

MICHIGAN STATE
UNIVERSITY

Alpha Presentation Time Cube

The Capstone Experience

Team Vectorform

Kartik Soni

Zach Garrett

Katherine Rochon

Josh Ilkka

Alexander Lee

Minsong Zheng

Department of Computer Science and Engineering
Michigan State University

Fall 2022



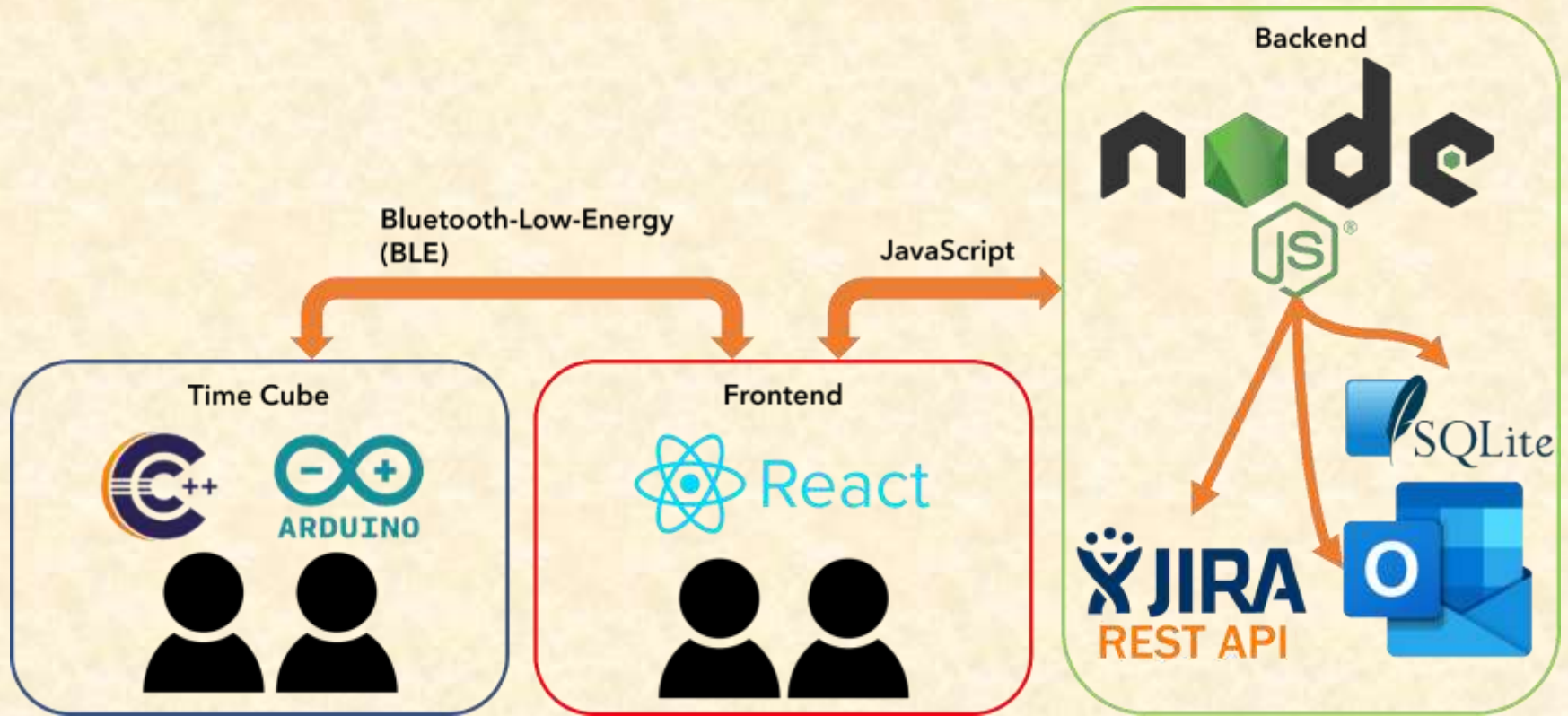
*From Students...
...to Professionals*

Project Overview

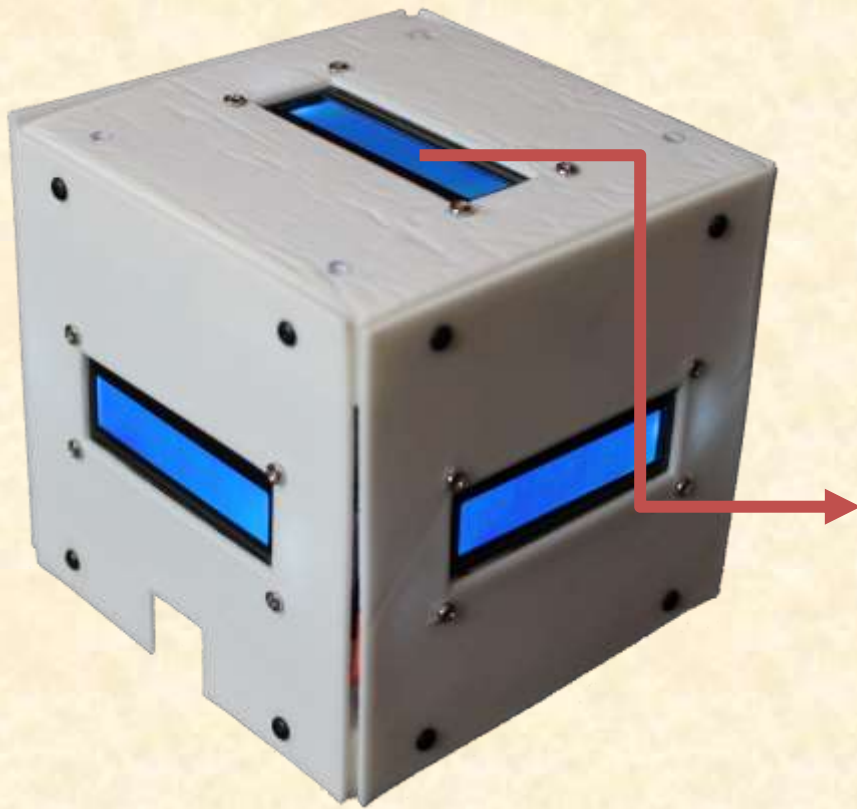
- Time Cube
 - Web application that tracks time spent on billable projects
 - Using a physical device
 - To provide accurate, automatic time tracking
 - Electronically without intruding on employee privacy
 - Ability to add, change, and remove time entries



