

The challenges for geo-infrastructure

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UK Transport Transparency Board



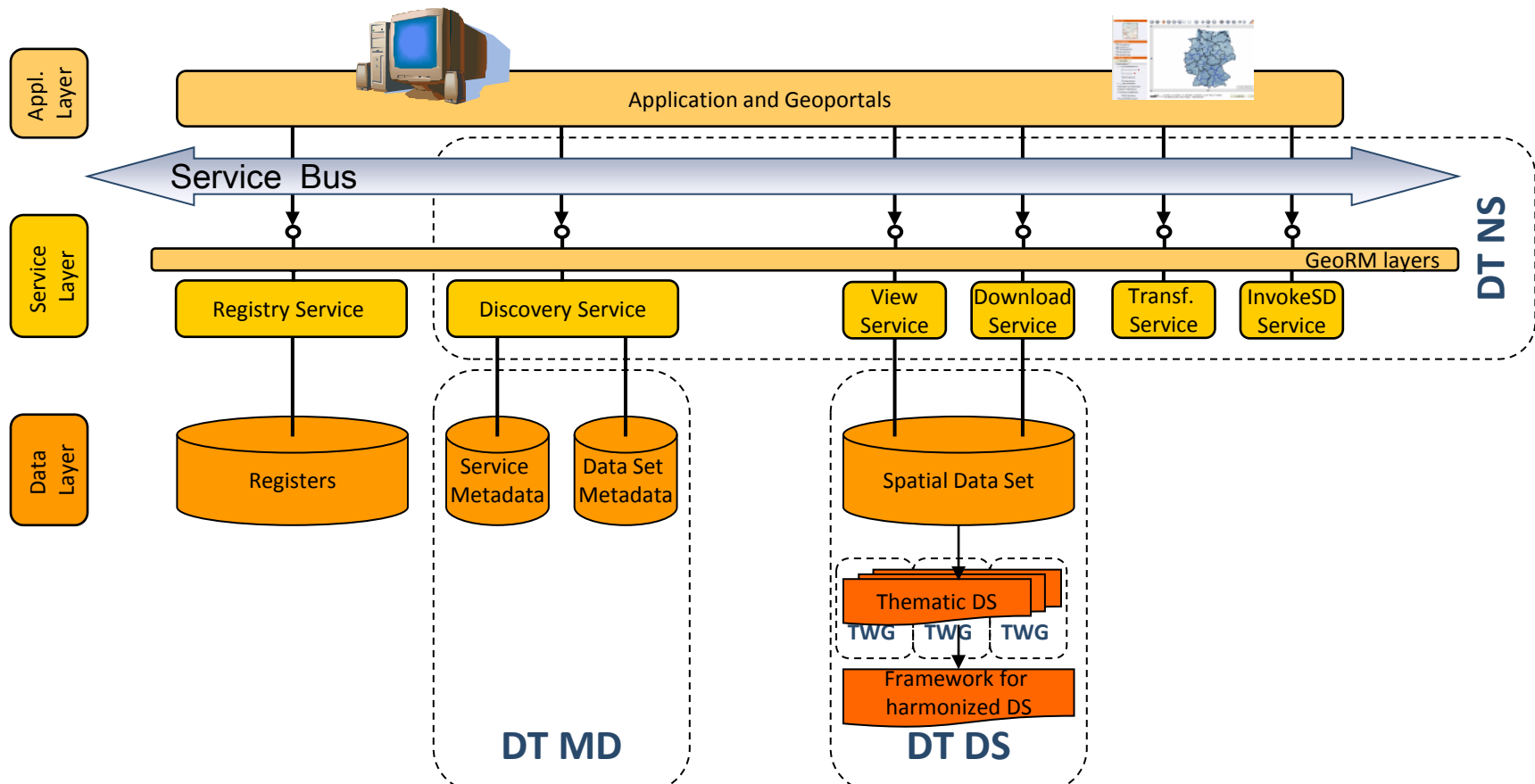
Hypothesis

- 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

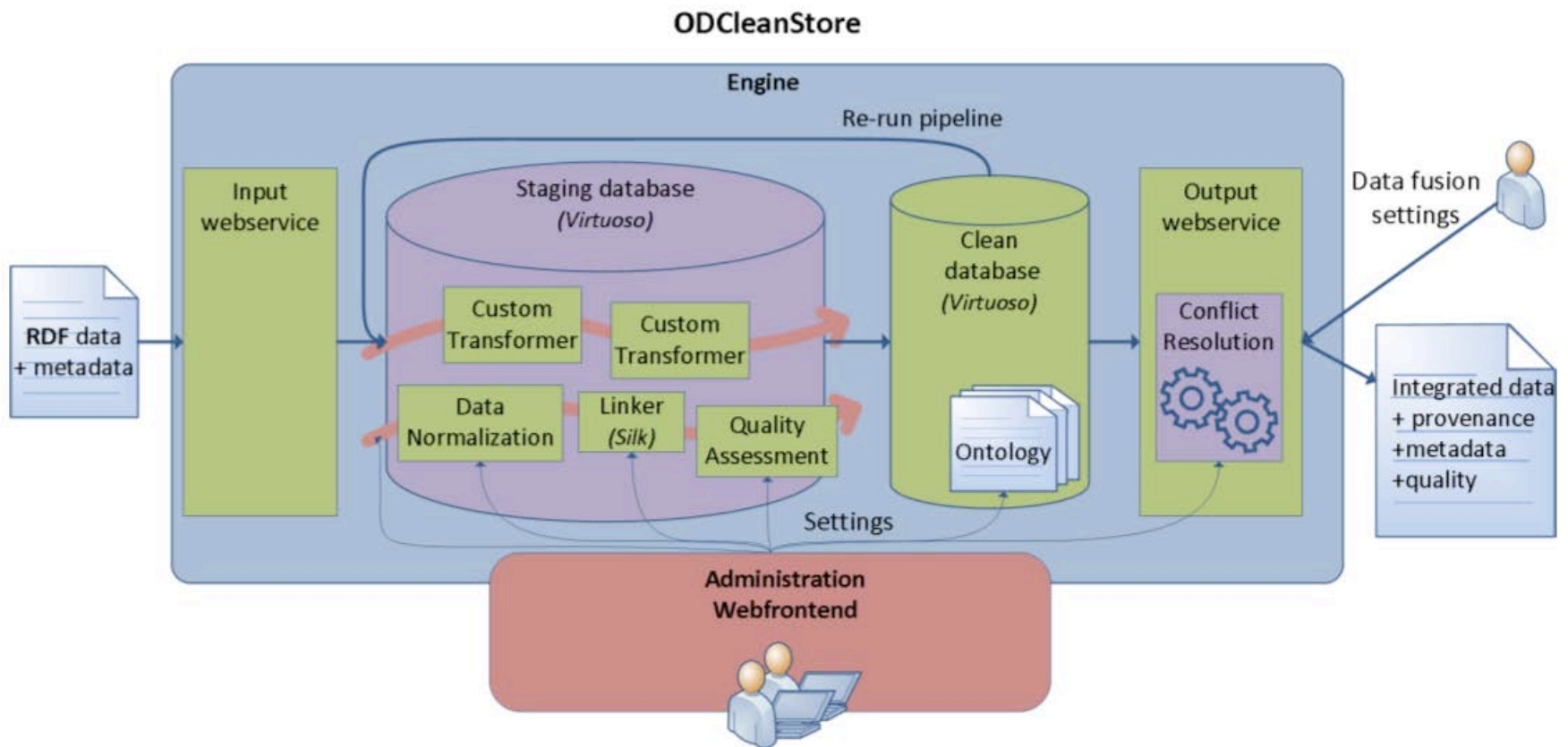


How will geo-infrastructure evolve?

