Brendan O'Brien September COST Workshop

Dublin City
Baile Átha Cliath

Dublin – World Class Location

- 5th Most Attractive European City for **Inward Investment**
- Strong **City Brand** – 12th in Europe and 29th in the world
- Ireland is the 2nd most **Globalised** country in the world -
- 8th Cities in Europe for cycling and the second safest City .
- One of the most **liveable cities** in the world - ahead of San Francisco, Helsinki, Boston, Madrid and Seattle.
- **Diversity** is main strength

Some Transportation Issues

- Historic City Core
- City approx 500K Greater Dublin Area 1.4 m
- Majority of Irish imports/Exports through Port Situated within 2 Km of City Centre.
- Central Business District 30% by Car
- Outer areas 70-80% by Car
- Policy decision in 1994 not to build additional road capacity but to prioritise Public Transport

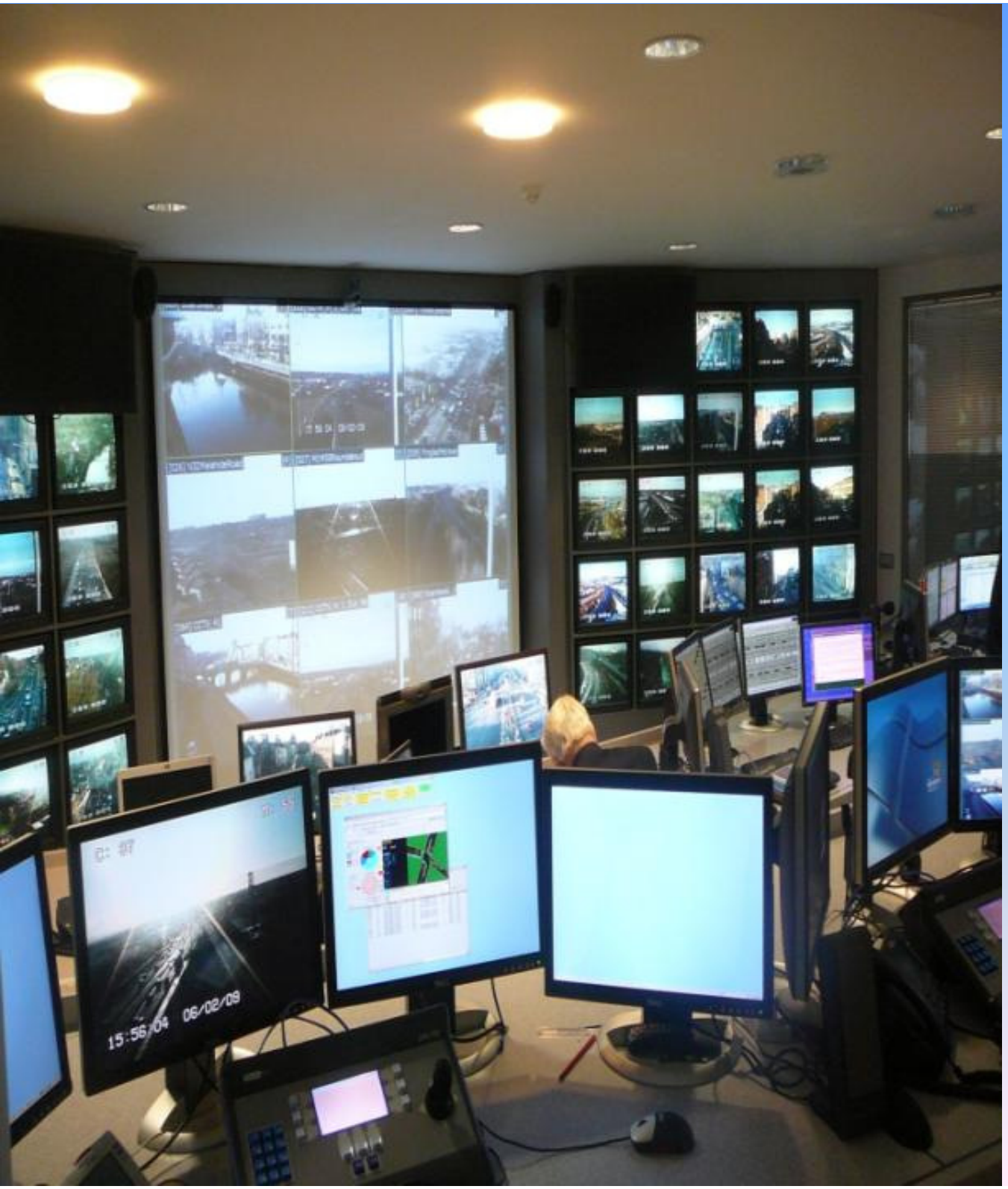
Dublin City
Baile Átha Cliath

New Light Rail System LUAS

Dublin City
Baile Átha Cliath

Port Tunnel

- **Trucks Banned from City Centre**
- **Electronic Permit System**
- **HGVS reduced by 97% in City Centre**
- **Very large Reduction in accidents.**



- Large scale investment in ITS Systems
- Adaptive Traffic Systems
- CCTV
- VMS
- Parking Systems
- Footfall Counters
- Large Data Storage

Existing use of technology for efficient public services in Dublin

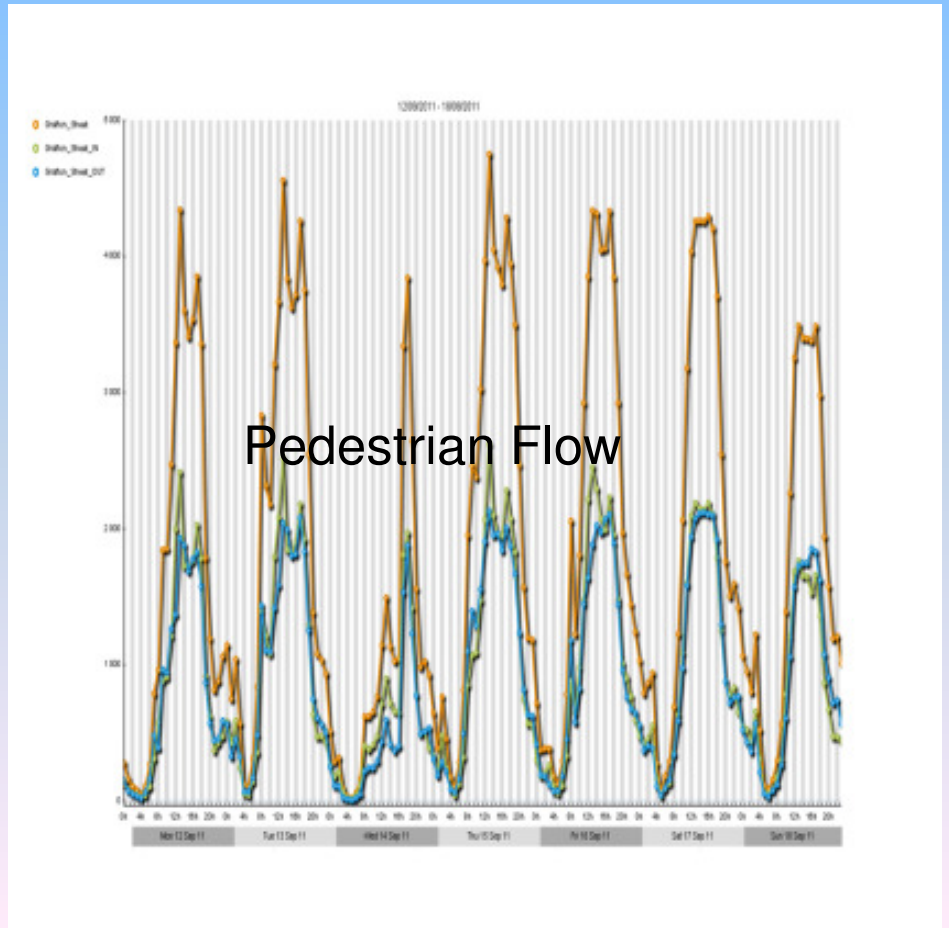
Real Time Passenger Information using open technology

Parking Tag
Creamán Páircéala

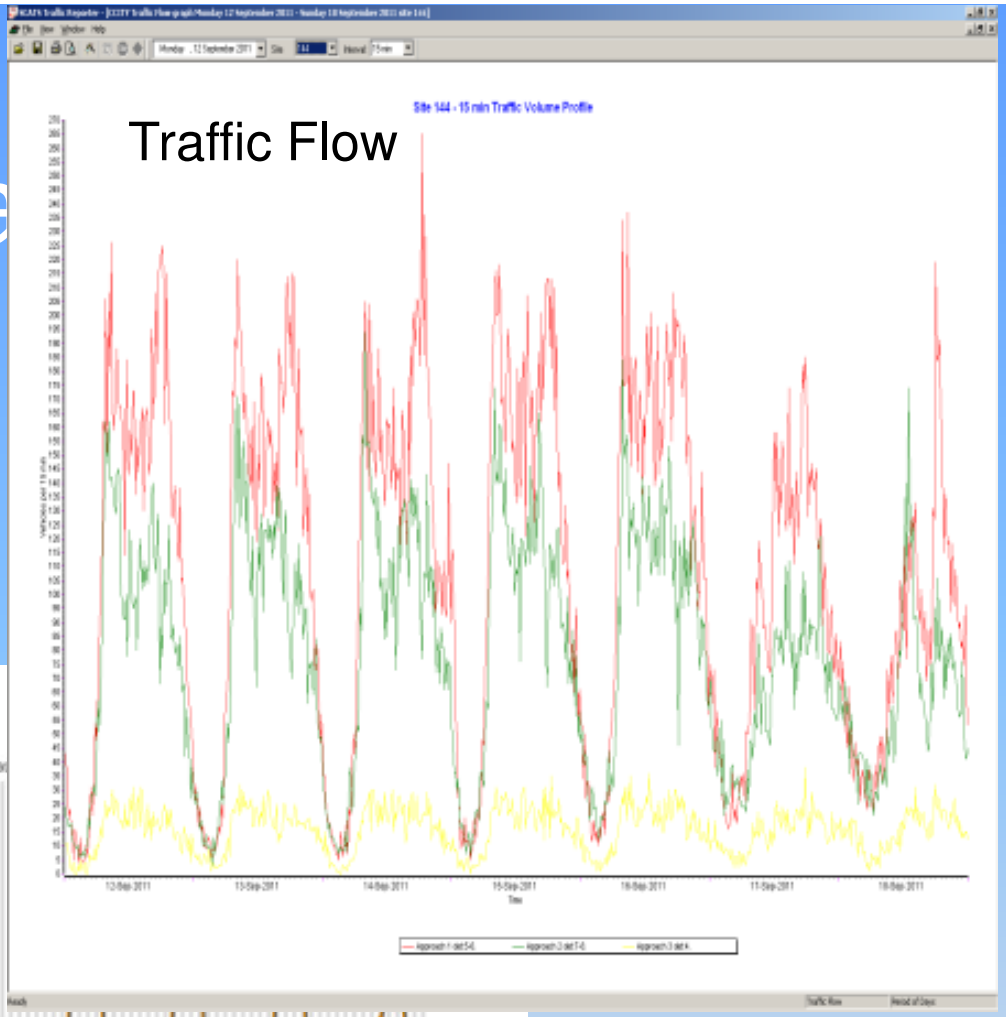
Mobile Phone to pay parking

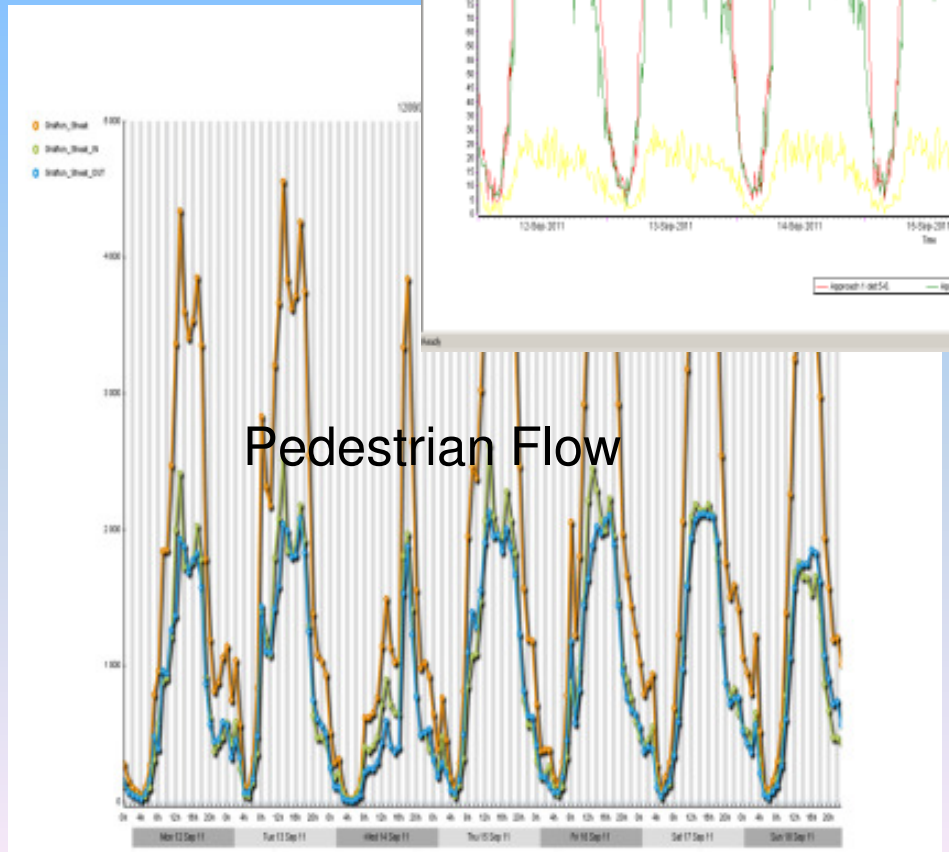
2.3 million journeys on Dublin Bikes (And growing every day!)