System Architecture



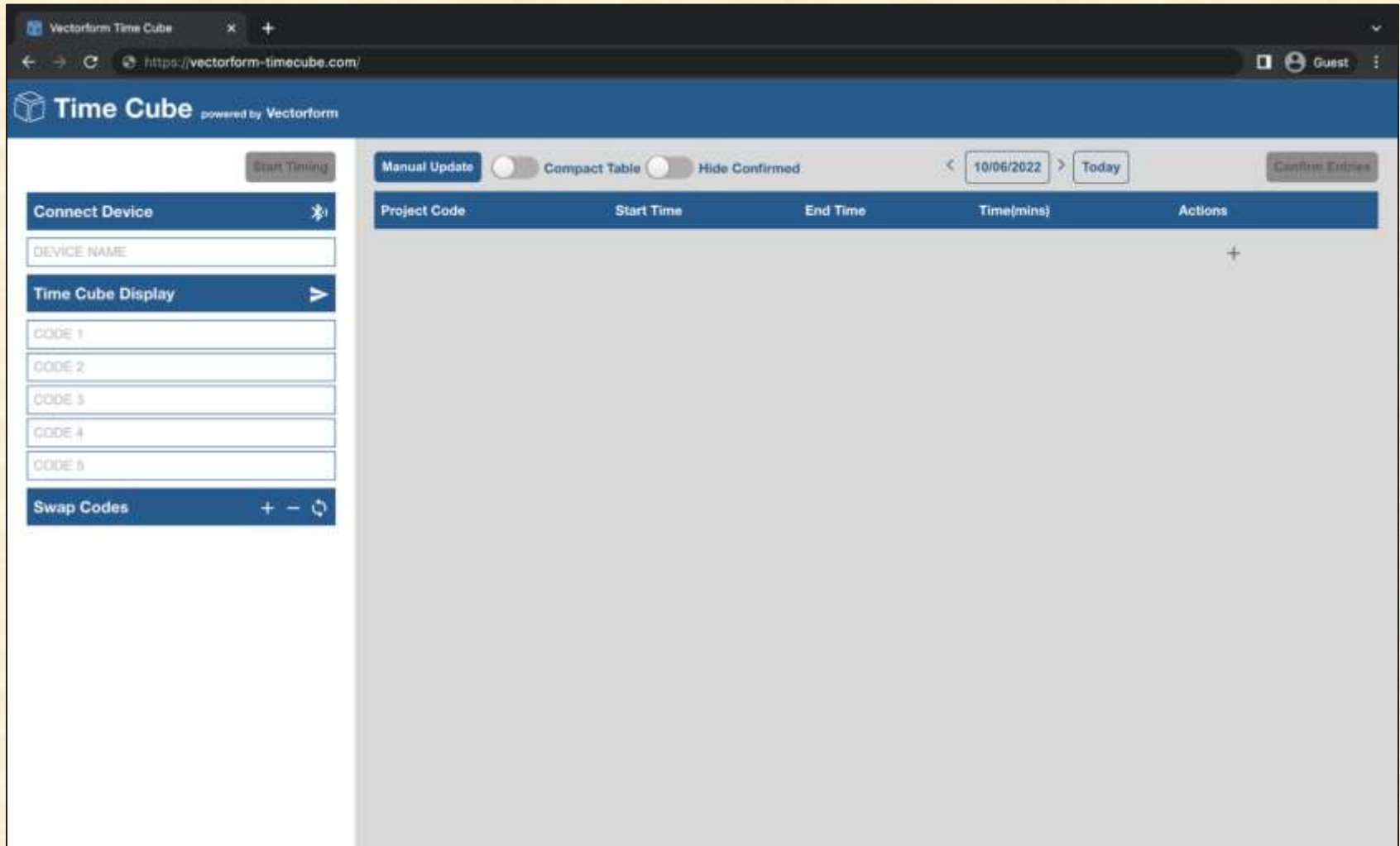
Time Cube Populated



Time-Cube-03

4195-HMI-WIDGET
ACTIVE 100%

Web Application



Web Application: During Use

The screenshot shows the Vectorform Time Cube web application. The browser address bar displays <https://vectorform-timecube.com/>. The page header includes the "Time Cube" logo and "powered by Vectorform".

On the left sidebar, there are two sections:

- Connect Device**: A button labeled "Start Timing" and a list containing "Time-Cube-03".
- Time Cube Display**: A list of project codes: "41954-HMI-Widget", "32134-HoloLens-2", "92714-Smart-Home", "28734-Home-Energy", and "87624-HB-Connect".
- Swap Codes**: A section with a "+ - ↺" icon and a list of codes: "17564-Fleet-Diagnostics" (marked as "suggested"), "87546-Augmenting-SmartCity", and "44323-BLE-Sport".

The main content area features a table with the following columns: Project Code, Start Time, End Time, Time(mins), and Actions. The table is filtered for the date "10/06/2022" and "Today". The "Compact Table" and "Hide Confirmed" toggle switches are visible above the table.

Project Code	Start Time	End Time	Time(mins)	Actions
28734-Home-Energy	8:00AM	9:00AM	60	
41954-HMI-Widget	9:00AM	10:20AM	80	
