MONITORING AND TRACKING SYSTEM FOR TRANSPORTATION OF PHARMACEUTICALS

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Motivation & Background

- What made us to think about this project?
- Highly Expensive Pharmaceuticals Products
  - Cargo theft
- Most of the Pharmaceuticals Products should be transported in controlled environment.
- Medicine suppliers and hospital management have to face a big lose due to unsafe transportation.

FACTS ABOUT

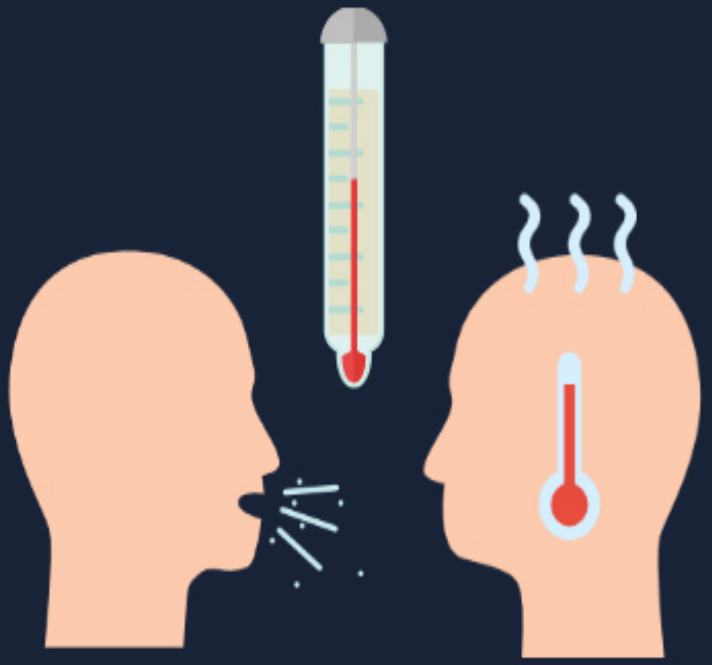
Pharmaceutical Transport

SOURCES:
Inbound Logistics
Pharmtech

iContainers

#1

Pharmaceutical products need to be maintained at a precise temperature to retain their efficacy.
These include flu vaccines and insulin.



#2

Thermal blankets for pallets are available to protect against sunlight, humidity, etc. It maintains a constant temperature range of around 15°C to 25°C.

#3

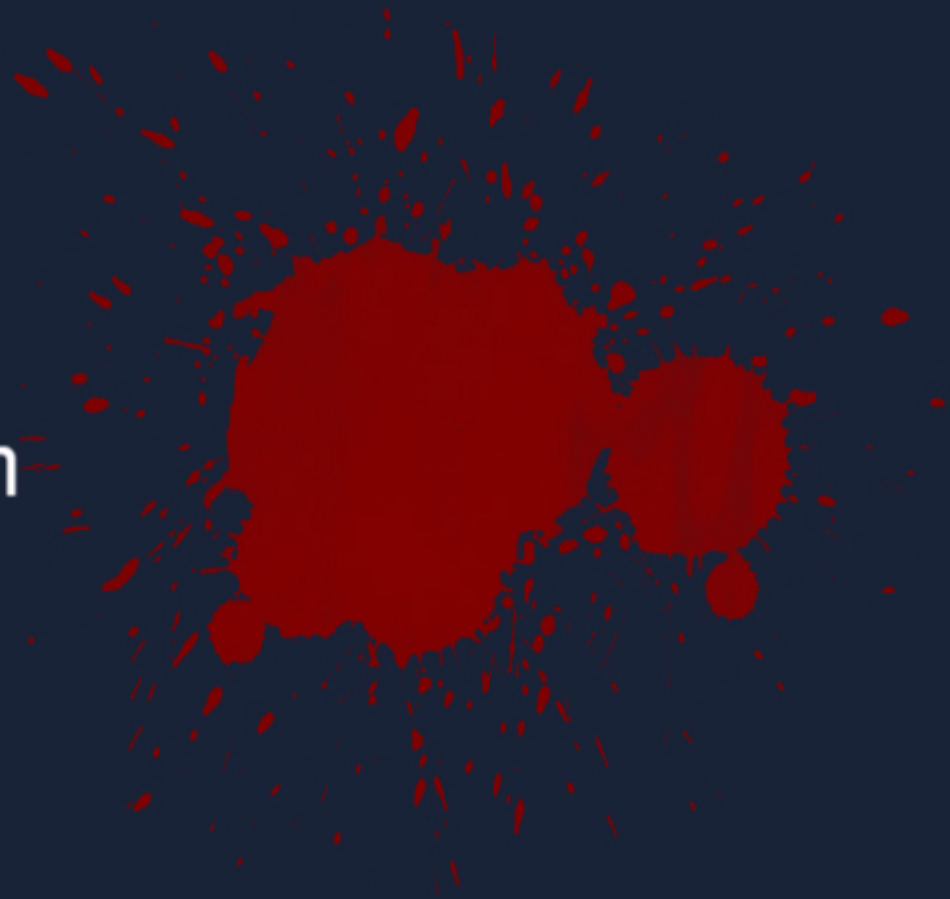
7 of 10 leading pharmaceutical products require temperature-controlled transportation.

