |
| R2.1 | The camera shall have a motion sensor that detects when there is motion from an animal that is larger than a common house pet. | 10% | High | High | High |
| R2.1.1 | When there is motion detected, the device will send a notification to the HUB and turn its camera on for observation. | 20% | High | High | High |
| R2.2 | The device will be able to open a live stream with the HUB or user device for observation or recording. | 25% | High | High | High |

## Tools and COTS/FLOSS Software

* HOMEplus will be designed as a closed system and will not interface with existing smart home hardware.
* For testing purposes, the team will utilize Travis CI in order to streamline testing procedures.

## Required Effort Estimate

* One team for oversight comprised of one stakeholder, one end-user, a team leader (responsible for team consistency and fixing roadblocks), a planner/scheduler, and a systems architect.
* Five teams for development each having five members:
  + IOS App Development
  + Android App Development
  + Web App Development
  + Back-End Server
  + Device Integration
* One team for testing to have three members to include one team leader and two testers to ensure that all exceptions are handled, code coverage meets standards, and unit tests are completed. Most testing will be accomplished using continuous integration requiring that test cases are written by the developers at time of development.

## Development Schedule Estimate

Eight months for the back end server team and the device integration team to have the system running, three months for the app and website development, and one month for testing.

|  |  |  |
| --- | --- | --- |
| Item | Sprints (2 weeks) | Hours |
| Back end server and device integration | 16 | 1280 |
| App development | 6 | 480 |
| Testing | 2 | 160 |
| Total | 24 | 1920 |

## 

## Project Cost Estimate

All costs were compiled through google research of current market pricing for similar designs.

|  |  |
| --- | --- |
| Item | Cost |
| iOS app development | $200,000 |
| Android app development | $200,000 |
| Website development | $300,000 |
| Back end server development | $500,000 |
| Device integration | $500,000 |
| Total | $1,700,000 |

## End-User Hardware Expected Costs

All costs were compiled with current market competition in mind.

|  |  |
| --- | --- |
| Item | Cost |
| Hub | $350 |
| Plug | $20 |
| Light | $20 |
| Lock | $200 |
| Speaker (standalone) | $100 |
| Speaker (hardwired) | $150 |
| Video Doorbell | $200 |

## 

## Possible Risks

* Individual team setbacks/delays could result in the delay of the final system roll out.
* End-user cost for whole home system could be too high for the sake of convenience.
* The inability of our system to be able to interface with existing smart home hardware and software might deter customers from purchasing the system because they would have to purchase all new hardware.
* Another company releasing a similar product before ours.