

Bus Usage Monitoring Through Wifi Probing

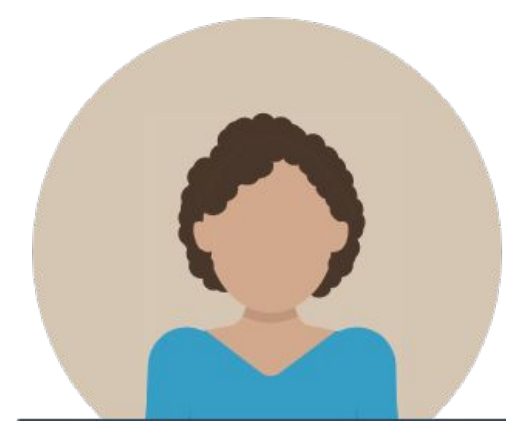
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Research & Engineering
For David

Introduction

Persona:



Tracy Delgado 32

Who is she?

- UCSC transit operations manager

What she wants to know?

- How will this make her job easier?
- How easily can this system be integrated?
- What are the operational costs?

What she doesn't want

- Unnecessary changes
- Terrible bugs
- High maintenance

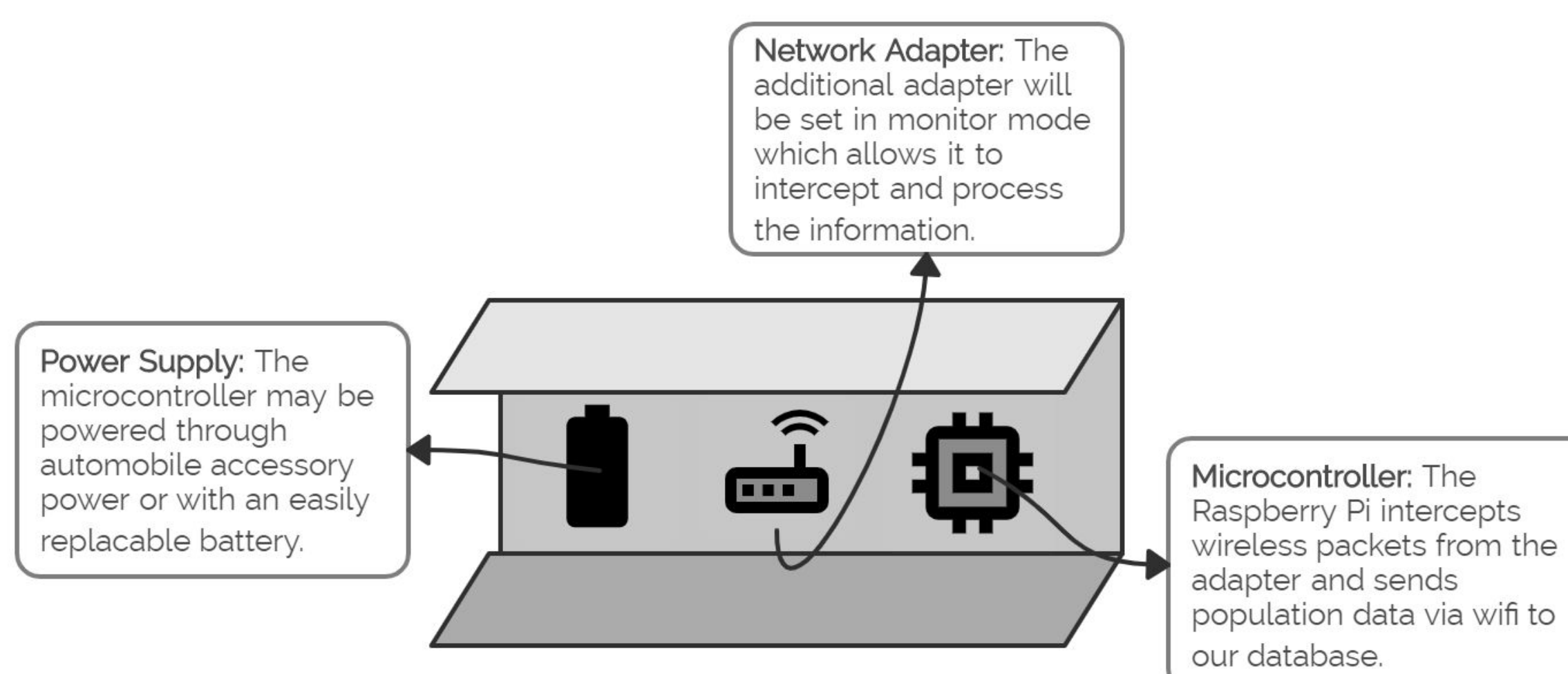
Design Objectives:

Inexpensive	< \$100 per sensor unit, < \$50 to operate annually
Reliable	weather-proof, minimal maintenance
Non-intrusive	does not draw attention
Accurate	density measurements within 8% of actual
Anonymous	minimize collection & eliminate storage of PII

Wifi Probing & Privacy

- Passenger devices are constantly probing for wifi
- We can match the unique identifier in those signals (MAC address) with the signal's strength (RSSI).
- Data is aggregated before transmission so private data is never stored.
- Data collected from wifi transmitters lead to an accurate estimation of population density on buses

On-Bus Design

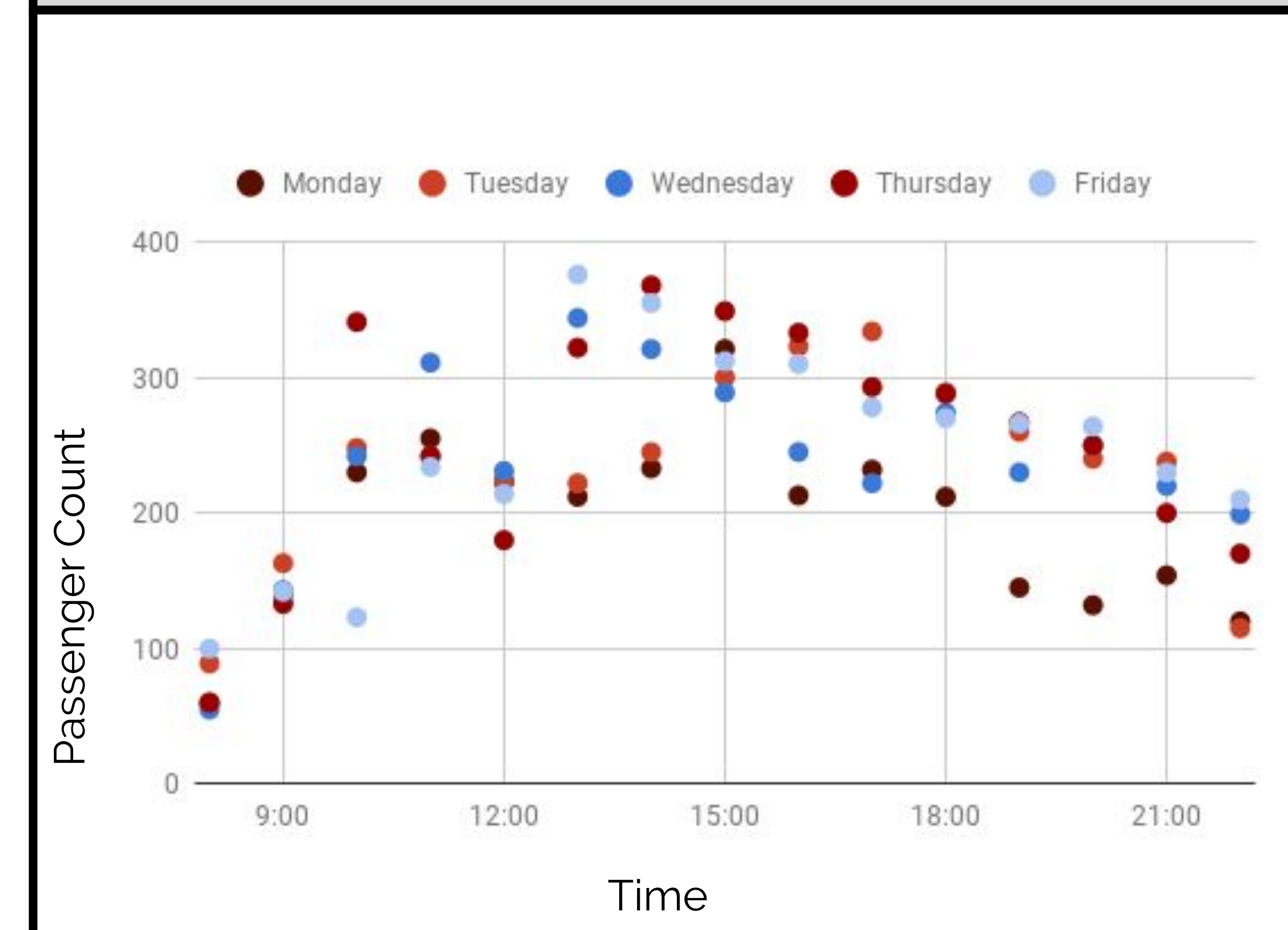


