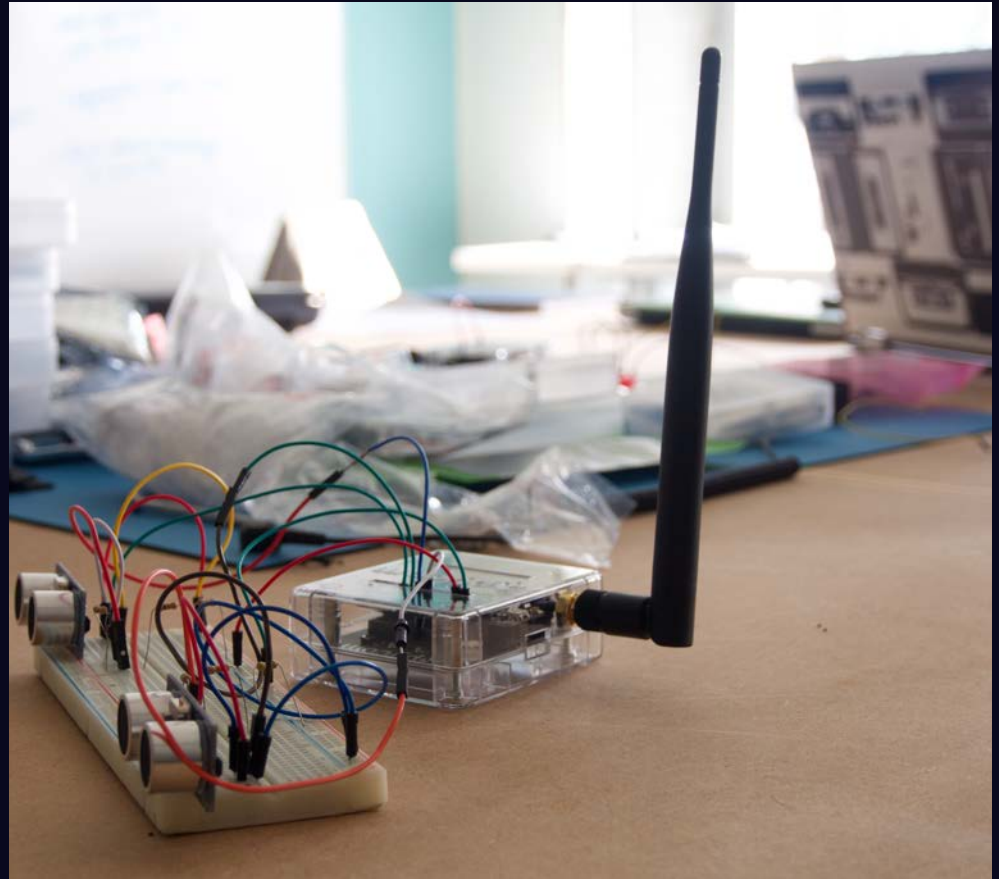




# University IoT Programme

Ewan Klein  
Simon Chapple





## LPWAN

- Low-Power Wide-Area Network
- Wireless
- Long-range communication between things
- Low bit rate
- Long battery life



# LoRaWAN

- One type of LPWAN
- Uses star topology:
  - A gateway relays messages between multiple end-devices and backend server
- Widely adopted globally, including the United States, Australia, New Zealand, Taiwan, Netherlands, India
- The Things Network global community build initiative
- Also deployed by CENSIS in Glasgow, and Digital Catapult in London (50 gateways)



