# The challenges for geo-infrastructure

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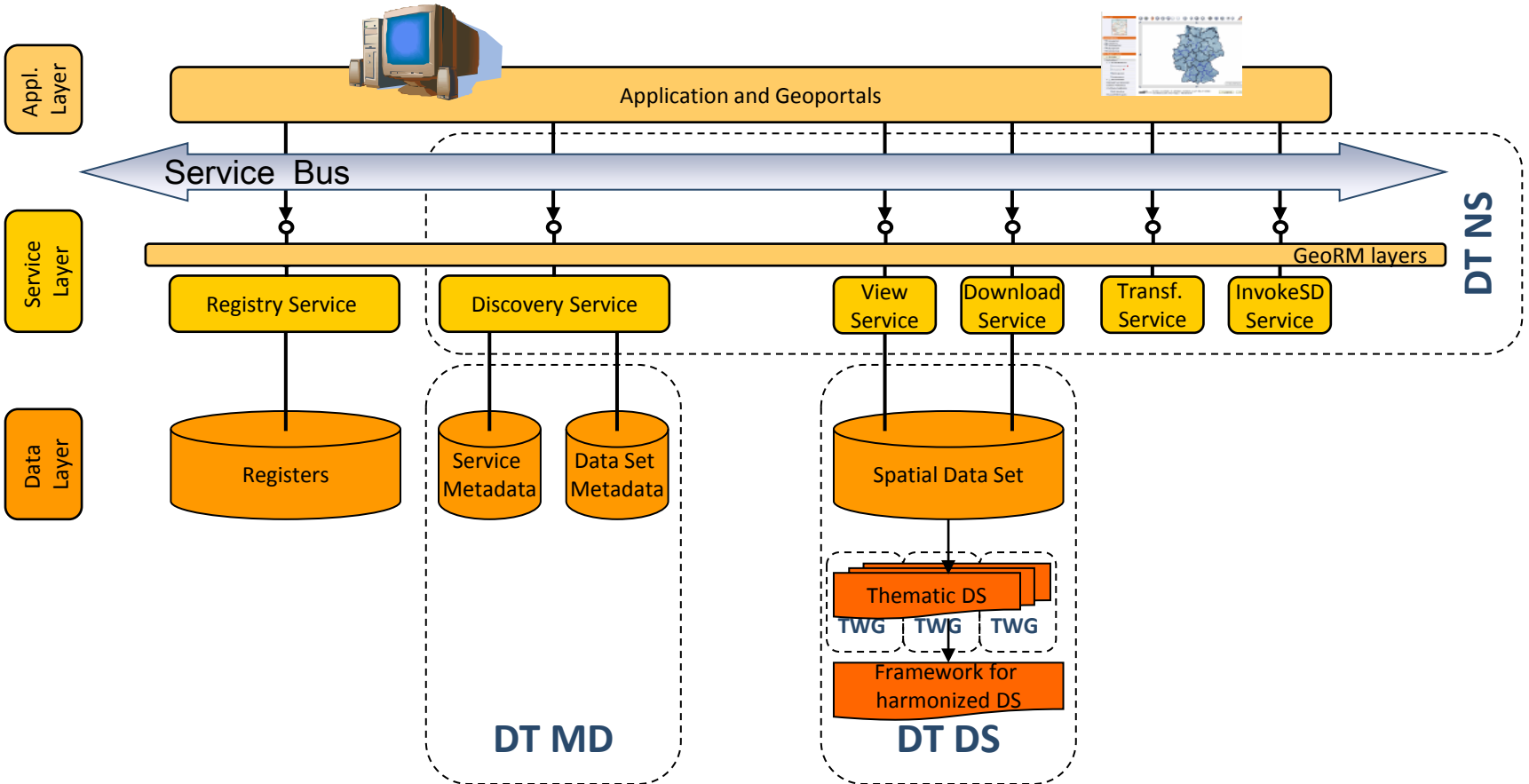
# Hypothesis

- The era of geo-content creation is over.
- Geo-content maintenance is ongoing…
- But now begins the era of content integration
- Content integration will become geo-infrastructure
- Based on open data releases everywhere
- This talk is about how this could happen

# What will this geo-infrastructure look like?

## Three main candidates in Europe:

- Google/Apple/Microsoft
- OpenStreetMap
- INSPIRE/Map Agencies

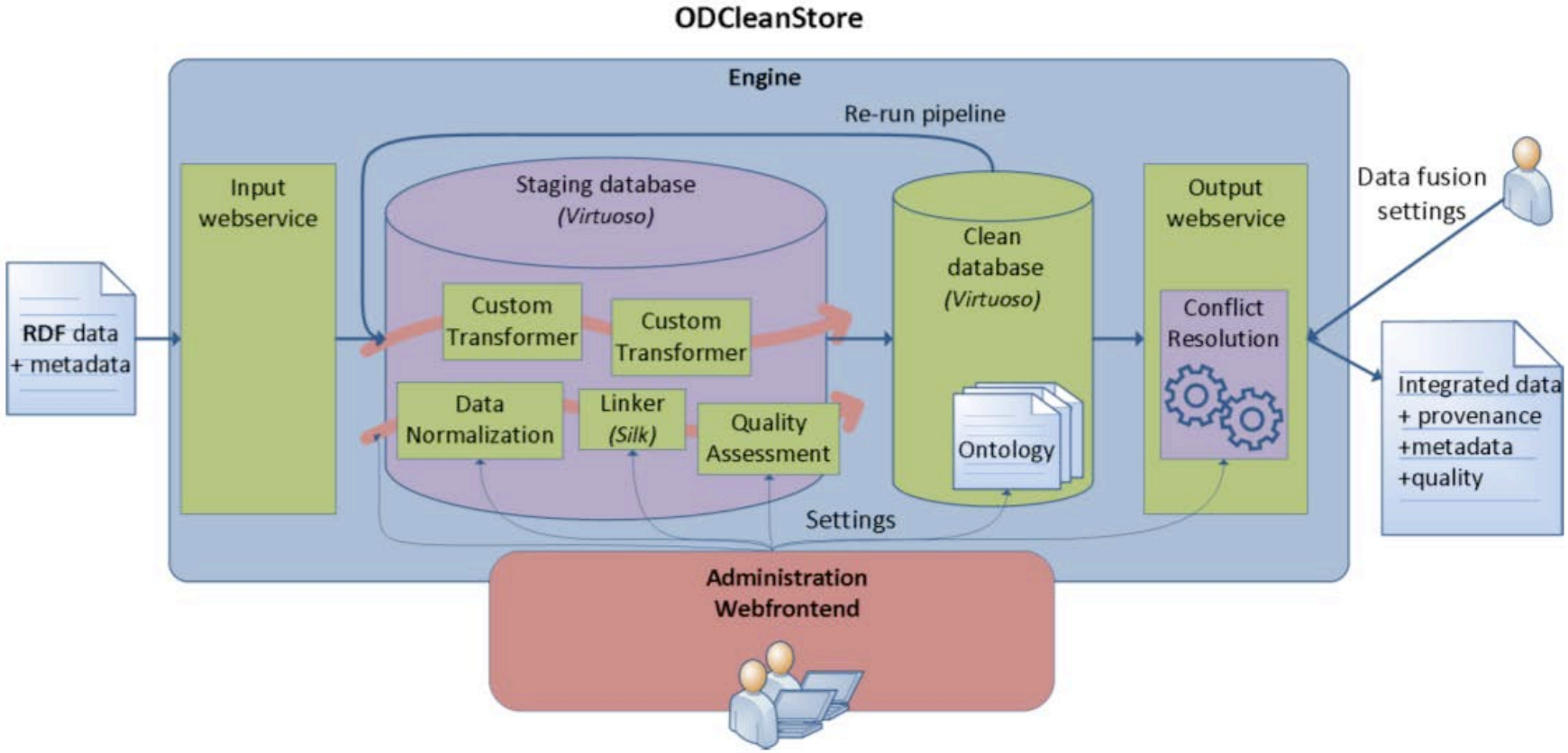


# How will geo-infrastructure evolve?

- Future geo-infrastructure will be ad hoc integration
- No ‘winner-takes-all’ situation for open geodata ☹
- Sector by sector service development
- Services must work together as geo-infrastructure
- Challenge will be how to design for this scenario

