

1 What are these boards?

The boards used in this project are the ESP12-E.
Just a quick show of hands, who here owns a Raspberry Pi?

Who has used or toyed with a Raspberry Pi before?

For this project we considered using the Pi as our board of choice, it has wireless, can be powered from a battery and has a small form factor.

But I think you'll agree that the ESP has a much smaller formfactor just by seeing it, not only that but the board requires much less power and we did encounter instances in which utilising some smart programming some people could get this board to run for over a month on a single coin cell battery.

The ESP boards come in at around a 12th the price of a

Raspberry Pi, at \$4 - 5 per board, a 10th the processing power at a whopping 160Mhz and include a total space onboard to flash of 4MB at most.

Comparitively though, that's around a 20th or less of what a modern x86 chipset will be expected to run at, the storage about a half millionth smaller than the storage we have on modern computerns and the memory for operating the chipset? 32KB of SRAM, 80KB of DRAM.

Issues we encoutnered with this board were only on or two major issues, writing of efficient code was super important, without a bit of thought that 100KB or so of RAM, we could easily be looking at a memory dump over serial to determine what went wrong.

Small issues around the specification of the wireless were present, we needed to ensure a 2.4Ghz network was reachable, as the boards don't support newer 5Ghz ranges of wireless yet. It should be noted that newer models however support both zigbee and bluetooth.

Small break.

Another show of hands, who here can write arduino code?

What about c++?

How about any Golang?

How about any Rust?

What about Javascript? Anyone written some of that

terrible language?

These boards support all of those languages, and the community is adding more regularly. The barriers to using tech like this is extremely low and only requires a small bit of learning to understand the sensors you are using.

Alternate SBCs or Single Board Computers exist that we could have used, the Raspberry Pi Zero or a number of replica style boards, but the ESP offered a large number of users already on the platform, the lowest price to start without this turning into a pure hardware project and were extremely easy to get on mass from China.

Given more time on the project, we wanted to look at

extending out more metrics we could analyse, namely carbon dioxide detectors, ultrasonic sensors to generate a proto-mapping of the room and potentially look at the noise generated in a room as further metrics.

We intend on open-sourcing the code to aid other makers into the future and give back to the community we learnt so much from over the course of this project.

I'll now pass along to Josh for a walkthrough of the web application we developed to facilitate our analytics of data.

