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# Smart Cities

Session 5: Lecture 2:  
City DashBoards

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# Outline of the Lecture

1. The Basic Idea
2. Different Realisations
3. The Technology and the Basic Design
4. Outputs from the Dashboard
5. Real Time Data

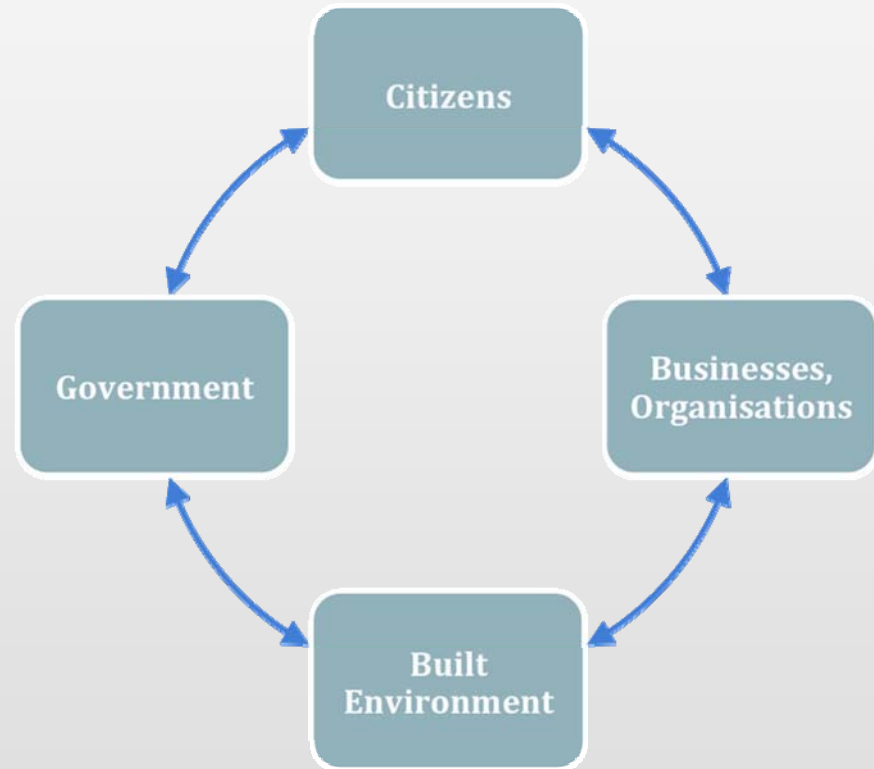
# Smart City Aims

Engage with cities as real-time integrated systems with feedbacks between citizens, businesses, governments and infrastructure.

Use smart technologies to provide detailed measures of city performance, help strategic decision making and enable better informed and more efficient citizen behaviour.

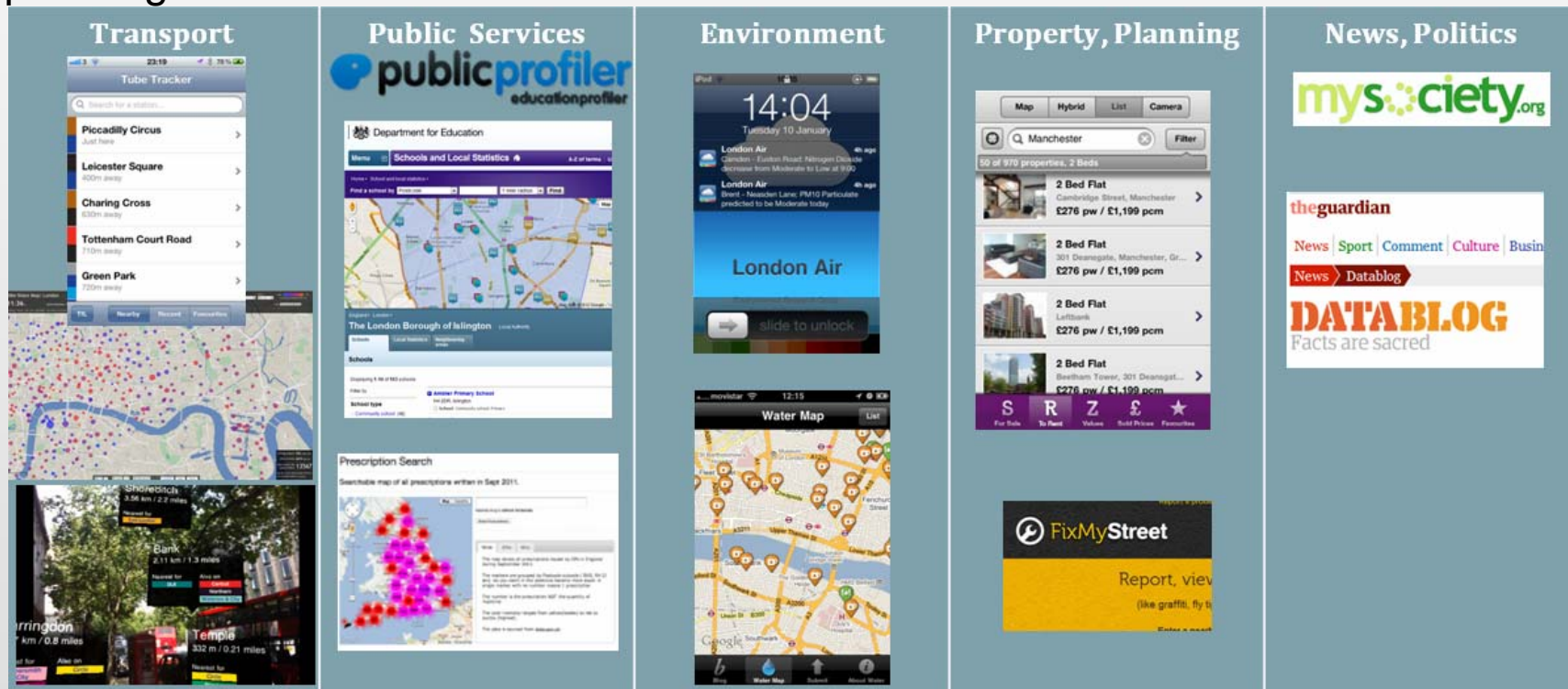
## Associated Technologies

Web 2.0, social networking, smart phones, open data, sensor networks...



# Open Data Ecosystem

For UK, key government drivers from data.gov and London Datastore, both launched early 2010. Currently evolving ecosystem of websites, apps using data-



National Audit Office report shows raw data needs to be made accessible and visualised to generate significant users.