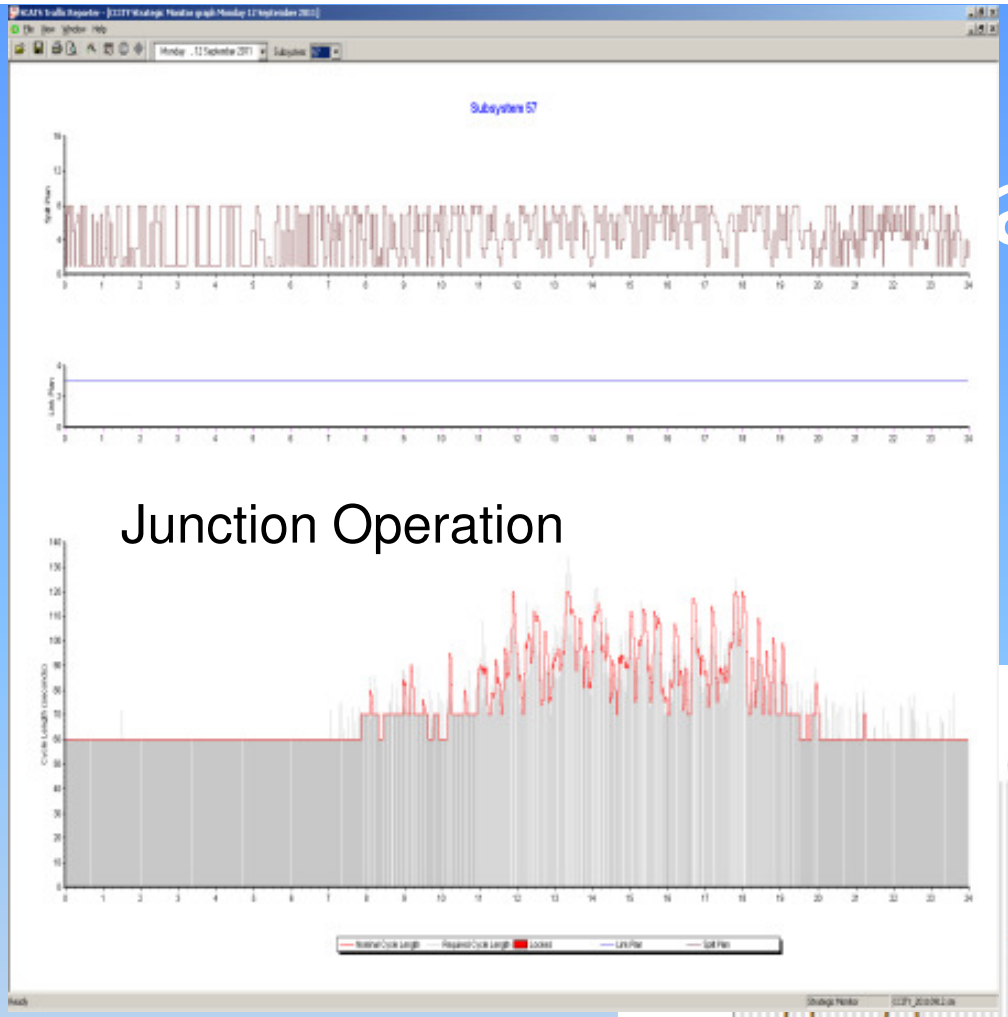
Data

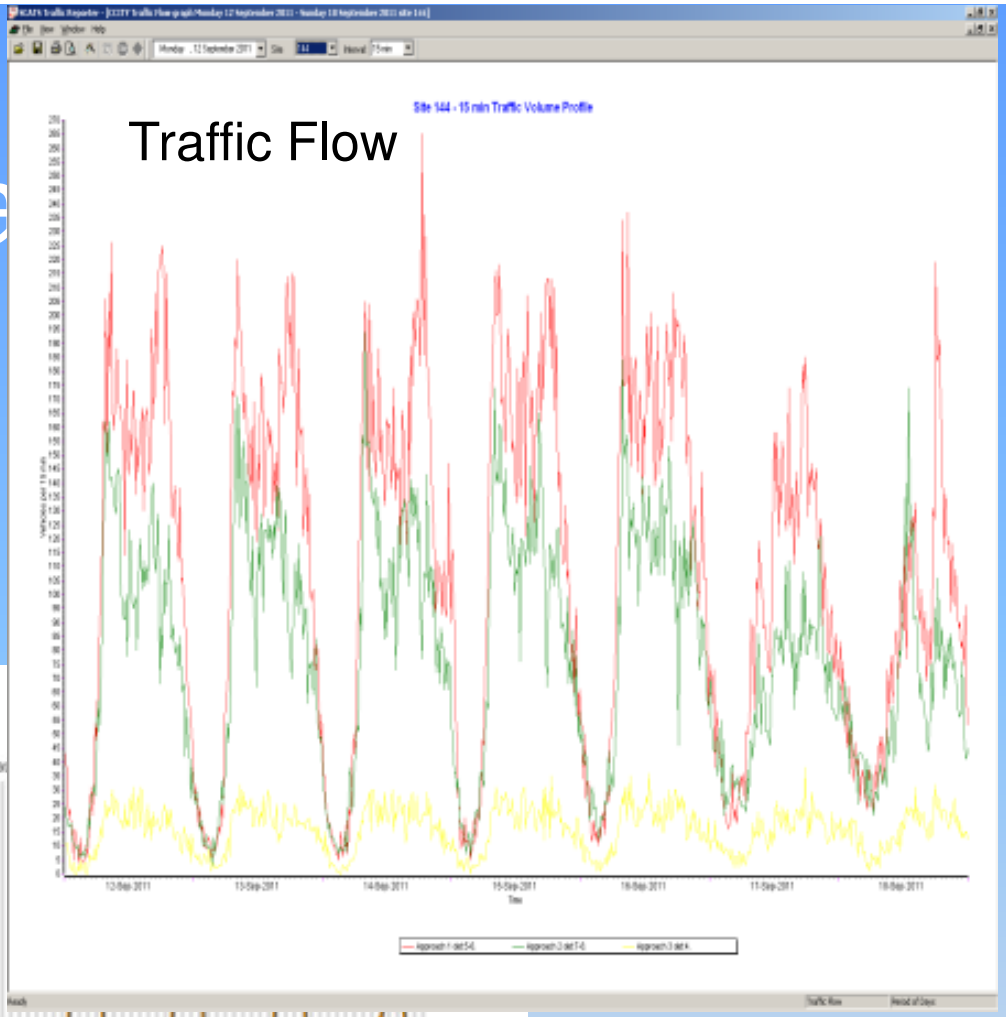


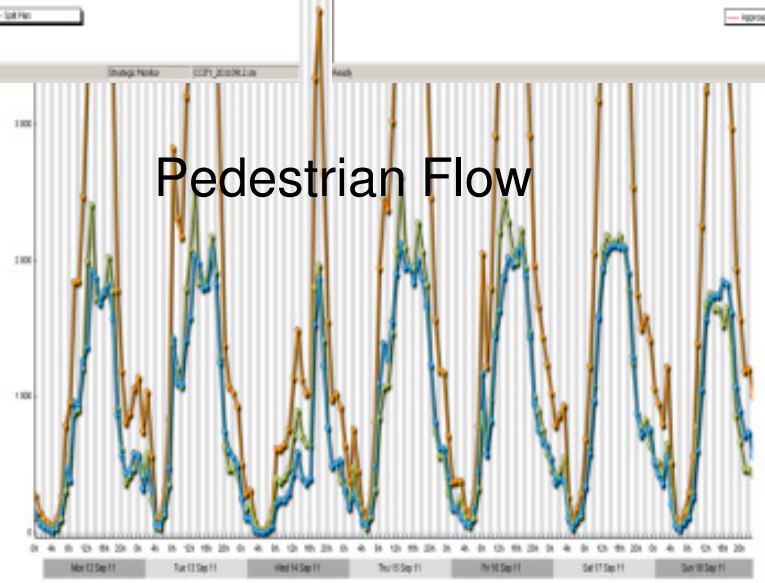
Da

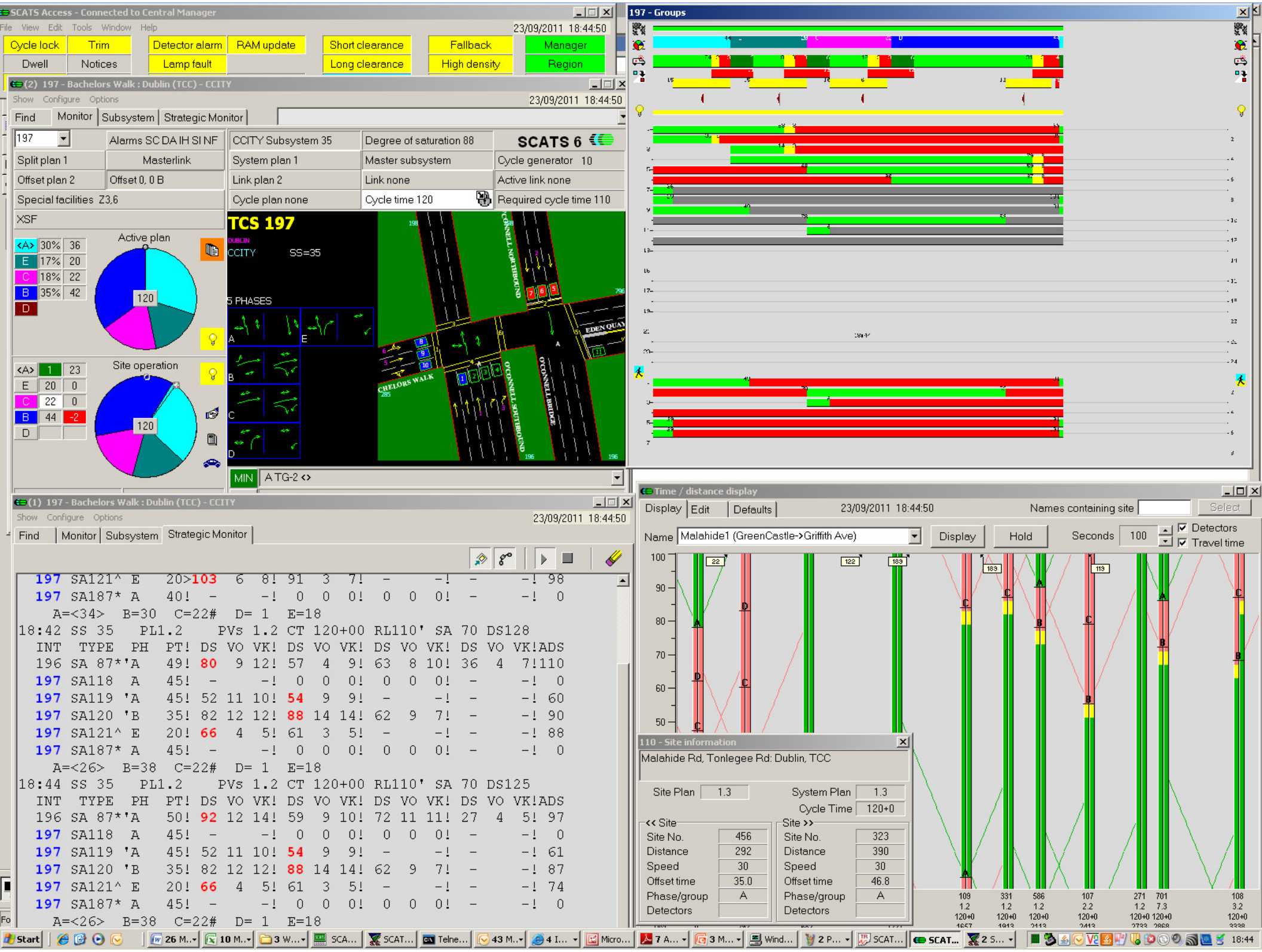

Traffic Flow
Site 144 - 15 min Traffic Volume Profile


Pedestrian Flow


Junction Operation


Traffic Flow


Pedestrian Flow


SCATS Access - Connected to Central Manager
File View Edit Tools Window Help
23/09/2011 18:44:50
Cycle lock
Trim
Detector alarm
RAM update
Short clearance
Fallback
Manager
Dwell
Notices
Lamp fault
Long clearance
High density
Region
(2) 197 - Bachelors Walk : Dublin (TCC) - CCITY
Show Configure Options
23/09/2011 18:44:50
Find
Monitor
Subsystem
Strategic Monitor
197
Alarms SC DA IH SI NF
CCITY Subsystem 35
Degree of saturation 88
SCATS 6
Split plan 1
Masterlink
System plan 1
Master subsystem
Cycle generator 10
Offset plan 2
Offset 0, 0 B
Link plan 2
Link none
Active link none
Special facilities Z3,6
Cycle plan none
Cycle time 120
Required cycle time 110
XSF
Active plan
<A> 30% 36
E 17% 20
C 18% 22
B 35% 42
D
120
Site operation
<A> 1 23
E 20 0
C 22 0
B 44 -2
D
120
TCS 197
DUBLIN
CCITY SS=35
5 PHASES
A
B
C
D
E
O'CONNELL NORTHBOUND
EDEN QUAY
CHELORS WALK
O'CONNELL SOUTHBOUND
O'CONNELL BRIDGE
MIN
A TG-2 <>
197 - Groups
(1) 197 - Bachelors Walk : Dublin (TCC) - CCITY
Show Configure Options
23/09/2011 18:44:50
Find
Monitor
Subsystem
Strategic Monitor
197 SA121^ E 20>103 6 8! 91 3 7! - -! - -! 98
197 SA187* A 40! - -! 0 0 0! 0 0 0! - -! 0
A=<34> B=30 C=22# D= 1 E=18
18:42 SS 35 PL1.2 PVs 1.2 CT 120+00 RL110' SA 70 DS128
INT TYPE PH PT! DS VO VK! DS VO VK! DS VO VK! DS VO VK!ADS
196 SA 87*'A 49! 80 9 12! 57 4 9! 63 8 10! 36 4 7!110
197 SA118 A 45! - -! 0 0 0! 0 0 0! - -! 0
197 SA119 'A 45! 52 11 10! 54 9 9! - -! - -! 60
197 SA120 'B 35! 82 12 12! 88 14 14! 62 9 7! - -! 90
197 SA121^ E 20! 66 4 5! 61 3 5! - -! - -! 88
197 SA187* A 45! - -! 0 0 0! 0 0 0! - -! 0
A=<26> B=38 C=22# D= 1 E=18
18:44 SS 35 PL1.2 PVs 1.2 CT 120+00 RL110' SA 70 DS125
INT TYPE PH PT! DS VO VK! DS VO VK! DS VO VK! DS VO VK!ADS
196 SA 87*'A 50! 92 12 14! 59 9 10! 72 11 11! 27 4 5! 97
197 SA118 A 45! - -! 0 0 0! 0 0 0! - -! 0
197 SA119 'A 45! 52 11 10! 54 9 9! - -! - -! 61
197 SA120 'B 35! 82 12 12! 88 14 14! 62 9 7! - -! 87
197 SA121^ E 20! 66 4 5! 61 3 5! - -! - -! 74
197 SA187* A 45! - -! 0 0 0! 0 0 0! - -! 0
A=<26> B=38 C=22# D= 1 E=18
Time / distance display
Display