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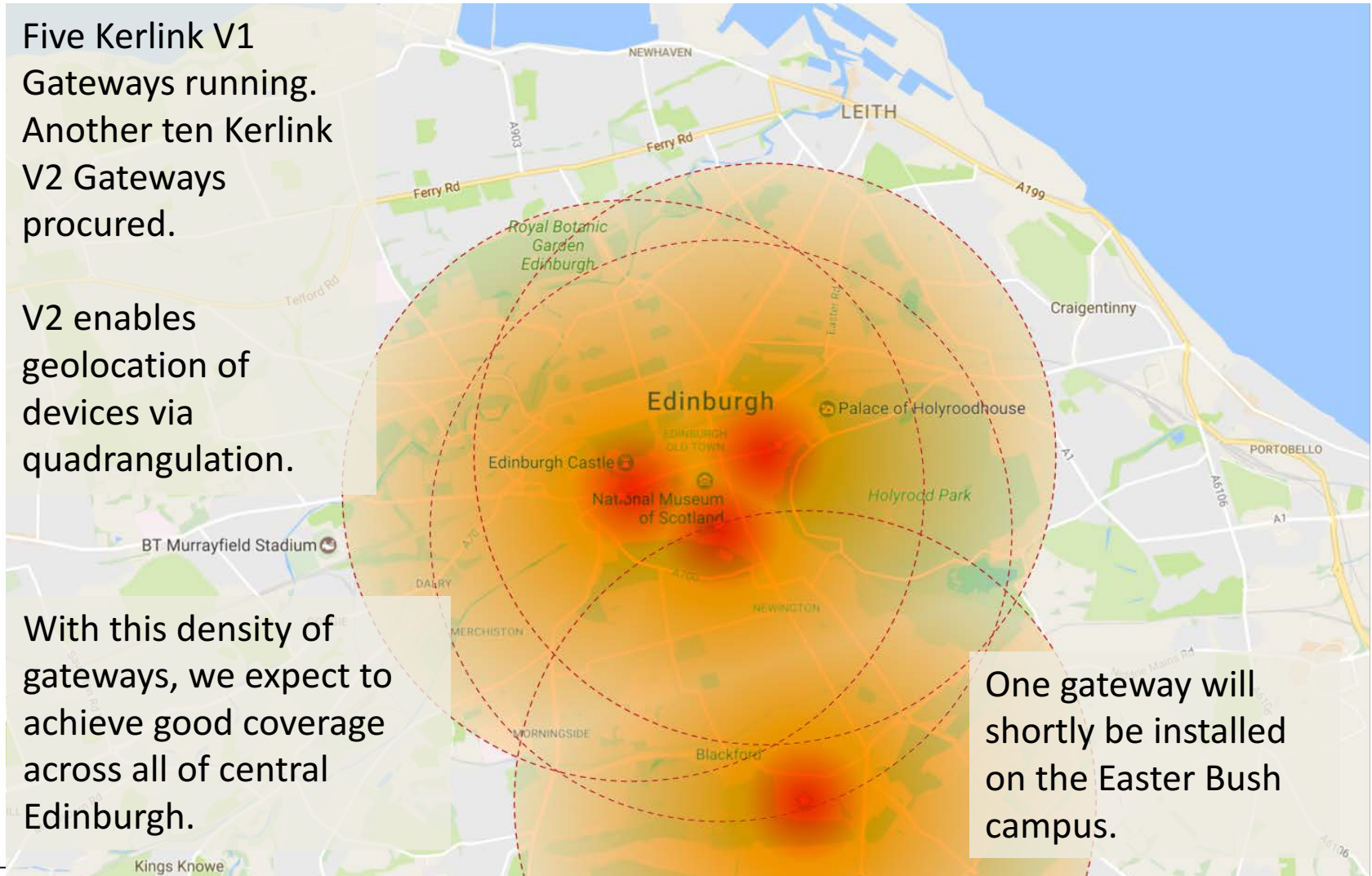
# University LPWAN Research & Innovation Infrastructure