# City Dashboard

## Integrated Overview

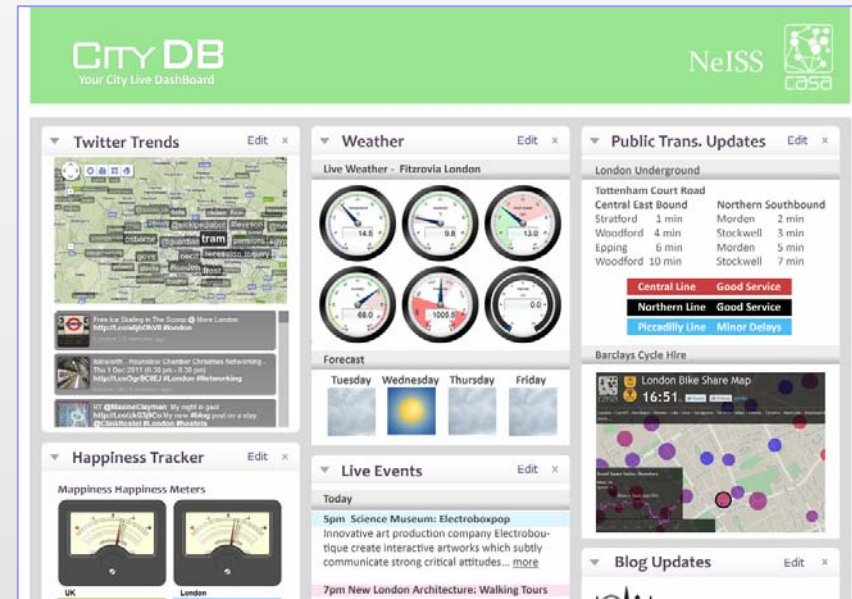
In addition to specialised apps for particular tasks, useful to have integrated overview of cities, identify connections and synergies in urban systems.

## City Dashboard Concept

Website presenting range of real-time data trends and patterns. Should be highly accessible, provide quick summary of trends. Customisable to user preferences.

## Transferable Platform

Want to include multiple cities. Currently based on major UK cities. Growing number of urban data stores- Paris, Barcelona, Amsterdam- means future potential for international platform.





# Existing City Dashboard Sites

## US Cities Gov Transparency Sites

Report government performance indicators, budgets, spending, news. "Track DC", "Checkbook NYC"...



## Birmingham Civic Dashboard

Visualises public requests to council and their solutions.



Interesting examples, but not providing customisable platform to integrate a range of real time urban data streams...

## Consultancy Design Concepts

Design mockups of similar idea from Arup, IBM. Not yet developed into functioning websites.



# Urban Interconnection Examples

Urban processes are interactions between citizens, organisations, built-environment. Reflected in connections between social networks (blogs, twitter etc), cultural events, physical networks, natural environment and citizen behaviour. Occur in context of typical urban cycles, and emergence of unique events.

## Current London Examples- Transport Disruption

Linking transport networks to major events (sporting, demonstrations, strikes). Reflected in journey behaviour, pollution, user delays, productivity.

## Mayoral Election

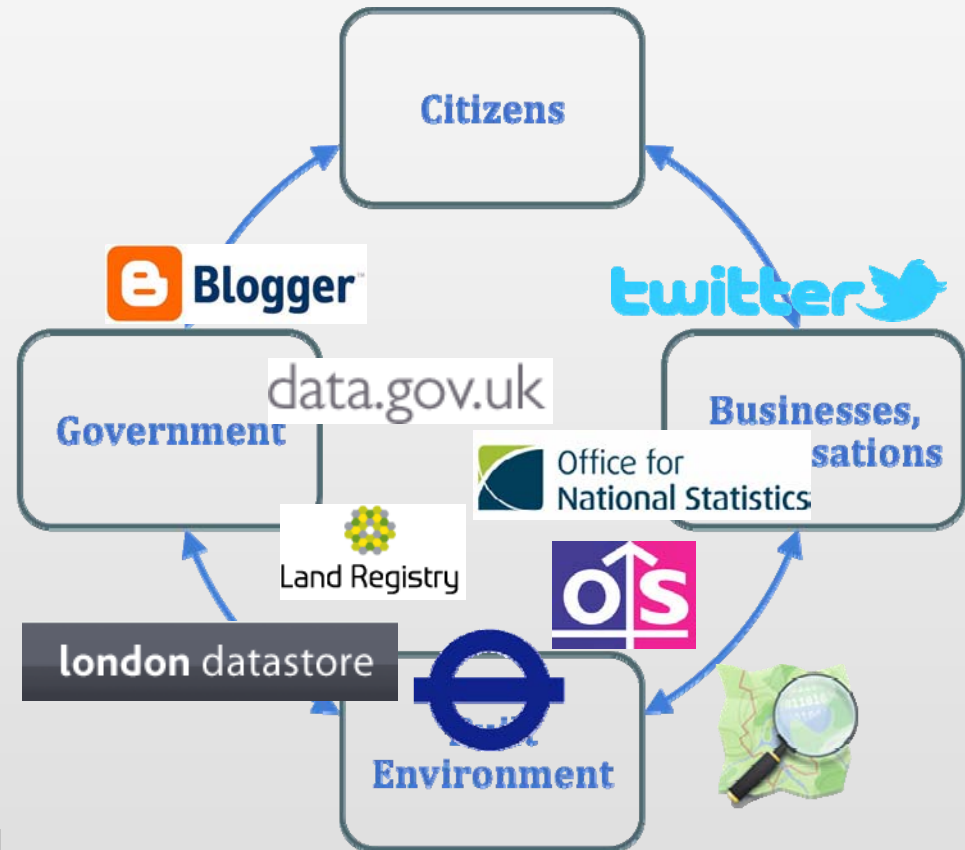
Political debate, social networking, government.

## Tech City

Business and cultural cluster linking start-ups, social networking, universities and government policy.

## Drought

Current drought predicted to last to winter 2012. Need to influence water use. Further effects on wildlife, green spaces.



# City Dashboard Outline Design

Still early in open data evolution, and currently data limited in many domains. Also challenges in integration, heterogeneity, finding real time data, reliability...

## Social Networking

Masses of real time data, but lots of noise. Issues of filtering, representation.