Edit
Defaults
23/09/2011 18:44:50
Names containing site
Select
Name
Malahide1 (GreenCastle->Griffith Ave)
Display
Hold
Seconds 100
Detectors
Travel time
110 - Site information
Malahide Rd, Tonlegee Rd: Dublin, TCC
Site Plan 1.3
System Plan 1.3
Cycle Time 120+0
<< Site
Site No. 456
Distance 292
Speed 30
Offset time 35.0
Phase/group A
Detectors
Site >>
Site No. 323
Distance 390
Speed 30
Offset time 46.8
Phase/group A
Detectors
Start
18:44

Traffic Control

Large Amounts of Data

- Systems work well but are complex
- CCTV systems and VMS signage
- Why does traffic move so well today and not tomorrow.

Junction Optimisation

- Need control room Operators
- Great for incidents and accidents but Analysis.???
- Hmmm difficult to say could be too many cars. !!!

Traffic Control

unction Optimisation

Need control room Operators

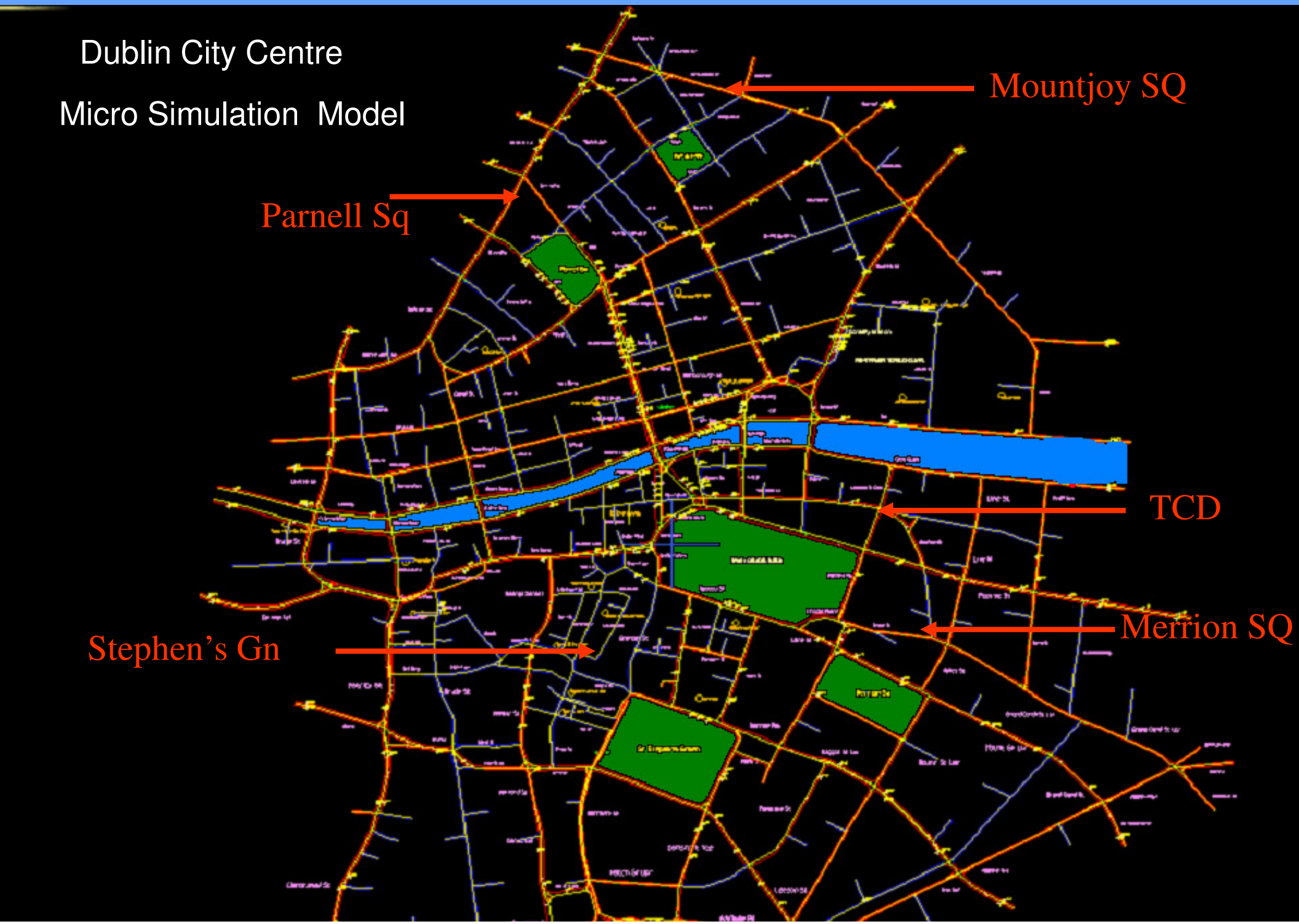
Great for incidents and accidents but Analysis.???

Hmmm difficult to say could be too many cars. !!!

- Where is the investment needed.

Dublin City Centre

Micro Simulation Model



Questions for a City

- How to Visualise all its data
- How to understand what is important
- How to intervene effectively
- Where to invest
- What functions it needs to undertake.
- What should it do with it’s data.
- Should all data be available and how do we share real time data.

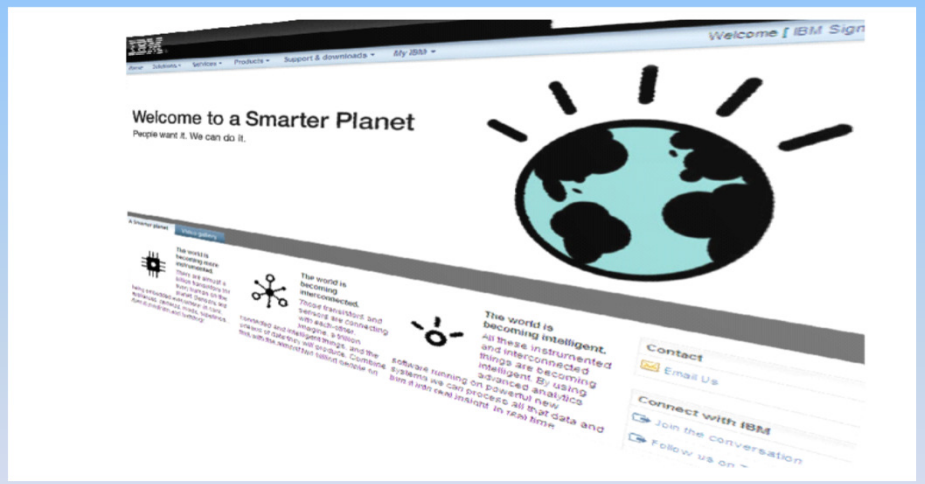
SmarterCities Technology Centre

IBM / Dublin Smart City projects launched in 2009
Location of **IBM's Global Smart City Technology Centre** in Dublin

City as a Test-bed for international product & service innovation

Current Dublin Smart City Seed Projects

- **Water**
- **Movement**
- **Energy**



SmarterCities Technology Centre

Dublin: IBM Research's First Smarter Cities Technology Centre

Developing Intelligent Solutions Across a System of Systems

Optimization

Forecasting

Simulation

Predictive Modelling

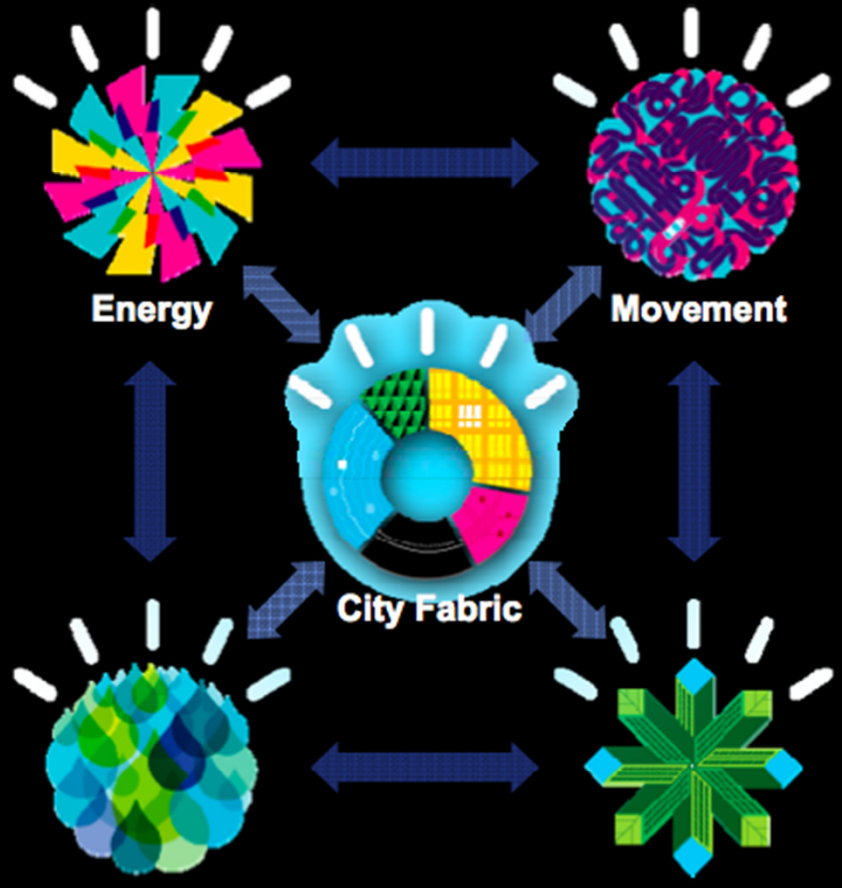
Driving New Economic Models

Significant Collaborative R&D

Skills Development & Growth

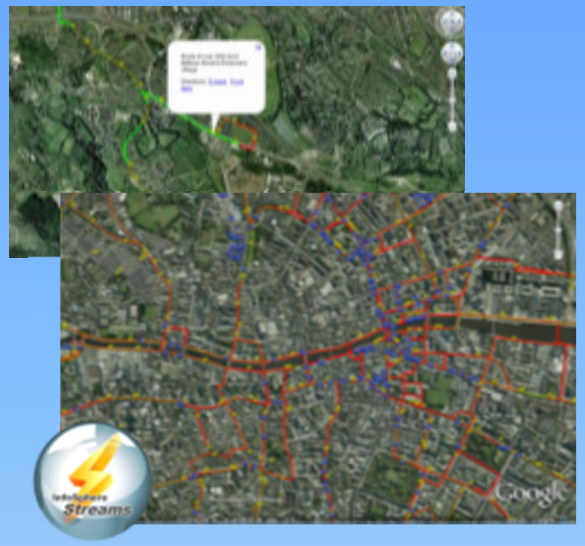
Competitive Advantage

Seed Projects



Examples of Collaborative Smarter Cities Seed Projects in Dublin

Transportation



- Continuously assess the state of the public transport system
- Provides personalized, real-time advice to riders and dynamic load-balancing opportunities to transit providers

