MICHIGAN STATE UNIVERSITY

Project Plan Presentation

Virtual Reality Network Monitoring

The Capstone Experience

Team GM 1

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Spring 2023

From Students…
…to Professionals

Project Sponsor Overview

- Multinational automotive manufacturing
- Largest automaker in the United States
- Headquartered in Detroit, MI

Project Functional Specifications

- Managing millions of packets worldwide is a tough task and this visualization tool will solve that
- This system will make visualizing network traffic clear using a new 3D rendition of traditional charts and graphs

Project Design Specifications

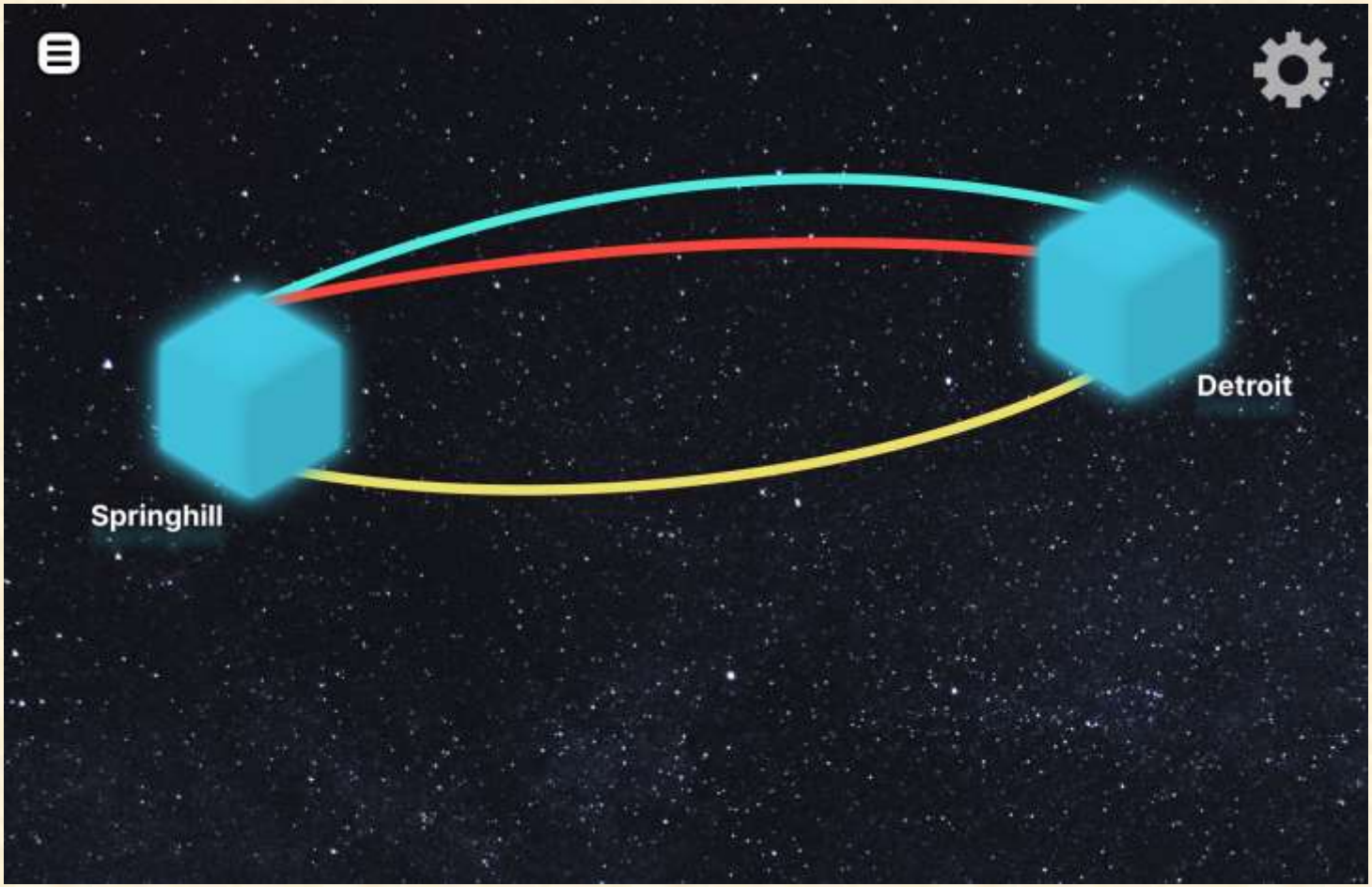
- 3D viewing of network traffic in Virtual Reality
- Employees can interact with and monitor any GM data center and its traffic on a small or large scale
- Holistic, modular approach to data visualization

