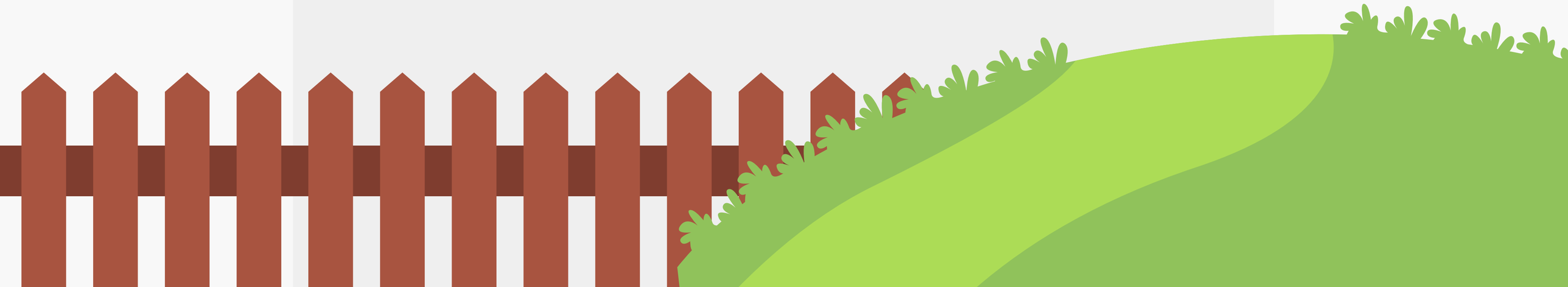
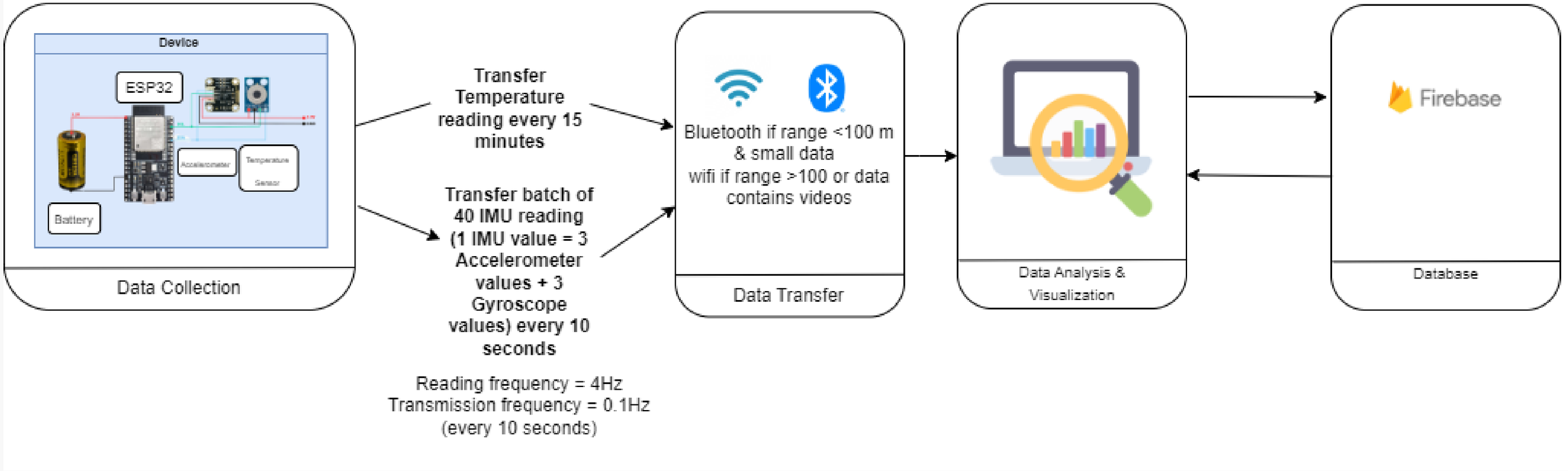
ICowCare