## Transport

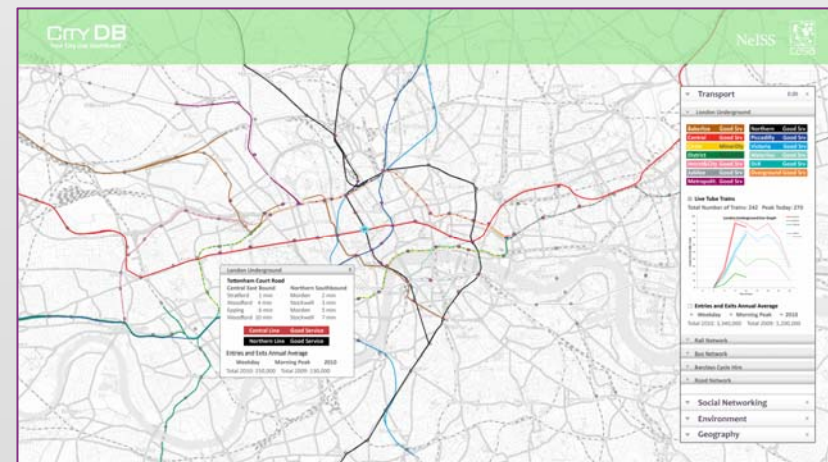
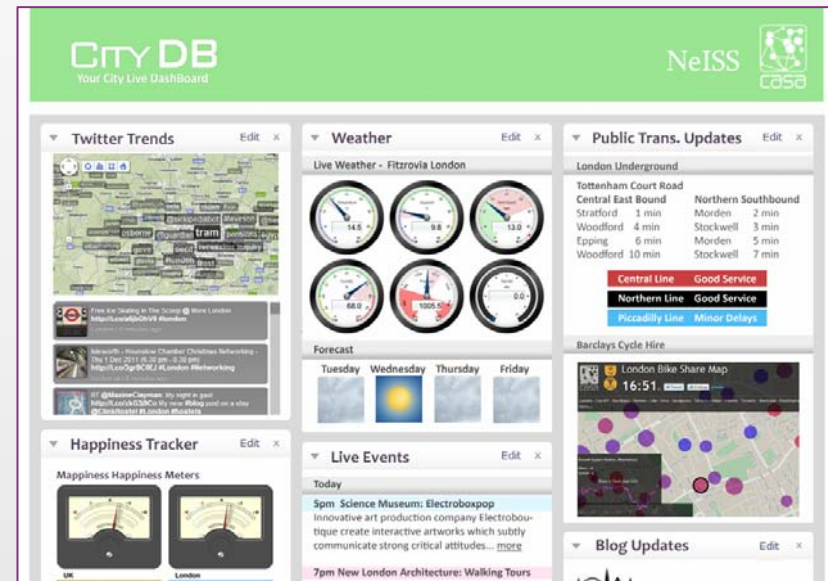
Innovation from TfL on real time data, and rail departure board info. Coverage more limited in other UK cities.

## Environment

Improving data with real time air pollution (LAEI, DEFRA), river levels (DoE), weather (Met Off). Challenge to give temporal context, link to citizen behaviour.

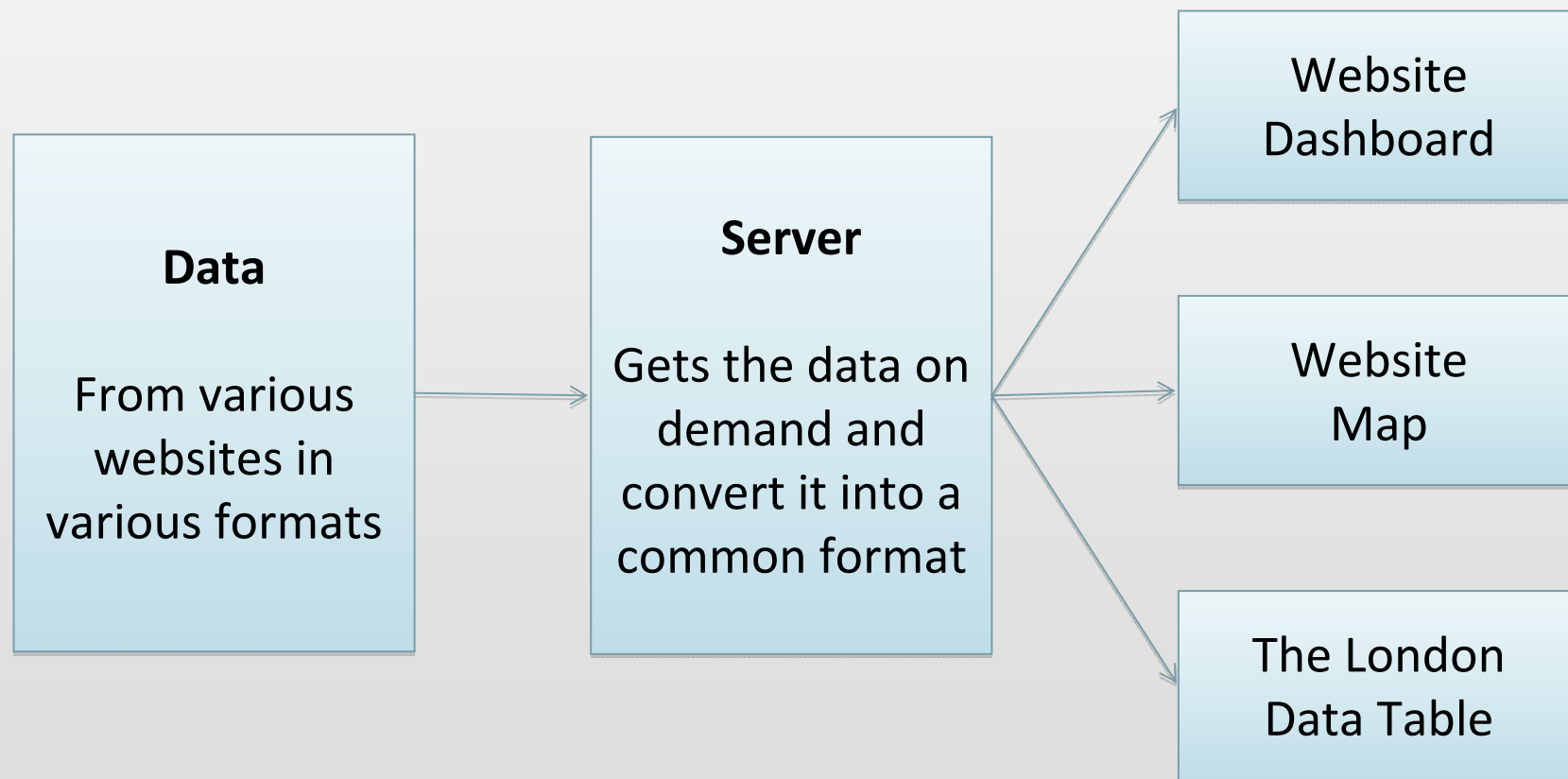
## News, Events, Community...

Can provide local news stories, events. Lots of info sources not easily available- community groups, planning decisions...