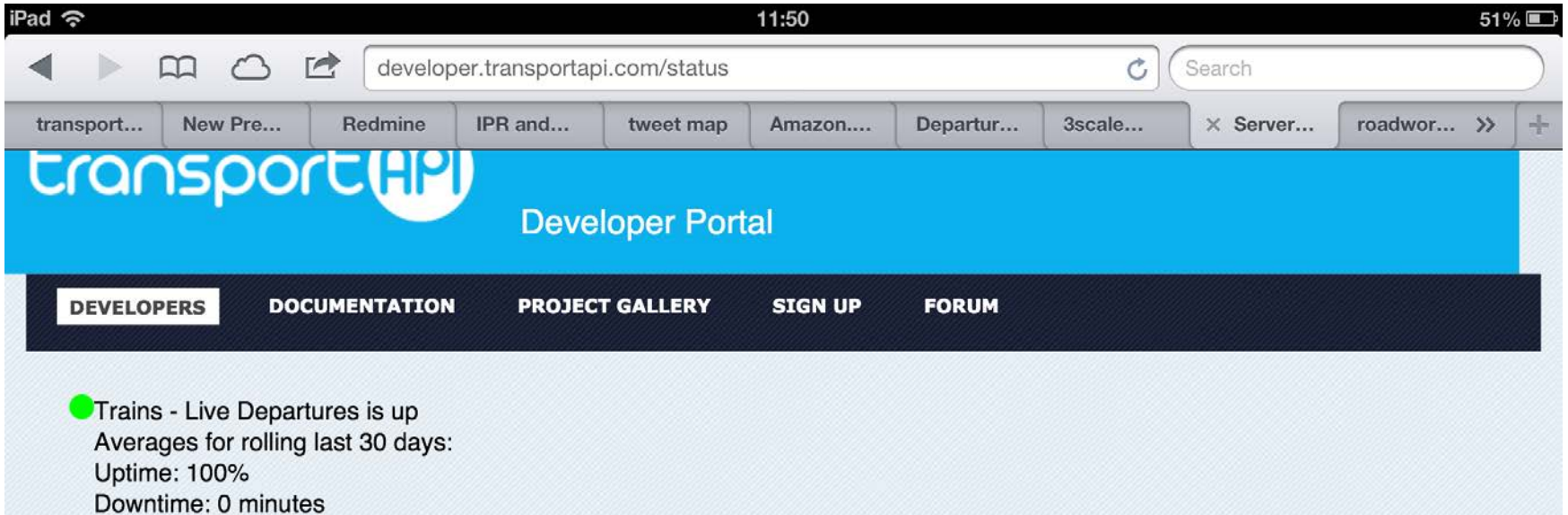
# Design for ad hoc geo-infrastructure

- Design for a lack of design!
- Solution is data aggregation eg ODCleanStore



# Aggregation and infrastructure

- Create geo-infrastructure by linking aggregators
- Aggregation and reverse aggregation
  - API's can all incorporate each other
  - Limits become rights management, performance
- Case study of Transport API aggregator I founded

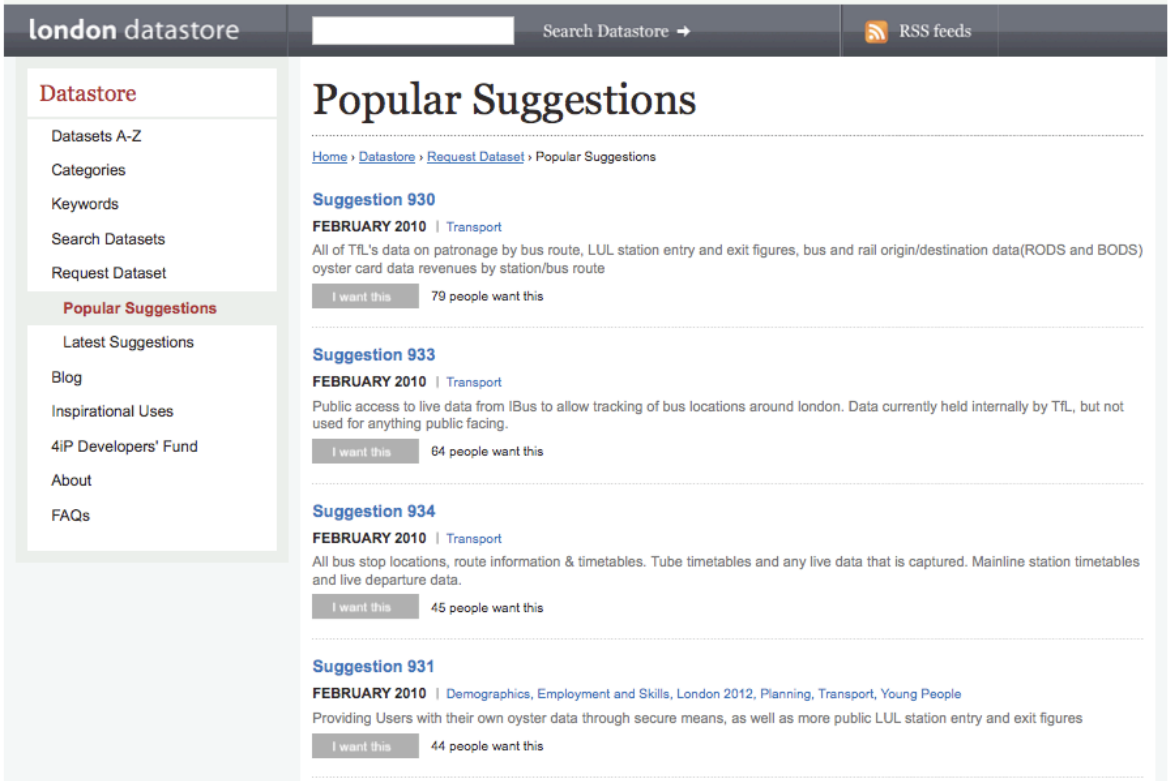


# Genesis of Transport API was in research

- Questions we could not ask
- What is the geography of travel disruption?
- Is there equality in journey opportunities?
- What do people think about their journey?
- What routes do people really take?
- We needed open data for these questions
- We have developed some geo-infrastructure to enable these questions to be addressed

# The radicalisation of a researcher

- I began to campaign for open transport data
- This is normative activity: defining what should be
- I decided to become a disruptor and innovator
- Became an advisor to GLA London DataStore



# My Open Data Manifesto

- If there is public money, there must be access
- If there is access it must be free at the point of use
- There must be equality of access to the data
- Open data releases should be of raw data
- No competition for re-users with public money
- In UK transport this manifesto has been fulfilled

# Open government

- Open Government is the political doctrine that holds that the business of government and state administration should be opened at all levels to effective public scrutiny and oversight
- Context has become favourable
  - Government has public tasks to produce the data
  - Digital data has low marginal costs of distribution
  - Smartphone is universal distribution platform
  - Much new value is being created with open data

# Open data landscape in UK

- data.gov.uk has >50000 datasets
- London DataStore has >500 datasets
- Prime Minister's letter on Open data June 2011
- Treasury Autumn Statement 2011 on data releases
- Every Ministry has a Transparency Board
- Budget 2012 Growth review
  - Open data is selected for government investment
- Freedoms Act May 2012- Right to Data established
- Established the Open Data Institute October 2012
- Government Shakespeare Review summer 2013