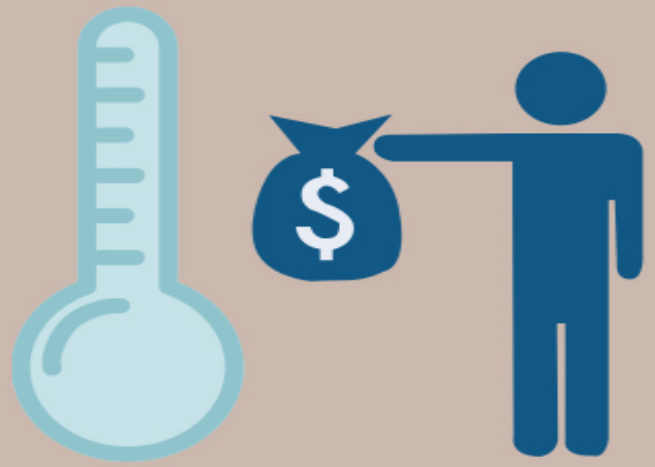
#4

Biologic material (e.g., blood, tissue, reproductive material) need to be stored in a cryogenic container that can hold the temperature at -150°C.

#5

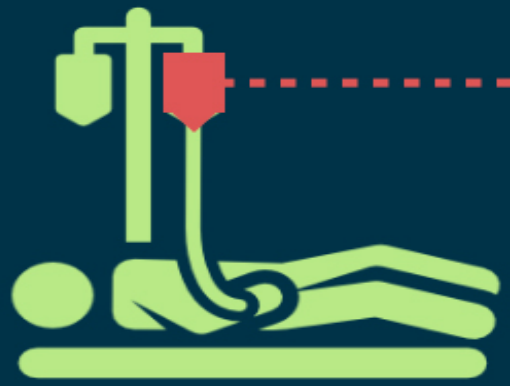
Just 2°C of temperature variation could completely ruin the pharmaceutical product.





#6

Pharmaceutical companies lose an average of $150,000 per small package shipment due to temperature slips.



- Trillion Doller Industry
- Monitoring conditions is important to the success of pharmaceutical distribution because it ensures compliance with standards and regulations, and the safety and effectiveness of drugs.
- WHO, Food and Drug Administration (FDA) Regulations