# CityDashboard – Summary

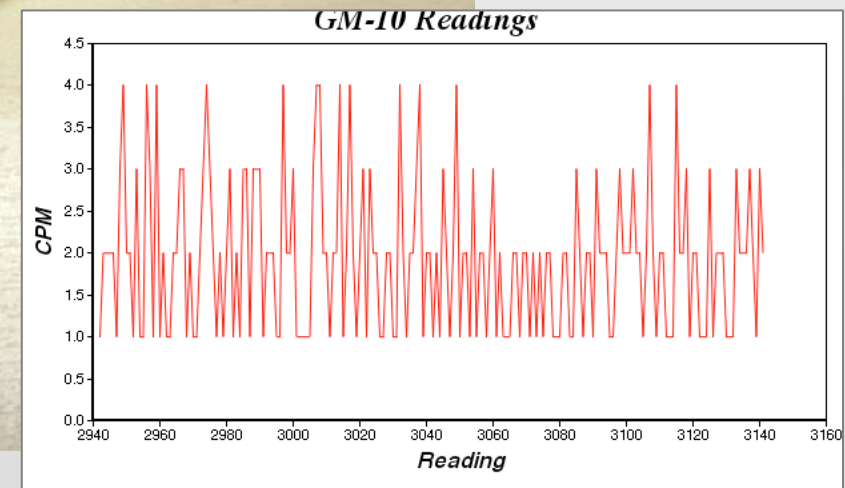
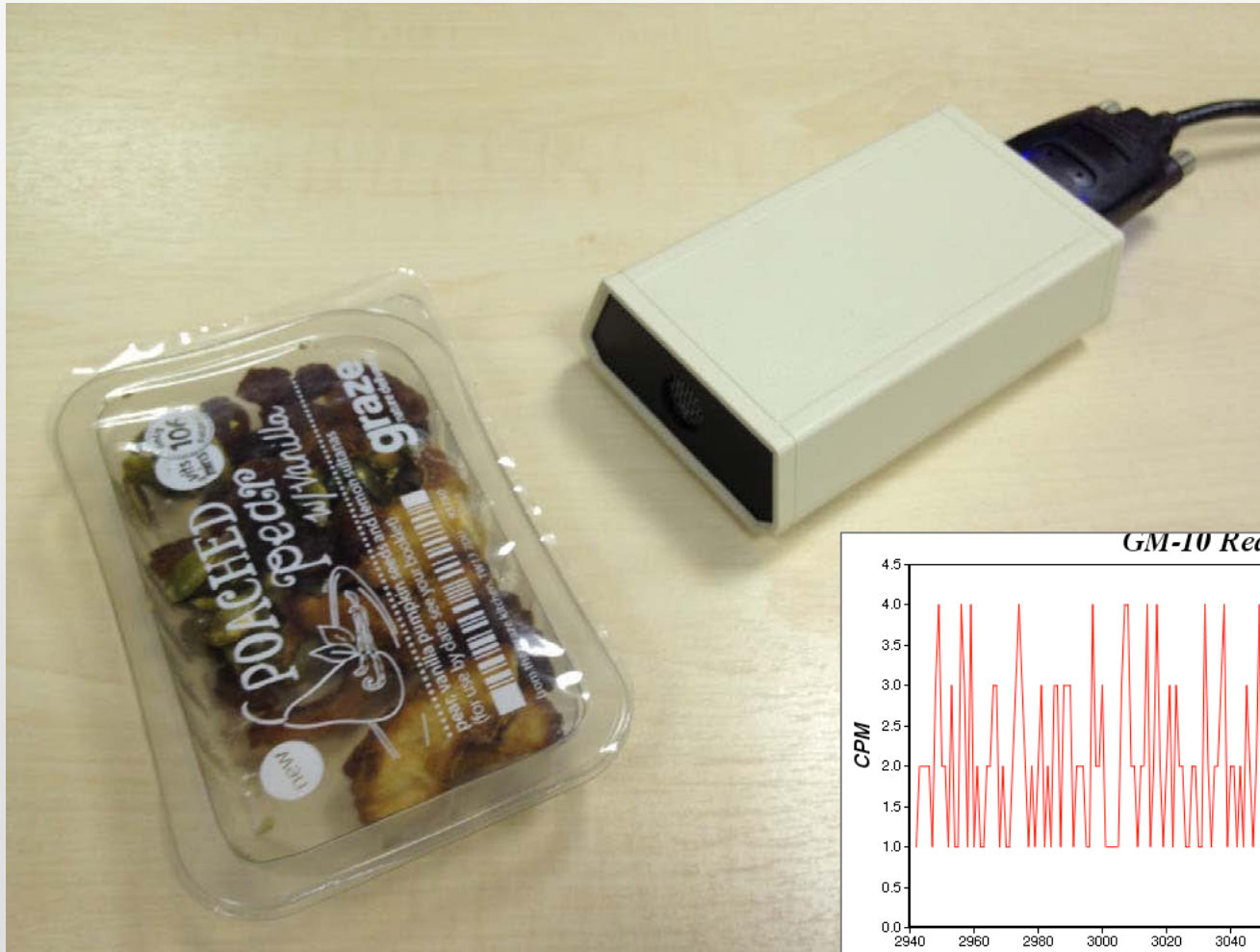


# CityDashboard – Data Inputs (The Good - APIs)

- XML
  - TfL (Cycle Hire bikes, Tube lines, traffic cameras, road matrix signs)
  - Google (iGoogle weather)
  - BBC RSS (local news)
  - OpenStreetMap RSS (updates)
  - PLA (Thames river levels)
- JSON
  - Twitter (regional trends, custom lists)
  - Mappiness (Mood)
- CSV and TXT
  - NOAA (METAR airport reports)
  - CASA's rooftop weather station
  - CASA's radiation detector (!)

```
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<xml_api_reply version="1">
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      <postal_code data="London"/>
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      <longitude_e6 data=""/>
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      <temp_c data="9"/>
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    </forecast_conditions>
  </weather>
</xml_api_reply>
```

# CityDashboard – Data Inputs (The Good - APIs)



# CityDashboard – Data Inputs (The Bad - Scraping)

- HTML
  - DEFRA
    - King's now have a JSON API for London
    - DEFRA have an JSON API with a subset of the data
  - ScotRail's "tube-style" line running information

Service updates		Last update: 23:12
<input type="checkbox"/> Strathclyde South	Good Service	
<input type="checkbox"/> Glasgow - Whifflet	Good Service	
<input type="checkbox"/> Glasgow - Cathcart Circle Neilston Newton	Good Service	
<input type="checkbox"/> Glasgow-East Kilbride Barrhead Kilmarnock	Good Service	
<input type="checkbox"/> Glasgow-Paisley Canal	Good Service	
<input type="checkbox"/> Strathclyde North	Good Service	
<input type="checkbox"/> Central	Good Service	
<input type="checkbox"/> Express	Good Service	
<input type="checkbox"/> Highland	Good Service	
<input type="checkbox"/> East Scotland	Good Service	
<input type="checkbox"/> Ayrshire	Good Service	
<input type="checkbox"/> South West	Good Service	
<input type="checkbox"/> ScotRail Sleepers	Good Service	