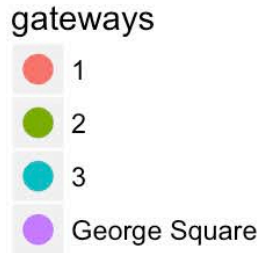
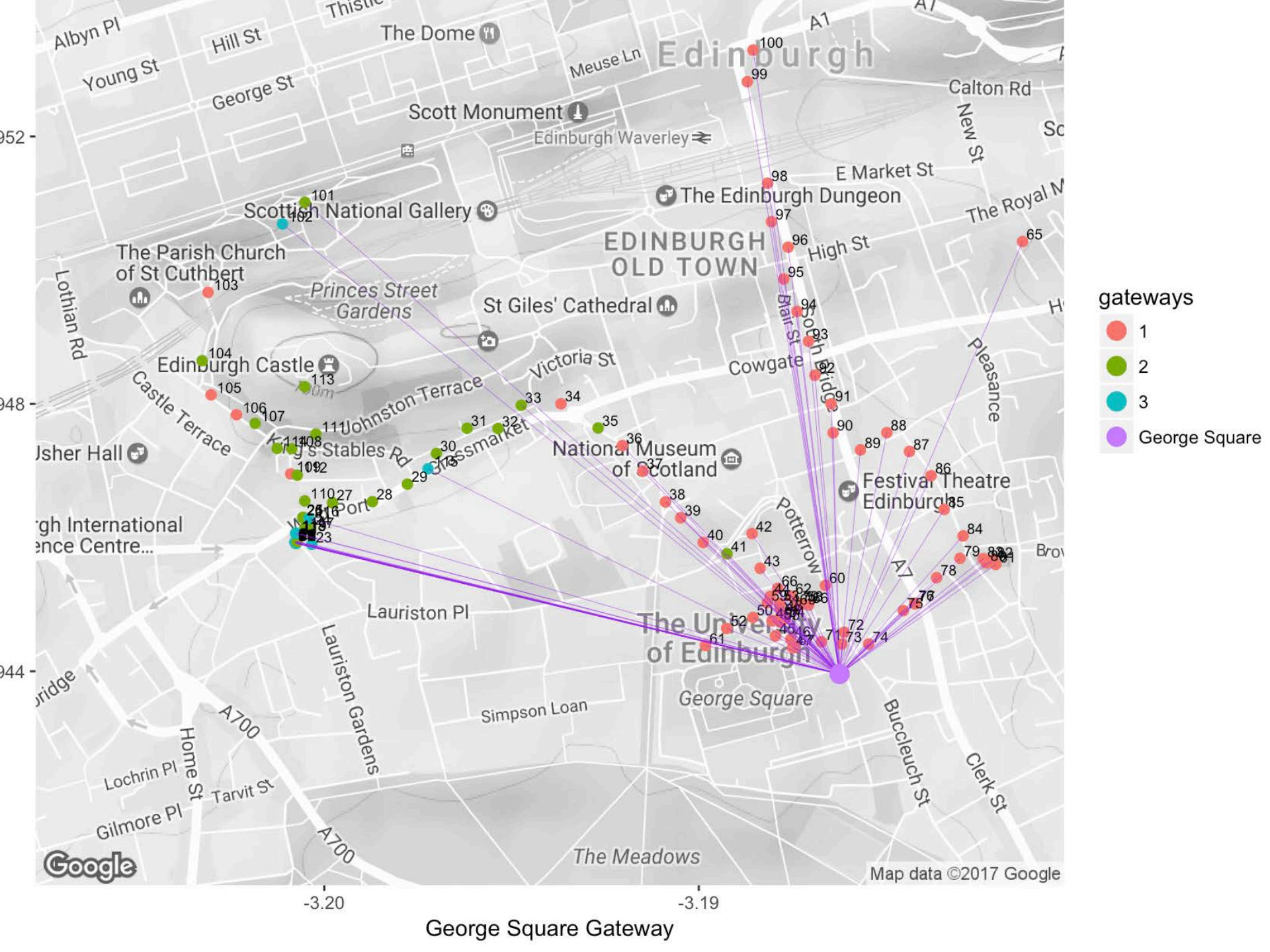
Five Kerlink V1 Gateways running.  
Another ten Kerlink V2 Gateways procured.

V2 enables geolocation of devices via quadrangulation.

With this density of gateways, we expect to achieve good coverage across all of central Edinburgh.

One gateway will shortly be installed on the Easter Bush campus.





George Square Gateway



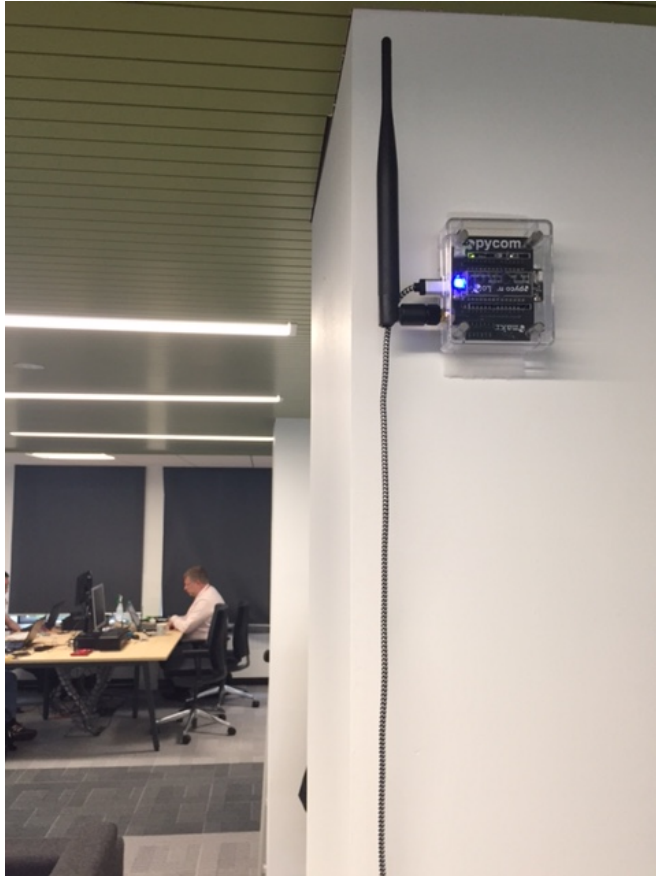
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# Argyle House



