

Preliminary Design Review

Unified Software Team

Tim Byers · Allie Kim · Nathan Lam · Andrew Obatake · Dylan Tokita

Overview

- Overall Block Diagram
- Firmware
- Gateway
- Database
- Gantt Chart

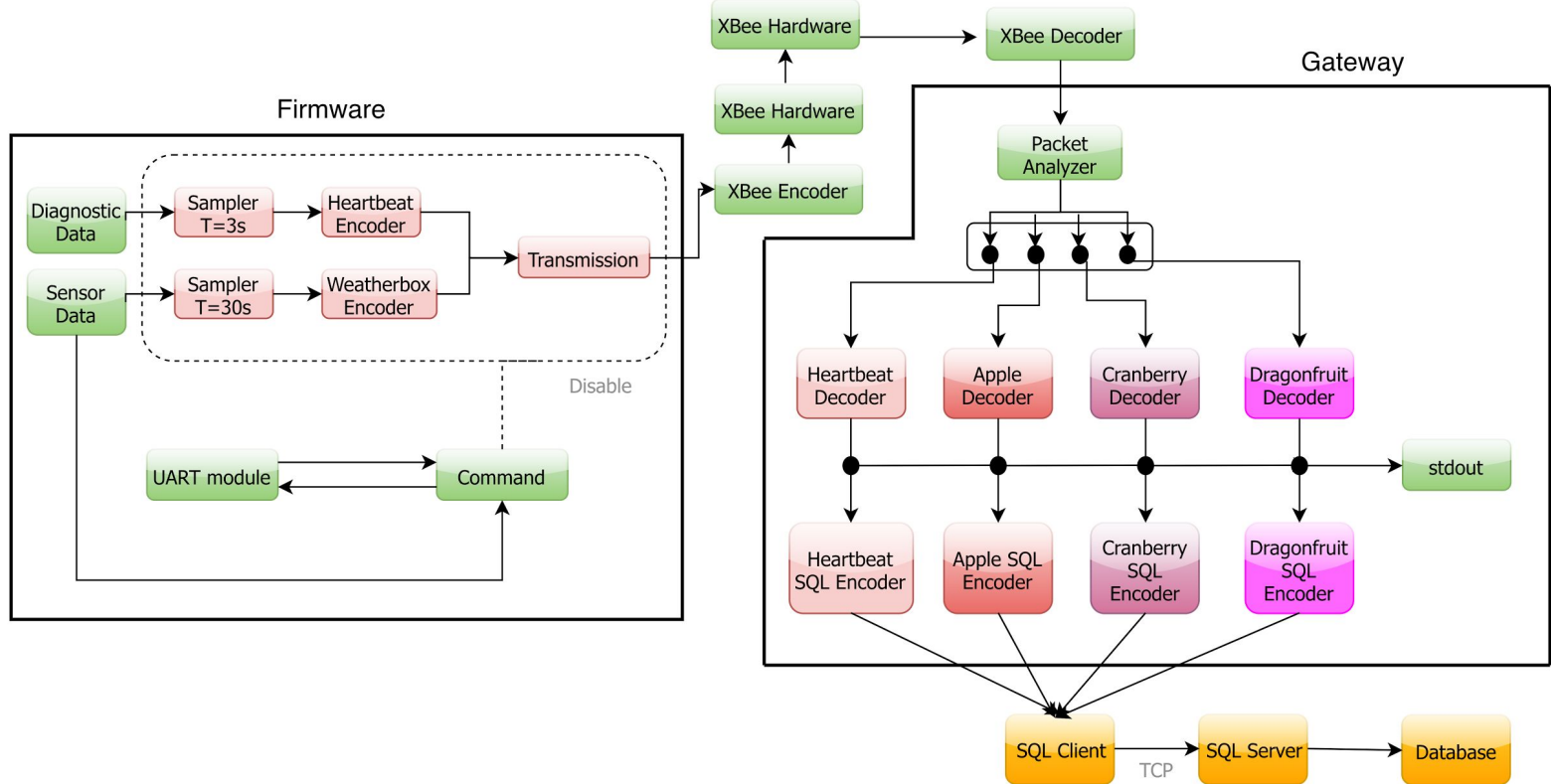
Subsystem Content:

- Block Diagram
- Current Progress
- Problems/Issues
- Future

1.