- 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

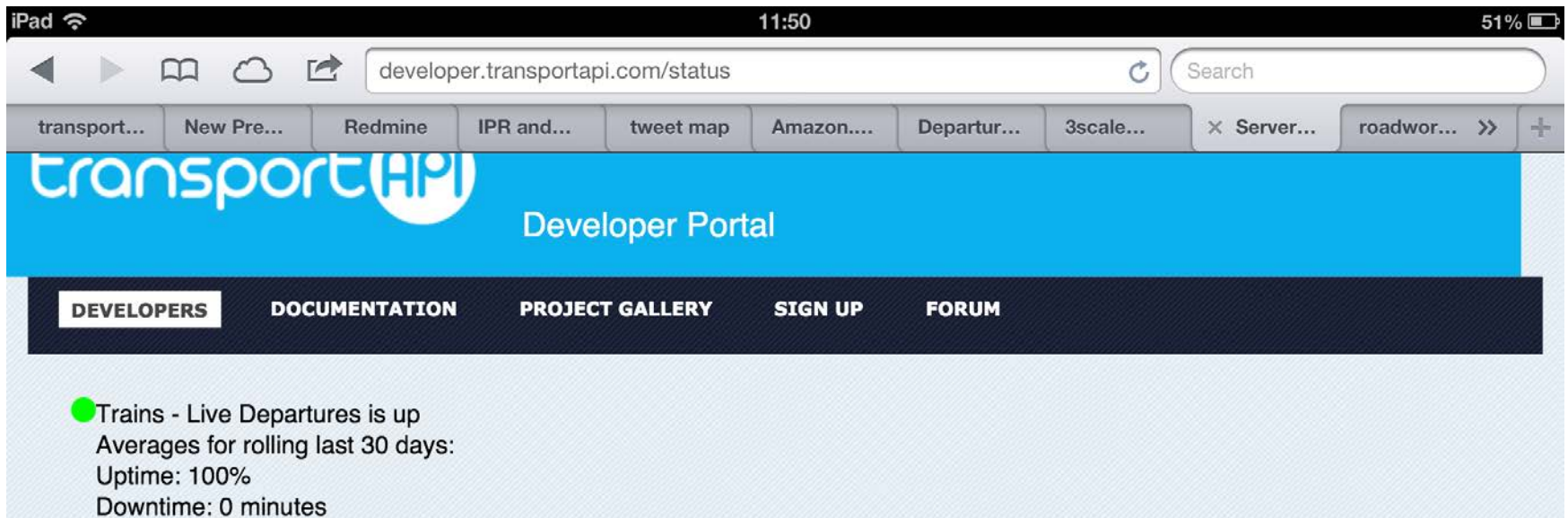
Design for ad hoc geo-infrastructure

- 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



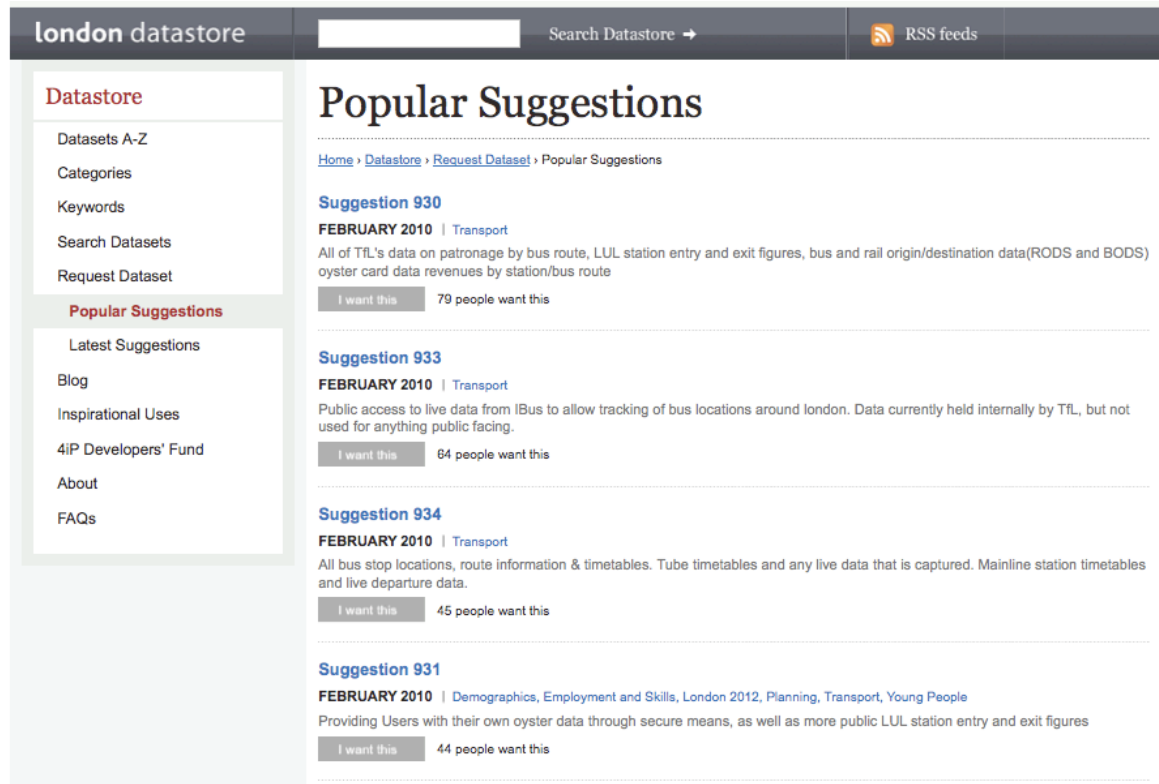
Genesis of Transport API was in research

- 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



The screenshot shows the London DataStore website interface. At the top, there is a navigation bar with the logo "london datastore", a search bar with the text "Search Datastore →", and an "RSS feeds" link. The main content area is titled "Popular Suggestions" and lists four suggestions:

- Suggestion 930**
FEBRUARY 2010 | Transport
All of TfL's data on patronage by bus route, LUL station entry and exit figures, bus and rail origin/destination data(RODS and BODS) oyster card data revenues by station/bus route
I want this 79 people want this
- Suggestion 933**
FEBRUARY 2010 | Transport
Public access to live data from lBus to allow tracking of bus locations around london. Data currently held internally by TfL, but not used for anything public facing.
I want this 64 people want this
- Suggestion 934**
FEBRUARY 2010 | Transport
All bus stop locations, route information & timetables. Tube timetables and any live data that is captured. Mainline station timetables and live departure data.
I want this 45 people want this
- Suggestion 931**
FEBRUARY 2010 | Demographics, Employment and Skills, London 2012, Planning, Transport, Young People
Providing Users with their own oyster data through secure means, as well as more public LUL station entry and exit figures
I want this 44 people want this

A sidebar on the left contains a "Datastore" menu with links to "Datasets A-Z", "Categories", "Keywords", "Search Datasets", and "Request Dataset". Below this is a "Popular Suggestions" section with links to "Latest Suggestions", "Blog", "Inspirational Uses", "4iP Developers' Fund", "About", and "FAQs".

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

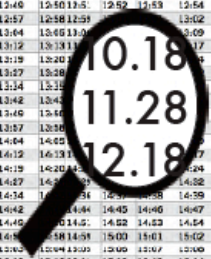
Open transport data

- 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

transport API

total public transport data solution

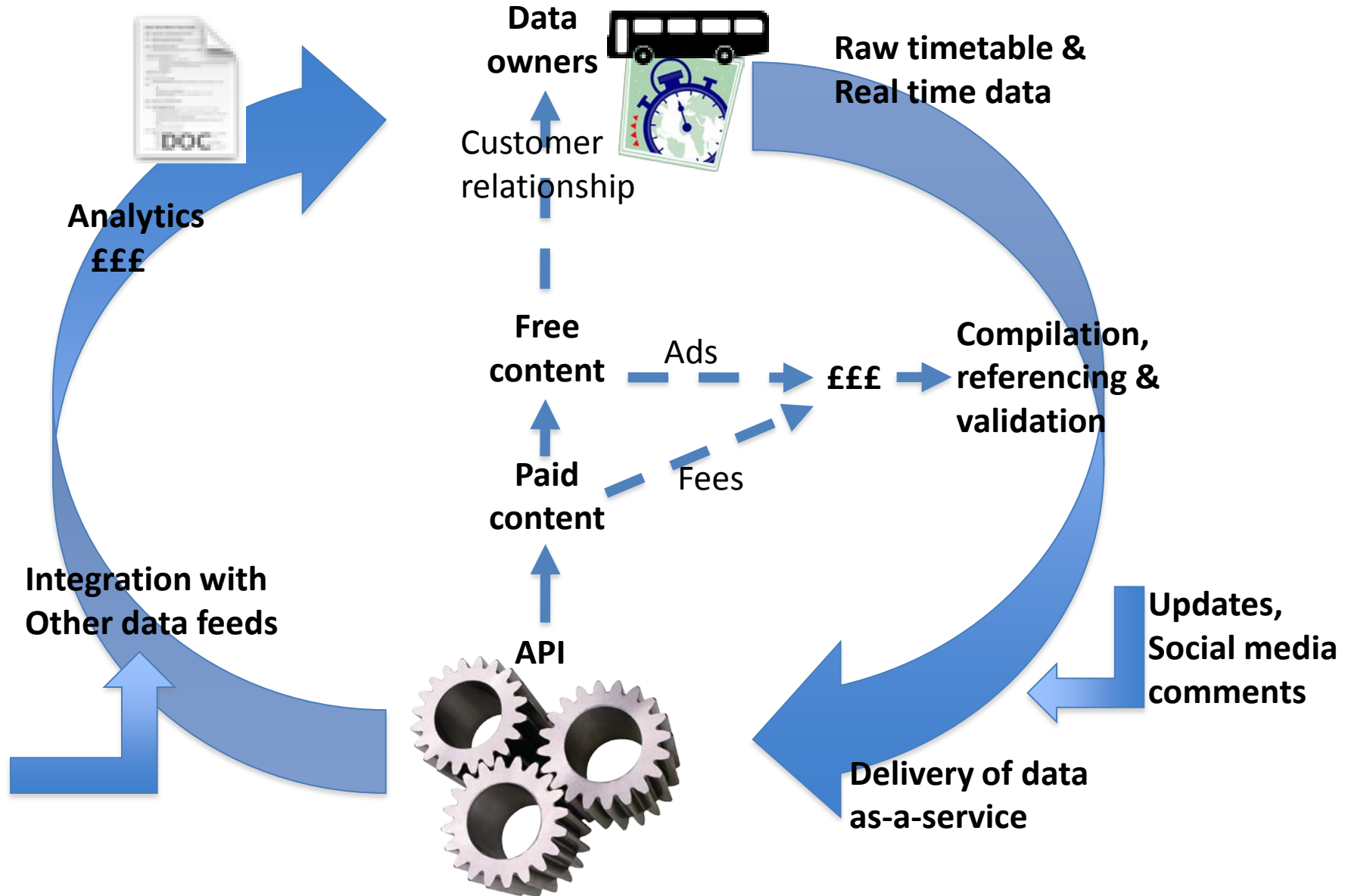


2:51	12:03	13:04	13:46	13:54	12:07	13:08	13:09	13:10	13:11	13:12	13:13
2:59	12:11	12:12	12:13	12:14	12:15	12:16	12:17	12:18	12:19	12:20	12:21
2:10	12:10	12:19	12:20	12:21	12:22	12:23	12:24	12:25	12:26	12:27	12:28
2:34	12:26	12:57	12:58	12:59	13:00	13:01	13:02	13:03	13:04	13:05	13:06
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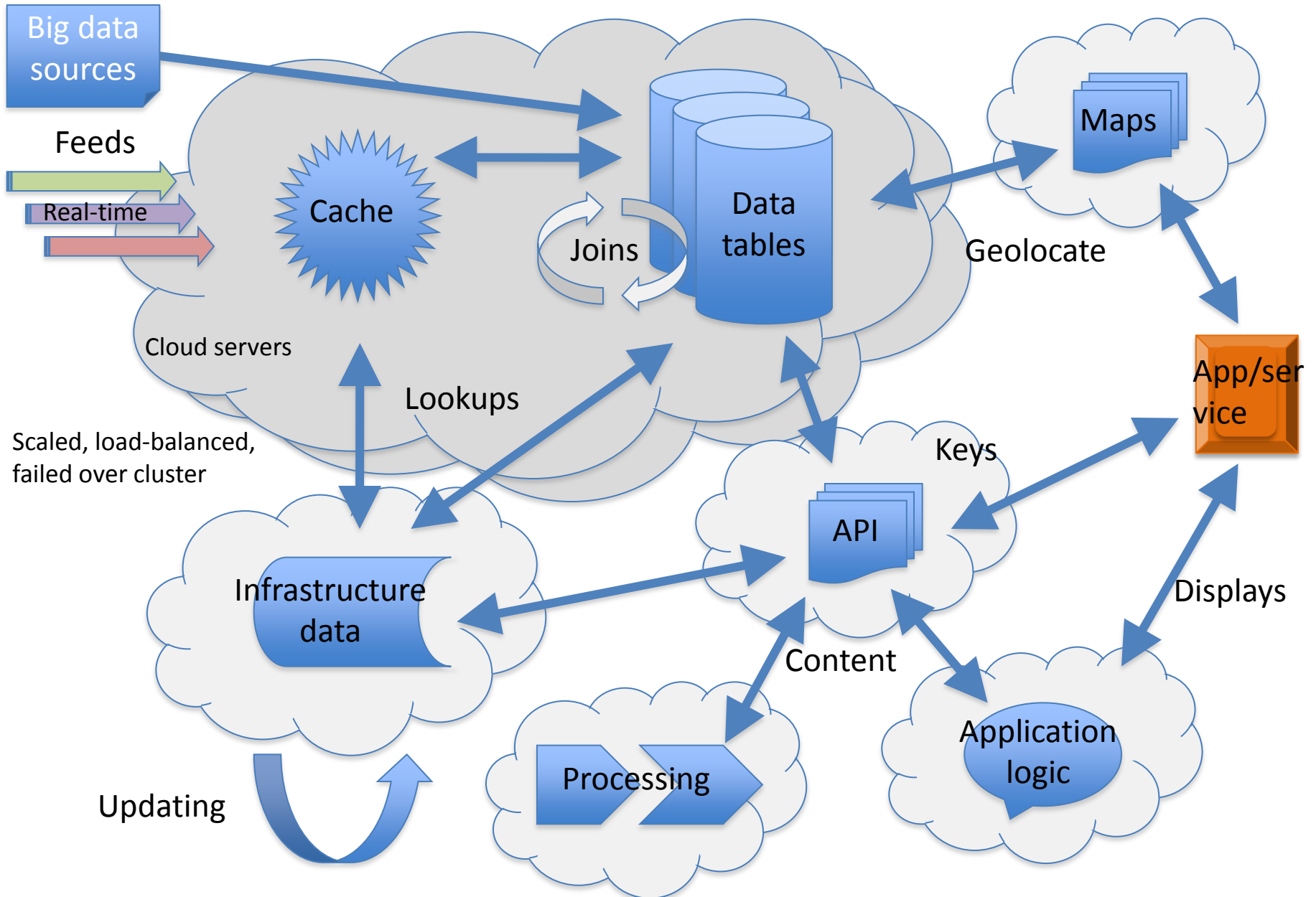
- standardised source of transport data ✓
