EE / CprE / SE 492 – sddec20-05

An Advanced Networking Outreach Activity for Kids

Bi-Weekly Report #6
10/27/2020 – 11/09/2020
Client & Faculty Advisor: Dr. Tom Daniels

Team Members

Grayson Cox | UI Developer | Agile Project Manager
Austin Dvorak | Network Systems Manager
Malcolm Johnson
Ryan Newell | Hardware Systems Admin
Spencer Parry | UI Developer
Ross Thedens | Communication Systems Manager

Reporting Period Summary

In this period, we accelerated our integration efforts, made implementation changes to the user application and backend application, and began our final documentation efforts. We ran into a critical roadblock when trying to connect to the mesh network from an outside device. The issue stems from the bridge between the network interfaces on the network master node. In the meantime, we improved the video component of the user application and fully implemented the backend application with a suite of unit tests. At the same time, we began filling out our repository's wiki with deployment/implementation information about the project that will be useful to a future team. We are also still trying to get information about the camera module that may have never arrived at ETG. Next week, we will try to make as much progress as we can in resolving the network issue while focusing on the final report and other deliverables for the conclusion of the semester.

Reporting Period Accomplishments

- Figured out a way to get temperature from the internal Pi temperature sensor instead of buying external sensors (Ryan).
- Test Video Streaming in Mesh Network (Grayson, Austin, Ross)
  - Performed/assisted with network setup and preparing nodes with Docker containers
  - Found that nodes inside the mesh network can connect to the video stream

- - ■ Can't actually display the video stream on a node due to Raspberry Pi OS browser incompatibility.
      - ■ Difficulties occurred with networking when desktop versions of Raspberry Pi OS were used
    - ○ Discovered connectivity issues when trying to connect to stream with a laptop connected to the network master node (i.e. the way an instructor station would be connected)
      - ■ Connection to the user application was successful, but the stream reports a CORS error
      - ■ Connectivity issues were determined to occur due to a problem with how batman-adv interacts with the bridge between the network master node's instructor station interface and its mesh network interface
        - ● It may turn out this is a bug in the implementation of batman-adv
- ● Fully implement LiveVideoPlayerComponent (Grayson)
  - ○ Refactor the Angular component.
  - ○ Fix its usage so that it no longer uses a hard-coded IP address for the video stream.
- ● Fully implement BackendApplication (Grayson)
  - ○ Implement all code that makes BackendApplication interact with the mesh network (we still need to test the integration with the actual network, but all the code is written).
  - ○ Re-design the individual node API to simplify the methods.
    - ■ There are now two methods: getNode and updateNode.
  - ○ Add unit tests.
    - ■ We now have 100% test coverage in BackendApplication.
- ● Reorganize Project Repository (Grayson, Austin, Ross)
  - ○ Organize code into NodeCommon (containing node REST API and networking configuration, NetworkMasterNode (containing BackendApplication and UserApplication), CameraNode (containing video stream Docker image)
  - ○ Create "build.sh" and "start.sh" scripts to make running the project components easier
- ● Write CameraNode Documentation (Ross)
  - ○ Provide all necessary instructions for running the camera node Docker container on an unconfigured Raspberry Pi
  - ○ Provide background details on the streaming options used and what each command/option does
  - ○ Provide background on how camera stream is displayed in the browser via the user application
  - ○ Provide links to external references that provide additional information on the commands/software packages used
- ● Website Updates (Ross)
  - ○ Create space for final documents, selected Wiki pages
  - ○ Update project description text

Pending Issues

- Testing BackendApplication (Grayson)
  - BackendApplication is fully implemented in a feature branch, but we cannot test it until we fix issues with Batman (Austin's domain).
- Mesh Network Bridge Problem (Austin)
  - The bridge between the instructor station interface and the mesh network interface on the network master node is causing connectivity issues
  - There is a chance this will not be resolved in the next week, as well as a chance that it is a bug in batman-adv
- Still trying to make contact with Leland Harker from ETG about missing camera module (Ryan)

Individual Contributions

Team Member	Contribution	Reporting Period Hours	Total Hours
Grayson Cox	- Complete all BackendApplication code that interacts with the network. (Still awaiting testing) - Add a complete set of unit tests for all BackendApplication code. - Beginning writing component documentation for UserApplication and BackendApplication. - Assist in testing the mesh network with video streaming. - Update the LiveVideoPlayerComponent in UserApplication to no longer use a hard-coded IP address for the camera node. - Review merge requests.	18	92
Austin Dvorak	- Met with Dr. Daniels to work on integration of networks and camera/user application - Started debugging issues with external computer connecting to mesh network	16	82

Malcolm Johnson	● Began design of poster first draft	12	48
Ryan Newell	● Researched getting temperature from sensors	12	72
Spencer Parry	● Begin work on customizable node properties	12	76
Ross Thedens	● Write complete documentation for CameraNode implementation and deployment ● Assist in testing the mesh network with video streaming ● Update website with new text and document links ● Assist in LiveVideoPlayerComponent updates ● Assist in reorganizing repository, including start/build scripts ● Review merge requests	16	82

Plans for Final Week

- Track down where the camera went from ETG and get one ordered if they don't have it. (Ryan)
- Attempt to fix mesh network bridge issue (Austin)
- Finish Documentation
  - UserApplication design and deployment (Grayson & Spencer)
- Revise Design Document for Final Report (Ross, All)
  - Revise all previous sections to indicate what parts are not implemented but were originally planned
    - Update diagrams accordingly
  - Indicate how actual schedule differs from original plan
  - Revamp testing section with unit testing from backend application, manual testing of parts performed in integration efforts
  - Write Operational Manual section detailing how to deploy the project in its current state
- Finalize Poster (Malcolm, All)
- Plan and Compile IRP Presentation Slides (All)