

CPR E / SE 492 BIWEEKLY STATUS REPORT 4

March 1 - March 15

Senior Design Team 15

Debugger and Visualizer for a Shared Sense of Time
on Batteryless Sensor Networks

Client/Advisor

Dr. Henry Duwe

Team Members

Adam Ford - Report Manager

Allan Juarez - Scribe

Maksym Nakonechnyy - Design Lead

Anthony Rosenhamer - Facilitator

Quentin Urbanowicz - Test Engineer

Riley Thoma - Project Manager

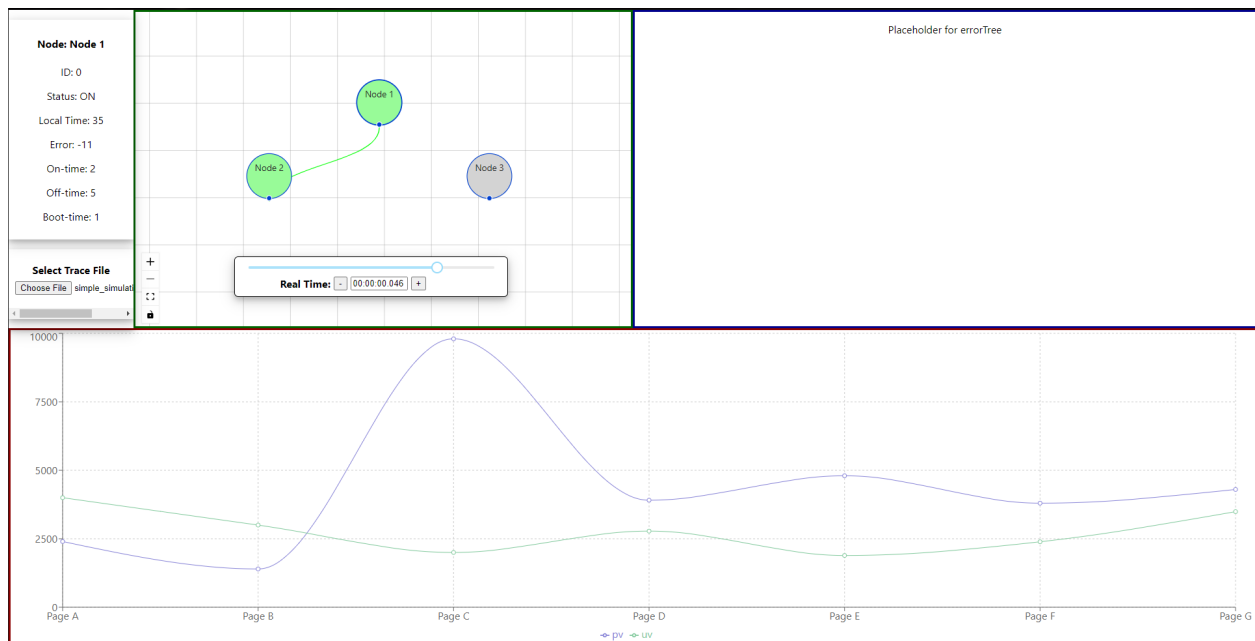
Biweekly Summary

Overall, we are continuing to get full system integration complete. Progress has been made on the frontend to finish some of the network graph functionality for the UI and the requests to the backend. Frontend UI is being reworked to accommodate new graphs showing node error. The simulator has been updated to add system configuration details to the trace file, so the frontend and backend can better represent the system in the visualizer. The simulator has also been expanded to add communication interfacing and energy modeling for the nodes. The backend has been working on keeping our current progress updated to the new trace file format as well as creating data formats to be passed to the frontend. Setup has started on the consumption of the events to create the data format for the frontend.

Accomplishments from the Past Two Weeks

- Backend Team (Adam and Allan)
 - Defined data formats to be passed to the frontend, by better understanding frontend elements
 - Reworked trace file parsing to V2 of format
 - Started work on Event consumption to understand state of simulation at a given time
- Frontend Team (Maksym and Riley)
 - Real time input completely working with slider functionality.
 - Frontend UI changed to account for new graphs being added.
 - Finished writing requests to get configuration from the backend.
 - Started implementing the error tree graph, and tried solving an issue with the graphing library.