- covers all 360,000 stops/stations in Britain ✓
- bus/train/tube timetables & real time data ✓
- JSON/linked html output from API ✓
- variety of usage plans, 1K hits/day, free! ✓

- 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

Business model



TransportAPI architecture



transportapi gallery



Train service: from LEEDS to NOTTINGHAM

Station	Arrive	Depart
Leeds	-	12:05
Wakefield Kirkgate	12:23	12:23
Barnsley	12:39	12:40
Meadowhall	12:52	12:52
Sheffield		
Dronfield		
Chesterfield		
Alfreton		
Langley Mill		
Nottingham		

https://transportapi.com/v3/uk/train/station/LGM/2012-06-28/13...uthent_key=QLT1ZN

Open

Open in New Tab



Train station: Langley Mill

- 13:40 from Leeds to Nottingham
- 14:30 from Nottingham to Leeds
- 14:40 from Leeds to Nottingham
- 15:32 from Nottingham to Leeds
- 15:40 from Leeds to Nottingham

Timetable data f

transportapi.com <https://transportapi.com/v3/uk/tube/platform>

Lines

Stations

Map

About

Embarkment Platforms

Southbound - Platform 6 **Bakerloo**
Waiting a bit longer than normal
current time between trains: 3.8 mins. normal: 3.5 mins

Northbound - Platform 5 **Bakerloo**
Unknown
current time between trains: *unknown*. normal: 3.9 mins
Note: Quite common to get an *unknown* at this time for this platform

Other lines:

Eastbound - Platform 2 **Circle**
Waiting longer than normal
current time between trains: 4.3 mins. normal: 3.1 mins

Westbound - Platform 1 **Circle**
Less waiting than normal
current time between trains: 2.4 mins. normal: 3.1 mins

Northbound - Platform 3 **Northern**
Waiting longer than normal
current time between trains: 7.3 mins. normal: 5.5 mins

Southbound - Platform 4 **Northern**
Less waiting than normal
current time between trains: 3.4 mins. normal: 4.0 mins

Overall station performance:

Waiting a bit longer than normal

<http://transportapi.com/v3/uk/bus>



Bus stop: St John Street (EC1) (Stop J)

Location: St Luke's, London
Buses going East →

Location map

Next buses from this stop:

The time now is 23:36

Route: 243

Expected:23:49 to Wood Green

Route: 55

Expected:23:45 to Bakers Arms

Expected:23:56 to Bakers Arms

Data source: Countdown

group by route

by time



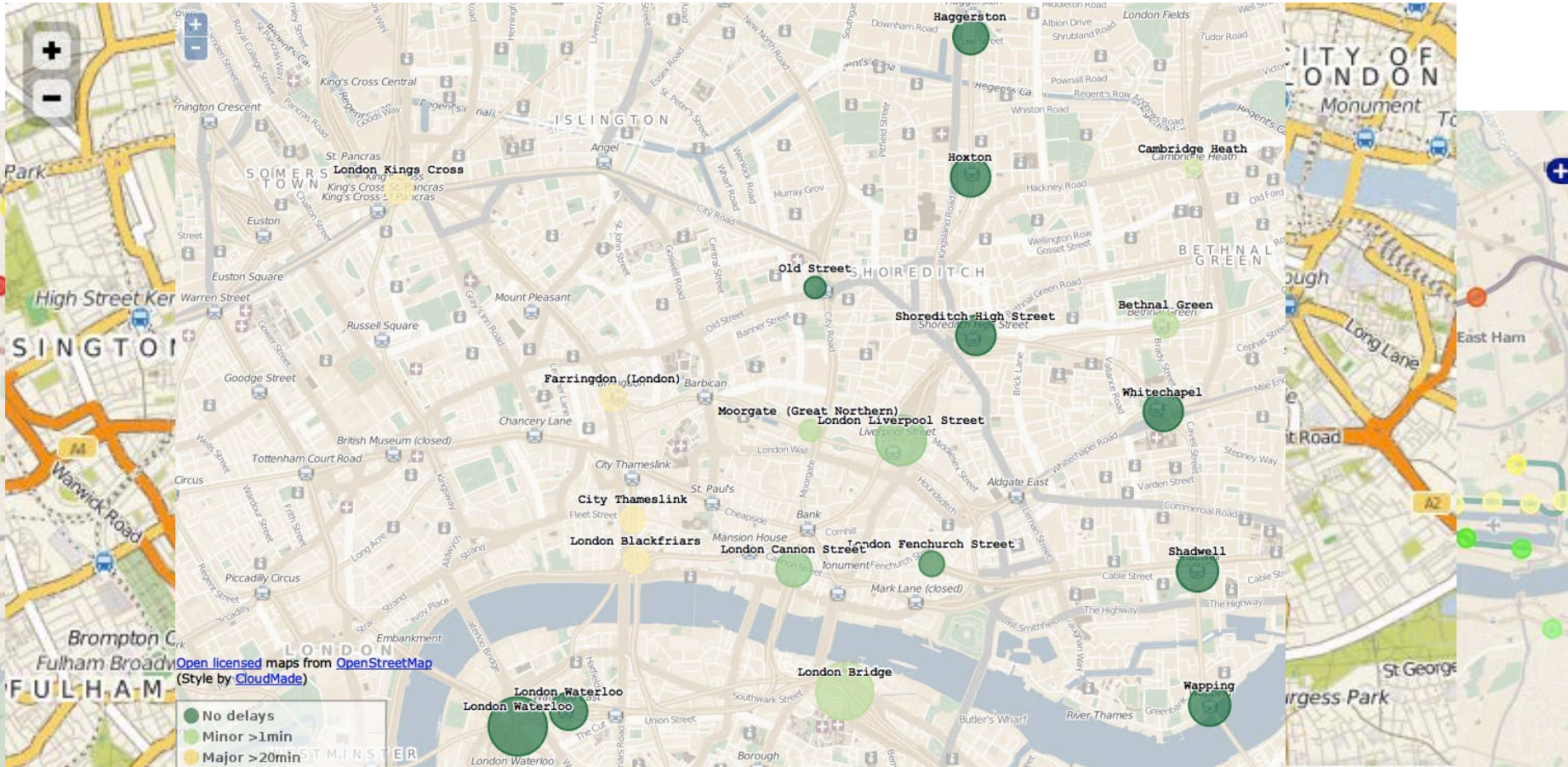
Live



Timetable

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



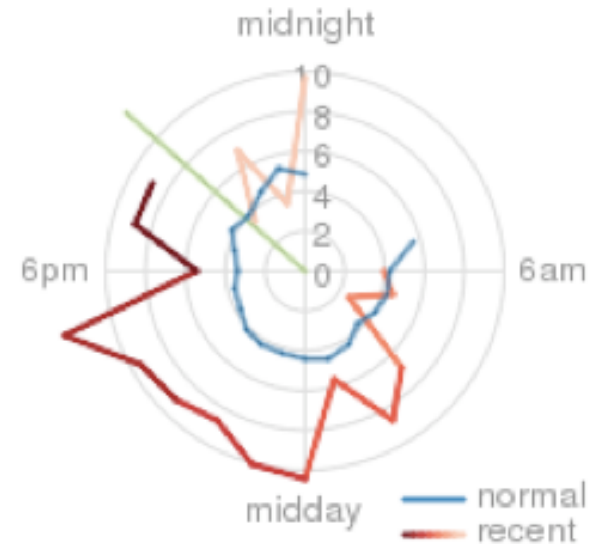
Historic data

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

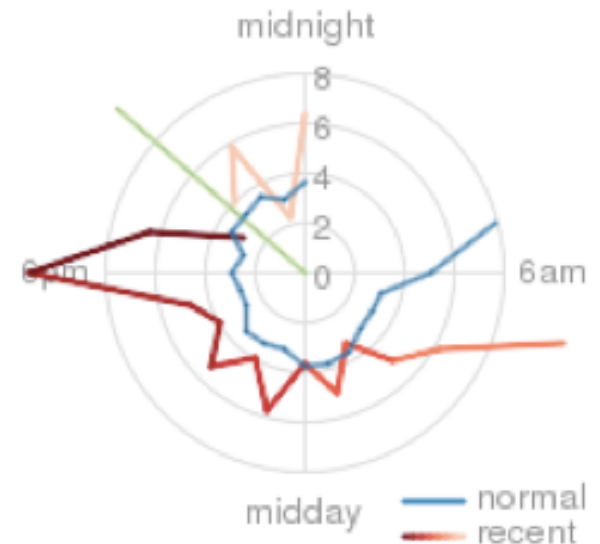
Bromley-by-Bow Departures

District line

Westbound - Platform 1



Eastbound - Platform 2



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.

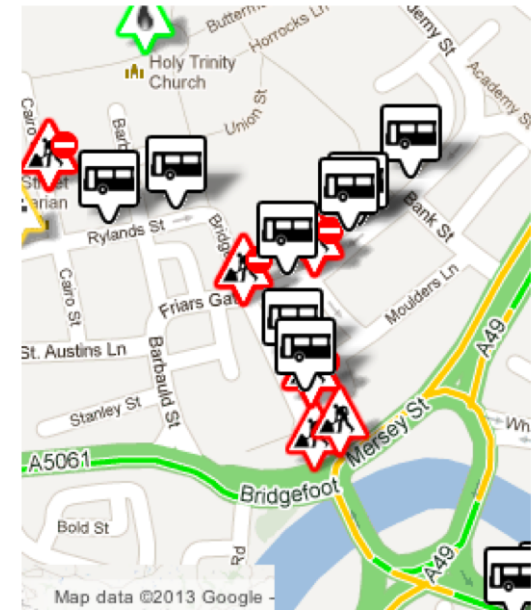
A range of localised native smartphone apps for Android and iPhone is being re-launched under the TravelOptions brand providing the same benefits to travellers on the move.