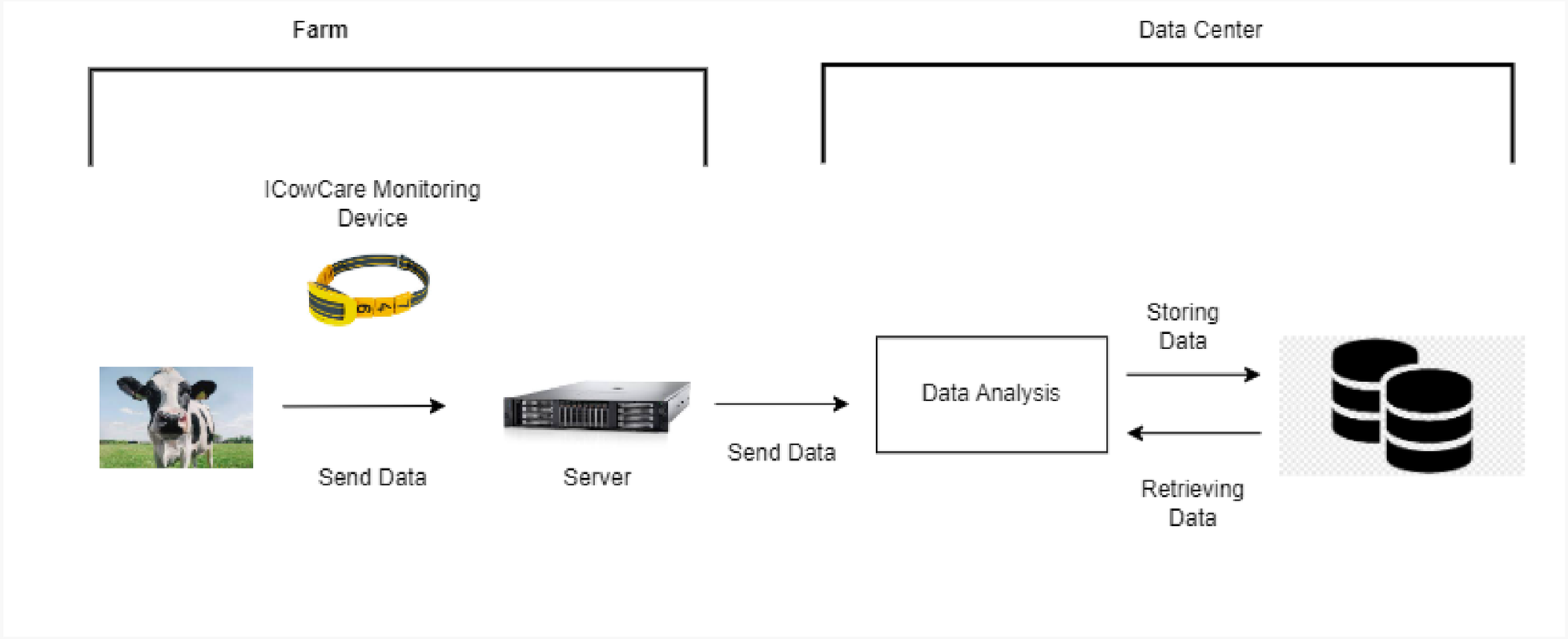
Mesurements Use Case



Flow Diagram



Flow Diagram



Battery Life Estimation

Parameters Used:

- **Temperature values** :

1 feedback= 1 float = 4B

- **Accelerometer/Gyroscope values** :

1 feedback = 6 floats = 24B

- **Program size**: 206KB (Flash memory)
- **Data storage and batch sending**: acquisition frequency 4Hz
- **Cycle time**: Every 10s = 0.4s Reading time + 9.6s Sleep mode.
- **Data**: Every 10s we can read up to 40 values equal to 1KB of data
- **Transmission rate** (via WiFi): 19MB/s
- **Data to transfer**: 1KB

ESP32 WROOM 32D Storage:

- **SRAM**: 520 KB of on-chip for data and instructions.
- **RTC FAST Memory**: 8 KB of SRAM in RTC, can be used for data storage; it is accessed by the main CPU during RTC Boot from the Deep-sleep mode.
- **RTC SLOW Memory**: 8 KB of SRAM in RTC, can be accessed by the co-processor during the Deep-sleep mode.