# Open transport data

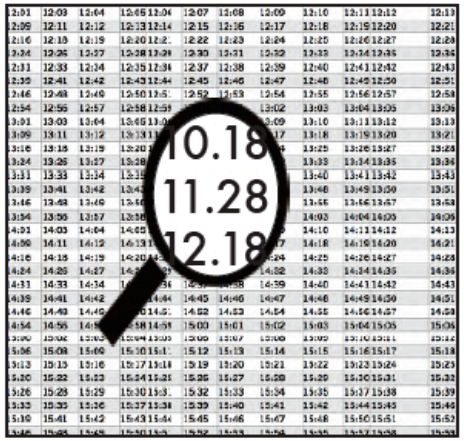
- London DataStore began by releasing all London's transport data in 2010 (thanks Boris!)
- Dept. of Transport then supported Traveline to release bus data across the country in 2012
- Then Network Rail released all train data
- http://transportapi.com/ has data for 360,000 British bus stops and 2,500 rail stations
- We can now distribute transport information to developers, hyperlocal users and consumers through a range of channels

# transportapi.com

- Covers all Britain's public transport from official sources
- Live, timetables & infrastructure
- Historic archiving of movements
- Performance indicators
- Embeddable content
- Partner integration
- 400 developers signed up
- TfL; Trapeze; CityMapper; Giraffe
- Guardian, Orange, ORR, DfT

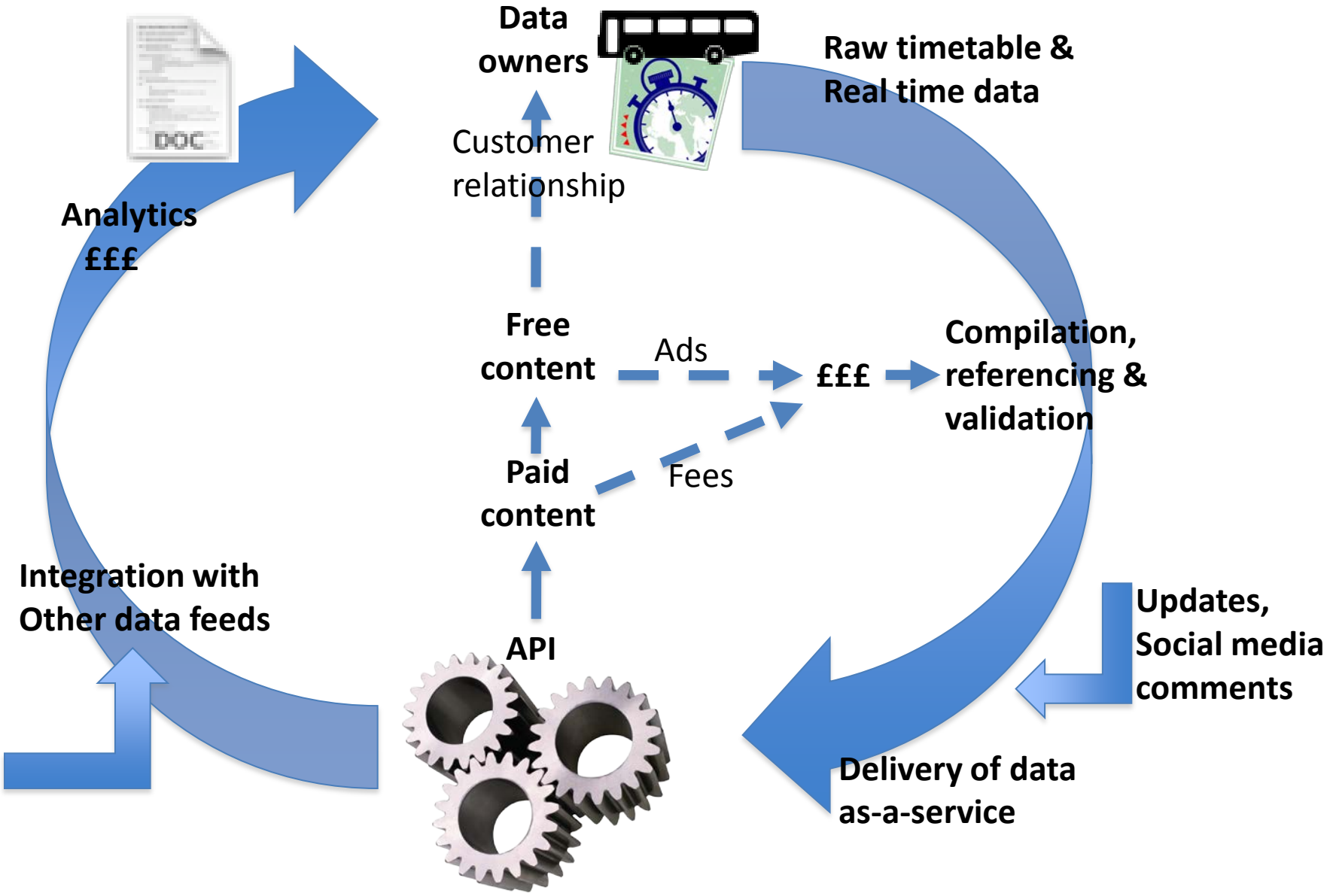
transport API

total public transport data solution

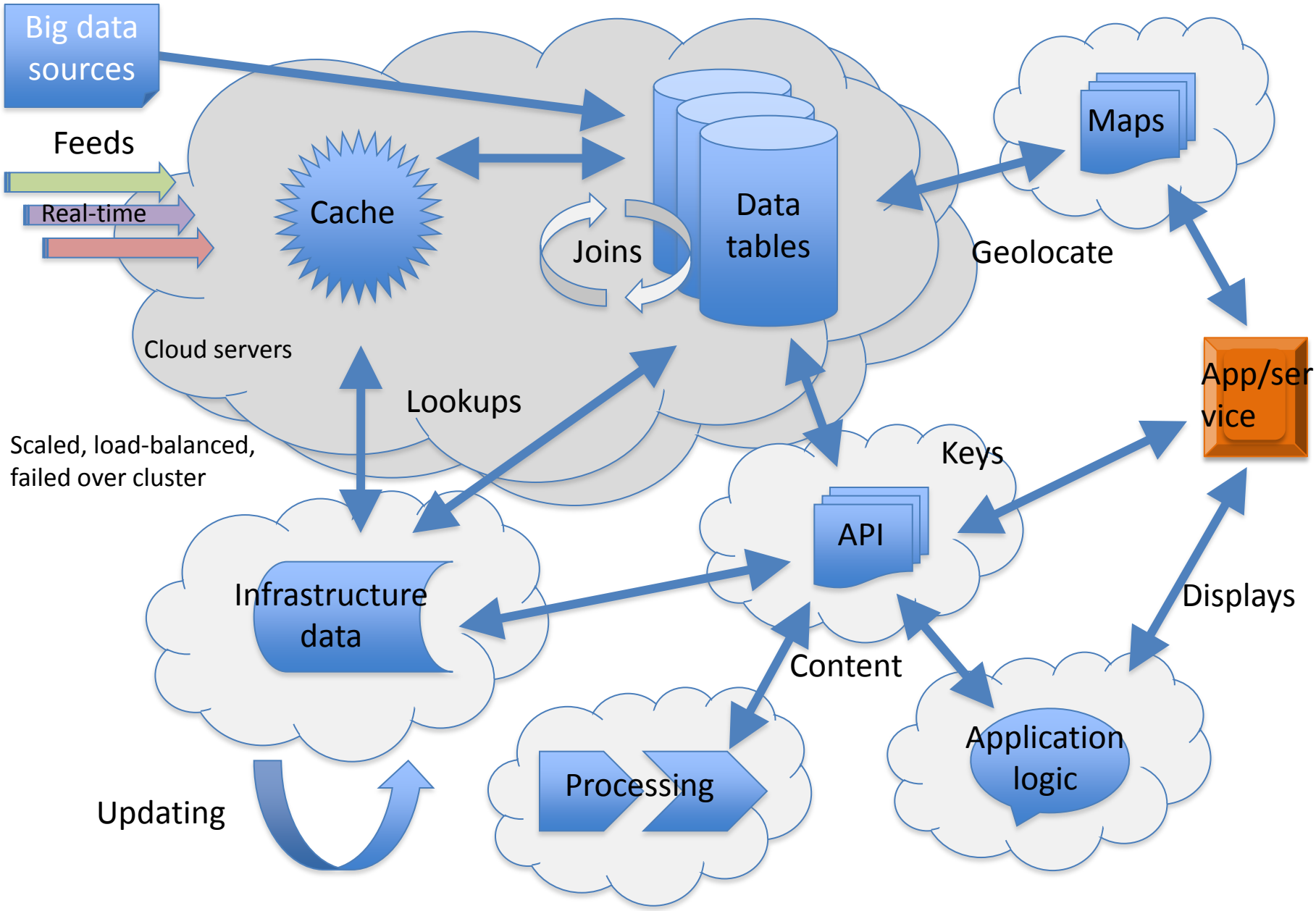



standardised source of transport data ✔
covers all 360,000 stops/stations in Britain ✔
bus/train/tube timetables & real time data ✔
JSON/linked html output from API ✔
variety of usage plans, 1K hits/day, free! ✔