# CityDashboard – Basic Technology

Requests from website  
(or data table) go via the  
local server

- Allows use of AJAX

Server caches requests

- Twitter rate limits

No database or other  
persistent storage

- Simple design
- CSV “API”

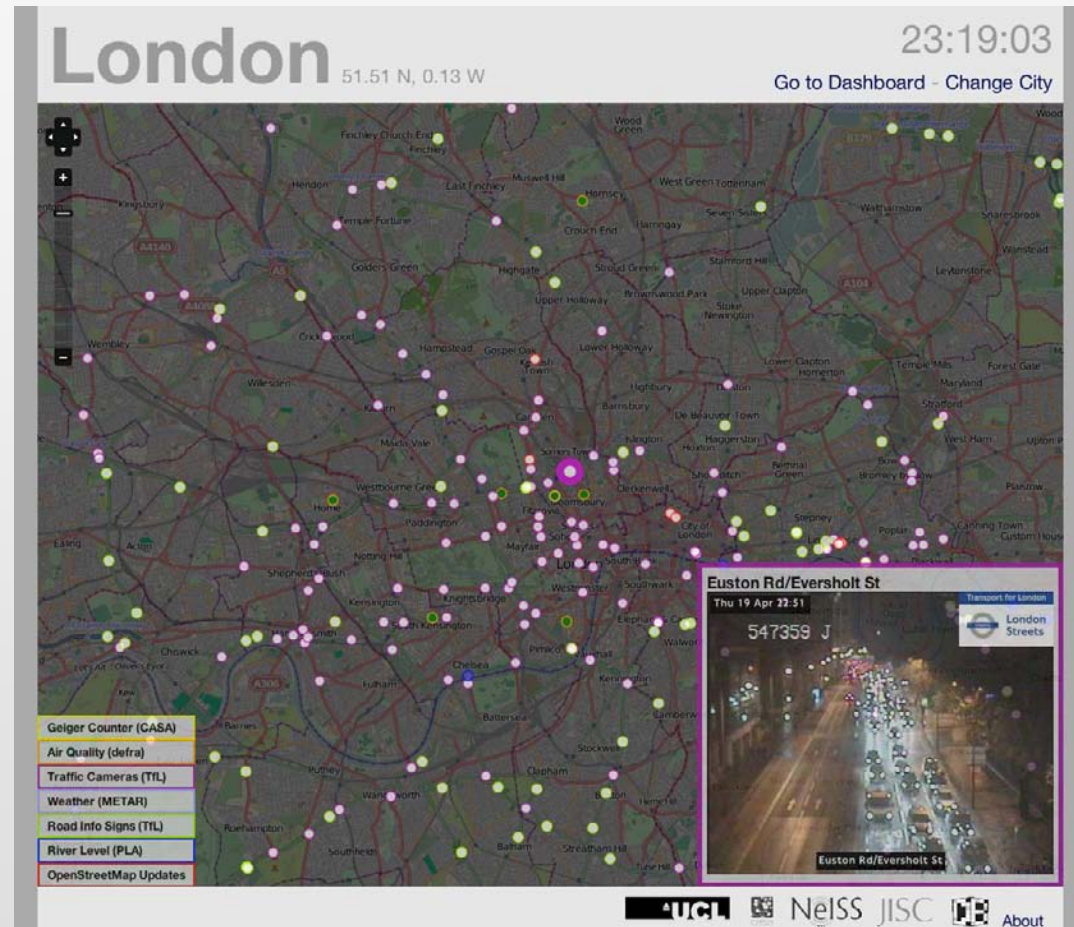