Water and Energy

- Collaborative sensing of water/energy consumption in public buildings
- Enables occupants and facility managers to manage and optimize resource usage, and utility providers to predict demand

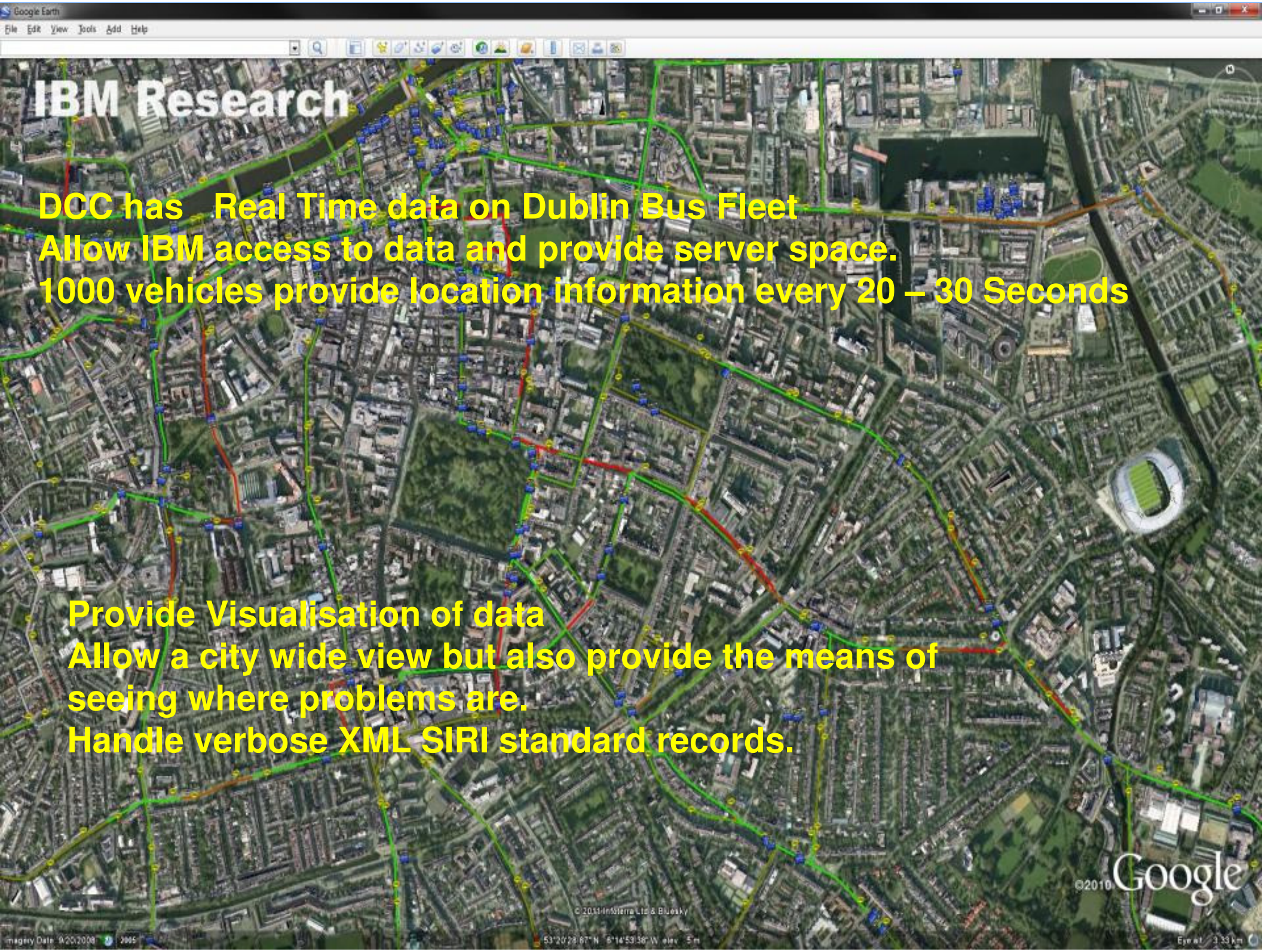
City Fabric

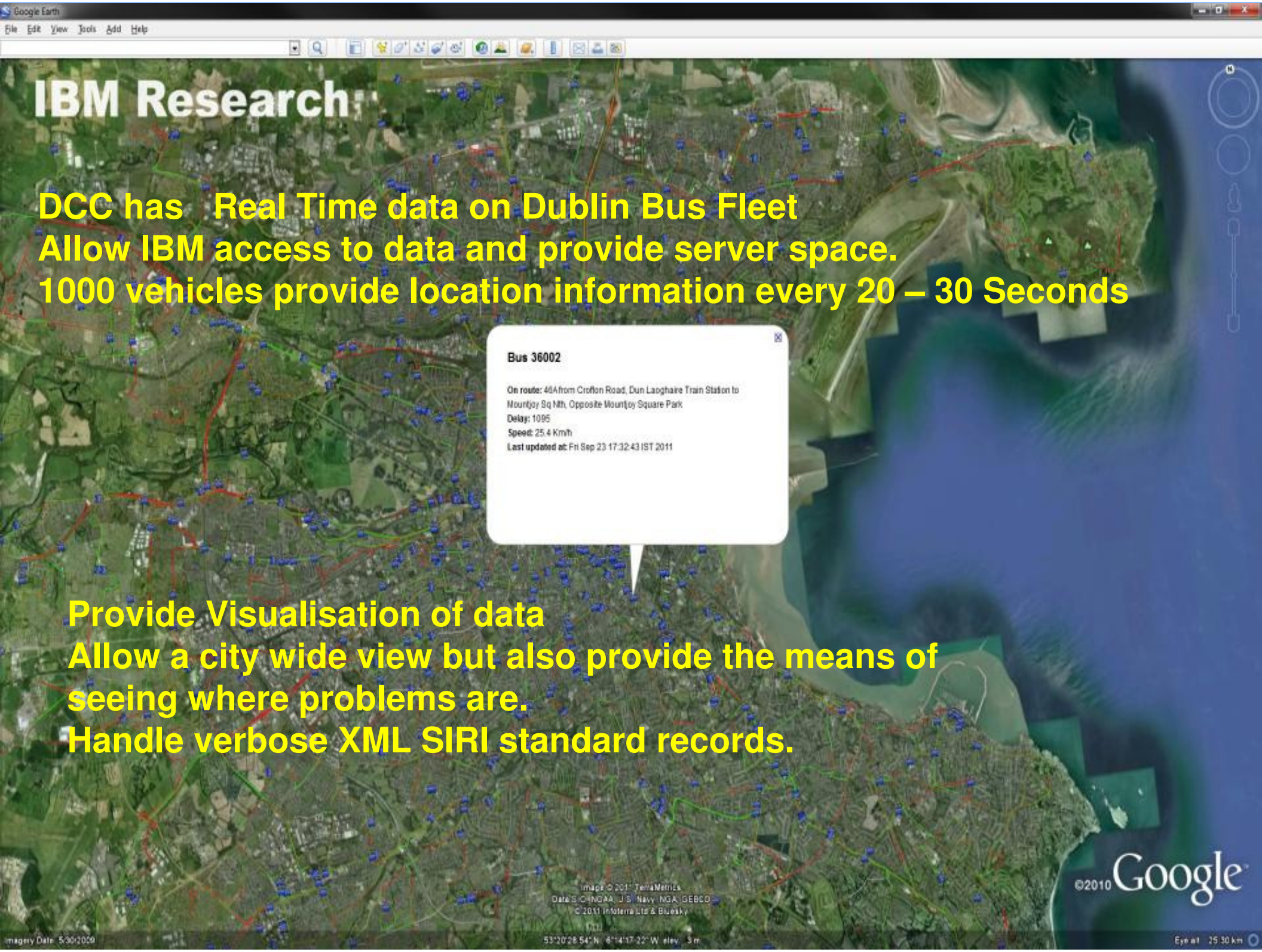
Dubl:nked

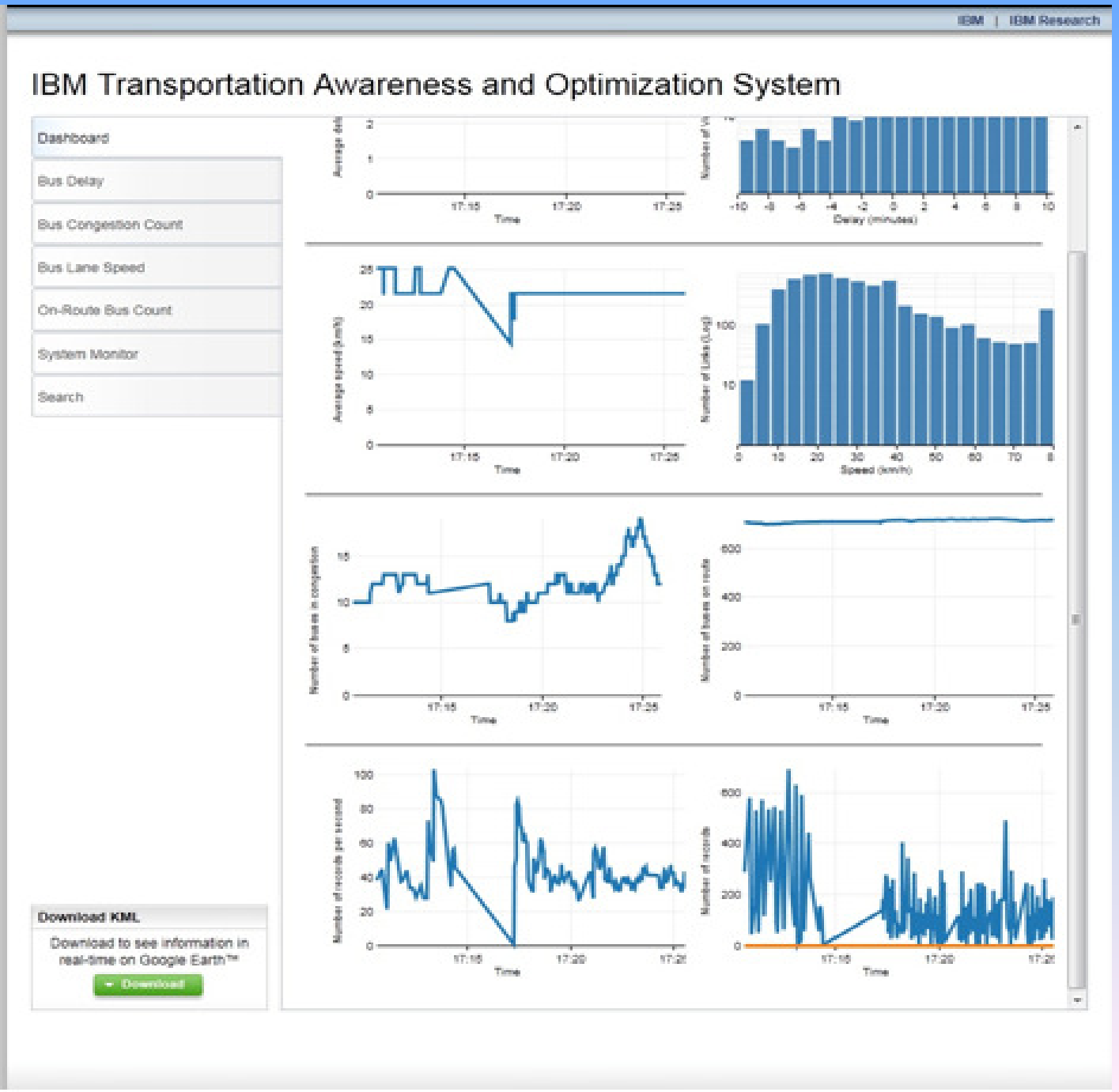
- Open Innovation Platform (Dublinked) for publishing and managing Dublin city's linked open data
- Positions Dublin as a hub for smarter city research, development, and innovation

Merrion Water Project – SMART water metering

Visualisation of high water consumption to support management and resource optimisation