Solutions

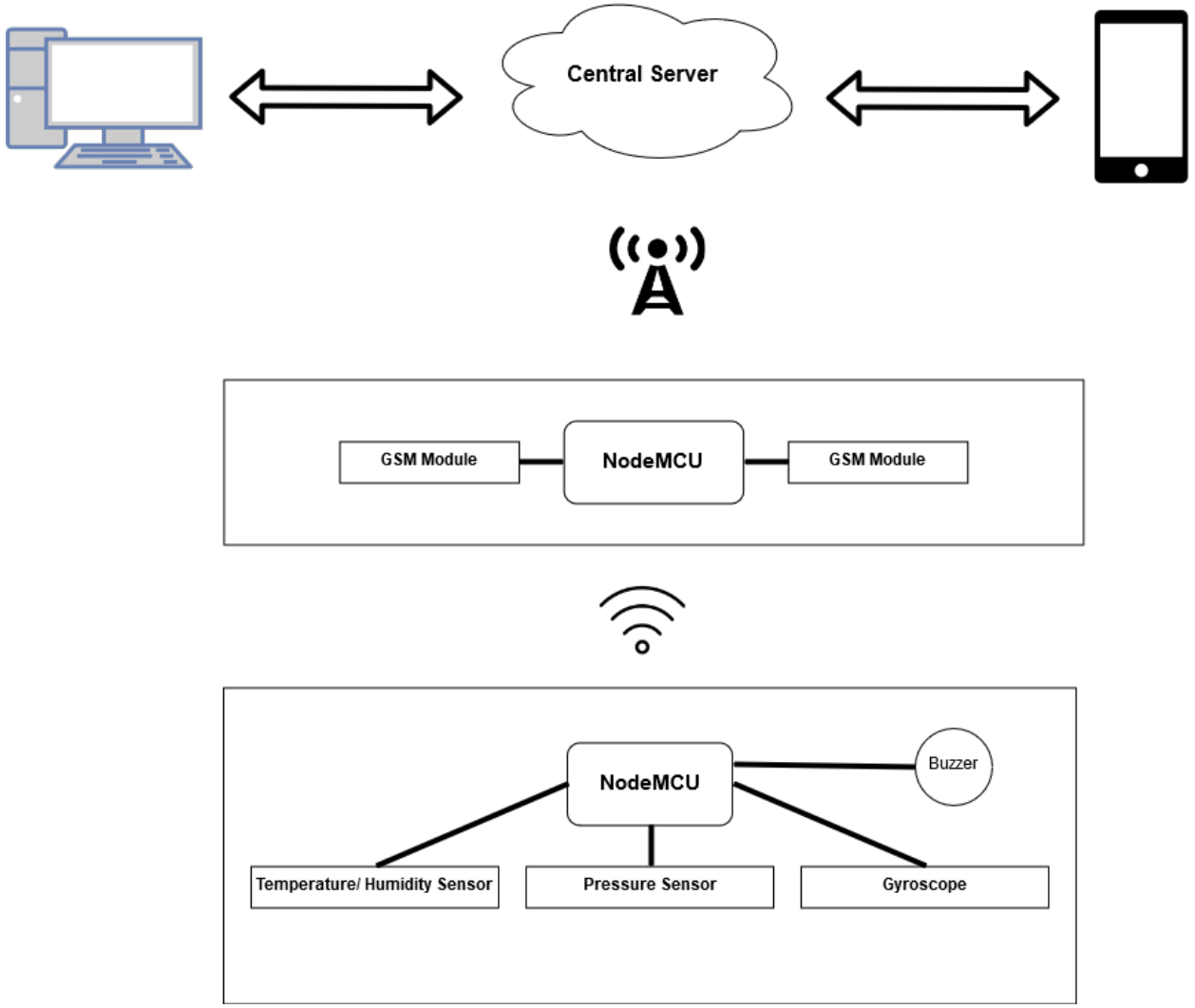
- **A Embedded System which helps to :**

- Measure important parameters often and make warning alerts.
- Track the location.
- Maintain a database and analyze.