Updated UI:



- Simulator Team (Anthony and Quentin)
 - Implemented logic to add configuration details (e.g. simulation duration, number of nodes, etc.) to the trace file
 - Modified the communication protocol interfacing to handle different ways for nodes to communicate
 - Corrected logic with event ordering during the simulation
 - Modularized node energy/state model functionality for simpler modification

Trace File Version 2:

Version	Time Resolution	Duration
- 1 byte - Version number	- 1 byte - Minimum step size during the simulation - $10^{(\text{byte value})}$ ns	- 8 bytes - Simulation time (in terms of resolution)
Number of nodes	List of nodes	Simulation Events
- 1 byte - Number of nodes in the simulation	- Variable size - Lists properties for all nodes: <ul style="list-style-type: none">- Node ID (1 byte)- x-position (1 byte)- y-position (1 byte)- Number of neighbors (1 byte)- List of neighbor IDs (1 byte/neighbor)	- Events occurring during the simulation (same as the previous trace file version)

Pending Issues

The frontend team is facing an issue with the frontend library. We cannot create two different graphs on one page because the main graph is implemented as Singleton in the library that we are using. The library documentation suggests a fix for our problem, but that solution doesn't work as expected, either.

Individual Contributions

Name	Individual Contributions	New Hours	Total Hours
Adam Ford	Defined data formats with fronted team for data passing, especially taking time to understand the error trees. Began the consumption of the trace file events into the format of the frontend.	13	44
Allan Juarez	Took time to understand what to format and pass to the front end. Reworked the formatting in the backend for the V2.	12	43.5
Maksym Nakonechnyy	Finished implementing functionality to get all configuration from the backend. Worked on fixing some issues with how edges are displayed in the current graph. Started implementing the error tree panel but ran into the issue described above.	12	45
Anthony Rosenhamer	Added configuration details to the new trace file version Set up interfacing for the ways nodes communicate Fixed logic related to the ordering of simulation events	13	45
Quentin Urbanowicz	Continued refactoring, abstracting, and further modularizing node behavior logic for easier modification and implementation of custom behavior. Worked on a modularized energy model for simulating node power state Implemented changes to node API based on client input	12	42
Riley Thoma	Finished implementing slider real time input to adjust slider with bounds checking. Added increment and decrement buttons to the slider real time. Styled and structured frontend to support new graphs being implemented Researched new line graph library to use and decided on Regraphs	10	40

Plans for the Next Two Weeks

- Adam Ford - backend development
 - Work with Allan on Trace File consumption into serviceable data to the frontend
 - Possible API work, dependent on pace of work on consumption
 - Allan Juarez - backend development
 - Reformat the simulator event data that tells us information about nodes.
 - Start working on formatting data with Adam so that the data is usable and readable to the front end.
 - Maksym Nakonechnyy - frontend development
 - Resolve the issue with the error tree.
 - Figure out error tree graphing.
 - Implement requests to get network status at a specific time.
 - Implement requests for the error tree.
 - Anthony Rosenhamer - simulator development
 - Expand the node communication interface to handle different protocols
 - Add more handling to log configuration details in plain text
 - Quentin Urbanowicz - simulator development
 - Finish modularizing node state/energy model logic
 - Continue working on implementing time delay and random variation
 - Riley Thoma - frontend development
 - I will be implementing the new line graphing library, Regraphs, and getting the error accumulation graph working
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Summary of Advisor Meetings

3/5/20201 - Meeting with Duwe and Vishal

The simulator team met with Duwe and Vishal to discuss details of the node communication interface and the energy model for the nodes. We figured out how we could implement an energy model that supports different energy configurations (constants, random distributions, and real variation). We also showed the existing code and node communication logic to give our clients a better understanding of the code that they will interact with.

3/12/2021 - Meeting with Duwe and Vishal

Discussed what their requirements are for an error tree, helping to understand what each node and edge in the graph represents. This was to aid us in both graphing it on the frontend and producing the necessary data on the backend.

Additionally, some simulator specifics were discussed, including the clarification that communications are not parent-child, but bidirectional. Also, a delay is to be configurable for the communication between nodes.