EE/CprE/SE 491 WEEKLY REPORT 5

Due: 4/1/2025

Group number: sddec25-17

Project title: Grid-UI: Developing Advanced Web-Interactive Interfaces for GridAI Power Grid Management Software

Client &/Advisor: Gelli Ravikumar

Team Members__Role/Component:

- ***Nick McCullough*** _____ ***Team Manager / Map Box***
- ***Ponciano Ramirez*** _____ ***Dashboard / Widgets Designer***
- ***Ethan Messmer*** _____ ***Module Design / Market Dashboard***
- ***Yusef Harb*** _____ ***Record Keeper / Live Code Editor***
- ***Evan Sivets*** _____ ***Test Lead / SVG-Diagram Designer***
- ***Tristan Nono*** _____ ***Dashboard / Widgets Designer***

Weekly Summary

This week, the team set up our virtual machines and set up our initial development environment. Nick reviewed how the MapBox component works via the codebase and researched the technologies used. Ethan looked into the codebase to better understand the market dashboard, as well as researched the Mantine library. Ponciano reviewed the codebase and understood more about how the dashboard and widgets work on both the front-end and back-end. Tristan looked at the current state of the Widgets and planned out features that weren't in there so he could better understand what to work on. Yusef met with Peeysuh, discussed the roadmap of the code editor, and reviewed the code related to the code editor component. Evan went through the codebase of SVGs and saw how everything tied together and made sense of the graph icons and how they are translated to a working circuit.

Pending issues

- The GridAI backend was having issues. A fix is in progress by Professor Gelli and Peeyush.

Accomplishments/Contributions

Past week accomplishments

- **Nick McCullough:** Set up the VM. Reviewed the code base for Map Box-specific code files such as: MapContext.tsx, MapTypes.tsx, Timeline.tsx and ProgressControl.tsx. All of these files provide relevant information and tools for the current iteration of the Map Box, such as line and bus retrieval, exported interfaces that display MapBox information, time/date formats for a real-time and historical timeline, and the timeline slider functionality. Reviewed Deck.GL documentation and researched possible 3D elevation implementation for the Map Box (idea OK'd by Dr Gelli).
- **Ponciano Ramirez:** Went over the codebase handed to us and tried to understand better how the code works—specifically, going over the widgets and dashboard components on the front and back end. Lastly, went through setting up our environment.
- **Ethan Messmer:** Analyzed codebase and reviewed market dashboard-related files such as CapacityProgressCard.tsx, ChartCard.tsx, and StatCard.tsx to better understand Mantine and the parts of the market dashboard. Finally, started to set up the VM and looked into the Mantine documentation.
- **Yusef Harb:** Met with Peeyush to better understand how the code editor component is laid out and its current state. Set a roadmap for the components. Will implement a Conflict-Free Replicated Data Type (CRDT) to improve live-time collaboration. This structure allows multiple clients to be updated independently and concurrently without synchronization. Set up the development VM and took notes on important files relevant to the component and how the front end and back end are structured.
- **Evan Sivets:** Went through the codebase of SVG diagrams. Went through understanding each icon the graph uses and how that translates visually. Went through more of the graph components and how it is used towards the work that is being done, such as how it incorporates all the other working parts of the project. Looked through the backend and learned how it ties everything together.
- **Tristan Nono:** Met with Jesus to get the current progress of the widgets and dashboard components. Studied the codebase mainly for widgets and the dashboard to better understand how the code works and how components interact and function. Set up and used the virtual machine.

Individual contributions

NAME	Contributions	Weekly hrs	HOURS cumulative
Nick McCullough	Set up the VM and reviewed the codebase since we have access now, and reviewed Map Box-specific code files to gain a better understanding of how my component works. Looked into technologies and methodologies used for the current iteration.	5	25
Ponciano Ramirez	Went over the Dashboard and Widgets Components on both the front end and back end. Got a better understanding of how our code works and how it encompasses the stack we are using, specifically Firebase and Next.js	4	23
Ethan Messmer	Looked into the codebase relating to the market dashboard, adapting to and understanding Justin's current work and what future code will look like. Set up VM to get used to the Ubuntu environment	4	27
Yusef Harb	Set up a development VM and got familiar with the Linux environment. Looked through and took notes of the code editor component files. Met with Peeyush and established a initial roadmap for the code editor component. Established goals for upcoming weeks. Reviewed through TypeScript Docs.	5	24
Evan Sivets	Worked through the SVG codebase to get a better understanding of the project. Researched more into real-world use of SVG diagrams	3	21
Tristan Nono	Met with Jesus from 492 to see what would need to be worked on and gained advice. Gained access to the codebase and a virtual machine and reviewed the widgets and dashboard components.	5	16