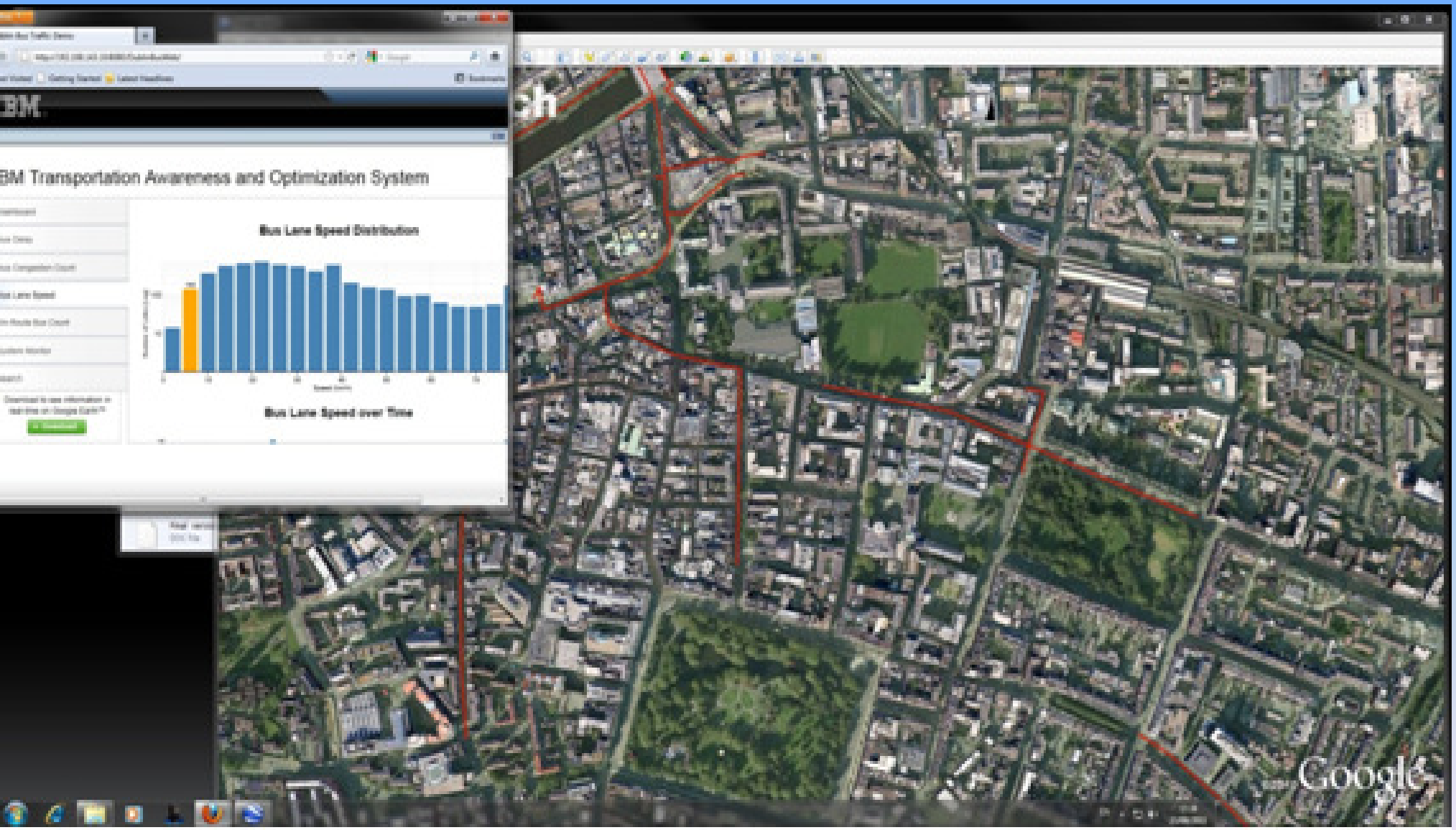

IBM Research
DCC has Real Time data on Dublin Bus Fleet
Allow IBM access to data and provide server space.
1000 vehicles provide location information every 20 – 30 Seconds
Provide Visualisation of data
Allow a city wide view but also provide the means of seeing where problems are.
Handle verbose XML SIRI standard records.
Google

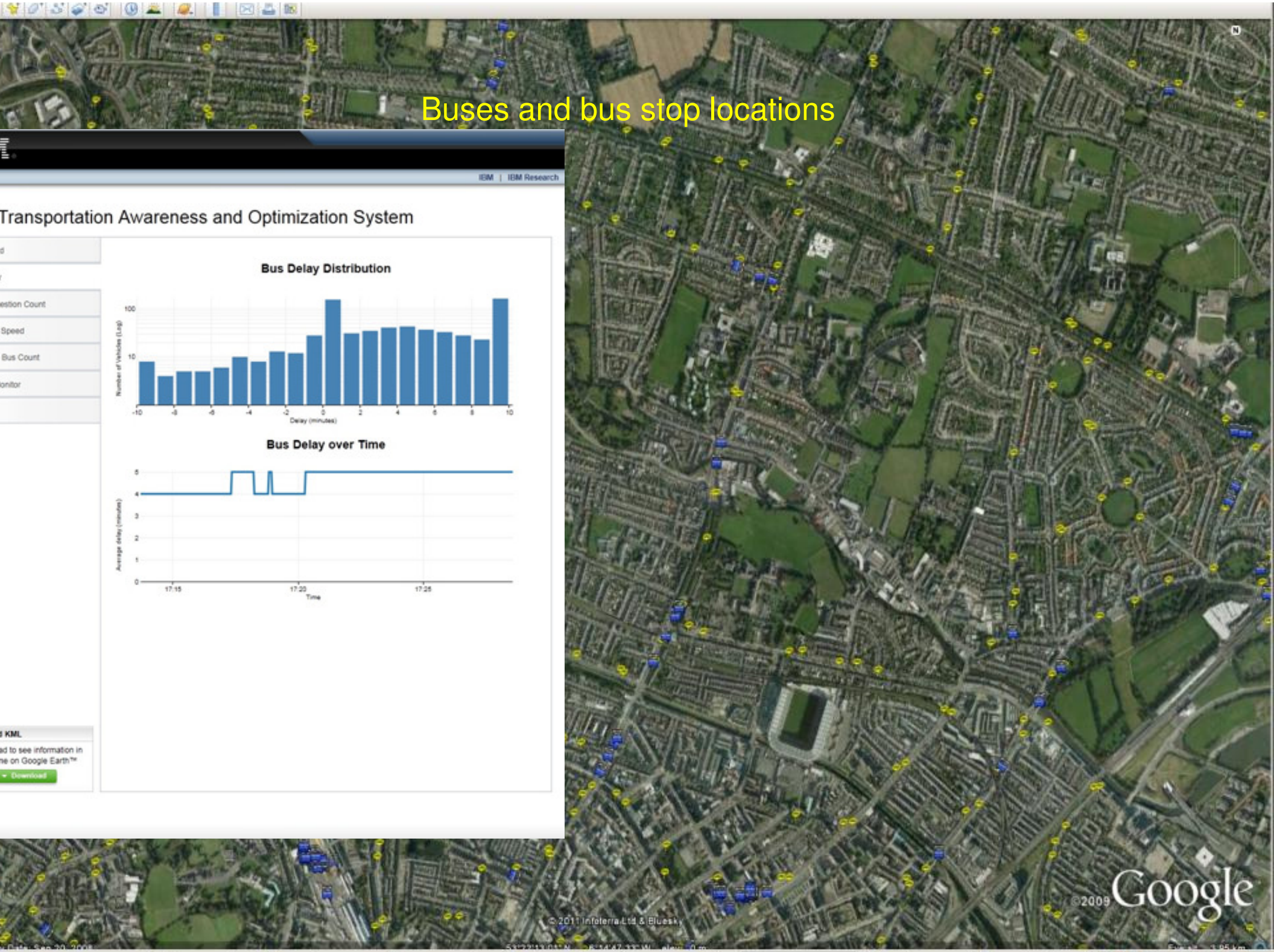

Google Earth
File Edit View Tools Add Help
IBM Research
DCC has Real Time data on Dublin Bus Fleet
Allow IBM access to data and provide server space.
1000 vehicles provide location information every 20 – 30 Seconds
Bus 36002
On route: 46Afrom Crofton Road, Dun Laoghaire Train Station to Mountjoy Sq Nth, Opposite Mountjoy Square Park
Delay: 1095
Speed: 25.4 Km/h
Last updated at: Fri Sep 23 17:32:43 IST 2011
Provide Visualisation of data
Allow a city wide view but also provide the means of seeing where problems are.
Handle verbose XML SIRI standard records.
©2010 Google

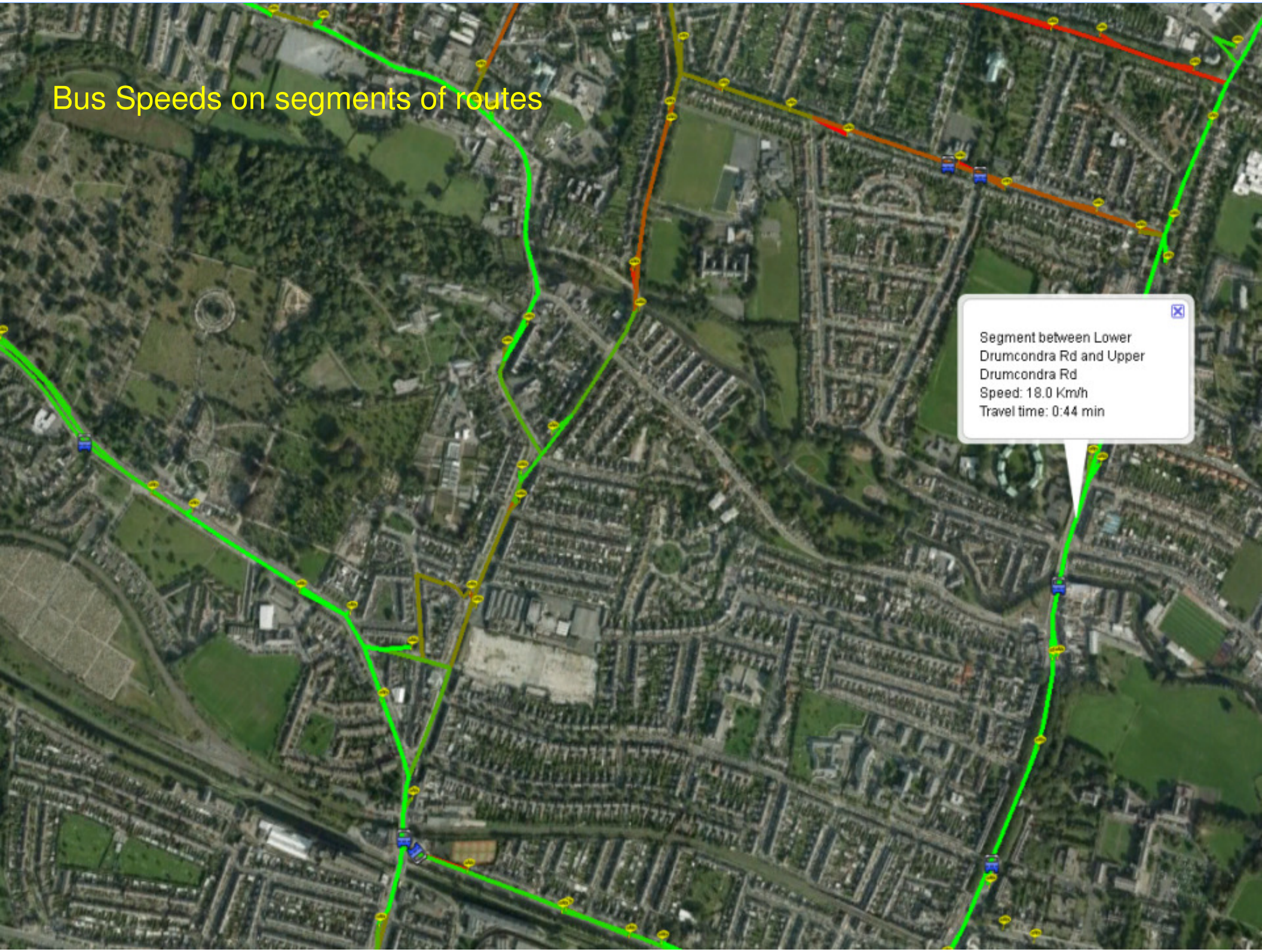


- Dash Board type view
- Linked to visualisation using Google Earth
- Allows focusing in on data

