

Data Muling for Sensor Data Collection

UrbanSense Platform

- City-wide monitoring platform in Porto, Portugal
- 20 sensing units deployed at relevant locations
- Data from sensing units gathered at backend server
- Challenge: collect data from disparate sites

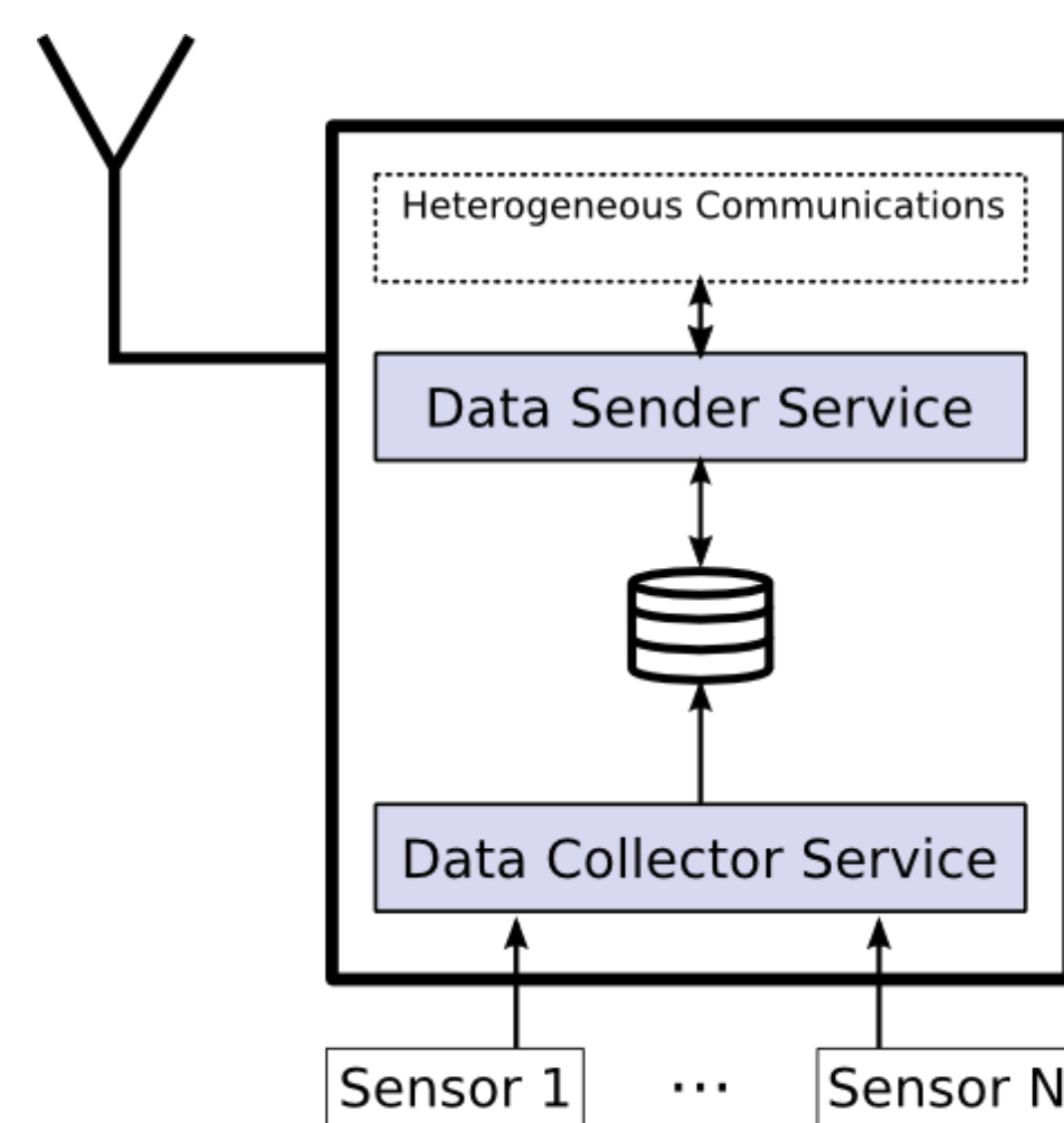
Solution: Data muling with *BusNet*

- Public buses equipped with WiFi AP and DTN support
- Bus network routes provide wide coverage
- Sensor data is off-loaded to passing buses via WiFi
- Cost-free, avoiding expensive data plan-based solutions