17564-Fleet-Diagnostics	10:20AM	11:15AM	55	
87624-HB-Connect	8:00AM	9:00AM	60	
41954-HMI-Widget	9:00AM	10:20AM	80	
32134-HoloLens-2	10:20AM	11:15AM	55	
92714-Smart-Home	11:15AM	11:30AM	15	

A "+" icon is located below the table, indicating an option to add new entries. A "Confirm Entries" button is located in the top right corner of the main content area.



Confirming Entries

The screenshot shows the Vectorform Time Cube web application interface. A modal window is displayed in the center, titled "405 minutes have been recorded". The modal contains a table with the following data:

Project Name	Total (min)
28734-Home-Energy	60
41954-HMI-Widget	80
17564-Fleet-Diagnostics	55
87624-HB-Connect	60
41954-HMI-Widget	80
32134-HoloLens-2	55
92714-Smart-Home	15

Below the table is a "Done" button. The background interface includes a "Connect Device" section with a "Time-Cube-03" device, a "Time Cube Display" section with various project codes, and a "Swap Codes" section. The top navigation bar shows the date "10/06/2022" and a "Confirm Entries" button.



What's left to do?

- Battery display
- Cube state machine
- Table toggles
- Date widget
- Edit entries
- Confirm entries
- Calendar API integration

Questions?

?

?

?

?

?

?