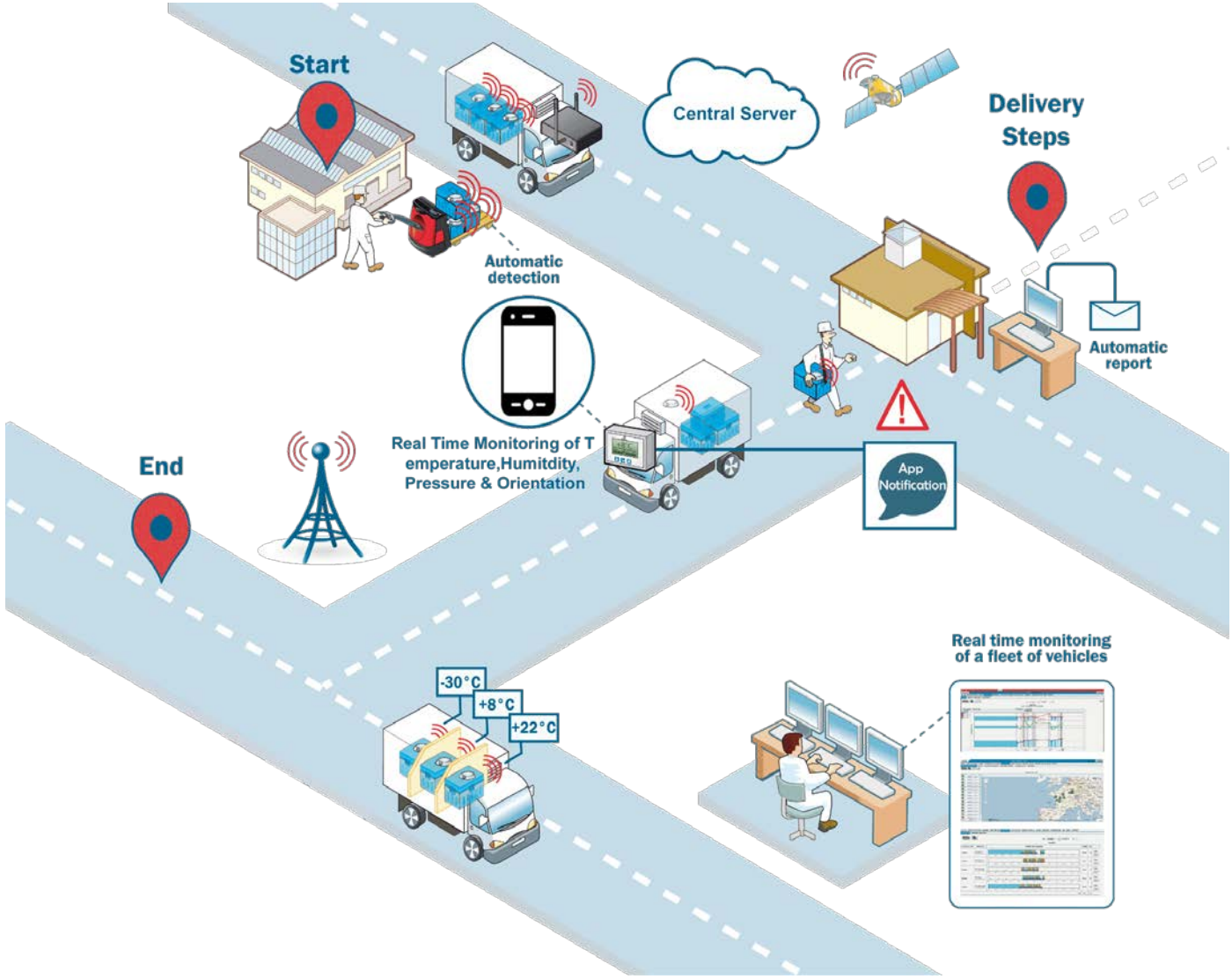
How it works…

- A database is maintained.
- If a condition is broken, the warning alert will be sent to the person in charge of that distributing process.
- Track the location of the truck. So no any robberies can happen.

Overall Design



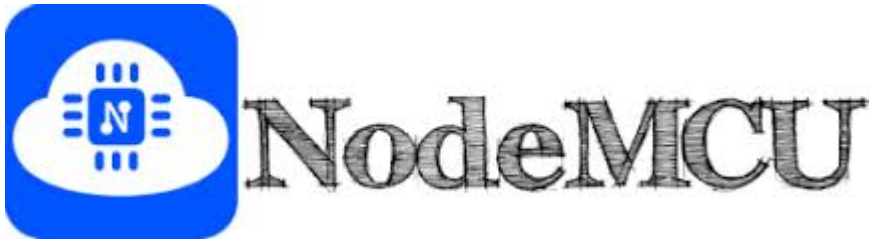
Overall Design



Scope and Limitations

- Owner of the product, the person in charge for the distribution, the whole sale buyer can monitor the database.
- It can be used for all the products which are need to be transported in controlled conditions.

Technology stack



ANDROID

Hardware Components

- **NodeMCU**
  - Inbuilt Wi-Fi Module
  - Enough processing power
  - Can store data
  - Cheap and Compact
  - Power efficient
  - Compatibility with requirements

Hardware Components

- **Humidity Temperature Sensor DHT22**
  - Can measure digital temperature and humidity
  - Higher accuracy and wider measuring range
  - Temperature
    Resolution : 0.1°C
    Accuracy : ±0.5°C
    Measuring range : -40°C ~ 80°C
  - Humidity
    Resolution : 0.1%RH
    Accuracy : ±2%RH (25°C)
    Measuring range : 0%RH ~ 99.9%RH

Hardware Components

- **Pressure sensor - BMP280**
  - Can Measure both temperature and pressure
- **Gyroscope (MPU6050)**
  - MEMS 3-aixs accelerometer and 3-axis gyroscope values combined
  - Built-in 16-bit ADC provides high accuracy
  - Built-in DMP provides high computational power
- **GPS Module (uBlox Neo-6)**