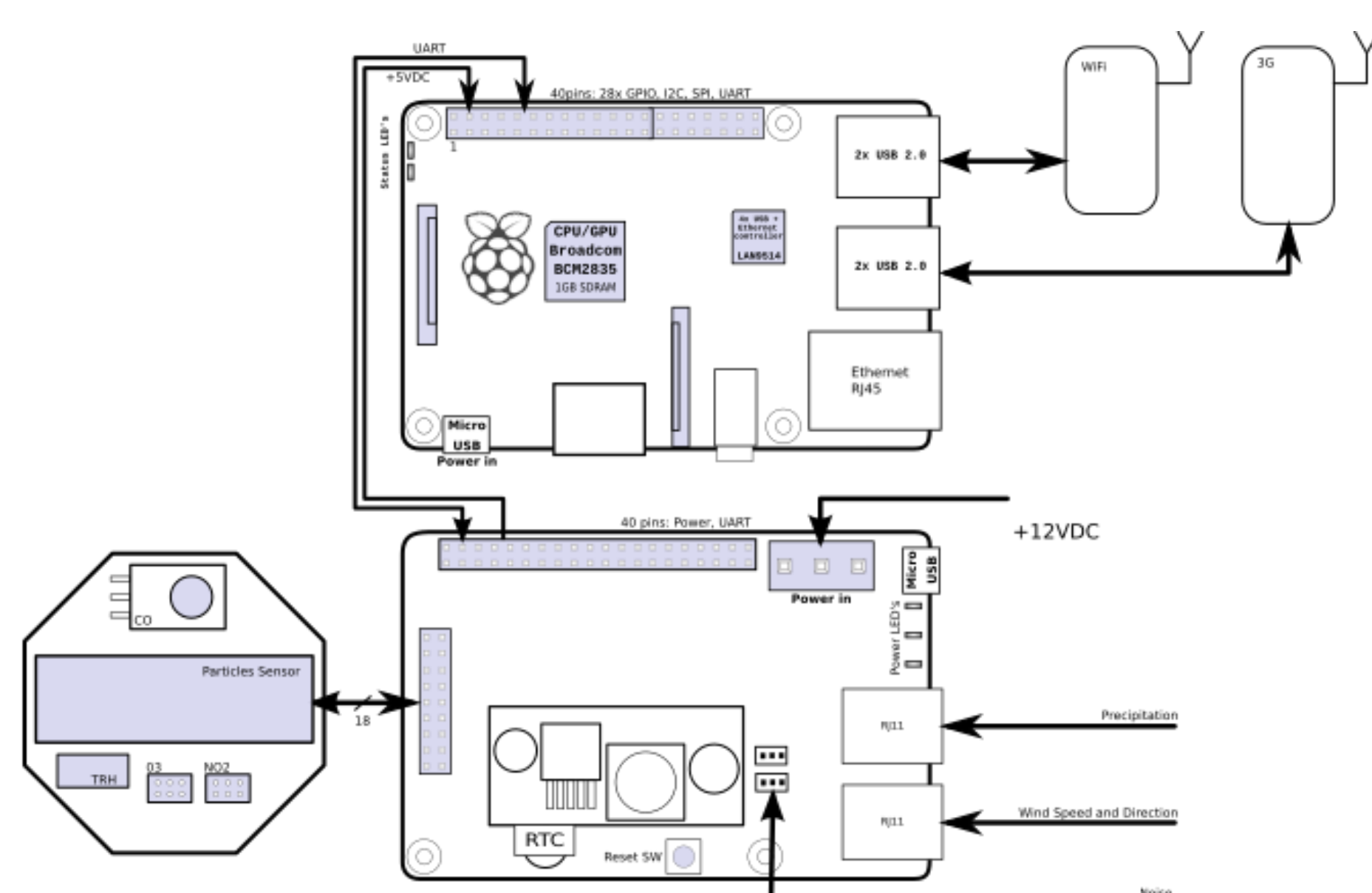


- Operation:
- DCU searches for AP from bus OBU
 - Data off-loaded to bus OBU using WiFi
 - Data routed to RSU through vehicular network
 - Data sent to server via backbone optical fiber