Screen Mockup: Welcome Scene

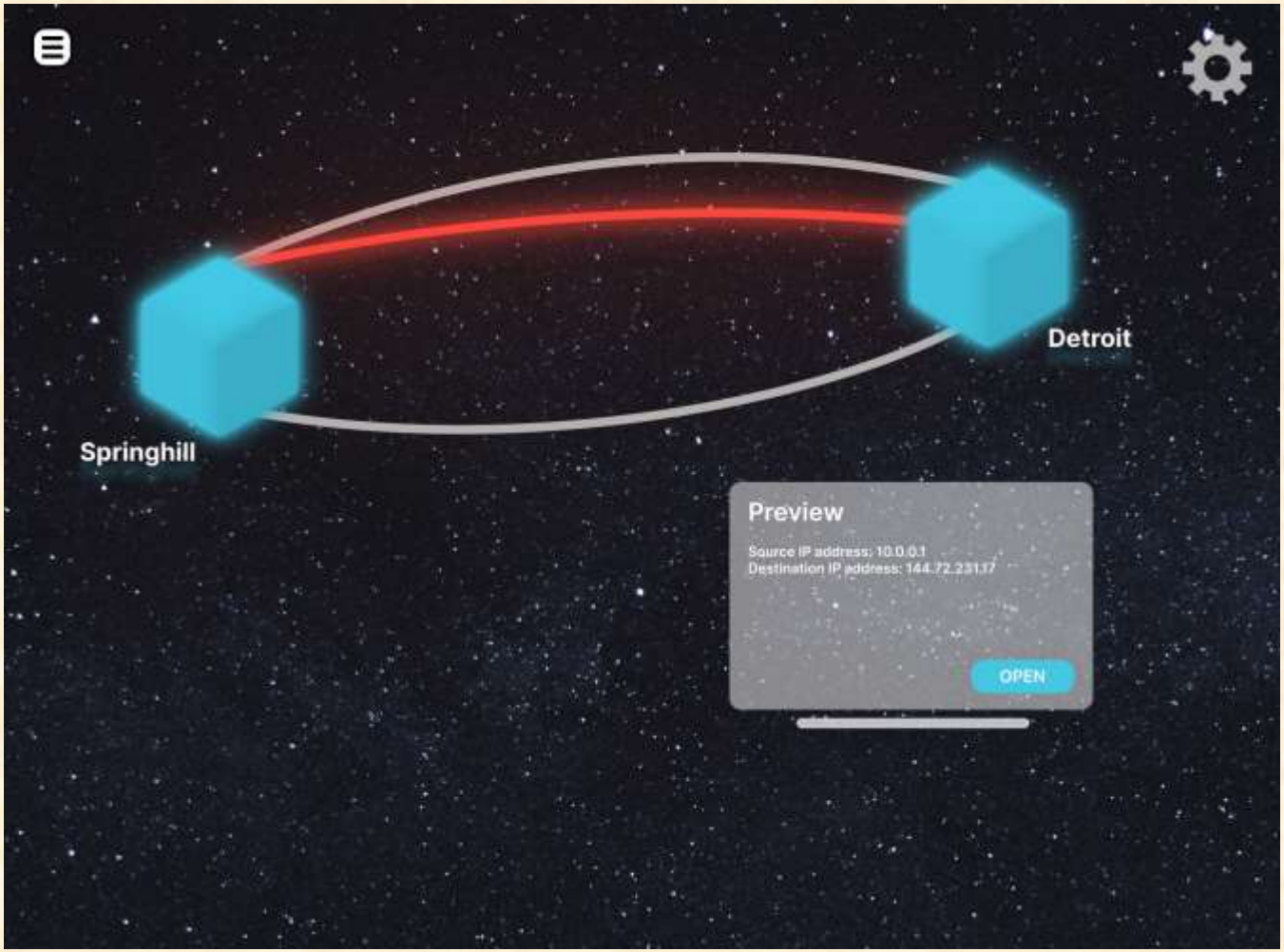
Screen Mockup: Home Scene

Screen Mockup: Data Center Detail

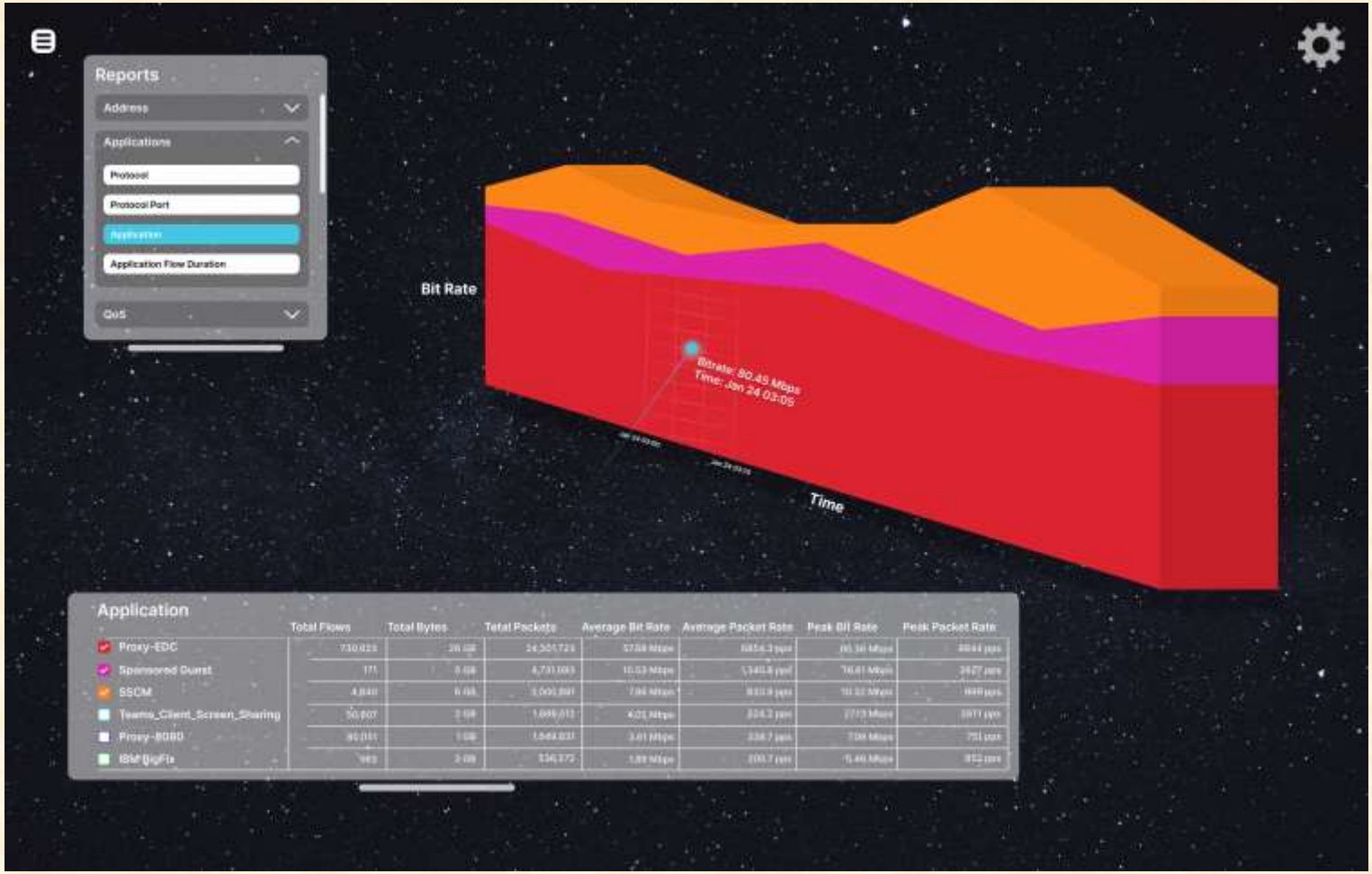
Screen Mockup: Data Center Preview



Screen Mockup: Data Center Preview



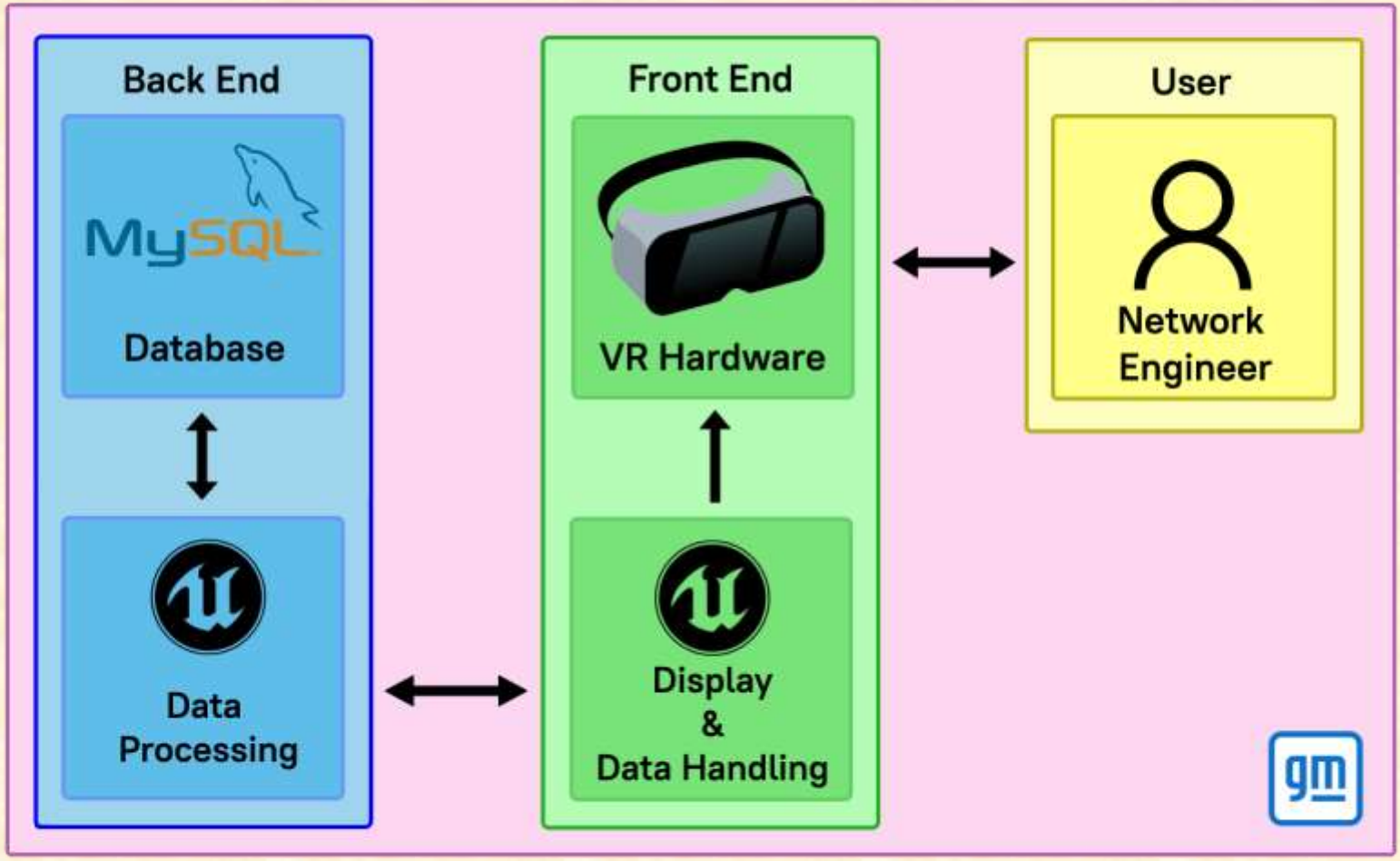
Screen Mockup: Data Center Detail



Project Technical Specifications

- Unreal Engine 5 handles our data processing and displays the data and environment for the user
- The database is built with an Ubuntu server using MySQL, and data is pulled and updated from UE5
- The user interacts with the Virtual Reality hardware influencing the displayed data in UE5

Project System Architecture



Project System Components

- Hardware Platforms
  - Oculus Rift: used by user to interact with the application
- Software Platforms / Technologies
  - C++: processes data and renders application in Unreal
  - MySQL: stores processed and raw network packet data
  - Ubuntu Server: hosts MySQL database
  - Unreal Engine 5: used to develop and run the application
  - Wireshark: reads PCAP files and exports them to JSON

Project Risks

- Processing Pertinent Data
  - Parsing the hex code and converting it to usable data could prove not possible
  - We will try to convert the data to other formats first
- Realistic Limitations of Data Visualization
  - Displaying large amounts of network information is difficult to do in a user-friendly and efficient way
  - Keep our design consistent with GMs' current software and plan simpler solutions as a backup plan
- Scalability For Large Data Streams
  - Our finished product requires us to process massive amounts of network data in real time demanding a lot of computer resources
  - We will extensively test our code in production and test on low-end hardware
- Unreal Is Demanding Software
  - Developing in Unreal Engine 5 is incredibly resource intensive and not everyone on the team has access to powerful machines
  - Good logistics within our team is required when effectively dividing up work

Questions?