EE/CprE/SE 491 - Weekly Report 2

Dates: February 9 - 15, 2019

CyWi: Open-Source Wireless Innovation Lab for Smart Ag, AR/VR, and Beyond

Team Number: sddec19-02
Client: Professor HongWei Zhang
Faculty Advisor: Professor HongWei Zhang

Team Members

Chenye Lim
Jian Chew
Pawel Darowski
Ryan Cullinan
Shay Willems
Tyler Beder

Weekly Summary

The team continued to research existing testbeds for a better understanding of this project's goals. University of Utah's POWDER project is similar to our CyWi testbed and will serve as an example. GENI is a much larger virtual lab that also demonstrates how testbeds work: a researcher creates a Slice, checks out the resources they require, and runs experiments remotely. The CyWi testbed will function like these two existing projects. Certain project tasks were identified such as building a UI for researchers, scheduling software for resources, control software for wireless devices, and reporting software for experiment data collection/storage. The team also continued to research SDR and IoT-type devices so the client can get them ordered soon. In the coming few weeks, we'll be in a position to specialize on certain tasks but for now everyone is still conducting core research.

Week 2 Accomplishments

- Everyone - Identified tasks for a rough project roadmap
    - Acquire hardware, determine open-source software platforms, build physical testbed, create user interface for researchers, write resource scheduler, implement control software for wireless devices, create database for experiment collection/reporting, run experiments on the testbed.
- Everyone - Researched POWDER and GENI projects to get familiarized with testbeds
- Jian - Signed up on POWDER for testbed demonstration
    - Currently waiting for approval from the admin.
- Everyone - Researched SDR hardware
    - Ettus USRP X310 supports open-source the open-source RFNoC software package which integrate with GNU Radio to allow for FPGA programming. A host device (such as an Intel NUC8) will create data for the X310 for filtering, processing, and transmitting

wireless signals. The X310 is expensive but seems to be the client's top SDR choice to allow researchers more flexibility.

- Everyone - Researched IoT hardware
    - Texas Instruments CC26x2R is an affordable development kit that supports multiple wireless technologies such as Wi-Fi, Bluetooth Low Energy, Thread, Sub-1 GHz, and Zigbee. Many of these are used to day for IoT and WSN. The client seems to favor the CC26x2R over other similar affordable development kits.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Chenye Lim	Researched testbeds and hardware/software.	3	9
Jian Chew	Tried to run experiment on testbeds.	4	10
Pawel Darowski	Researched testbed projects, SDR/IoT hardware, and open-source software options.	6	12
Ryan Cullinan	Researched other testbed, worked on rough road map for our project.	3	9
Shay Willems	Researched the Phoenix and Orbit test beds and added goals that we needed to accomplish to the road map.	3	9
Tyler Beder	Researched testbeds, figuring out what kind of software is tested on them.	3	9

Plan for Coming Week

- Everyone - Run experiment on testbed like POWDER and ORBIT
    - To have a better understanding on what the user interface should look like.
- Everyone - Finalize a project roadmap and have the client sign off on it