Overall Block Diagram

Overall Block Diagram

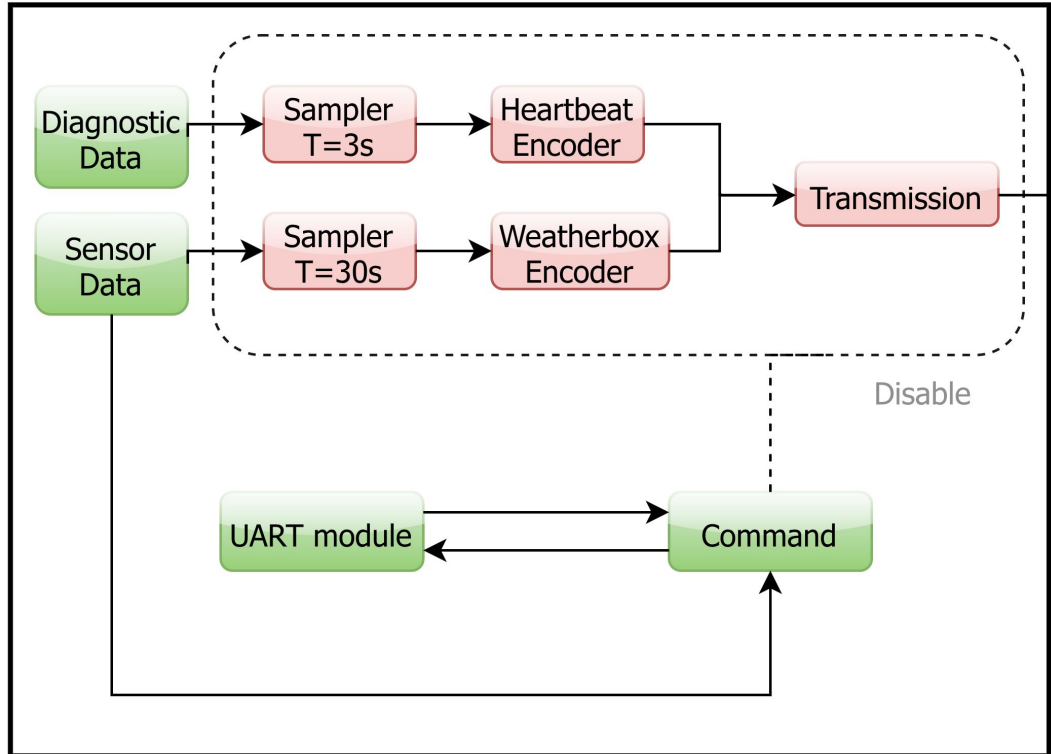


2.

Firmware

Firmware Block Diagram

Firmware



Firmware - Progress

- Incorporated Git/GitHub into workflow (Code Reviews)
- Apple
 - Wrote drivers for all sensors
 - All sensors validated
 - Complete deployment of firmware
- Cranberry
 - Wrote drivers for all sensors and loaded firmware onto box
 - Most sensors validated
- Dragonfruit
 - Wrote drivers for all sensors and loaded firmware onto box
 - All sensors validated

Firmware - Problems and Issues

- Debugging boards
- Determining accuracy of sensor readings
- Unfamiliar with boards/sensors
- Cranberry
 - Unconfirmed solar panel readings
 - Need to ensure packets correctly sent/received
- Dragonfruit
 - Need to ensure packets correctly sent/received

