Home Automation Platform Client Extension System

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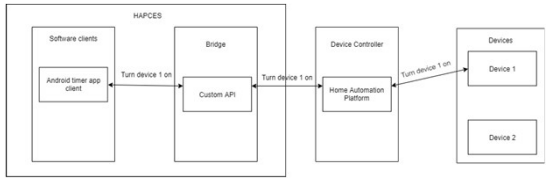
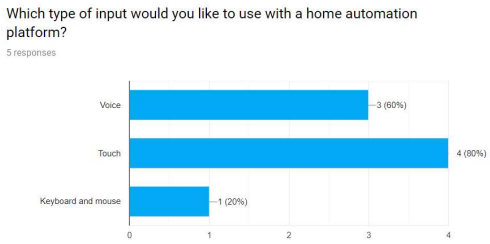
Introduction

- Low-cost system
- Aims to address the limited variety of applications currently offered by Home Automation Platforms such as Amazon Alexa
- Provides CCB API to separate applications from automation platforms and demonstrates increasing application variety via its Timer App that provides timed-control of smart plugs for the openHAB platform



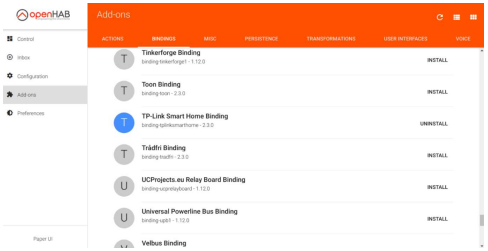
Background

- Limited variety of applications for Home Automation Platforms reoccurred during literature review of consumer and research platforms
- User research revealed user preferences and common platform interaction types differed, justifying the necessity of interaction software variety



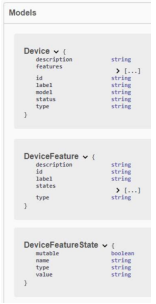
Chosen Platform

- openHAB was chosen based on research
- Low-cost
- Provided a REST API, allowing integration with HAPCES
- Extensive flexibility, supporting most application input and communication types
- Smart plugs were chosen due to interest in in timed-control of wired devices



CCB API

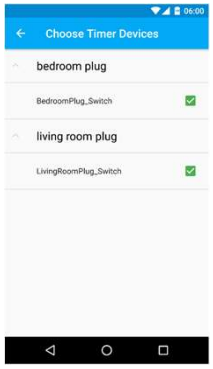
- Cloud-hosted CCB (Client Controller Bridge) REST API
- Integrates with the openHAB platform to endpoints and resources to inspect or control smart plugs
- API resource designs based on other platforms including openHAB and Samsung SmartThings



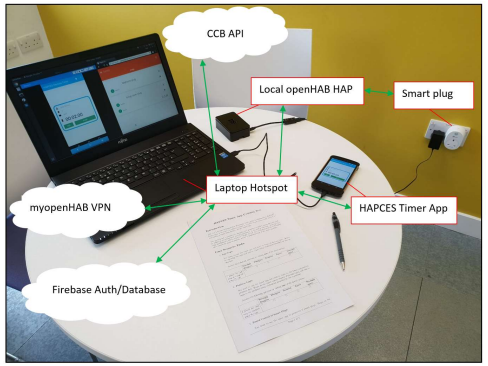
- Endpoints design supports Timer App requirements
- Endpoints were made, validated, and tested with Python
- Automatically generated interactive documentation
- Additional platforms can be supported via new adapter

Timer App

- Java/Kotlin Android app for openHAB
- Timed control of smart plugs via CCB API
- Customisable timer
- Link and inspect smart devices
- Consistent, simple Material Design user interface
- User accounts via Firebase Auth
- Timer cloud storage via Firebase database
- Informative error handling
- Can be tested with real or mock data



- Usability testing assessed user interaction
- Involved tasks focusing on Timer App features



- System Usability Scale assessed each user's opinion of the system
- Above average usability score (79/100)

Conclusion

- Achieved aims to successfully increase application variety for openHAB platform
- Developed low-cost interactive documentation, command-line tool, and the Timer App
- Demonstrated above average usability
- Established rudimentary foundations for future development (e.g., supporting other platforms)