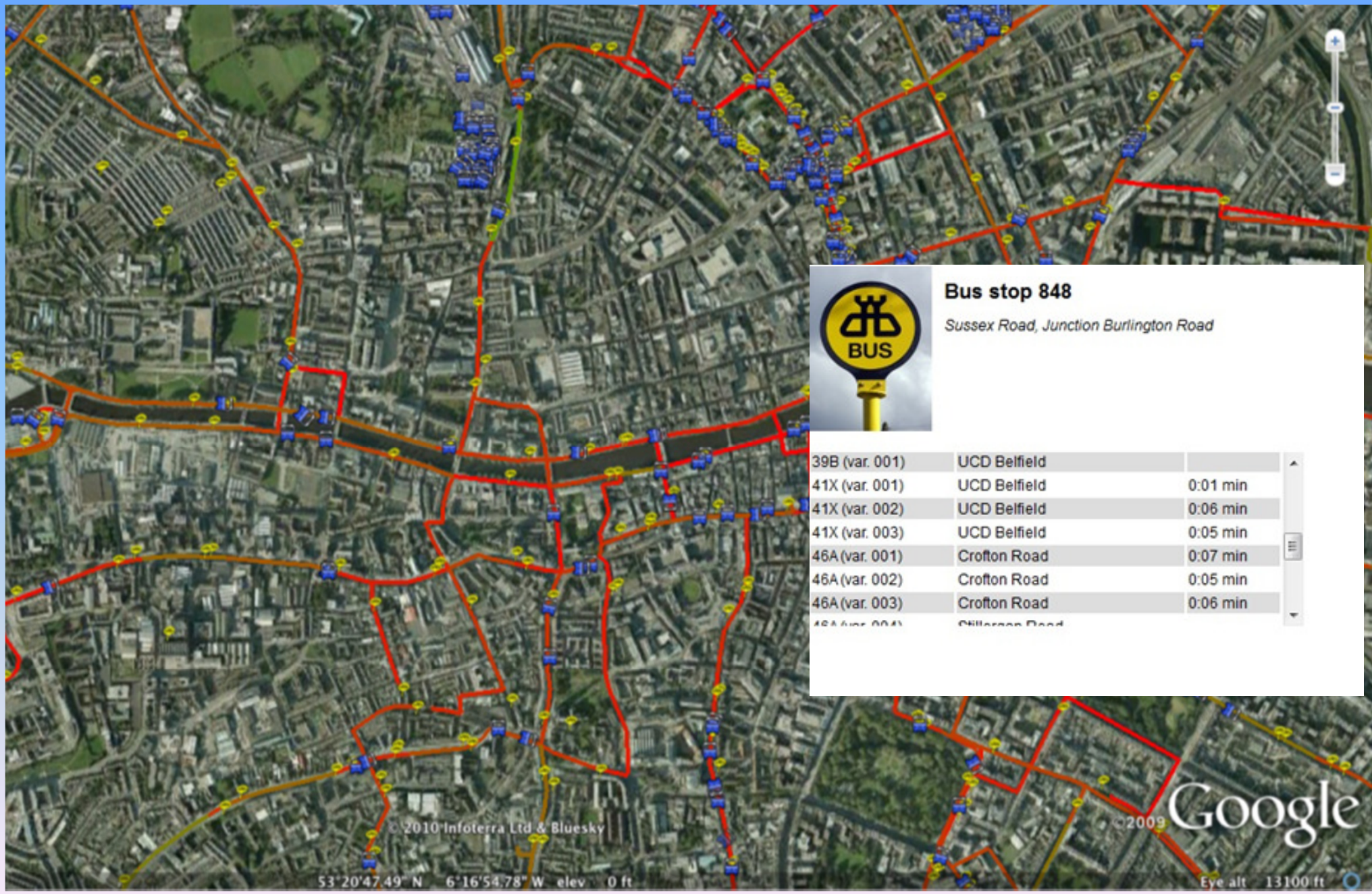
Bus Lane Speed Over Time




Buses and bus stop locations
IBM | IBM Research
Transportation Awareness and Optimization System
Bus Delay Distribution
Number of Vehicles (Log)
Delay (minutes)
Bus Delay over Time
Average delay (minutes)
Time
17:15
17:20
17:25
Google
©2009
© 2011 Infoterra Ltd & Bluesky


Bus Speeds on segments of routes
Segment between Lower Drumcondra Rd and Upper Drumcondra Rd
Speed: 18.0 Km/h
Travel time: 0:44 min

Data used for Bus arrival Predictions



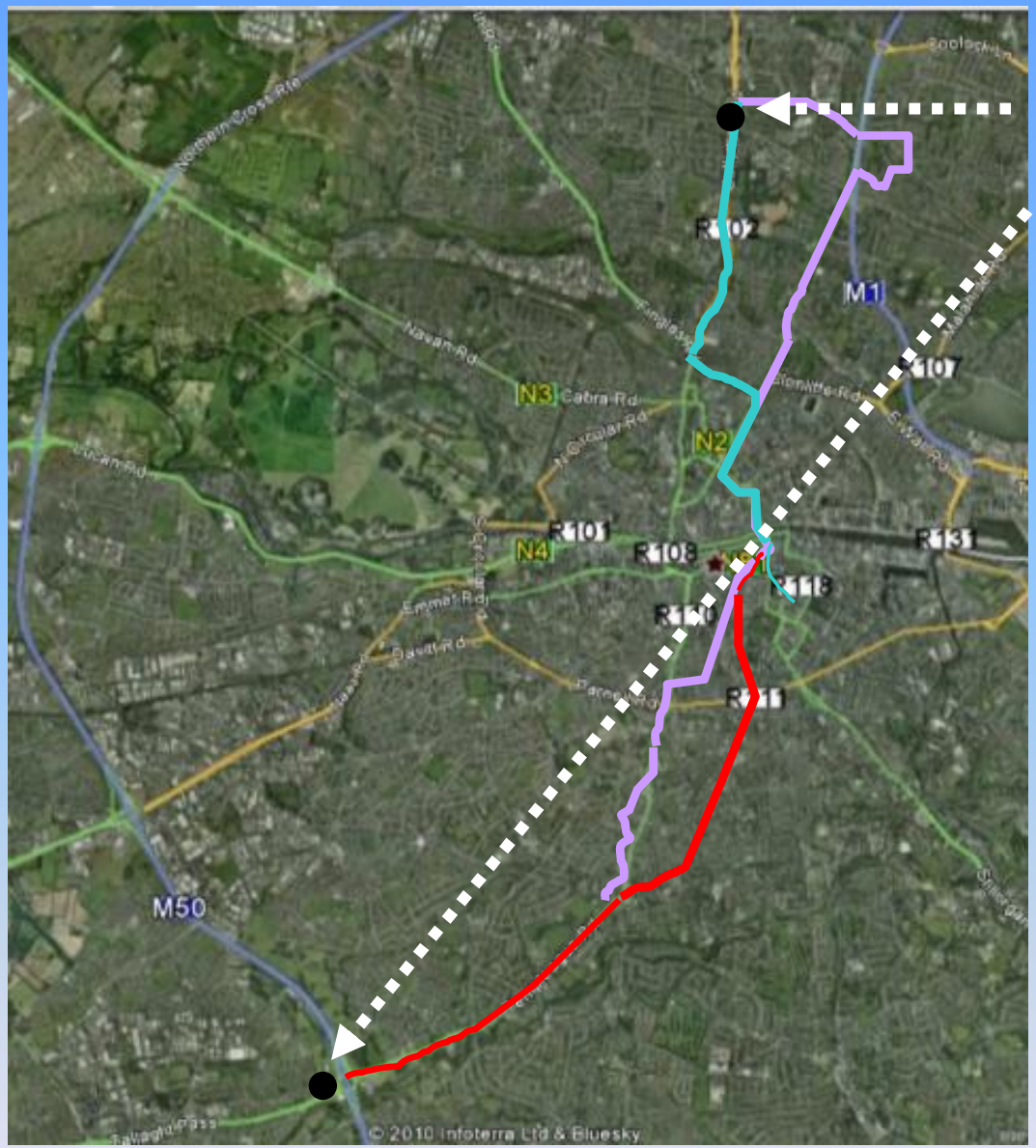
SIRI DATA

PublishedLineName>**123**</PublishedLineName>
<OperatorRef>**bac**</OperatorRef>
<DestinationRef>**MARINO**</DestinationRef>
<DestinationName>**Marino via O'Connell Street**</DestinationName>
<Monitored>**true**</Monitored>
<InCongestion>**false**</InCongestion>
<BlockRef>**123006:31**</BlockRef>
<VehicleRef>**28023**</VehicleRef>
- <MonitoredCall>
<VisitNumber>**28**</VisitNumber>
<VehicleAtStop>**false**</VehicleAtStop>

<AimedDepartureTime> **2011-09-08 T13:21:22** <

<ExpectedDepartureTime> **2011-09-08 T13:22:42** <

TRANSPORTATION

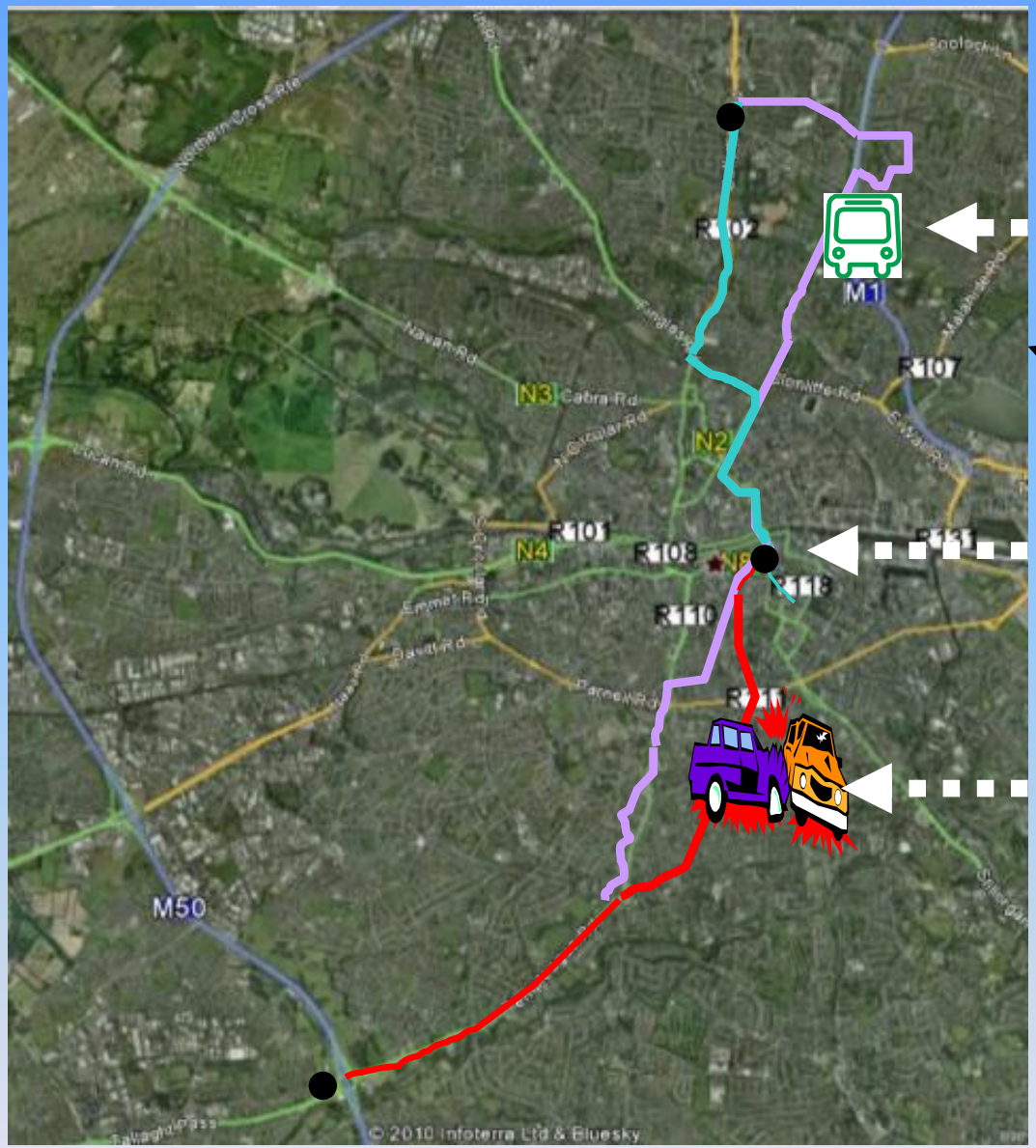


Suppose you want to go from here
to here.

Many routes to accomplish the journey.

Each can involve connections, wait times, and uncertainty due to normal traffic patterns as well as unusual occurrences.

How should you make up your mind ?