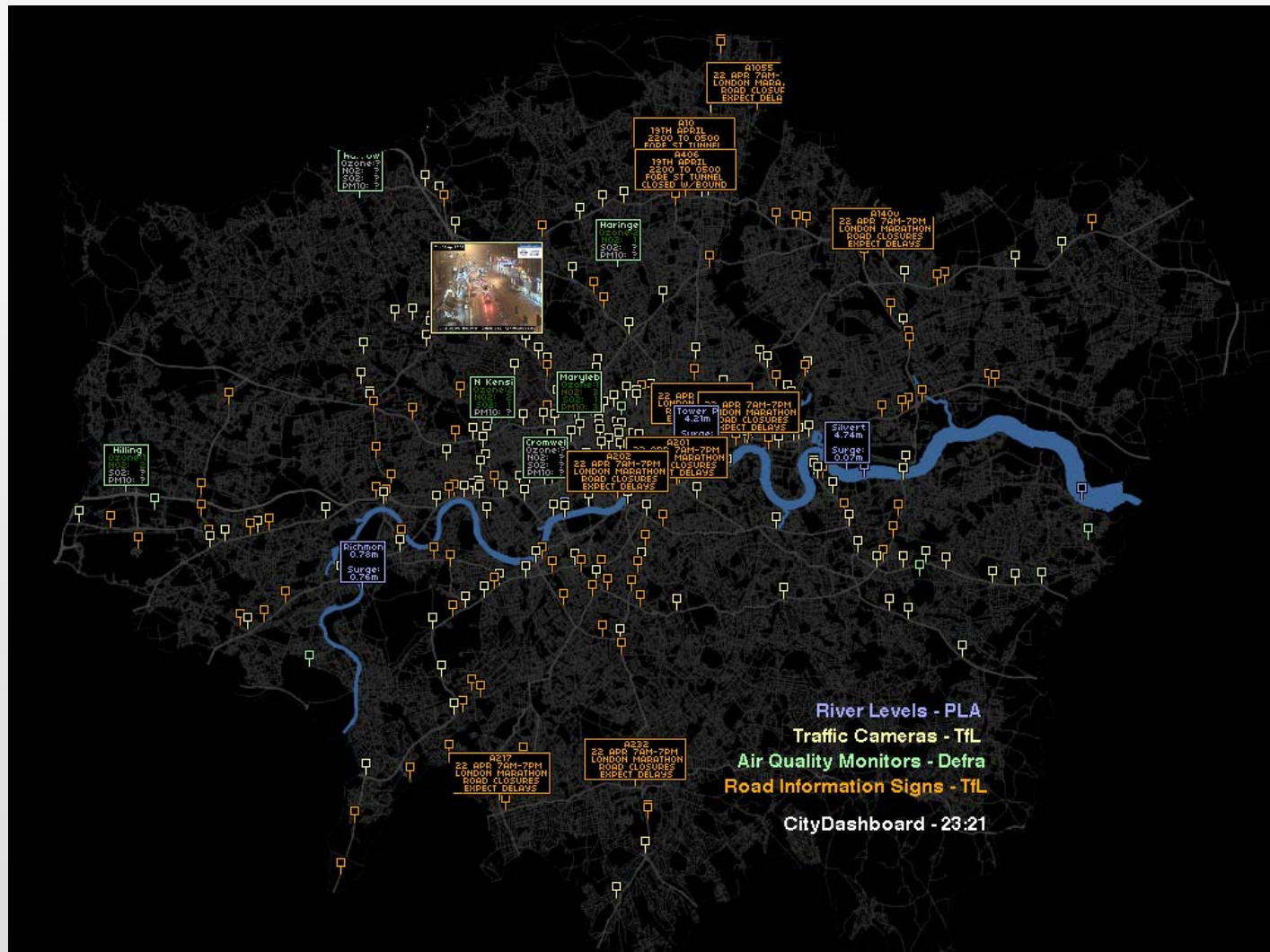
# CityDashboard – Outputs

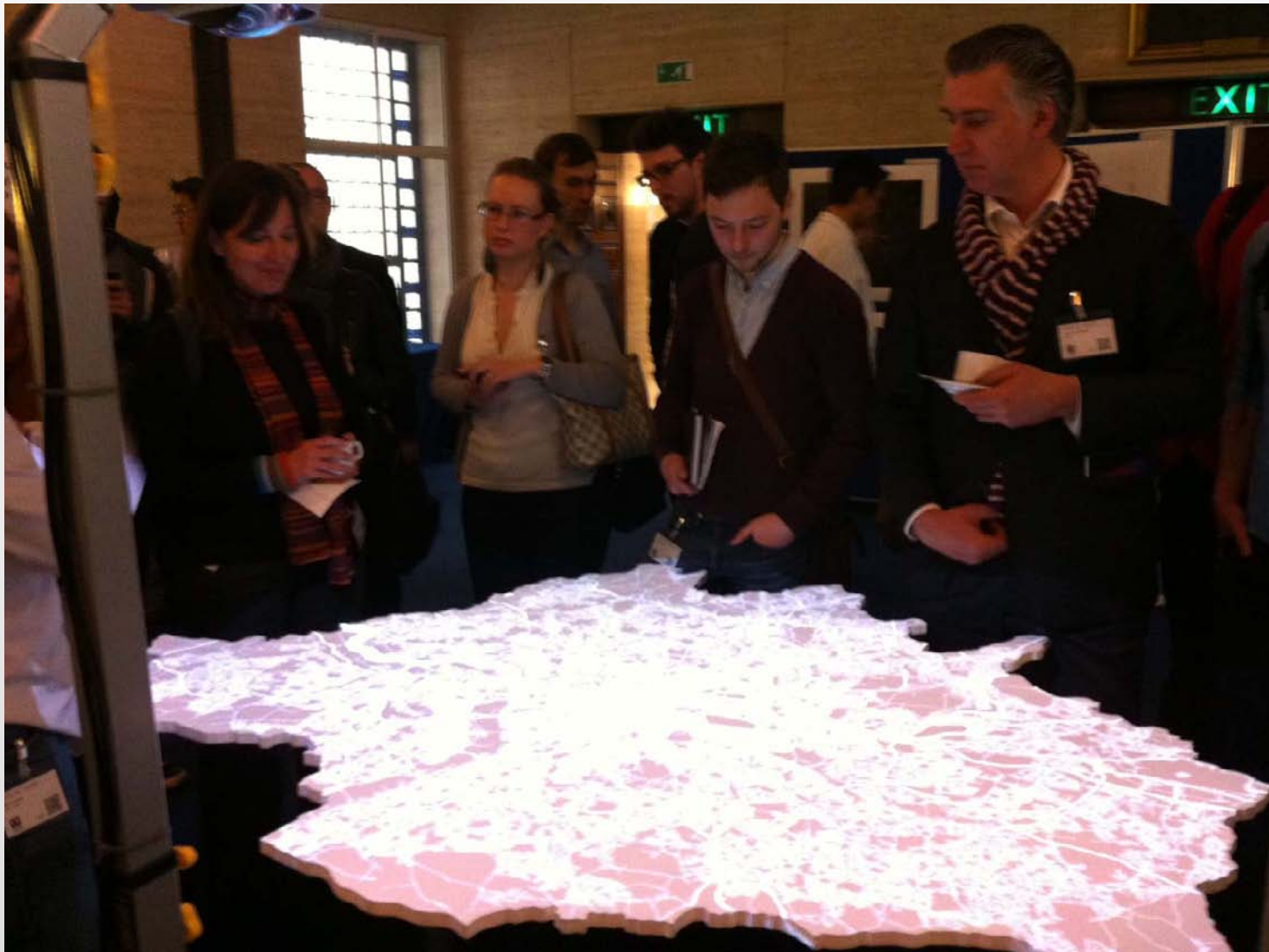
Each feed available as:

- Styled HTML (city-wide and point data)
  - Website dashboard
- As CSV with formatting instructions (point data)
  - Website map
  - Data table