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

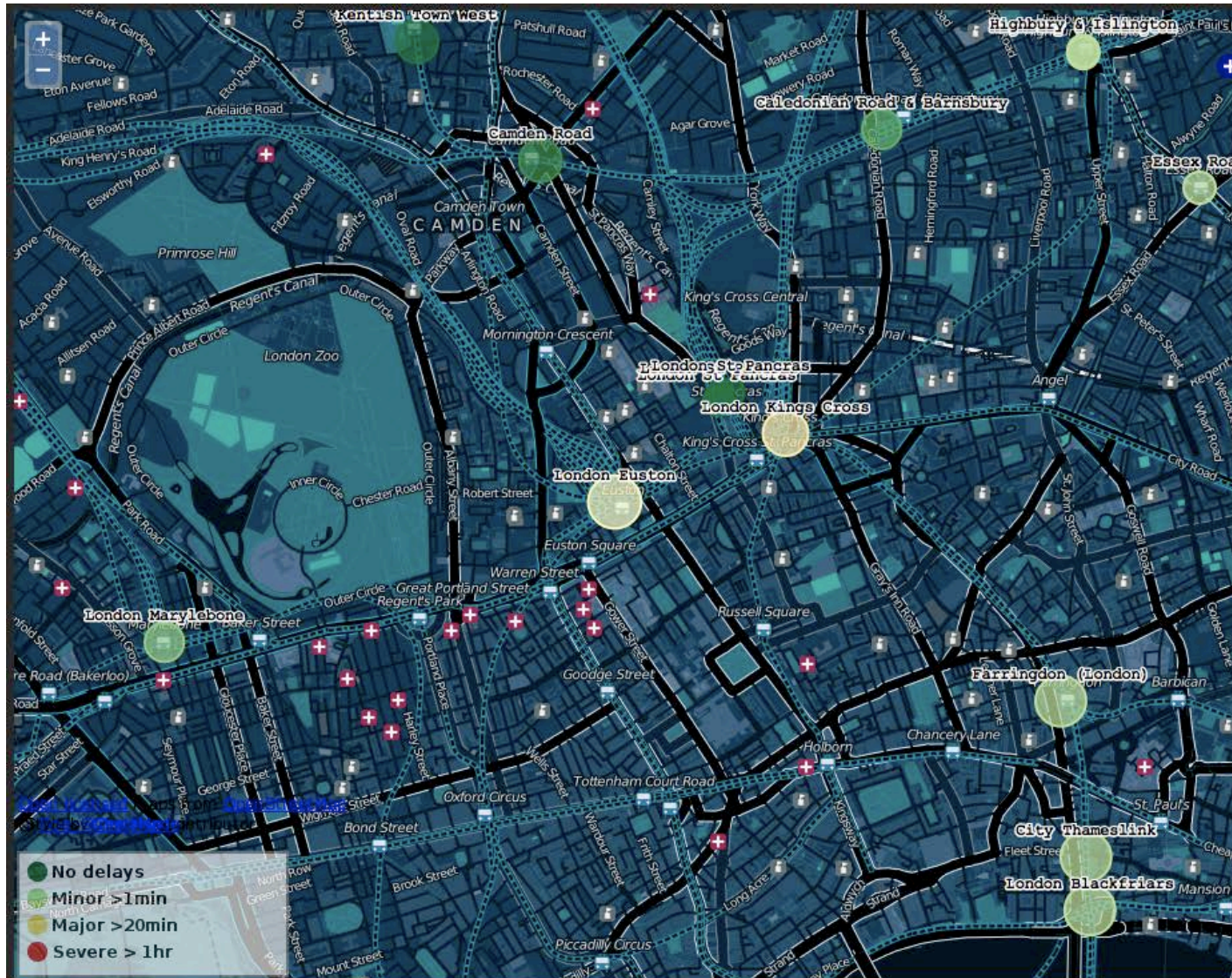
"It is only now that we are beginning to see the first practical demonstrations of Open Data. By combining our integrated transport datasets - which include live bus and train information - with the national platform established by ELGIN we are on the way to creating a seamless integration of all modes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

JourneyMapper.org Travel Portal

The screenshot displays the JourneyMapper.org Travel Portal interface. The main map shows a section of London, including areas like Shoreditch, Whitechapel, and Wapping, with the River Thames visible. The map is overlaid with numerous icons representing different travel modes and incidents: red triangles with numbers (e.g., 5, 7, 8, 11, 12, 13, 16, 17, 18, 20), green triangles with walking figures, and black train icons. A sidebar on the right contains the following elements:

- Map search** and **Alerts and Search** buttons.
- Map layers** section with expandable options: **Traffic incidents and roadworks**, **Public transport**, and **Plan a route**.
- Plan a route** section with input fields for **From:** EC2A 4JE and **To:** Canary wharf, and a **Plan journey** button.
- 4 alternative routes** section:
 - Route 1: 00:24 minutes. EC2A 4JE to Shoreditch High Street on foot. Shoreditch High Street to Canada Water by overground. Canada Water Underground Station to Canary Wharf Underground Station by tube.
 - Route 2: 00:24 minutes. EC2A 4JE to Shoreditch High Street on foot.
- Previous version** button.
- Map data copyright notice: ©2013 Google - Terms of Use - Report a map error.

Rail performance alerting dashboard



Avg train lateness
@ Euston (secs)

204

↑ 3%

Last updated at 18:40

Trending tweet
terms

train	84
bus	58
london	55
station	48
underground	46
tube	34

Last updated at 18:33

Transport for London's travel updates

The screenshot shows the Transport for London website on an iPad. The browser address bar displays www.tfl.gov.uk/tfl/livetravelnews/departure-boards/departureboards.asp. The page features the TFL logo and a navigation menu with options like Home, Live travel news, Getting around, Tickets, Road users, Corporate, and Business & partners. The main content area is titled "Departure boards" and includes filters for "1. Filter by line" (set to Overground) and "2. Filter by station" (set to Shadwell). Below the filters, there are two platform sections: Platform 1 and Platform 2, each listing upcoming arrivals with their respective line names and arrival times.

Transport for London Search: Search

Home **Live travel news** Getting around Tickets Road users Corporate Business & partners

Live travel news > Departure boards > Live Departures

Departure boards

Last updated 11:52:46 | Refresh page

1. Filter by line: Overground
2. Filter by station: Shadwell

Overground

Shadwell

Line	Platform	Arrival Time
Highbury & Islington	Platform 1	
Dalston Junction Stn E11	Platform 1	4 mins
Highbury & Islington	Platform 1	7 mins
Crystal Palace	Platform 2	2 mins
New Cross E11	Platform 2	6 mins
Clapham Junction Plats 0 2	Platform 2	9 mins