Client: TAPS & General bus services

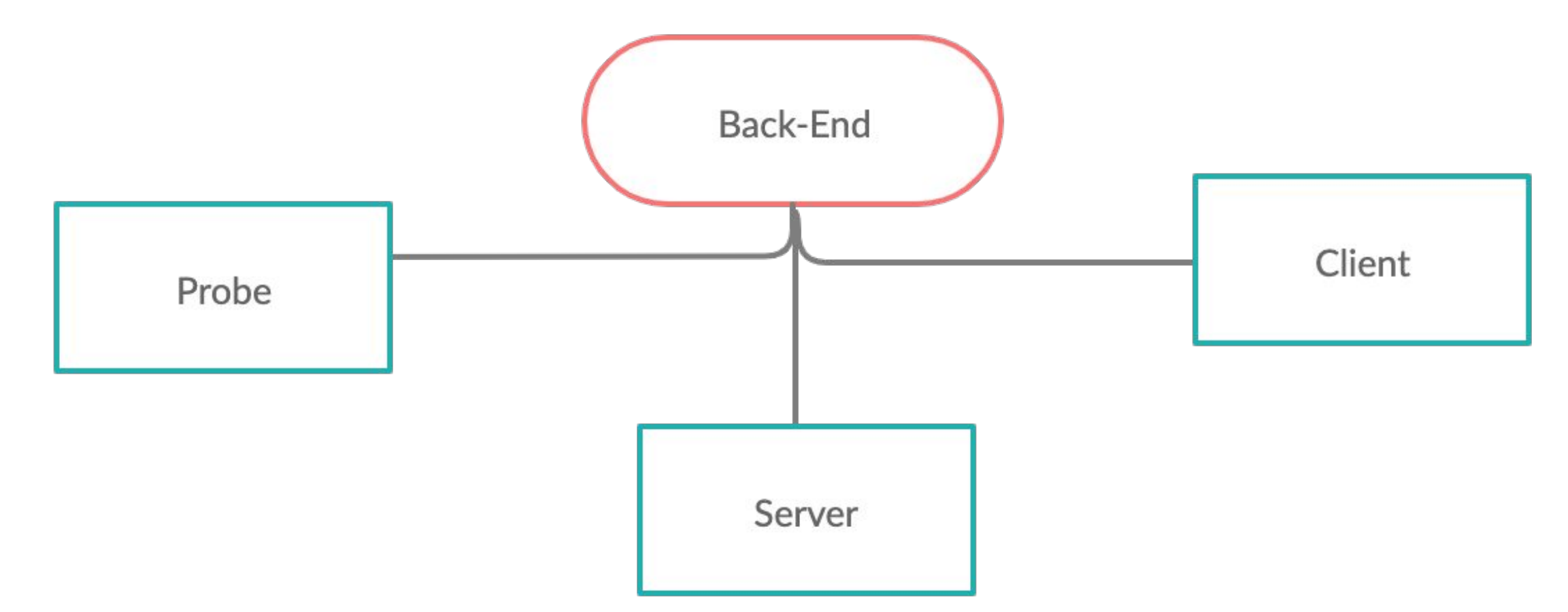
Need: more buses operating during peak hours

Goal: Deploy enough buses during peak hours

Front-End



Back-End



Additional Information

Acknowledgements:

We would like to thank Prof. David Harrison and David Kooi for their help and support.

Reference:

D. Bleeker, G. Griffin, and M. Skelly, "How to Log Wi-Fi Probe Requests from Smartphones & Laptops with Probemon," *WonderHowTo*, 14-Jun-2017. [Online]. Available: <https://null-byte.wonderhowto.com/how-to/log-wi-fi-probe-requests-from-smartphones-laptops-with-probemon-0176303/>. [Accessed: 04-May-2020].

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