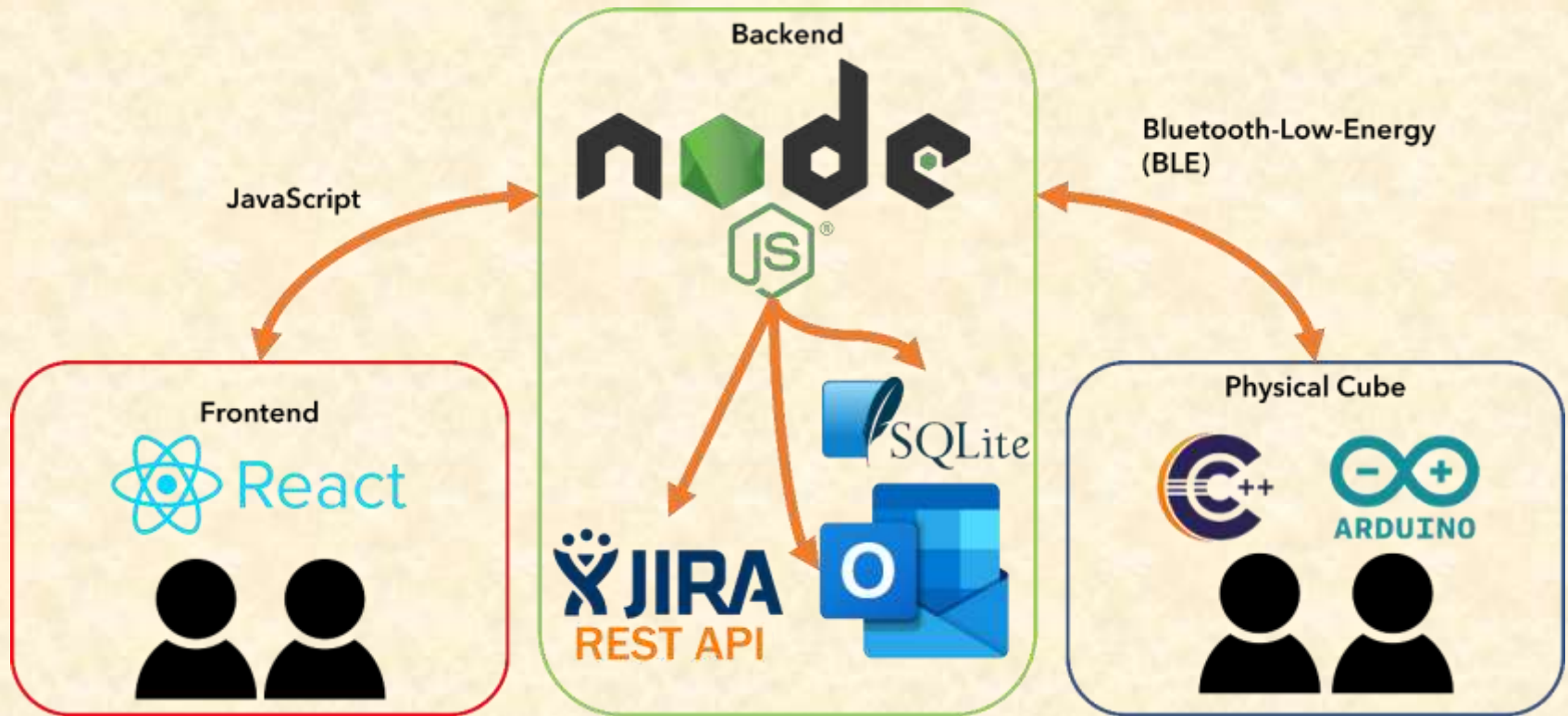
?

?

?

End of slide show, click to exit.

Project System Architecture



Project Risks

- Bluetooth Communication
 - The web application needs to communicate with the Arduino via Bluetooth. The data needs to be accurately sent in a timely manner
 - Research BLE and get the web application and Arduino communicating as soon as possible
- Tracking Accelerometer and Time Data
 - The orientation needs to be accurately tracked so the Time Cube does not record wrong entries
 - Test multiple time implementations to determine the most stable and efficient method for transitioning between project codes
- Deriving Project Code from API Data
 - The web Application needs to derive and suggest project code from the user's calendar and project management board
 - Research and determine received from APIs. Build mock data for determining the best data point to concentrate on

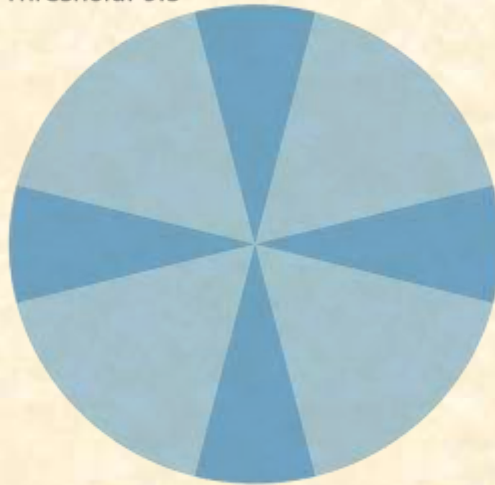


Orientation Mitigation

Threshold: 8.0



Threshold: 9.5



Threshold: 9.0