Plans for the upcoming week

- **Nick McCullough**
  - Set up the codebase on my local computer to begin development on my own VM.
  - Continue researching Deck.GL, React MapGL, Dexie.js and IndexedDB, and Web Workers.
  - Will review and take notes on how these existing technologies above are currently working in our project and how they can be expanded to enhance the Map Box page of the project.
- **Ponciano Ramirez**
  - Start with some possible widgets to be implemented and bring up to Dr.Gelli and Rolf/Peeyush.
  - Look into how settings and bundles could be implemented since that was something that Jesus mentioned that we needed to build.
  - Make sure that the environment in the VM is entirely set if everything from Rolf and Peeyush is set up.
  - Run the code locally multiple times to understand how the components are working more.
- **Ethan Messmer**
  - Read more about market standards such as the FERC order 2222.
  - Finish setting up the VM.
  - Dive deeper into the backend relating to the Market dashboard.
  - Meet with Justin to keep learning about the work to do.
  - Look further into the Mantine documentation.
- **Yusef Harb**
  - Review how CRDT works and examples of applications it's used in.
  - Look into Y Socket IO (to assist in implementing CRDT).
  - Solidify understanding of typescript and review over the Monaco editor npm library.
  - Reach out to Peeyush with any concerns or questions about the codebase.
  - Look into setting up an SSH key into the VM.
- **Evan Sivets**
  - Meet with Skyler on SVGs and understand more on what will be done with them.
  - Look over more examples of how to use SVGs in the workplace and how i could use them for the project.
  - Work with the code and entirely run through everything to understand how everything works.
- **Tristan Nono**
  - Look into Apache charts.
  - Play with the application and understand how the widgets work on the app.
  - Draw inspiration from the ThingsBoard to see what widgets can be developed
  - Work on the time series chart widget.

Summary of weekly advisor meeting

Week 7 Notes 3/28

- Make a new Google account with team ID to give to Rolf for Firebase access
- Look into ShadCN and compare it to Mantine and determine which will be better
- Prepare to present a recommendation on whether GridAI should migrate to ShadCN
- Continue meeting with 492 team members and Peeyush to understand the objectives and scope
- Continue to document findings through the codebase and each component's action items
- Ensure the VM setup is fully operational

Archived Weekly Meeting Notes

Week 1 Notes 2/7

- Student and advisor introductions
- Went over the technologies and progress of GridAI thus far
- Grid AI backend is complete and runs on Go and Python
- Utilizes Deck.gl for managing a large number of nodes and lines
- Three layers are used in Deck.gl (IconsLayer, LineLayer, and HeatMapLayer)
- The professor emphasizes understanding the market through the next few weeks

Week 2 Notes 2/14

- The previous team members gave a presentation
- Gitlab files will be provided to the team in a few weeks
- Showed structure diagrams of how the backend and frontend are built and should be configured
- The professor gave lots of tips for this project:
    - Have branches for just one or two features
    - Use an issue board so everyone is on the same page
    - Keep secrets, like credentials, in repos secret storage
    - Make lots of commits, describe them well, and merge them into master when done

Week 3 Notes 2/21

- Last semester GridAI team presented to us
- Showed structure diagrams of how the backend and frontend are built and should be configured
- 5 main components: SVG diagrams, market dashboard, collaborative code editing, map box, and widgets
- Widgets and main dashboard inspired by Thingsboard

- For naming branches, follow convention …<yourName>/<feature>
- Have a staging branch when finishing changes and wanting to merge into master branch
- By next week, create a presentation to present our understanding, scope, and questions about the project
- Treat the previous team (currently in 492) as our mentors

Week 4 Notes 2/28

- We presented our understanding of GridAI
- Presented the components each of us want to work on
- We will get access to the codebase and an individual VM in the upcoming 2 weeks
- Figma education license will be provided next week
- He will share documents with more info next week
- Next week, present the responsibilities and requirements of the project
- Also, presents a deeper understanding of the components
- Pose and prepare any questions

Week 5 Notes 3/7

- We presented our understanding of each component along with questions
- Intends to give us a Figma license this week
- Schedule a meeting with Peeyush to figure out Mapbox requirements
- Understand the road map between the code editor and the map box
- Gelli has to talk to 492 to get requirements for us
- Identify key components/key features in terms of logic and aesthetics. Lay it out for each component
- When we get the codebase, dig through it
- The codebase should be done by Monday and shared with us by the end of the week
- Code editor and Mapbox, message Peeyush and cc Rolf and Dr Gelli

Week 6 Notes 3/14

- Repository has been provided; be sure to look through it
- Still awaiting individual VMs
- To access VMs, go to https://git.ece.iastate.edu/sd/sddec25-17
- Editor access to Firestore and individual accounts coming soon
- After starting VM, follow README in the repository for instructions on installing and initializing the project
- Rolf will email the team soon with more
- For the setup process, watch the video in the teams chat
- Reach out with questions about the codebase to previous team members
- Prepare an understanding of the code by the next meeting