Software Architecture

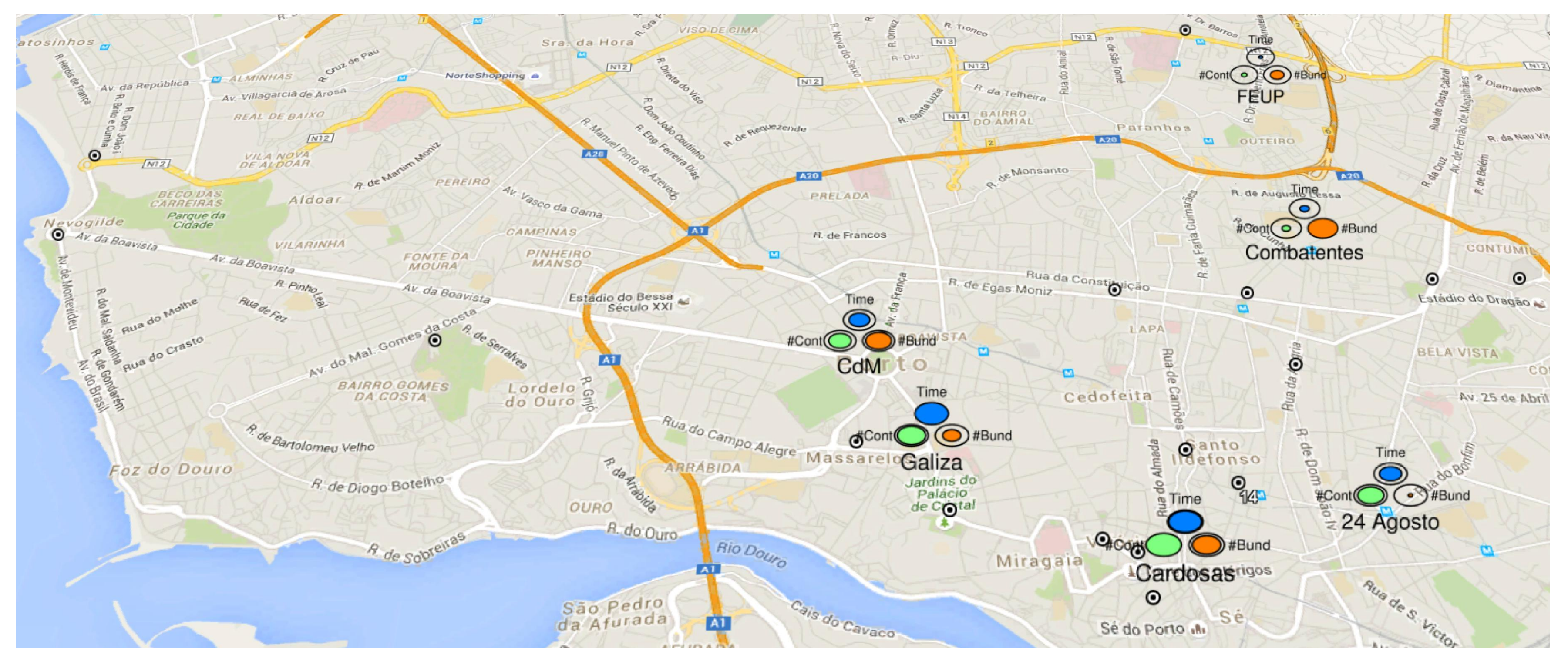


Hardware Architecture at DCUs



Deployment and Network Metrics

- Locations have different DCU-to-OBU communication characteristics
- We measure **number of contacts** with buses, **number of packets transmitted** per contact, and **total contact time** with buses.



Legend: Location of all DCUs. For DCUs with infrastructure-to-vehicle measurements, graph of three circles shows ratio of that metric for maximum value recorded of all DCUs.

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