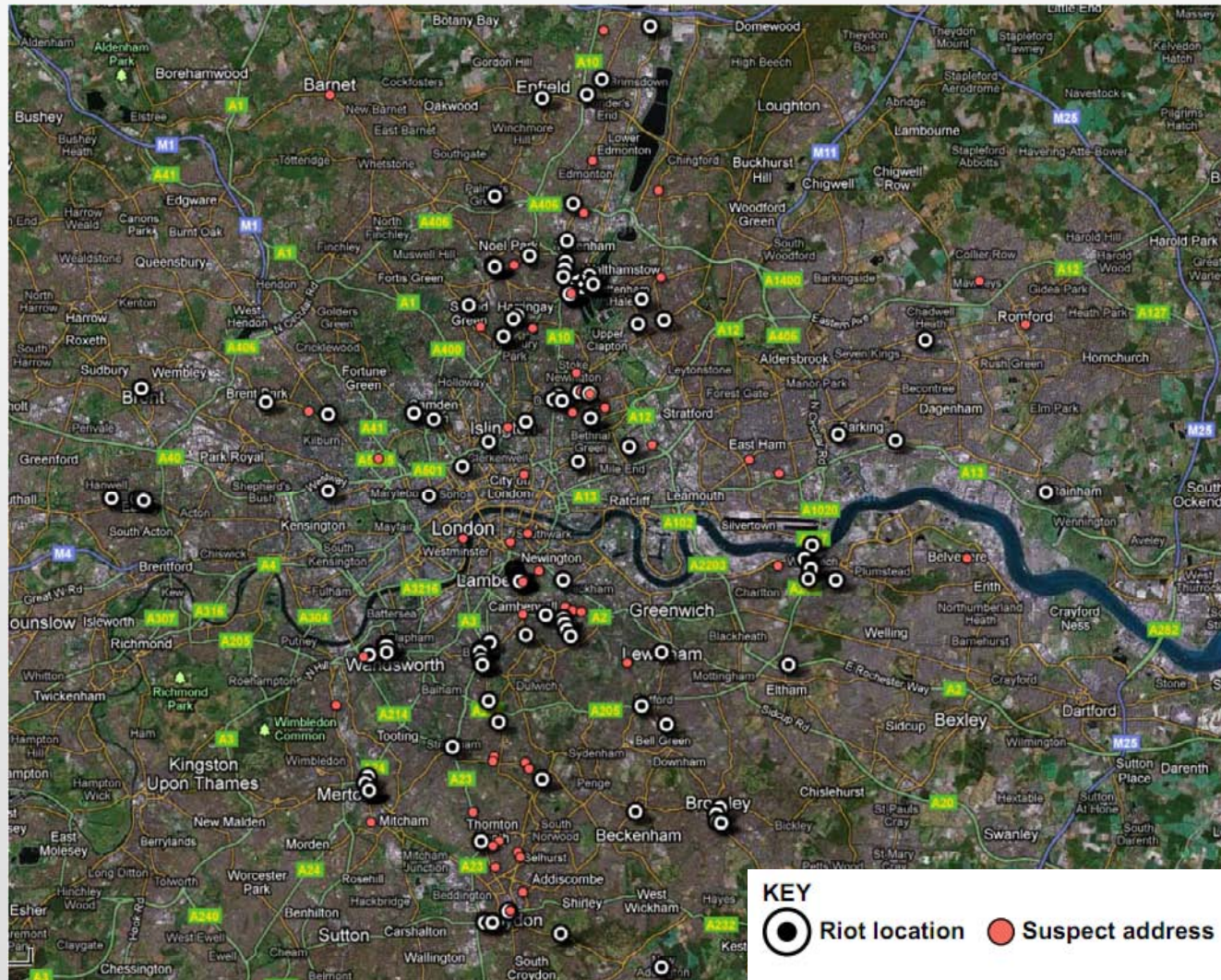
# CityDashboard – Data Table







# The London Riots – Display on the Data Table



# CityDashboard – PigeonSim

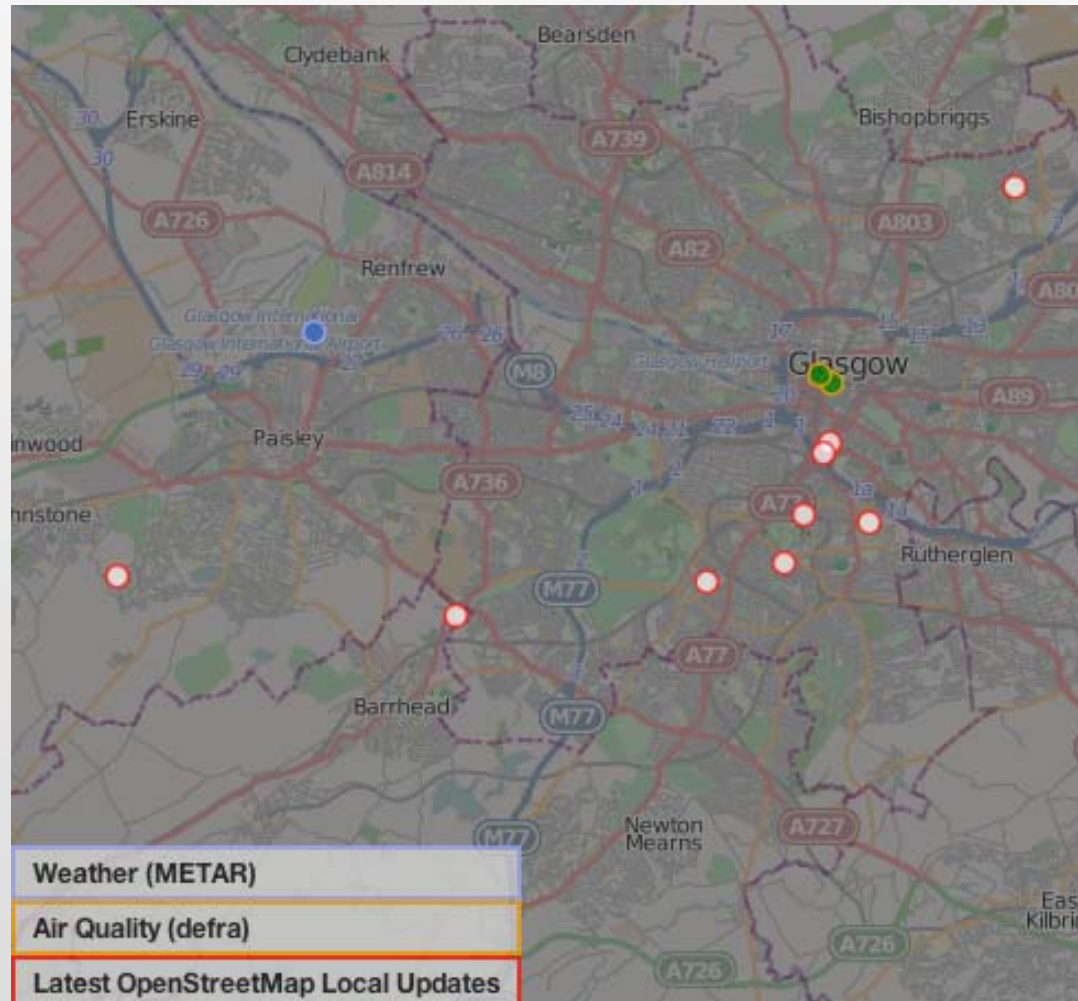
You'll also find  
some  
CityDashboard  
data as you fly  
around in  
PigeonSim,  
along with point  
data from other  
sources





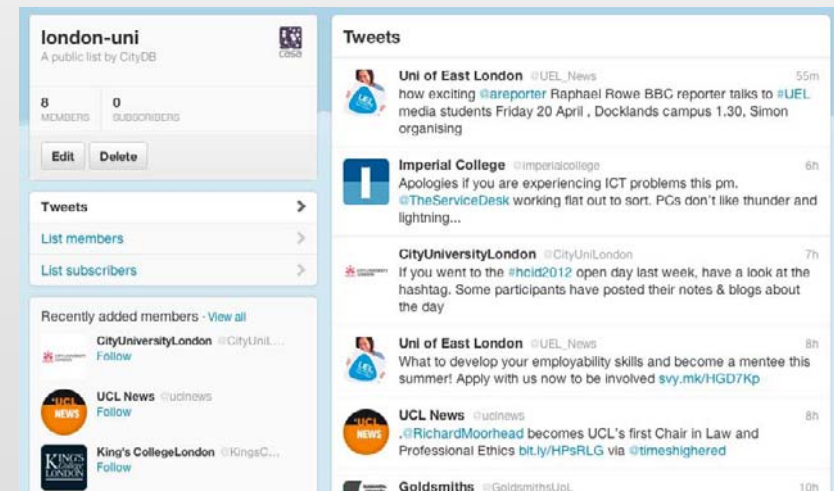
# CityDashboard – City Coverage

- Birmingham
- Cardiff
- Edinburgh
- Glasgow
- Leeds
- London
- Manchester
- Newcastle