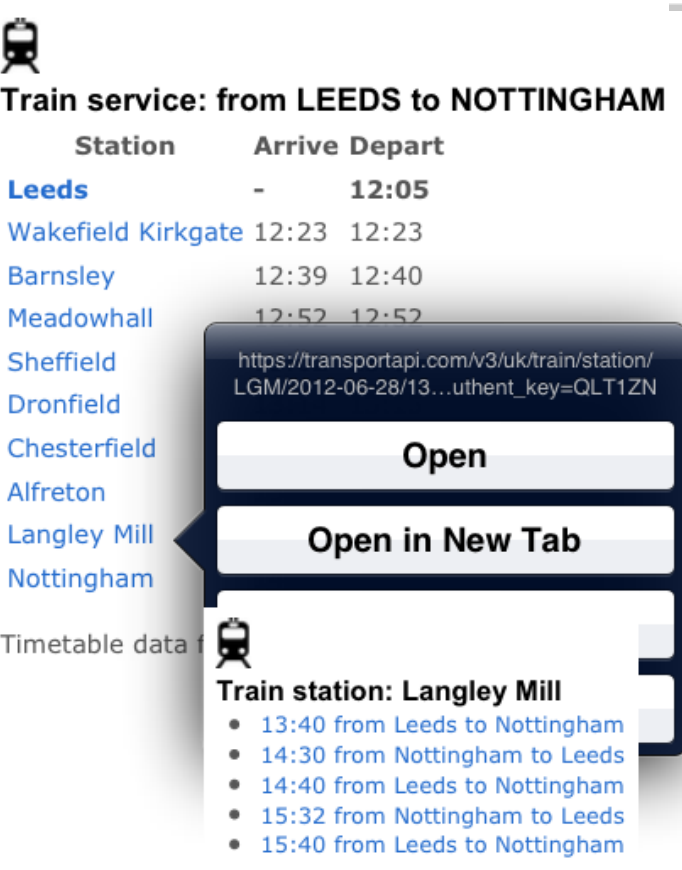
# Business model

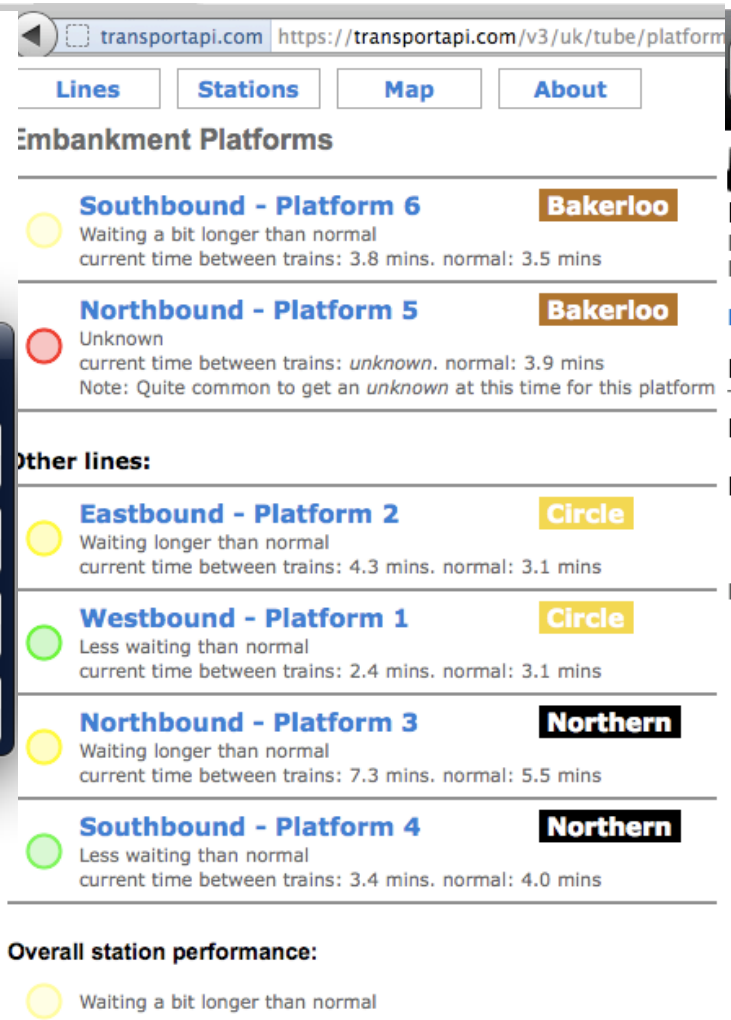


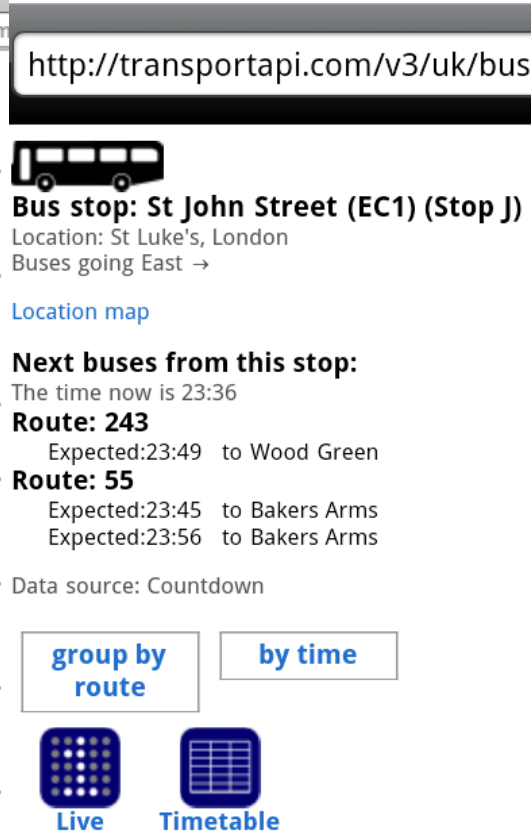
# TransportAPI architecture



# transportapi gallery

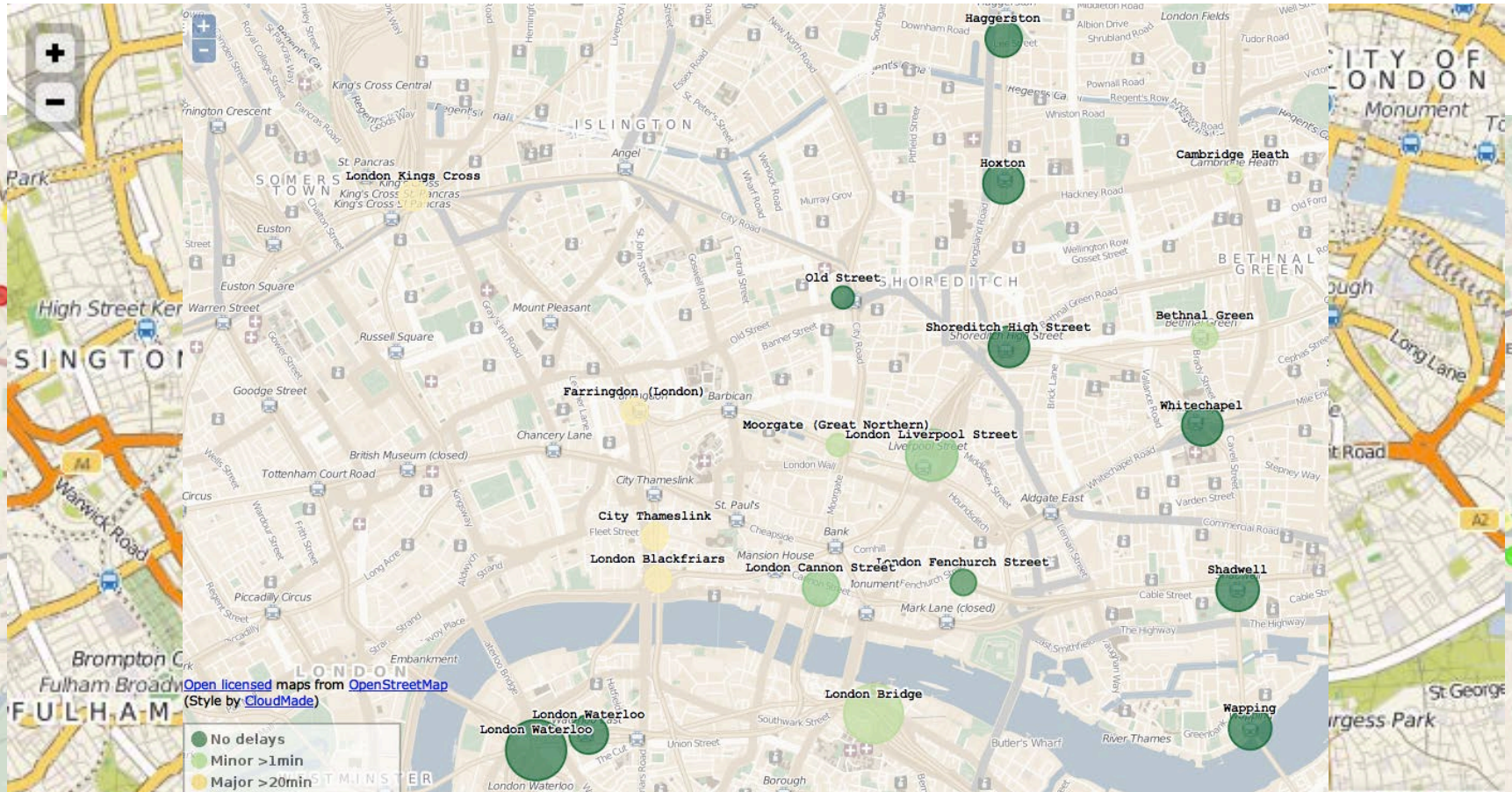


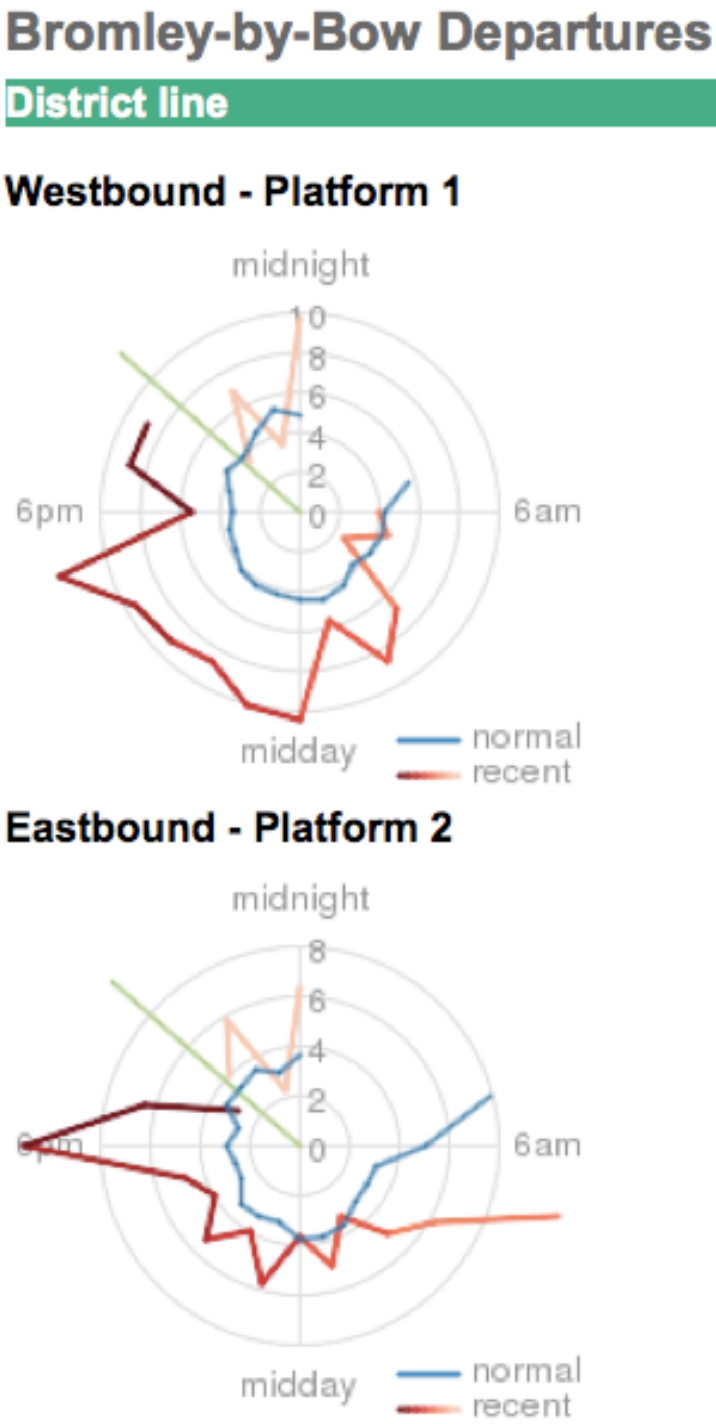
# Transport performance

- Transport data can be embedded in web widget
- London Underground performance indicators
- Real travel time through London bus network
- Train lateness maps across country



# Historic data

- Recording data streams on tube, bus and train
- Storing and structuring it
- Making historic data available at API endpoints



# journeymapper.org

## Travel Portal

Over the summer of 2013 we will be launching journeymapper.org, an integrated map based web app offering multimodal journey planning and alerts.