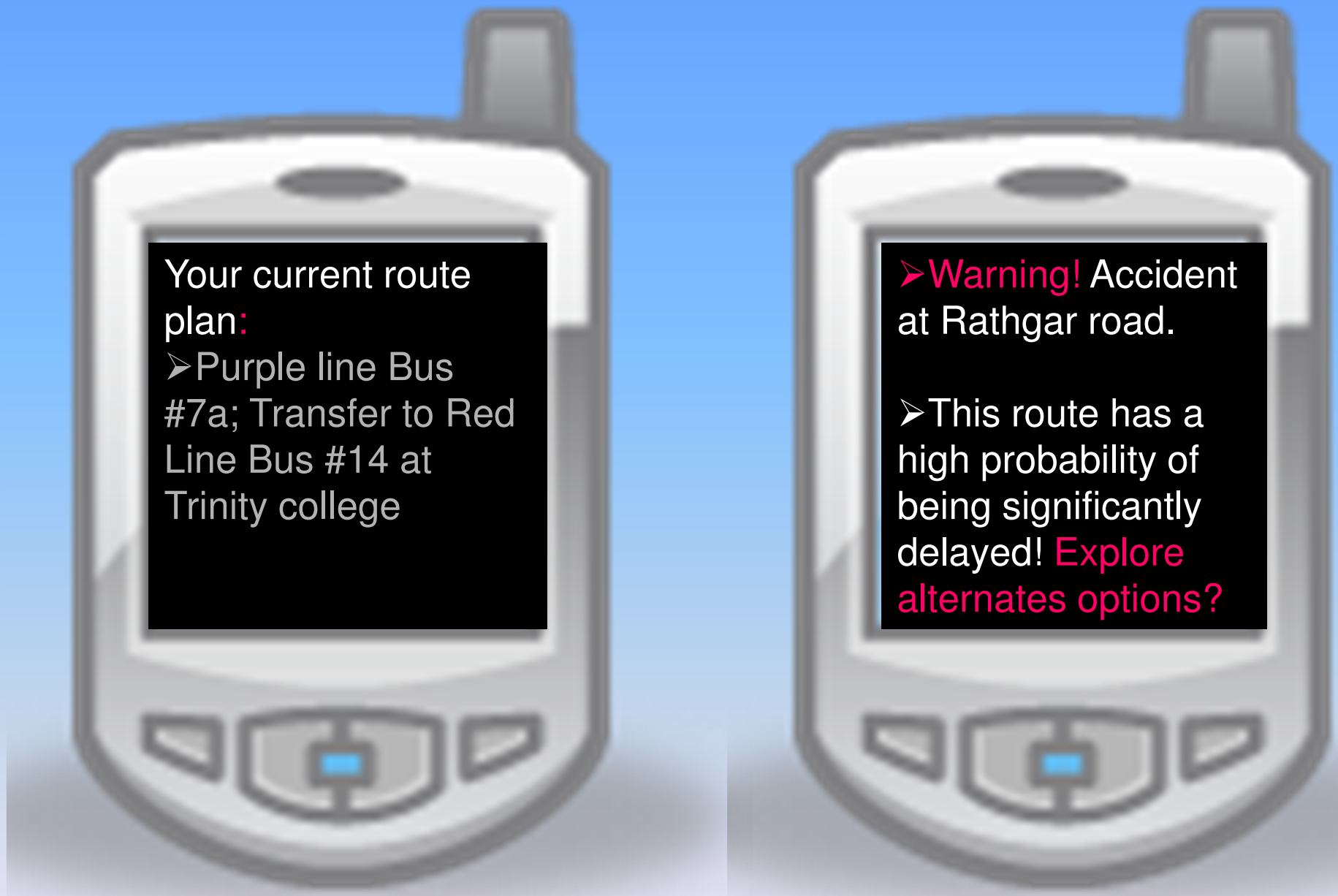
You are currently on a bus on the purple line,

Your plan is to transfer here

Five minutes ago, there was an accident on the red line

What if you had real time information about the status of the network and the value of your options?

SMART TRANSPORTATION SOLUTIONS



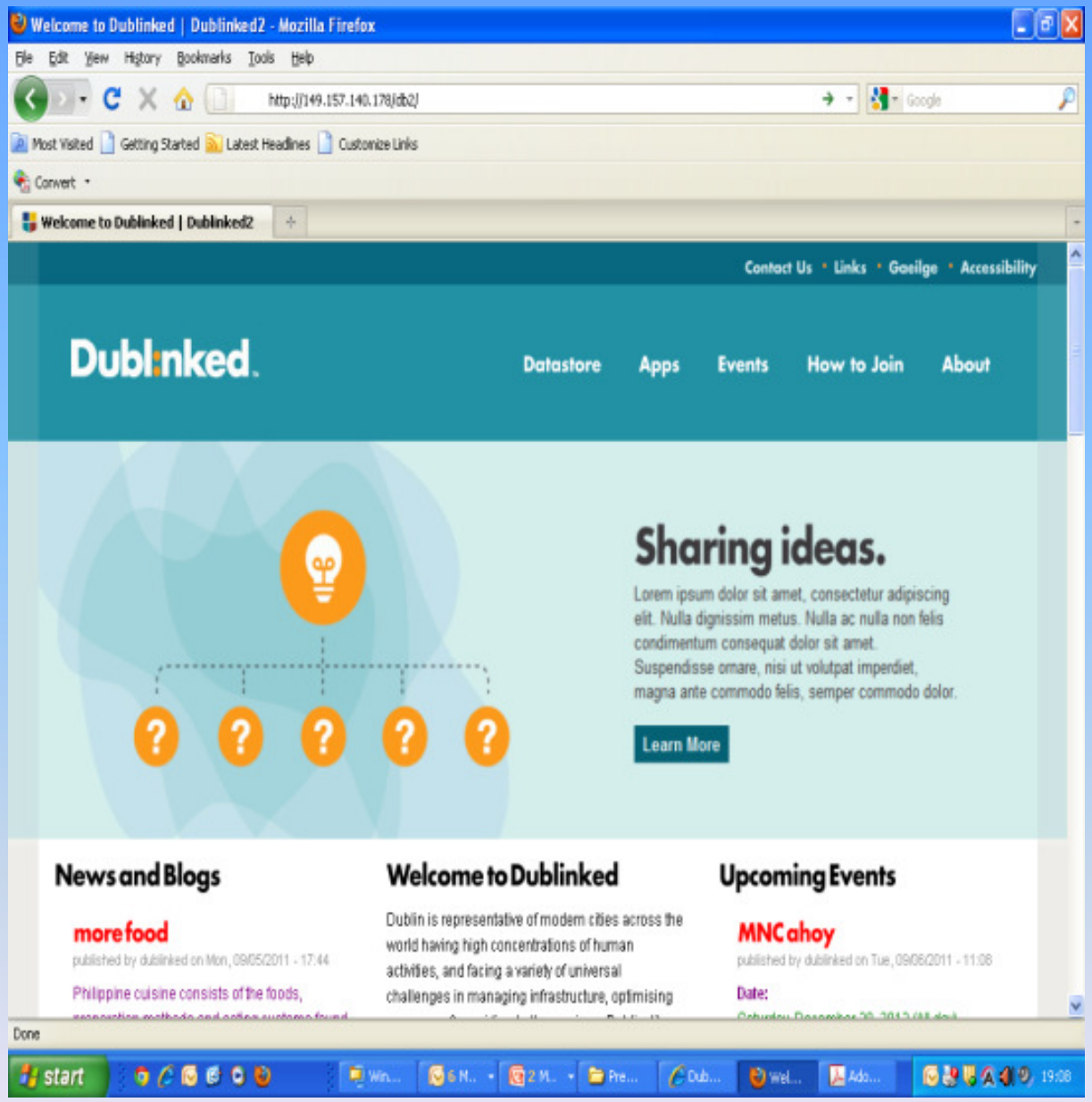
Smart Cities Interface

- Data is the key
- A Smart City Fabric is built on sensors.
- All systems in Dublin will have a “Smart Cities Interface “
- No systems should now be deployed that has no open interface.
- But large scale systems tend to have licences with high costs.
- SCATS / SIRI compliant systems licence per connection. (25 – 30 K per connection)

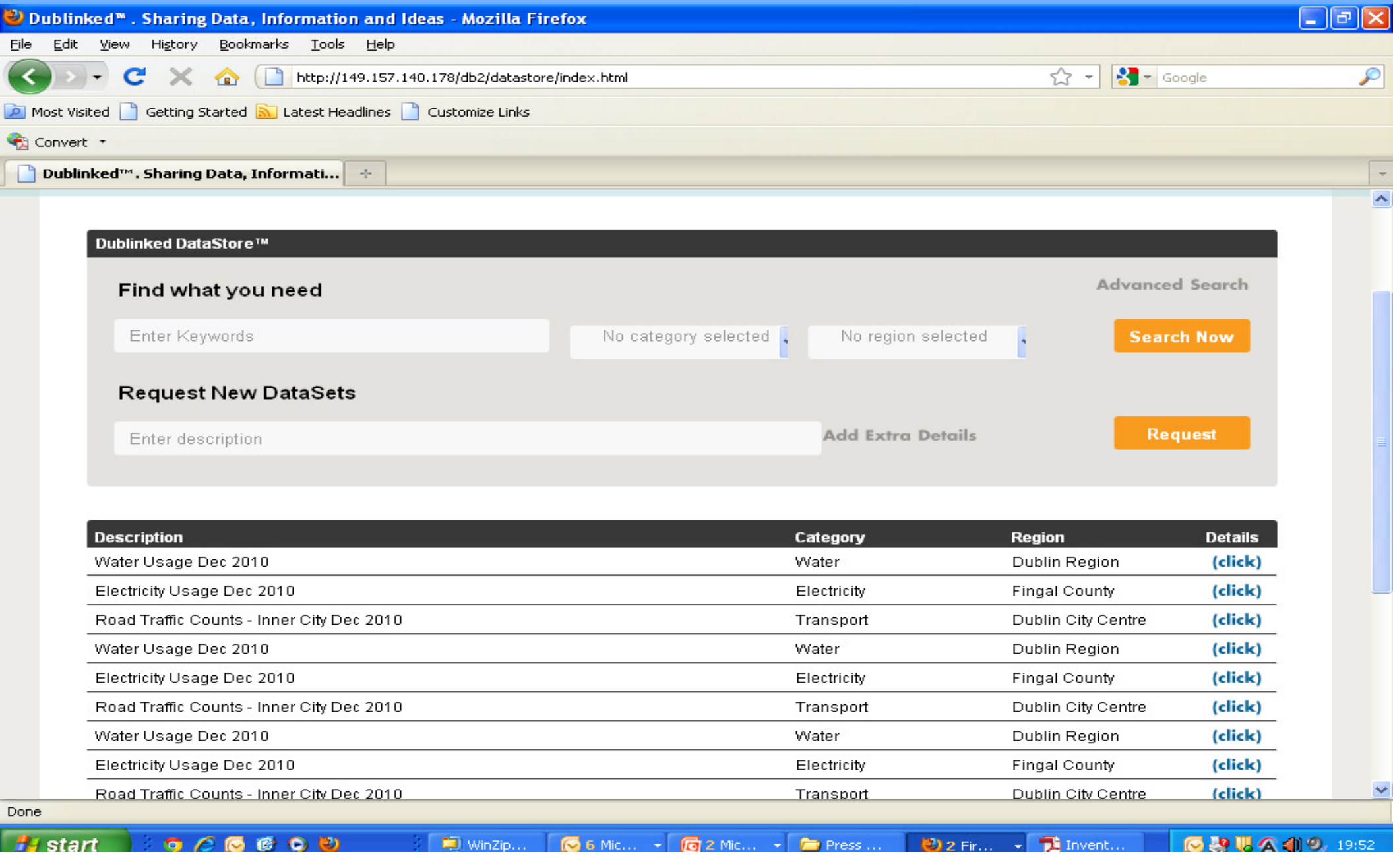
Dublinked

Open Data Sharing to support innovation & enterprise ecosystem

- Led by the 4 Dublin Local Authorities Project managed by National University of Ireland Maynooth
- Portal and technical support by IBM



Dublinked Data

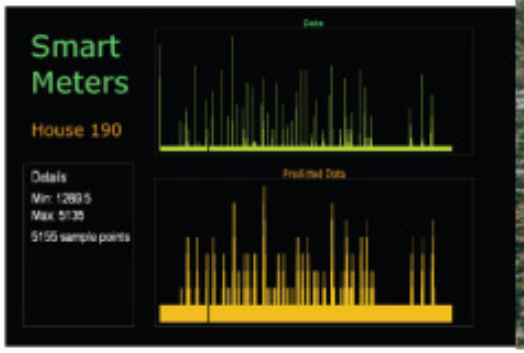


IBM

Datasets

Water consumption measured at DMA level
- Every 15 minutes
- For 1 month (April 2011)

Water consumption measured at household level
- Merrion road
- Every 15 minutes
- About 1 year