# CityDashboard – Twitter Lists

- Hand-picked Twitter lists for each of the 8 cities. Each city has two lists:
  - General news
    - city council
    - relevant newspapers, radio and TV stations
    - local correspondents
    - tourist board
  - University news
    - Research news from the major universities
    - Student Union news
- The lists are separately available at:
  - <http://twitter.com/citydb/london>
  - <http://twitter.com/citydb/london-uni>
  - <http://twitter.com/citydb/cardiff>
  - <http://twitter.com/citydb/cardiff-uni>etc...



# Challenges

## Data Availability and Standardisation

Data availability improving. Relatively standardised within the UK but more problematic internationally.

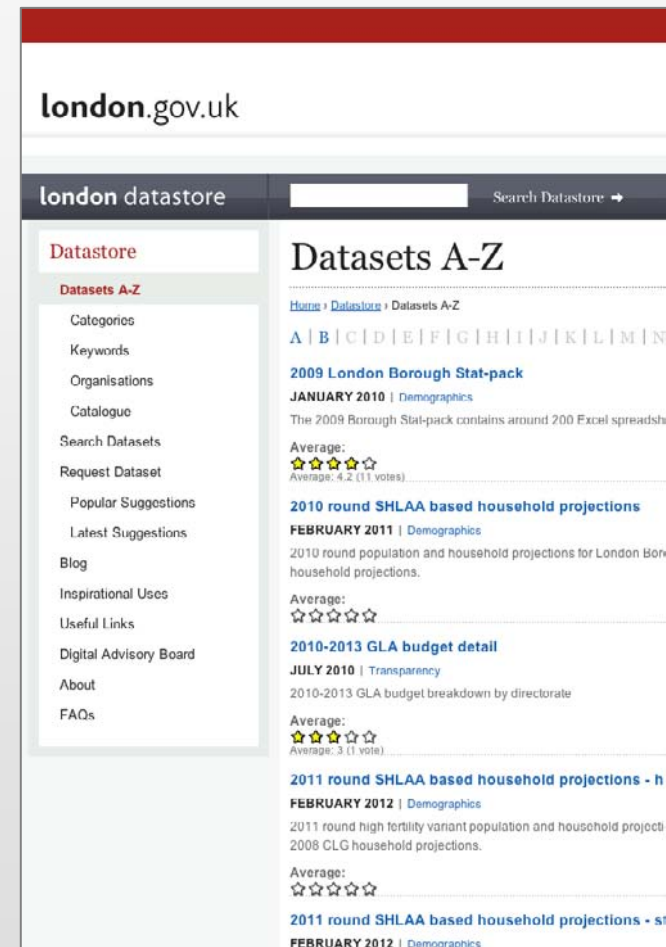
## Temporal Variation

Limited number of datasets in real time. Also important to put real time data in context of typical urban cycles and highlight important events.

## Filtering and Relevance

Social networking data in particular very noisy. Currently filtering by location only, may need more sophisticated approach.

Local Twitter trends



# Future Developments

## Incorporating New Datasets

Include other key feeds

Train running information for major stations in each city

Build out city-specific feeds for the other cities in the project

Document and make available the API for other projects

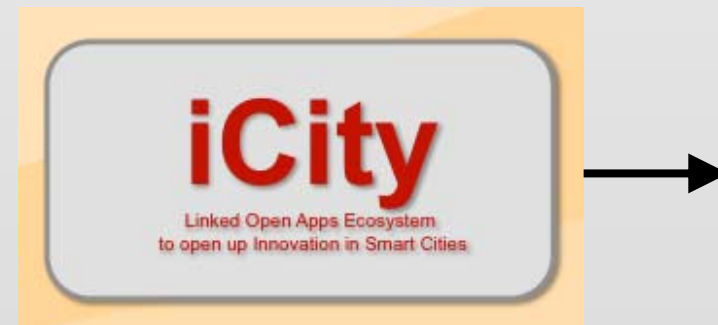
## Improving User Customisation

Commute mode start/end split screen

Geolocate website visitor within their city

## International Platform

**iCity** - Linking up with city data store projects in other EU cities.



Projects: iCity | Europa - Information Society - Windows Internet Explorer

http://ec.europa.eu/information\_society/apps/projects/factsheet/index.htm

Projects: iCity | Europa - Inf...

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Projects :: iCity

## iCity: Linked Open Apps Ecosystem to open up innovation in smart cities

The iCity project aims at making a step forward in fostering the co-creation of services of public interest by third parties pushing for their space as services provisioners in Smart Cities' urban spaces. This will be done by bootstrapping the involvement of open innovation ecosystems such as Living Labs in bringing the users together in the whole co-creation process using a self-centred methodology. iCity involve into the co-creation of services of public interest different types of stakeholders: private and third sector as new services developers, and citizens and companies as beneficiaries and final users of the new services. The project responds to the growing demand from social stakeholders to provide services of public interest based upon the exploitation of available public information, digital assets and infrastructure. In doing so, the project encompasses the concept of Open Data with a novel approach of Open Infrastructures where the available municipal ICT networks already deployed in urban spaces will be made available and accessible to open innovation ecosystems (specially SMEs) with the objective of maximizing the number of deployed services of public interest. The services to be finally deployed will be designed by interested user-driven open innovation ecosystems according to selected priority areas for cities and will be developed on the top of a shared technological platform that the iCity project will integrate in the 4 participant cities: Barcelona, Bologna, Genova and London. The iCity platform will enable services deployment using on due time appropriate municipal infrastructures in each city and providing a software development kit (SDK). Transferring will be assured by making the platform be ready to be integrated in any other interested city willing to shift into a Smart City and adopt the co-creation approach in services provision and also by making available services of public interest to the citizenship on an iCity Open Apps Store.

**Contact information**

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**Project ID card**

- Funded under: **The Information and Communication Technologies Policy Support Programme**
- Area: CIP-ICT-PSP.2011.5.1 - Open Innovation for future Internet-enabled Services in "smart" Cities
- Total cost: €5.21m
- EU contribution: €1.98m
- Project reference: 297363
- Execution: From 01/01/2012 to 31/12/2014
- Project status: Running
- Contract type: The Information and Communication Technologies Policy Support Programme PB Pilot Type B

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