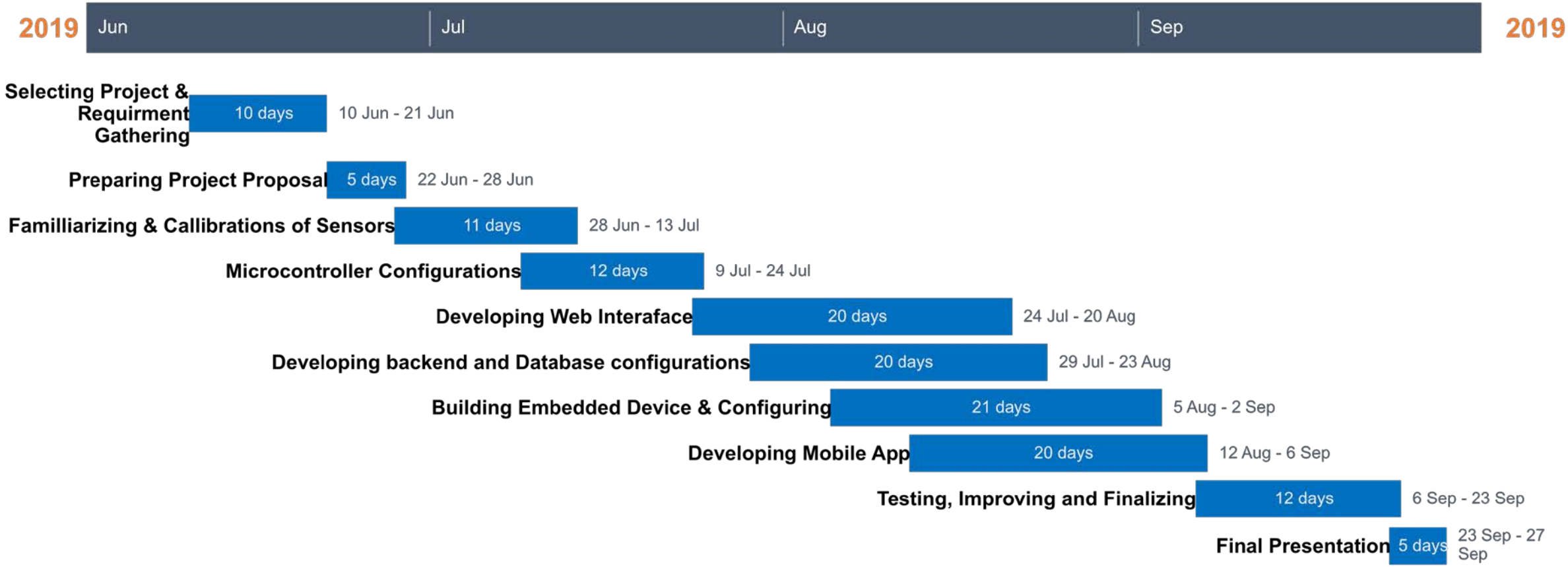
Power Requirements

- NodeMCU- 5V
- GSM Module – 3.3V
- GPS Module - 5v
- Gyroscope (MPU6050) – 3.6V
- Temperature/Humidity Sensor(DHT22) – 3.3v
- Barometric Pressure sensor (BMP280) – 3.3V
- Buzzer – 3.3v

Technologies (Software)

- NodeJS (Backend)
  - Its also lightweight, efficient, and its ability to use JavaScript on both frontend and backend
  - Ease to use
  - Compatibility with requirements
- Firebase (Database)
- React (Web Interface)
- Android

Project Timeline



Bill of Materials

Item	Amount	Unit Price	Cost
NodeMCU	3	850	2550
Temperature/Humidity Sensor(DHT22)	2	650	1300
Barometric Pressure sensor (BMP280)	2	800	1600
Gyroscope (MPU6050)	2	350	700
GSM Module (SIM900)	1	1450	1450
GPS Module (uBlox Neo-6)	1	1500	1500
Battery	3	150	450
Buzzer	2	50	100
Wires			150
Total			9800

Demonstration plan

- Two End Nodes for Box (Sensors connected to Microcontroller)
- One node to fix in the vehicle carrying the boxes
- Web Interface to monitor & tracking
- Mobile App for Monitoring

Q & A

Thank You!