**Based on the roadworks.org technology platform, local authorities will be able to embed journeymapper.org within their own web pages to create a local travel portal for their residents.**

ELGIN's joint venture with PLACR transportAPI has enabled us to combine highway information such as roadworks, incidents and accidents data and live traffic feeds with live departure and timetable information local rail and buses. This means that we can provide real-time travel local information across the entire country.

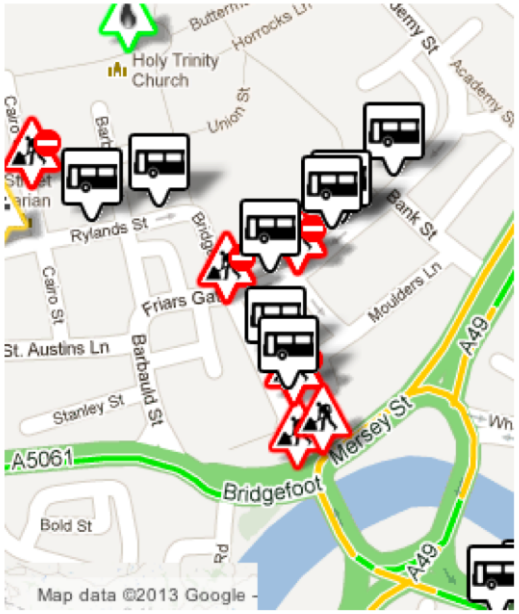
For traffic management professionals we are able to offer true multimodal intelligent applications, for example the ability to generate alerts for bus operators about planned and emergency diversions which will impact each of their routes.