Service updates

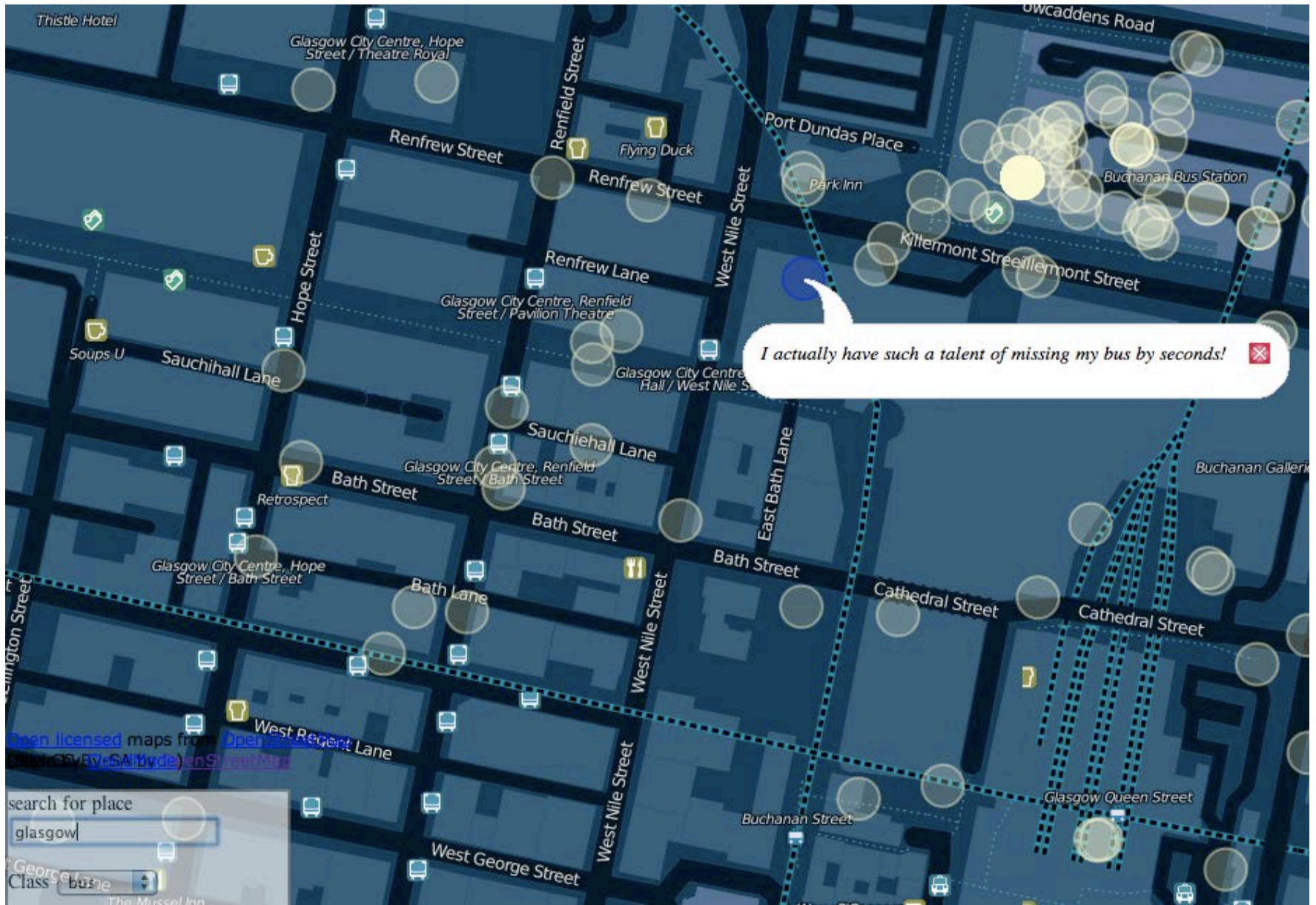
at 11:51

Now Later This weekend

Line	Status
Bakerloo	Part suspended
Central	Good service
Circle	Good service
District	Good service
DLR	Good service
H'smith & City	Good service
Jubilee	Good service
Metropolitan	Good service
Northern	Good service
Overground	Good service
Piccadilly	Good service
Victoria	Good service
Waterloo & City	Good service

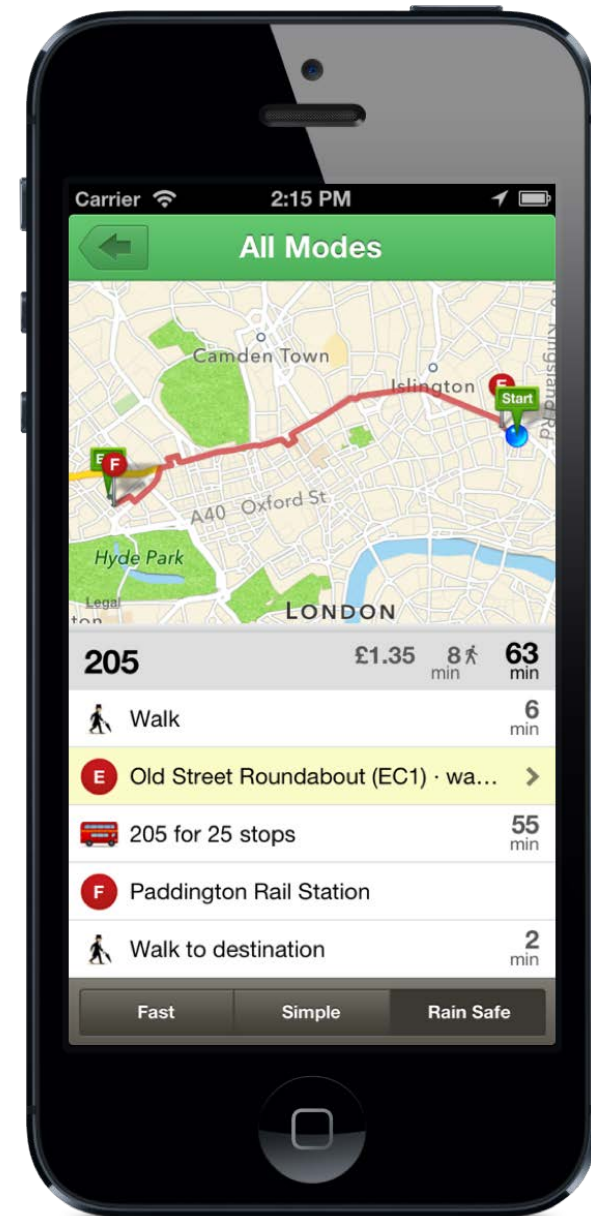
▸ Buses ▸ Road ▸ River
▸ Coaches ▸ Trams ▸ Rail
▸ Emirates Air Line