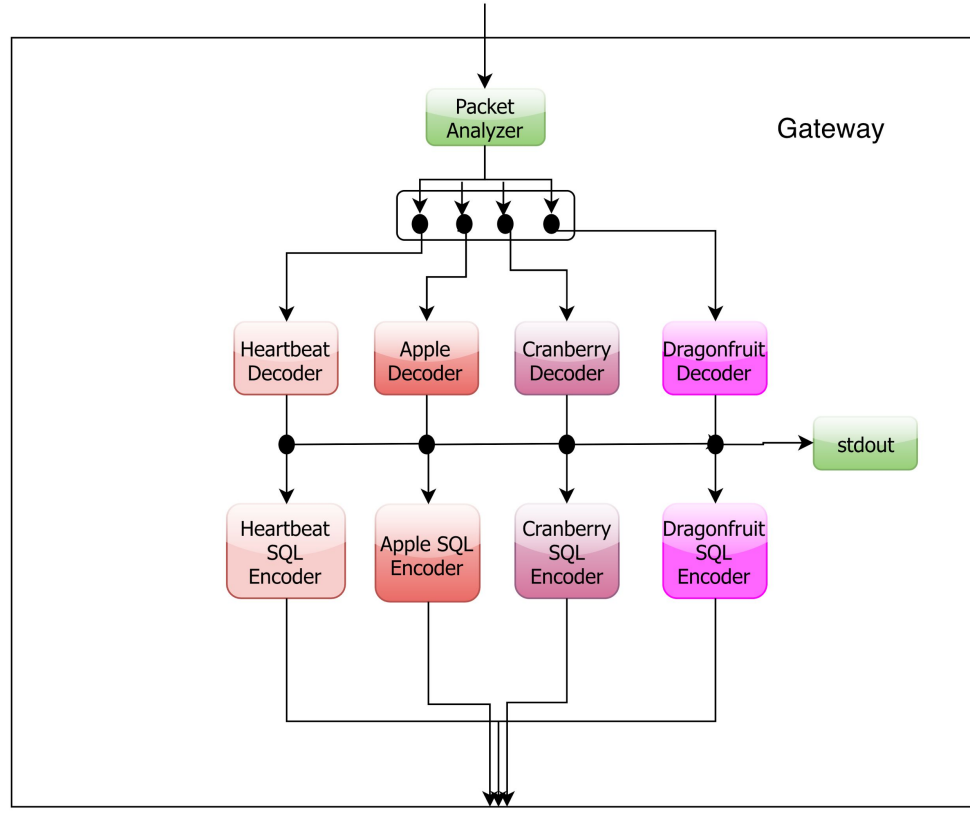
Firmware - Future

- Deploy weatherboxes
- Included weatherbox teams in on writing device drivers
- Work with hardware design teams on redesign of weatherboxes
- Maintain firmware on current generations of weatherbox