A range of localised native smartphone apps for Android and iPhone is being re-launched under the TravelOptions brand providing the same benefits to travellers on the move.

This service is taking shape during May-August 2013, with bus and train departure information already live and available via roadworks.org aka **journeymapper.org**.

**Navigation**

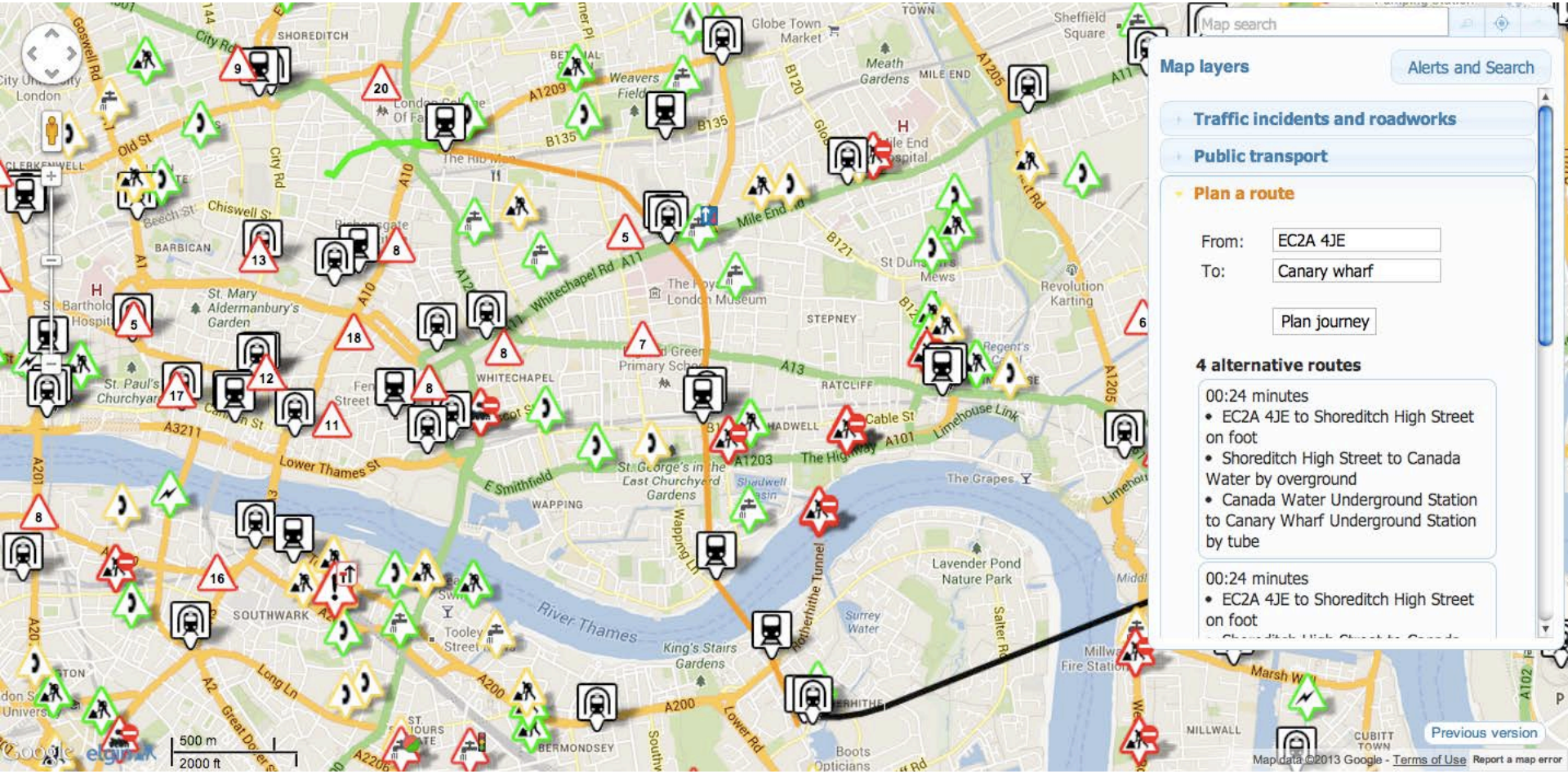
- TransportAPI




**Jonathan Raper, Transport Transparency Board**

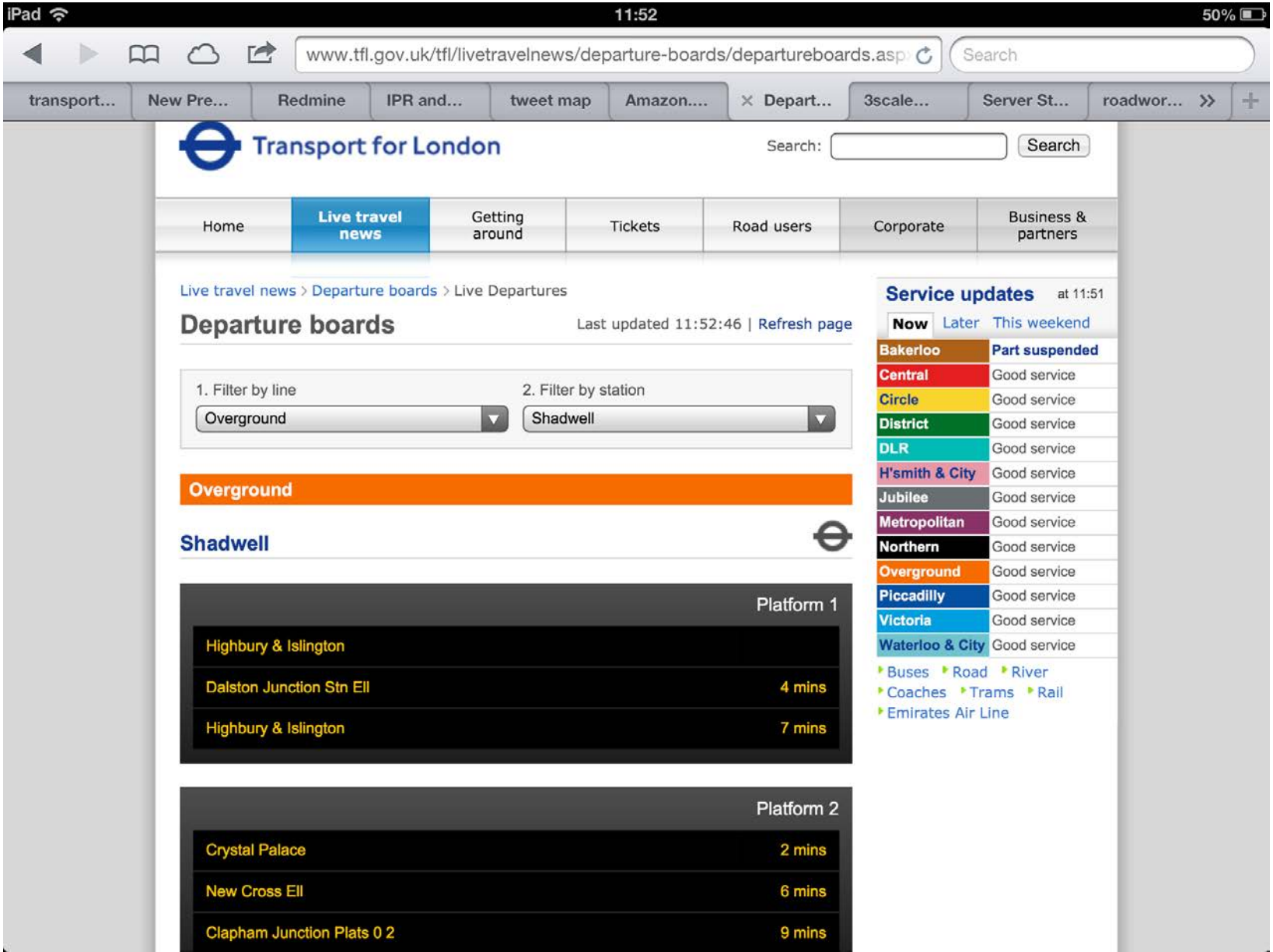
"It is only now that we are beginning to see the first practical demonstrations of Open Data. By combining our integrated transport datasets - which include live bus and train information - with the national platform established by ELGIN we are on the way to creating a seamless integration of all modes of transport data."

