

EE / CprE / SE 491 – sddec20-05

An Advanced Networking Outreach Activity for Kids

Bi-Weekly Report #3

2/17/2020 – 3/1/2020

Client & Faculty Advisor: Dr. Tom Daniels

Team Members

Grayson Cox | UI Developer | Agile Project Manager

Austin Dvorak | Network Systems Manager

Ryan Newell | System Admin

Spencer Parry | UI Developer

Ross Thedens | Hardware Systems Manager | Meeting Secretary

Reporting Period Summary

In this reporting period, we formed a clear definition of the scope of the project and its requirements. By completing sections 1 and 2 of the design document, we clarified the project purpose and determined the functions required in our ad-hoc network and Control/UI program. We also started work on our first proof of concept prototype. We created a bill of materials to obtain the hardware for this effort. We also began setting up our development environment in Gitlab in preparation for the prototyping and our eventual project implementation. We are ready to establish an initial task breakdown and schedule for the project, as well as develop/determine the software configuration for our prototype (once the hardware is ordered early next week).

Reporting Period Accomplishments

- GitLab Repository & Development Process Artifacts Setup (Grayson)
 - Create 'develop' branch and set branch permissions to ensure all production code goes through merge requests before being merged (i.e., disallow pushing directly to 'develop' or 'master').
 - Add 'team::' Labels to denote scope of an Issue.
 - team::Frontend
 - team::Backend
 - team:: Network
 - team::Report
 - Add 'status::' Labels to monitor the lifecycle of Issues.
 - status::InProgress

- status::InReview
 - status::Blocked
 - Add sprints as Milestones in GitLab with which Issues can be associated.
 - Begin writing Wiki pages
 - There will be a Git Workflow guide so that we have a written record of our development process.
 - There will also be an Issues guide that shows how we write and format our GitLab Issues.
 - Add project logo
- Python Socket Evaluation (Ross)
 - Became reoriented with python syntax
 - Wrote python code to establish a UDP socket on a Raspberry Pi
 - Tested sending messages between server and client
 - Tested functionality for command parsing using regular expressions in python
 - Parsed messages with special indicators to trigger different function calls on the server, including shell commands. This will be used to get temperature and sensor data
- Design Diagrams (Ross)
 - Drew two design diagrams for v1 of the Design Document
 - Conceptual sketch of project in use
 - Divides project into two domains: UI/Control Program Domain and Ad-Hoc Network Domain
 - Represents each configuration of forward node (with/without sensors, camera)
 - Structural sketch of project modules
 - Represents the software stack on forward nodes, network master node, and instructor laptop
- Bill of Materials (Austin, Ryan, & Ross)
 - Our first BOM is intended to get the basic hardware needed to begin work on different aspects of the project.
 - This will not be the only BOM that is made during this project.
 - The BOM includes 4x Raspberry Pi 4 and a Raspberry Pi Camera Module. With this, we will be able to start working on interfacing the camera with our web interface and getting the ad-hoc networking capabilities working.
 - This BOM does not include materials for making the nodes rechargeable and wireless or cases and any other materials needed. These will be included in later BOMs.
- Design Document V1 (All)
 - All members contributed to the write ups for each section in the design document

Pending Issues

- Determine video/sensor feasibility in routing distributions considering incompatibility of Raspberry Pi camera module (Ross)
 - First, retry using a raspberry pi camera module (the one tested before was broken)
 - Find out what video/sensor options are supported in OpenWrt and IPFire (USB webcams, etc.)
 - After researching, procure several of these options for testing; use this information when making a final hardware/OS choice so that video and sensor data collection does not become a major roadblock

Individual Contributions

Team Member	Contribution	Reporting Period Hours	Total Hours
Grayson Cox	Plan out our development process for the design document, set up GitLab repository and Agile artifacts, coordinate meetings to work on design document, briefly look into options for hosting our web server on a Raspberry Pi, and continue familiarizing myself with Angular/Typescript.	12	36
Austin Dvorak	Got networking working fully on raspberry pi. Can connect nodes to raspberry pi with security and internet connection. Learned more about networking configuration in linux	12	36
Ryan Newell	Researched hardware requirements and created a Bill of Materials	12	36
Spencer Parry	Worked on the design document, met with the team to discuss the design documents and technologies we are going to work with, and did some more playing around with Angular and Typescript	12	36
Ross Thedens	Worked on design document text, two major design diagrams for design document, exploration of socket programming in python, bill of materials assistance	12	36

Plans for Next Period

- Bill of Materials (Ross, Ryan, Austin)
 - Revise and submit for approval/order
- Repository & Development Process (Grayson)
 - Decide on a standard for creating GitLab Issues.
 - User stories
 - Verification criteria
 - Update Wiki pages.
- Raspberry Pi Web Server Hosting (Grayson & Spencer)
 - Analyze options for hosting the UI on a Raspberry Pi.
 - NodeJS
 - Apache
- Raspberry Pi Python Programming (Ross)
 - Try video streaming between (at least) two python programs over a UDP socket
 - View final result with VLC to validate results
 - Test reading data from GPIO sources (buttons for now) in preparation for dealing with temperature/other sensors
- Connect /etc/config folder to git (Austin)
 - Use etckeeper to connect configuration files to git for easy deploy
- Design Document sections 3 and 4 (All)
 - Break down clear project milestones
 - Determine a tentative implementation schedule