SmarterCities
Technology Centre

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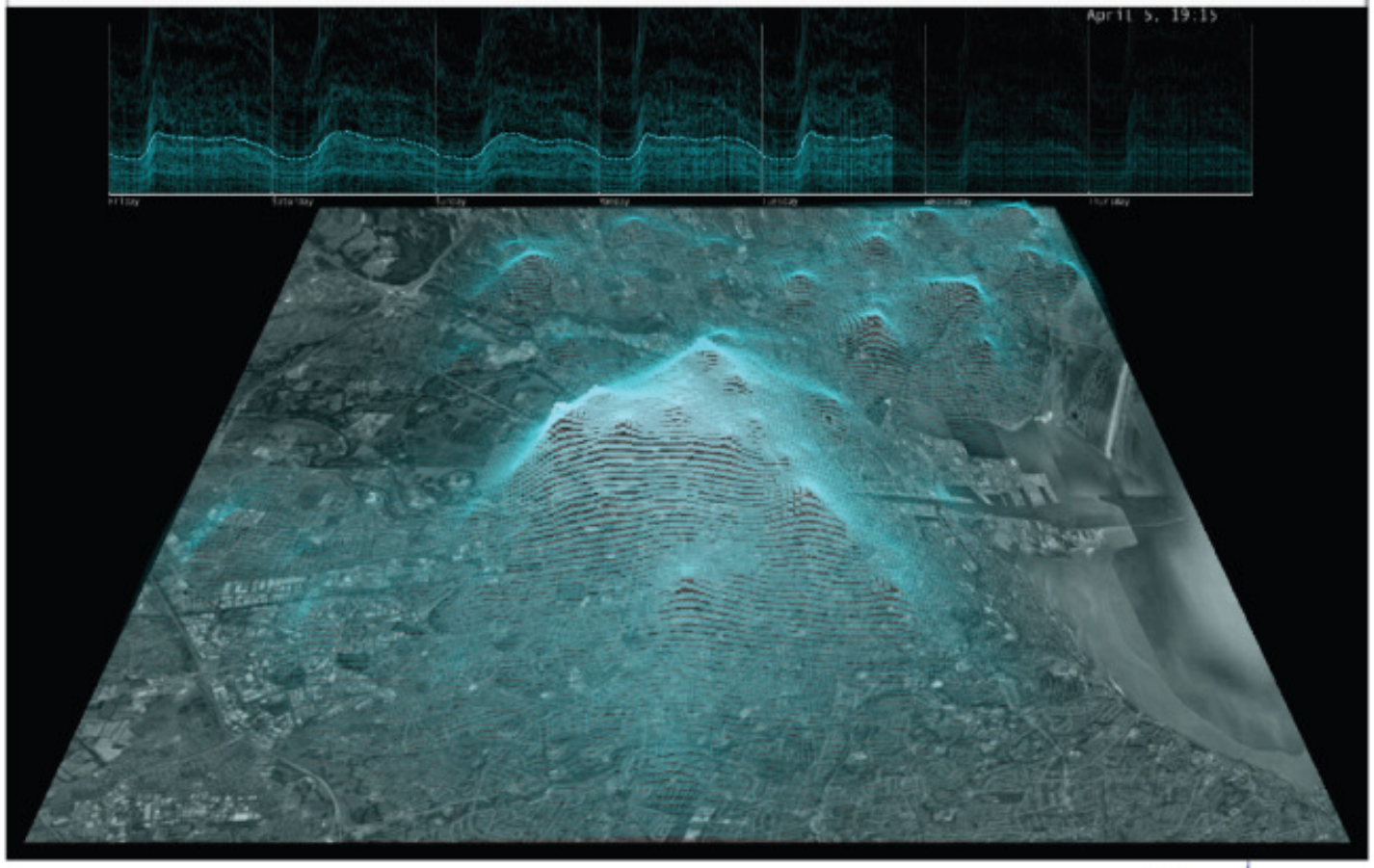

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Technology Centre

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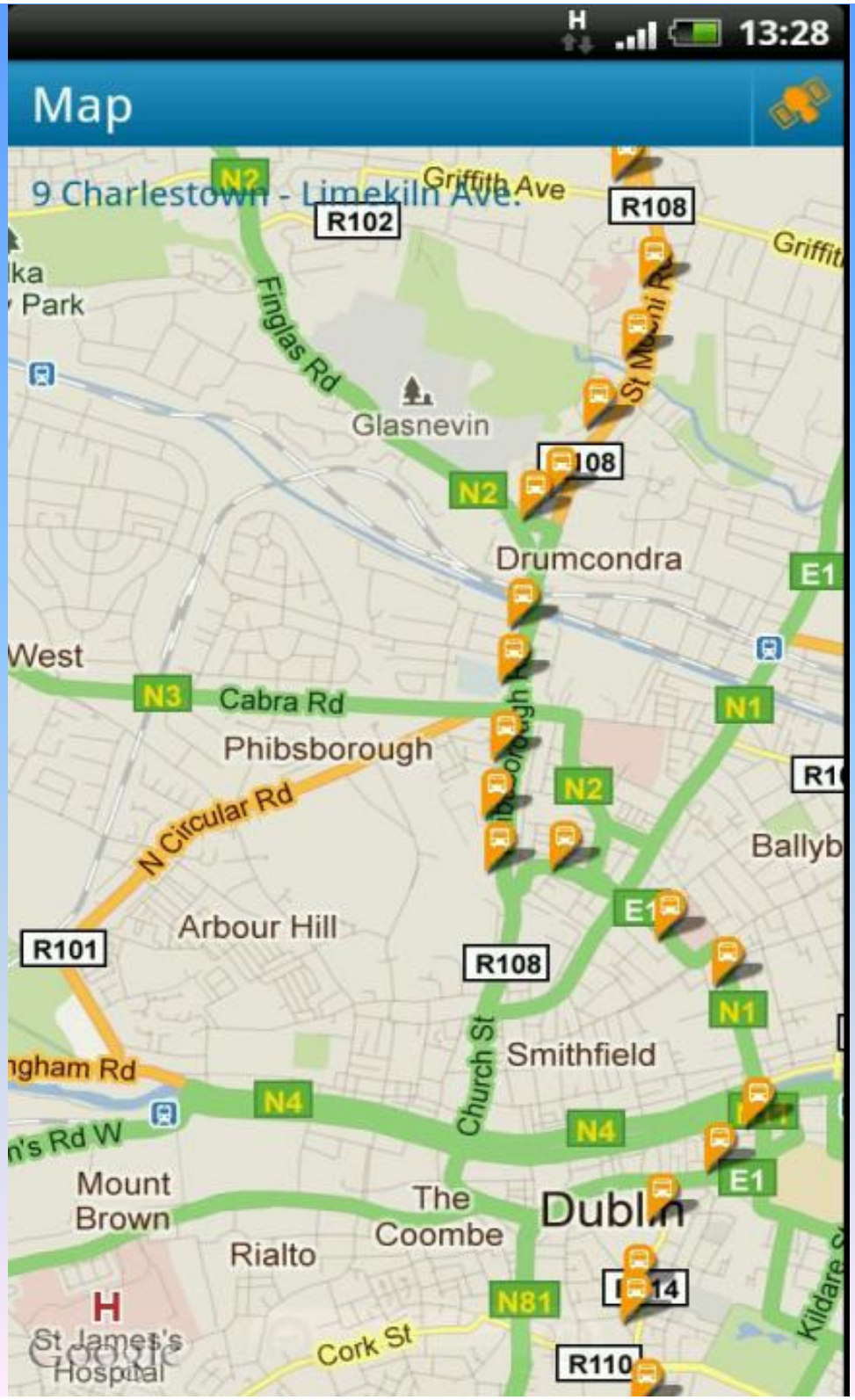
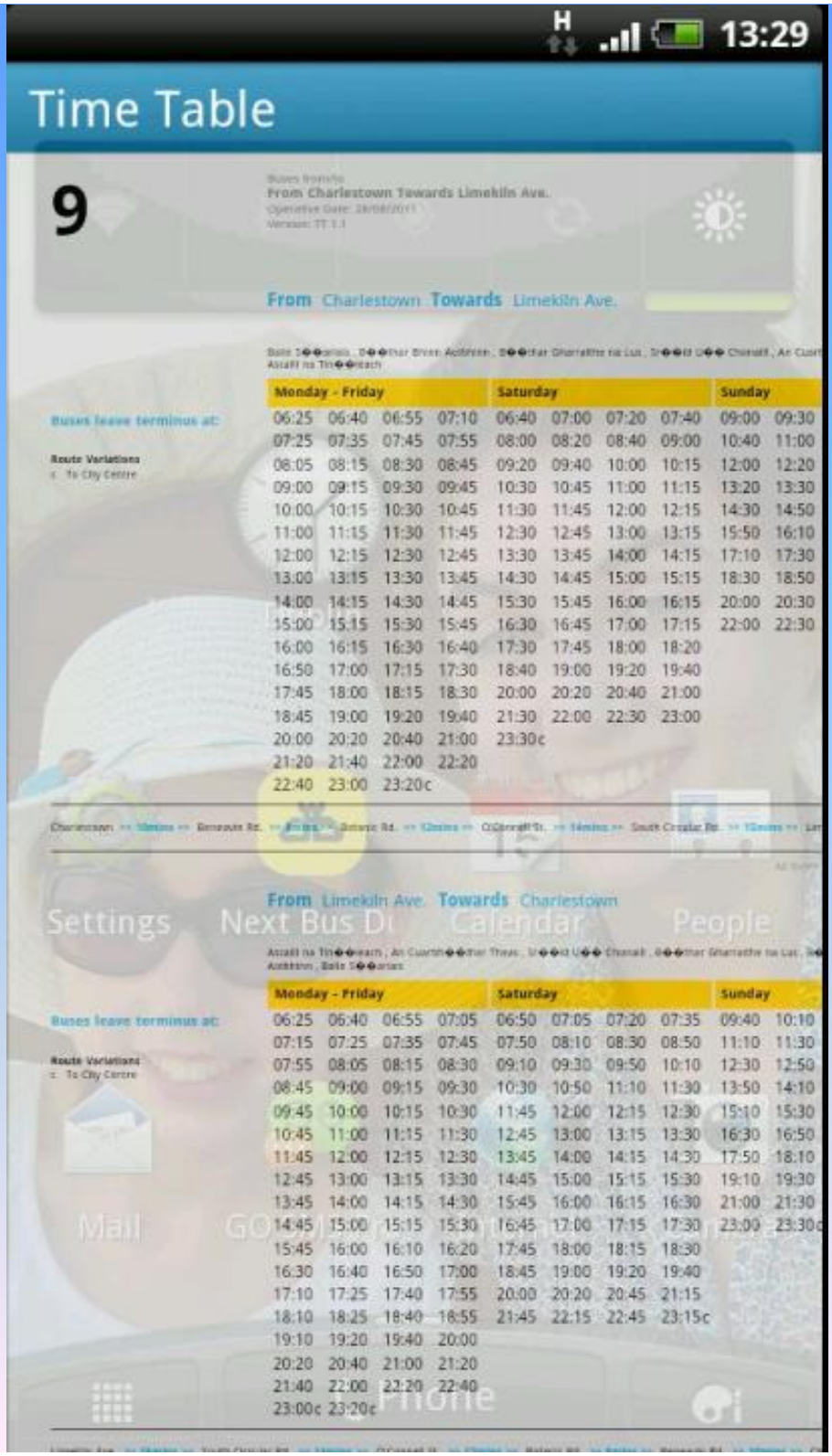
Real Time Data

- Problems with Interfaces/ Licences
- Large data volumes and a possible one to many relationship for data distribution.
- “stale “ data is not real data.
- Systems tend to present data in a way that often requires expertise to decipher.
- What happens if City Stops supporting a system


13:27
Dublin Bus
Appliance Calculator App
Download Android App
AdChoices
Route: 9
Due in: Due
Destination: Limekiln Avenue via City Centre
Route: 83
Due in: 2 Mins
Destination: Kimmage via City Centre
Route: 83
Due in: 7 Mins
Destination: Kimmage via City Centre
Route: 4
Due in: 14 Mins
Destination: Monkstown Av via City Centre
Route: 9


13:28
Map
9 Charlestown - Limekiln Ave.
Griffith Ave
R102
R108
N2
Finglas Rd
Glasnevin
Drumcondra
E1
West
N3
Cabra Rd
Phibsborough
N1
N Circular Rd
Ballyb
Arbour Hill
R101
R108
Church St
Smithfield
N4
Mount Brown
The Coombe
Dublin
Rialto
N81
St James's Hospital
Cork St
R110
Google


13:29
Arrive Time
9
Phibsboro Road,Junction Monck Place, Stop 197
Service | To | Time | Low Floor
140 | IKEA via Phibsboro | 3 Mins
9 | Charlestown via City Centre | 7 Mins
140 | IKEA via Phibsboro | 8 Mins
83 | Harristown | 14 Mins
140 | IKEA via Phibsboro | 18 Mins
9 | Charlestown via City Centre | 20 Mins
140 | IKEA via Phibsboro | 28 Mins
83 | Harristown | 29 Mins
9 | Charlestown via City Centre | 33 Mins
4 | Harristown via City Centre | 34 Mins
140 | IKEA via Phibsboro | 38 Mins
83 | Harristown | 42 Mins


13:29
Time Table
9
From Charlestown Towards Limekiln Ave.
Monday - Friday
Saturday
Sunday
From Limekiln Ave. Towards Charlestown
Monday - Friday
Saturday
Sunday

Departure information for **Phibsboro Road** at **18:30**

Stop Ref: **00197**

Service	To	Time	Low Floor
83	Harristown	Due	
9	Charlestown via City Centre	Due	
140	IKEA via Phibsboro	4 Mins	
140	IKEA via Phibsboro	11 Mins	
83	Harristown	13 Mins	
9	Charlestown via City Centre	16 Mins	
140	IKEA via Phibsboro	18 Mins	
140	IKEA via Phibsboro	27 Mins	
83	Harristown	31 Mins	
9	Charlestown via City Centre	33 Mins	
4	Harristown via City Centre	35 Mins	

Later departures

Search again