3. Gateway

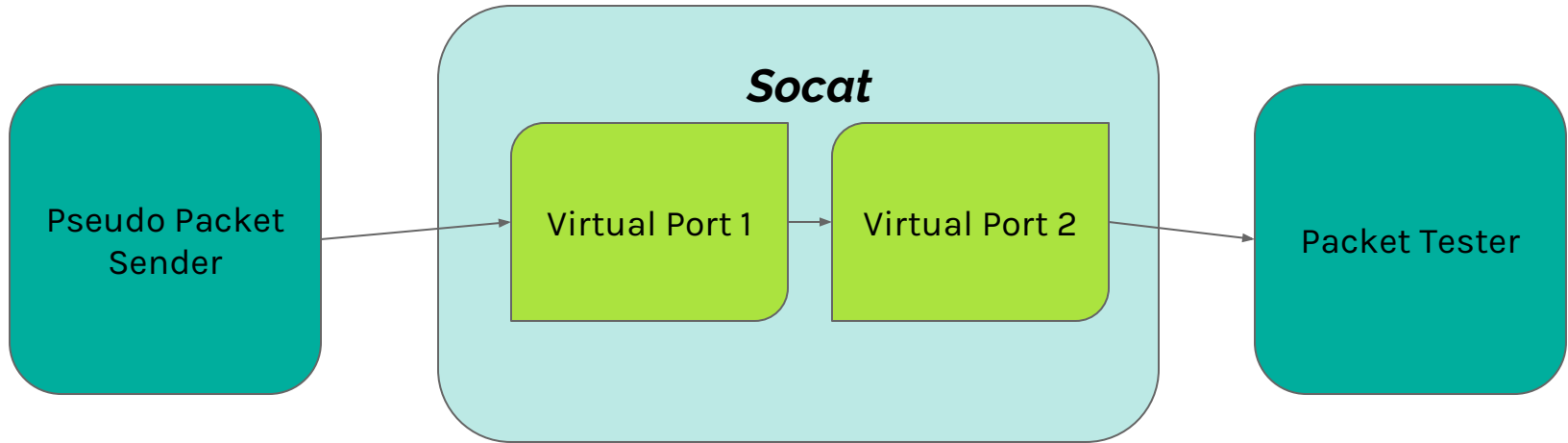
Gateway Block Diagram



Gateway - Progress

- Created program to test weatherbox packets
 - Receives and decodes packets
 - Prints to terminal
- Developed a process to simulate incoming packets
 - No Hardware
 - Use socat command to create virtual ports

Simulation Process Diagram



Gateway - Problems and Issues

- Implementing socat into our simulation system
- Server did not have appropriate software to run gateway code
 - Python 2.7
 - Socat
- Schema numbers were not defined for the 3 weatherbox generations

Gateway - Future

Simulation

- Create fake packets for the other schemas
 - Currently only heartbeat

Gateway Functionality

- Send data to database
 - Postgresql python library
- Account for varied sampling rates from weatherbox sensors



4. Database

Database - Progress

- Learned basic SQL queries
 - CREATE, SELECT, INSERT, UPDATE, DELETE
- Experimented with postgresql python library
 - Table creation
 - Insertion

Database - Issues and Problems

- Focusing on other aspects of the software system first
 - Firmware
 - Gateway

Database - Future

- Update database initialization
 - Table for each schema
- Implement a method for lab members to access data in database
 - Dashboard for data visualization

Gantt Chart

| Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|----------------------------------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|-----------|------------|------------|------------|-----------|
| Date | 9/10/2016 | 9/17/2016 | 9/24/2016 | 10/1/2016 | 10/8/2016 | 10/15/2016 | 10/22/2016 | 10/29/2016 | 11/5/2016 | 11/12/2016 | 11/19/2016 | 11/26/2016 | 12/3/2016 |
| Presentations | | | | | | | | | | | | | |
| Proposal | | | | | | | | | | | | | |
| Design Review | | | | | | | | | | | | | |
| Critical Design Review | | | | | | | | | | | | | |
| Demonstration/Final Presentation | | | | | | | | | | | | | |
| Research | | | | | | | | | | | | | |
| Firmware | | | | | | | | | | | | | |
| Gateway | | | | | | | | | | | | | |
| Database | | | | | | | | | | | | | |
| Firmware | | | | | | | | | | | | | |
| Deployment Firmware | | | | | | | | | | | | | |
| Design Direction | | | | | | | | | | | | | |
| Implement Design | | | | | | | | | | | | | |
| Gateway | | | | | | | | | | | | | |
| Packet Decoder w/ Test | | | | | | | | | | | | | |
| Simulation | | | | | | | | | | | | | |
| Send to Database | | | | | | | | | | | | | |
| Different polling rates | | | | | | | | | | | | | |
| Database | | | | | | | | | | | | | |
| Multiple table functionality | | | | | | | | | | | | | |
| Data Access | | | | | | | | | | | | | |



Questions

