

Indiana University - Purdue University Fort Wayne
Opus: Research & Creativity at IPFW

Computer and Electrical Engineering Technology &
Information Systems and Technology Senior Design
Projects

School of Engineering, Technology and Computer
Science Design Projects

4-20-2017

Smart Home Control Panel

Brett Carusillo

Indiana University - Purdue University Fort Wayne

Follow this and additional works at: http://opus.ipfw.edu/etcs_seniorproj



Part of the [Computer Sciences Commons](#), and the [Engineering Commons](#)

Opus Citation

Brett Carusillo (2017). Smart Home Control Panel.
http://opus.ipfw.edu/etcs_seniorproj/980

This Senior Design Project is brought to you for free and open access by the School of Engineering, Technology and Computer Science Design Projects at Opus: Research & Creativity at IPFW. It has been accepted for inclusion in Computer and Electrical Engineering Technology & Information Systems and Technology Senior Design Projects by an authorized administrator of Opus: Research & Creativity at IPFW. For more information, please contact admin@lib.ipfw.edu.

Smart Home Control Panel

Final Project Report

4/20/17

Brett Carusillo

Professor Paul Lin

Submitted to:

Michelle Parker, Professor ITC 481 Senior Design II

Department of Computer, Electrical and Information Technology

College of Engineering, Technology, and Computer Science

Indiana University-Purdue University Fort Wayne, Indiana

ACKNOWLEDGEMENT

I would like to thank my academic advisor Professor Michelle Parker for her time and help with the project management aspects involved. I would also like to thank my project advisor Professor Paul Lin for his assistance and for making himself available for questions.

ABSTRACT

I will be creating and hosting a web page that interfaces with Insteon Hub smart-home equipment to allow for any device connected to my local area network to manage the plug-in appliances. A bonus function will allow for the webpage to control a VLC media player process on my PC. I will be setting up a web server via XAMPP that is hosted locally on my local area network and I will be purchasing and installing the 4 pieces of required Insteon hardware. I will be working alone on this project continuously until its spring completion in 2017.

The brand of smart home equipment selected was Insteon due to its affordability and its inclusion of a RESTful API. The software chosen to serve as the music controller was VLC media player due to it being free, its ability to function with a web interface, and its RESTful api. The webserver will be run using XAMPP, a free and open source web server stack. The use of Ajax requests will allow the webpage to communicate with the server side scripts behind the scenes. This project took place across 2 semesters. The first semester was primarily the planning phase while the second semester was the development phase.

Keywords: Ajax, RESTful API

TABLE OF CONTENTS

EXECUTIVE SUMMARY	5
PROJECT INTRODUCTION	5
Problem Topic	5
Background	5
System Requirements	6
Primary Purpose	6
Overview	6
PROJECT DESIGN OVERVIEW AND RESEARCH	7
Feasibility	7
Design Process	7
Legal Aspect	8
System Scope	8
HARDWARE	9
SOFTWARE	10
UNIT TESTING AND SYSTEM INTEGRATION	11
PROJECT MANAGEMENT	11
Resource and Cost Management	13
Risk Management	13
ISSUE LOG & LESSONS LEARNED	15
Issue Table with Resolutions	15
CONCLUSION	16
REFERENCES	17
APPENDICES	18
Keywords	18
Network Theory Diagram	19
Configure Xampp	20
Install Insteon Hardware	20
Create URL commands	23
Convert URL commands	24
Maintain Device Status	25
Download Bootstrap	25
Creating a Toggle Switch with State Detection	26
Ajax JavaScript Functions per Device	27

Create VLC interface	27
VLC Ajax Javascript Functions	28
Configure VLC for web interface	29
Write URL commands for VLC	29
Convert VLC URL to PhP	29
Implementing the sidebar tabs	29
Home.php	31
JavaScripts	40
Insteon Device PhP Scripts	47
MainLight ON MLO.php:	47
MainLight OFF(Not) MLN.php	48
BedLight On BLO.php	49
BedLight OFF(Not) BLN.php	50
BoxFan On BFO.php	51
BoxFan Off(Not) BFN.php	51
VLC PhP Scripts	53
Previous.php	53
Pause.php	53
Next.php	53
Shuffle.php	54
Volume Down interval 30 VolDown.php	54
Volume Up Interval 30 VolUp.php	55
Css Changes	55
Bootstrap2.css	63

TABLE OF FIGURES

Figure 1: As viewed on Mozilla Firefox (PC)	7
Figure 2: As viewed on mobile	8
Figure 3: Insteon Smart Hub	9
Figure 4: Insteon On/Off Module	9
Figure 5: Insteon Connectivity Diagram	9
Figure 6: Project Gantt Chart	12
Figure 7: Risk Assessment	14
Figure 8: How AJAX Works	18
Figure 9: Network Theory Diagram	19