TransportBuzz social media integration

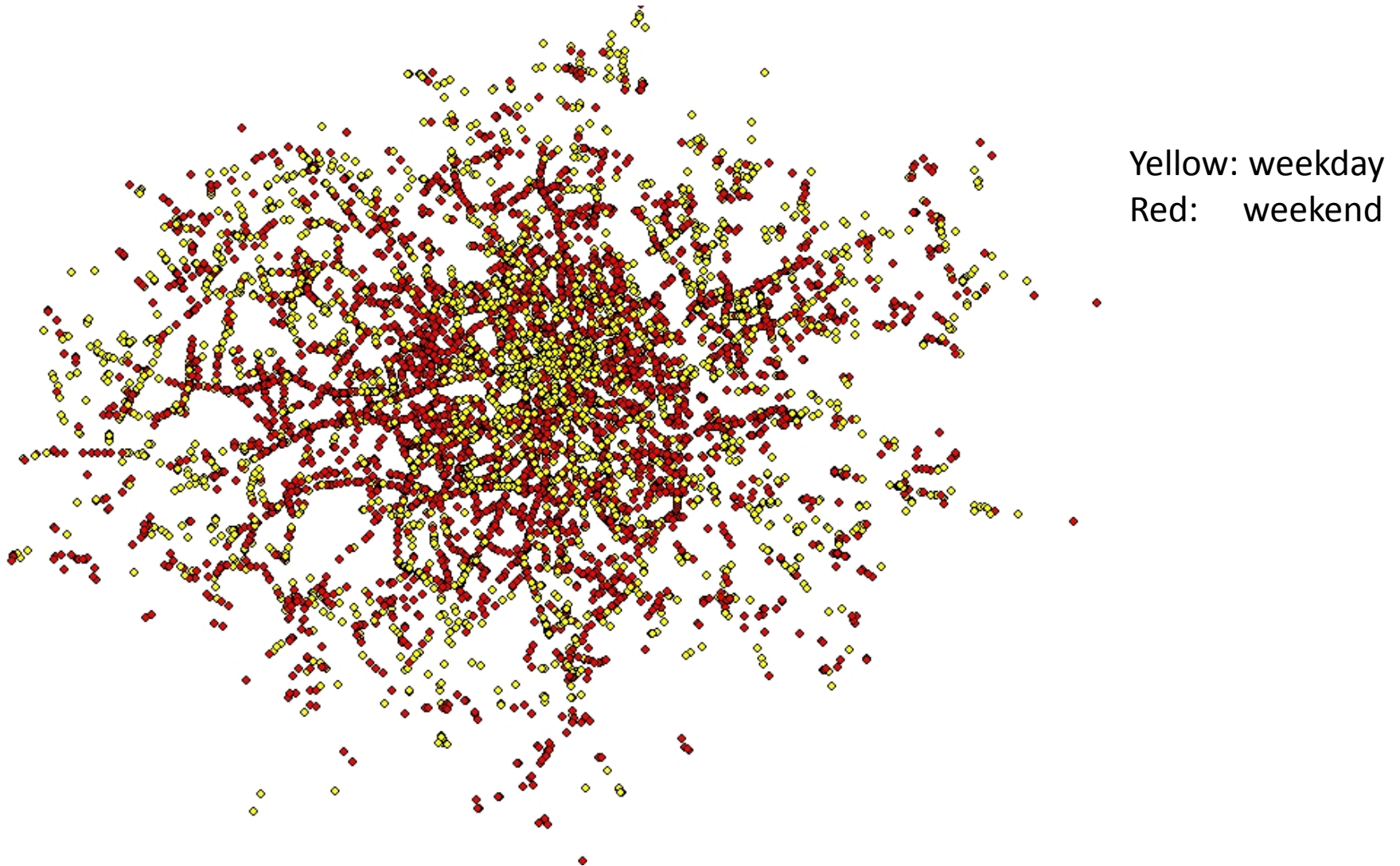


CityMapper

- 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

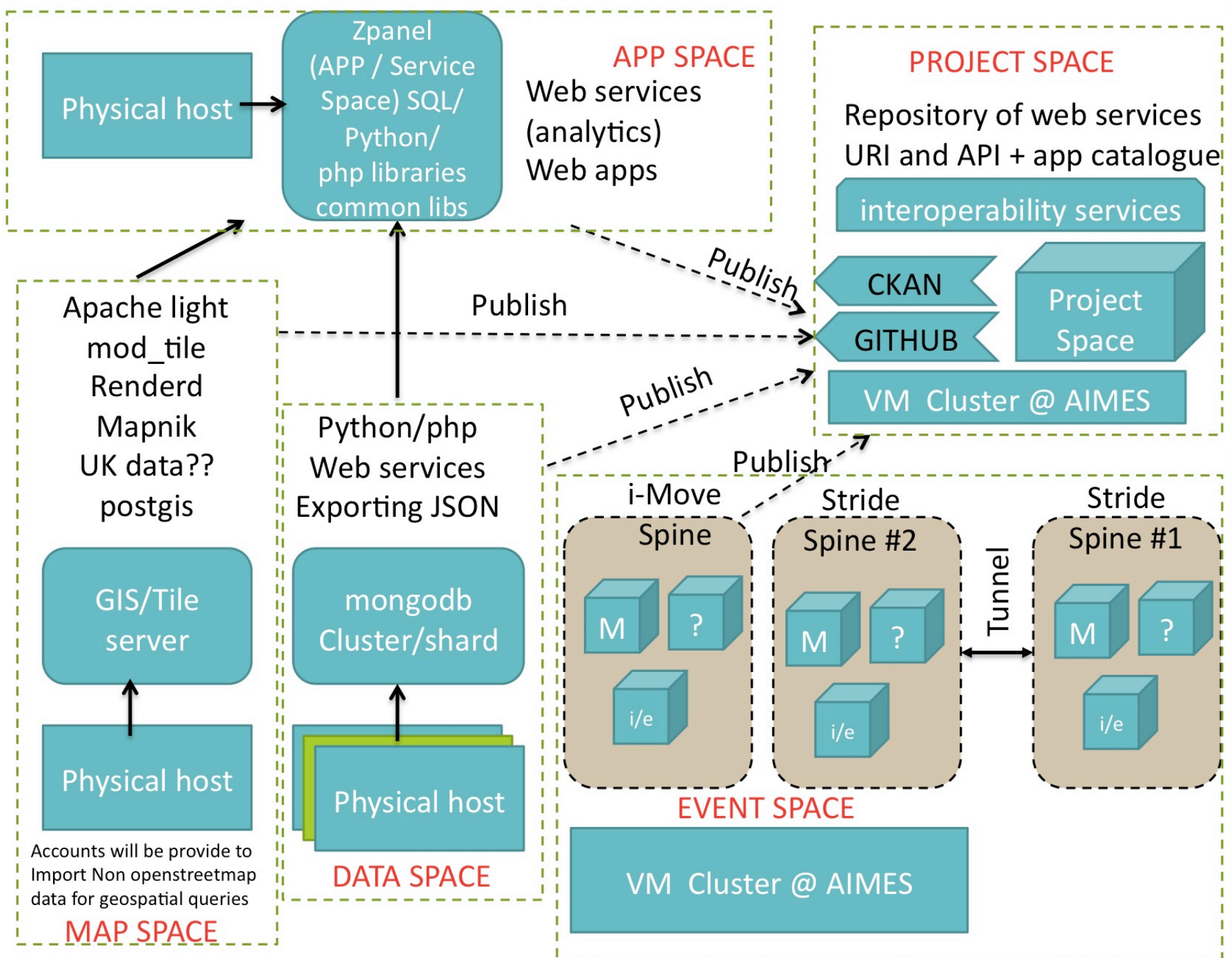


Analytics based on usage of data



i-MOVE

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



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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