## Argyle House: meeting room occupancy



### Estimote Beacons (Bluetooth)

- Smart cushion with with Force Sensitive Resistor
- presence, movement, temperature, light level

### LoPys = Local Sensor Hubs

- collect data from beacons
- transfer to backend server over LoRaWAN

### Currently deployed:

- E4 meeting room
- K-East & K-West
- F-East & F-West
- 9 Sensor Hubs, 58 beacons
- 114 recorded sensor readings every 2 minutes





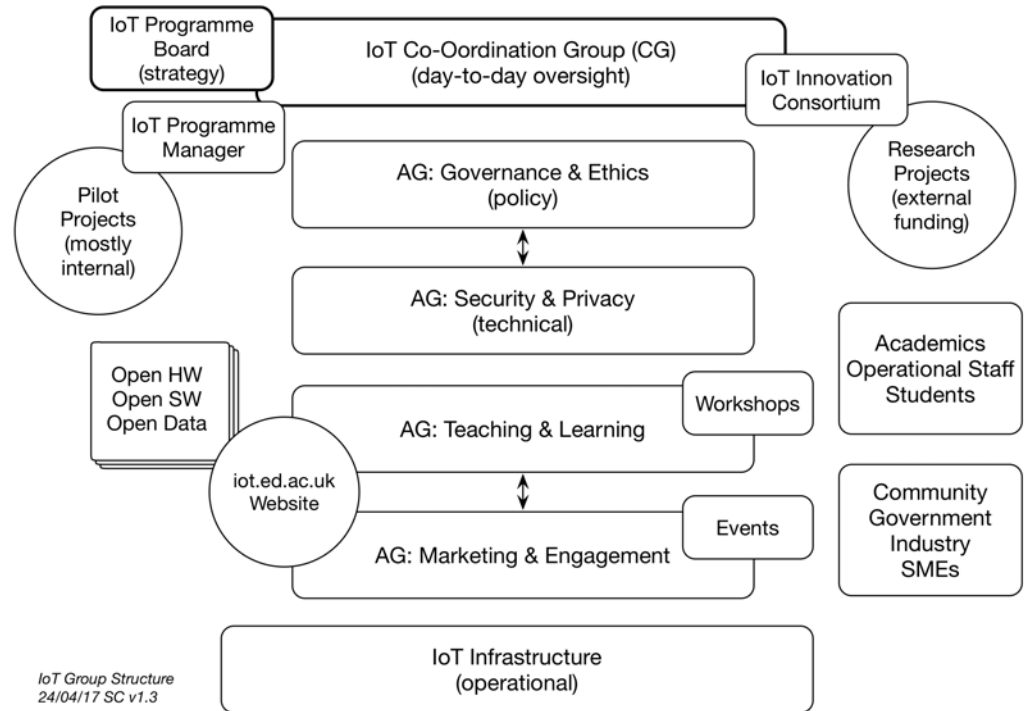
## Questions

- How can we use visualisation to explore and understand the data?
  - What are the views of staff in Argyle House about the data collection?
-



# Main IoT Programme Goals for 2016/17

1. Establish IoT communications infrastructure on University estate
2. Experiment with infrastructure and sensors via a small set of pilot projects
3. Establish a governance framework to manage the IoT Programme
4. Address specific areas of concern/importance with focused 'action groups'



5. Establish IoT Innovation Consortium for startups, SMEs, government, civic science...