Inputs

Battery Capacity:	1500	mAh
Time Spent in Sleep Mode	9.6	s
Current Draw in Sleep Mode	10	uA
Time Spent Transmitting Data	52	us
Current Draw When Transmitting Data	200	mA
Time Spent Collecting Data	10	ms
Current Draw When Collecting Data	200	mA
Time Spent Processing Data	10	ms
Current Draw When Processing Data	200	mA

Output

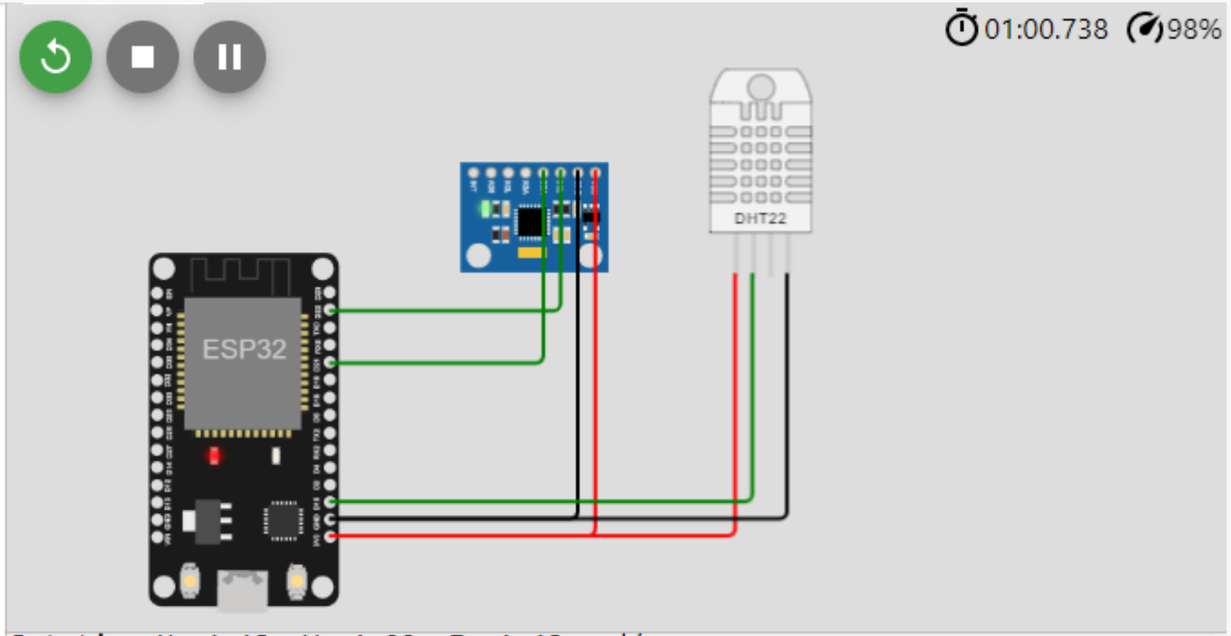
Battery Lifetime (hrs)	3435.9

Final Estimation:
143 Days = 4.76 Months (approximation)

N.b :Real values known with adequat tests

Code Simulation

```
#include <Adafruit_MPU6050.h>
#include <Adafruit_Sensor.h>
#include <Wire.h>
#include "DHTesp.h"

const int DHT_PIN = 15;
Adafruit_MPU6050 mpu;
DHTesp dhtSensor;

void setup(void) {
  Serial.begin(115200);
    dhtSensor.setup(DHT_PIN, DHTesp::DHT22);
  while (!Serial)
    delay(10); // will pause Zero, Leonardo, etc until serial console opens

  Serial.println("Adafruit MPU6050 test!");

  // Try to initialize!
  if (!mpu.begin()) {
    Serial.println("Failed to find MPU6050 chip");
    while (1) {
      delay(10);
    }
  }
  Serial.println("MPU6050 Found!");

  mpu.setAccelerometerRange(MPU6050_RANGE_8_G);
```




```
Rotation X: 1.13, Y: 1.22, Z: 1.48 rad/s
Temperature: 32.00°C degC

Acceleration X: 13.24, Y: 13.24, Z: 15.20 m/s^2
Rotation X: 1.13, Y: 1.22, Z: 1.48 rad/s
Temperature: 32.00°C degC
```