# JourneyMapper.org Travel Portal

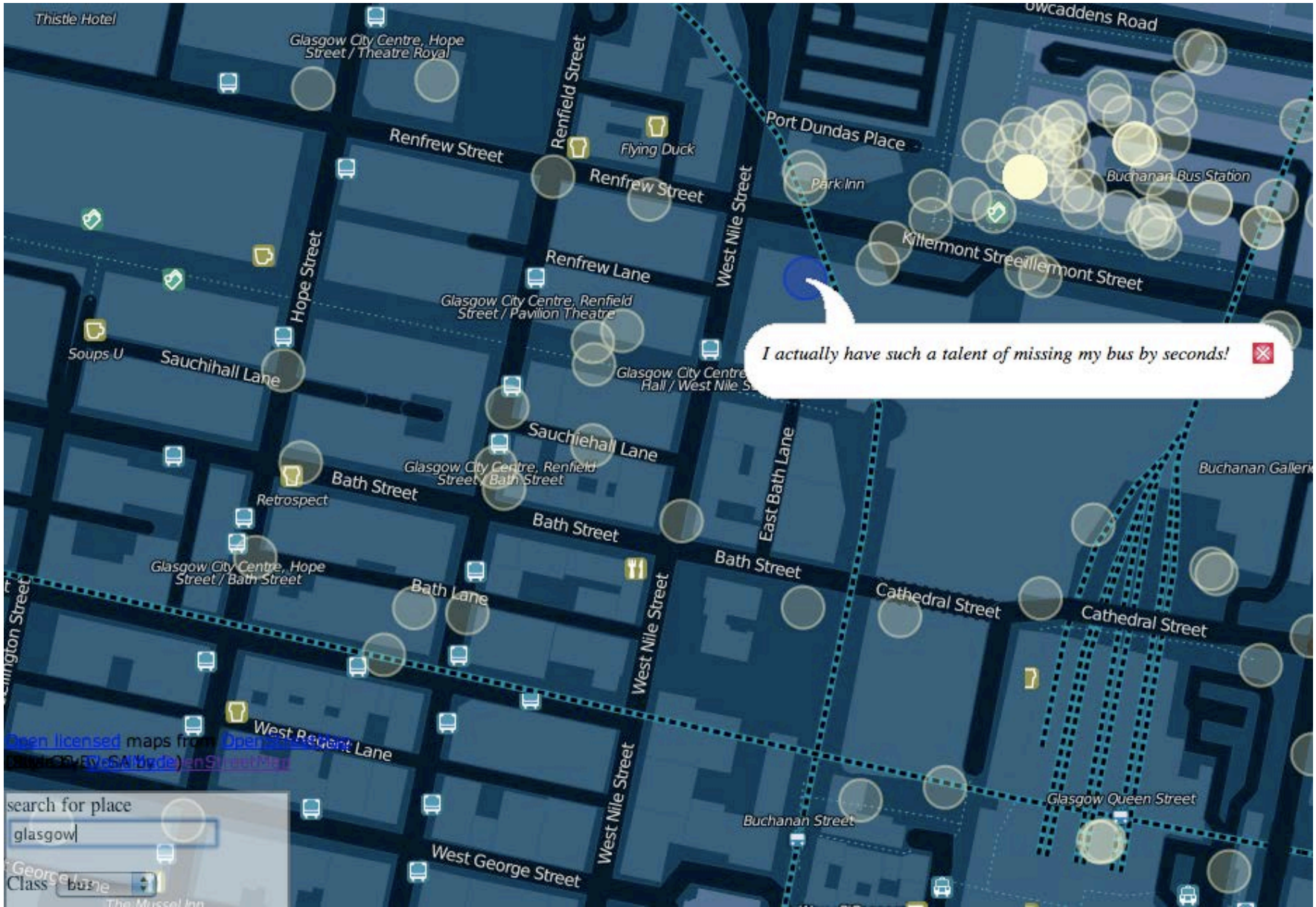


# Rail performance alerting dashboard

# Transport for London's travel updates

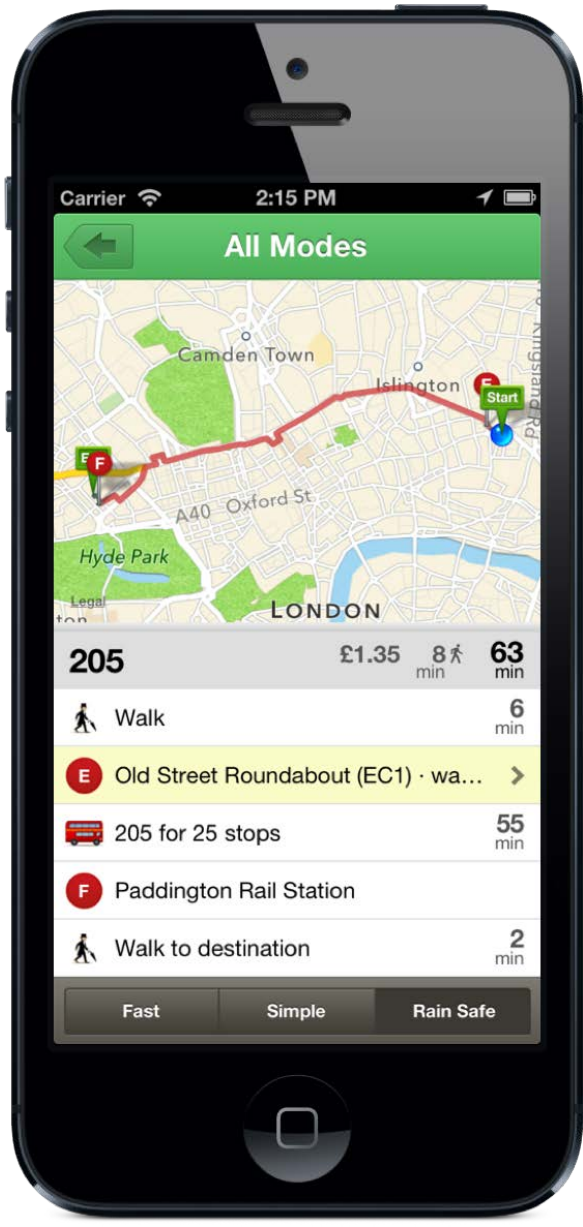


# TransportBuzz social media integration

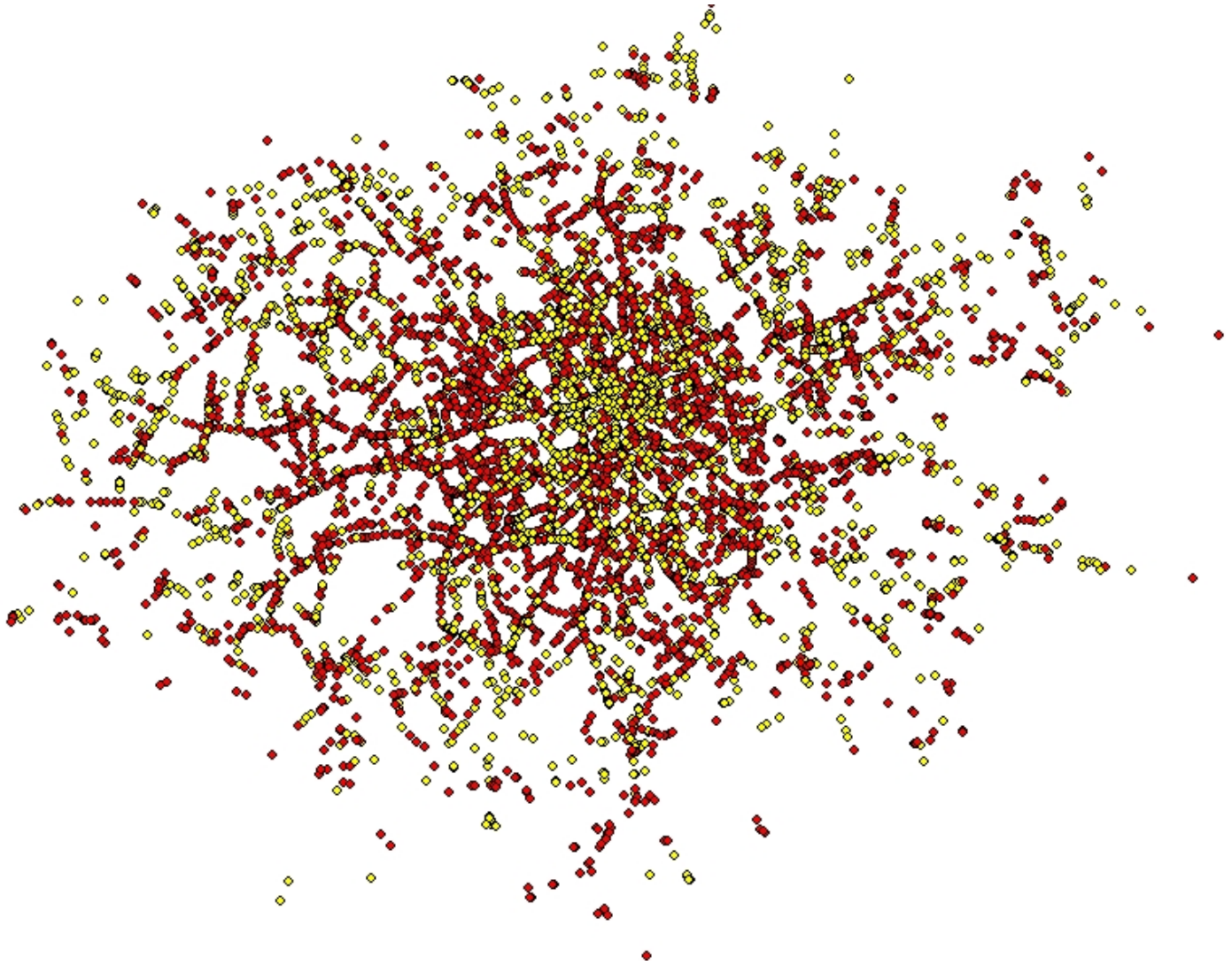


# CityMapper

- London's most popular travel app
- TransportAPI supplying the back end for rail data
- CityMapper source bus and tube
- Accuracy, latency are paramount
- Looking for guarantees & management of liabilities



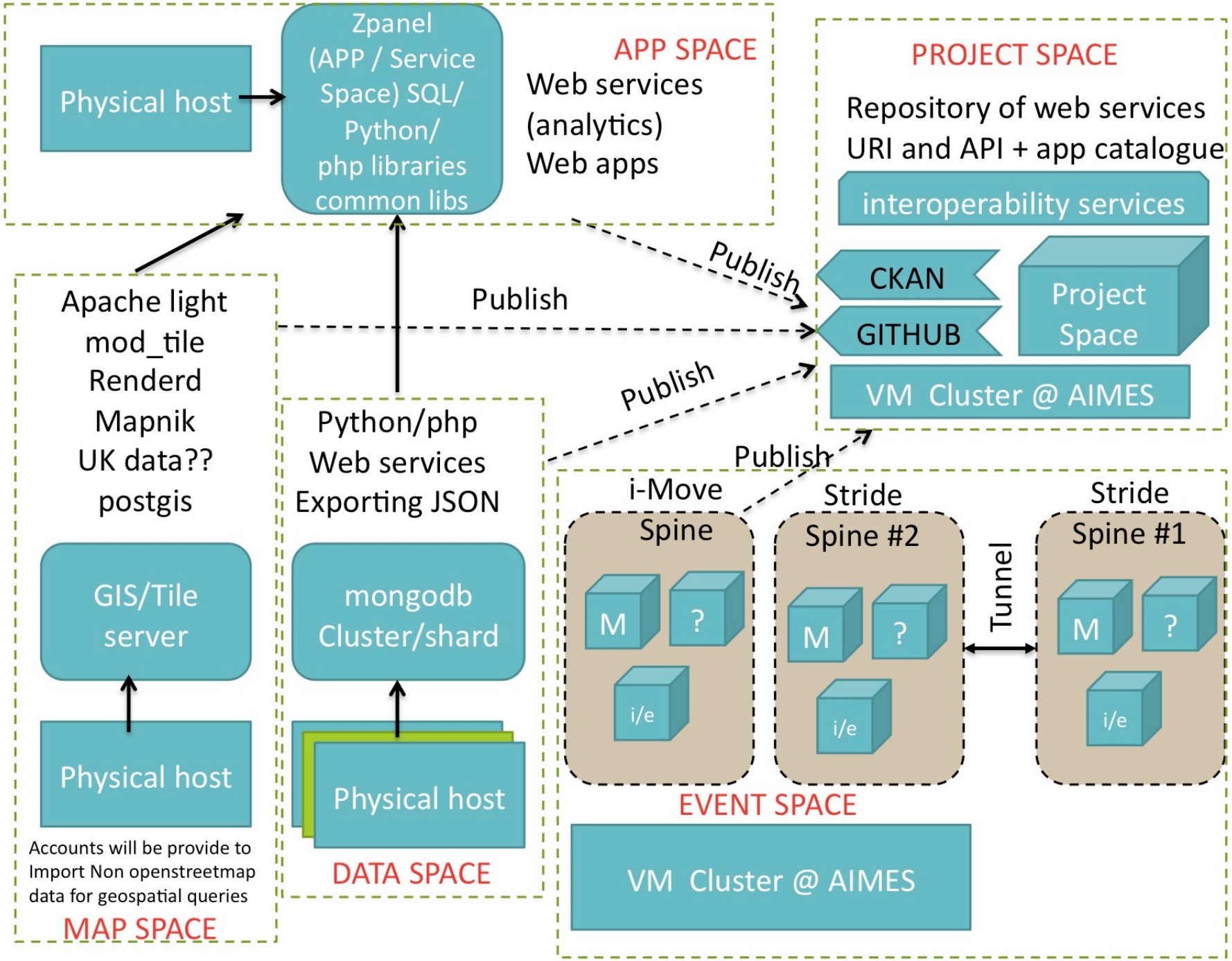
# Analytics based on usage of data



Yellow: weekday
Red: weekend

# i-MOVE

- TransportAPI now aggregated by i-MOVE
- Aggregation demonstration platform
- Internet of Things architecture
- Auto-discovery of resources


Physical host
Zpanel (APP / Service Space) SQL/ Python/ php libraries common libs
APP SPACE
Web services (analytics)
Web apps
PROJECT SPACE
Repository of web services
URI and API + app catalogue
interoperability services
CKAN
GITHUB
Project Space
VM Cluster @ AIMES
Publish
Publish
Publish
Publish
Apache light
mod_tile
Renderd
Mapnik
UK data??
postgis
GIS/Tile server
Physical host
Accounts will be provide to Import Non openstreetmap data for geospatial queries
MAP SPACE
Python/php
Web services
Exporting JSON
mongodb Cluster/shard
Physical host
DATA SPACE
i-Move
Spine
Stride
Spine #2
Tunnel
Stride
Spine #1
M
?
i/e
EVENT SPACE
VM Cluster @ AIMES

# Geo-infrastructure by aggregation

- All Britain's public transport with five people- we do this!
- Based in London's Open Data Institute
- Massive opportunities to open transport data
- New questions can be answered
- Many new partnerships

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