

An open data platform for integrated city services

Open Glasgow



Background

Innovate UK (the Technology Strategy Board) announced in January 2013 that Glasgow had been successful in beating 30 other cities to receive £24M investment to become the UK's Future Cities Demonstrator; the intention being for a city to demonstrate at scale, and in use, the additional value that can be created by integrating city systems.

The Future Cities Demonstrator, run by Glasgow City Council, aims to deliver four outcomes in the city – Health, Energy, Transport, and Public Safety – and contains three work-streams detailed below.

1. The creation of the world-leading Glasgow Operations Centre to co-locate and integrate city services into a single control room improving efficiency and resilience.
2. Four demonstrator programmes that provide examples of how new technologies such as the internet of things, sensors, open data, crowd-sourcing, mobility, etc. can contribute to health, energy, public safety and transport outcomes in the city:
 - a. intelligent street lights
 - b. integrated social transport
 - c. active travel
 - d. energy-efficiency in buildings and housing.
3. The creation of a big data platform (“Open Glasgow” <http://open.glasgow.gov.uk>) that can be used to harvest large volumes of data from organisations, people and devices across the city and make it publically available as open data.



Open Glasgow platform

The goals of the demonstrator include increasing transparency, providing new insight into the city for stakeholders, providing new ways of engaging with communities, improving efficiency and effectiveness for public services and providing a test-bed to stimulate innovation.

Motivation

The challenge that the project team faced was enormous, but the opportunity to increase transparency and stimulate innovation provided a clear case for development.

Specific issues faced by the project included that most of the data is typically published manually, i.e. people upload files to online data catalogues and they quickly become out of date. This does not scale when extrapolated across the city, but the underlying operational assumption precludes a city that is hyper-connected with smart infrastructure and sensors.

Built Environment



Information & Communications





Glasgow's Integrated Operations Centre

The project envisioned an “open by default” end-state in which:

- every organisation across the city published open data automatically;
- non-sensitive data from devices and sensors was made open to everybody in the city and citizens had the ability to volunteer anonymous information (for example information about their cycle journeys).

Development

The project team recognised the need to define key project principles, to guide the design and build of the solution placing scalability and reliability at the heart of (city-wide) data collection, storage and analytics, but also placing open innovation at the heart of data use and re-use.

The need for iterative development was also recognised to accelerate engagement with stakeholder groups therefore an agile development approach was adopted.

The team invested in a cloud computing platform-as-a-service (PaaS) that provided a suite of tools to publish, store and catalogue data, and providing advanced big data analytics and machine learning capabilities.

They also developed a suite of open application programming interfaces (APIs) that encapsulated the core services provided by the platform (e.g. data ingestion, search, data storage, data retrieval, etc.) so that they could be used by a variety of third party applications.

Results

Within 18 months, the project team has implemented an innovative and scalable platform for harvesting large volumes of data (including real-time data) with close to 400 datasets published.

This progress has been facilitated by iterative prototype development, allowing the team to build a community of interested parties across the city before the new platform was available. This “data value chain” represents a supply-chain of data providers (organisations/individuals who can make data available), data users (who use data to make decisions, with day-to-day decisions made by citizens at one end of the spectrum and policy decisions at the other) and a new role of a data “developer” (or intermediate) who can bridge the gap between how users need information to be presented to them and what is available (e.g. app developers, designers, data scientists, etc.).



By understanding people's needs and then connecting relevant data providers to data users across the city, the project is beginning to unlock data and unleash its potential – moving from people knowing how valuable their own data is to them individually (and to their organisation) to a wider recognition of how sharing data might be valuable to others.

An example of this approach is a theme that the team call “busyness” i.e. information that allows people to understand how busy the city is at certain points in time.

The team have overlaid real-time data from sensors in the city, such as footfall counters (built into new intelligent street lights) and traffic flow sensors (already built into the traffic junctions across the city but previously only used for adaptive traffic signalling) to create a time-series of pedestrian and traffic flow, which provides everybody with insight into movement across the whole city.

The benefits here include better marketing of business offerings and what is happening, improved understanding of how people flow through the city, targeting of transportation services and people themselves knowing where to go to potentially avoid crowds or when to visit places of interest.

Using the APIs the team developed, a suite of open-source applications now have integrated access to key project information including:

- a data catalogue (which provides access to raw datasets)
- a linked data catalogue (which provides access to data represented using the semantic web)
- a city dashboard (which provides access to real-time data through a series of real-time “widgets”) and
- interactive maps (which allow people to select and view location-based information such as assets and services).

Next Steps

Collecting the information, while difficult, is only the start. The project is employing more sophisticated models to correlate datasets, study trends over time and identify cause and effect in the data. The aim here is to realise benefits through predictive modelling, as well as to develop new visualisations and ways of making data available to stakeholders (including citizens themselves).

Over the next nine months the platform will be evaluated through a number of test projects to review how it works at scale, routes to stimulate innovation and means to engage with businesses interested in using this platform for designing, building and testing smart city solutions.

To accelerate learning throughout this period, Glasgow City Council will continue to increase the number of organisations contributing to the data value chain, as well as the number (and value) of the datasets published. They will also expand the collection of real-time data from smart devices (e.g. energy sensors/devices, vehicle sensors, electrical charging points, etc).

The overall outcome of this approach to data discovery and use, is to allow Glasgow to share innovations with other cities; and for other cities to share their innovation with Glasgow.

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Dr Colin Birchenall MIET is the Chief Architect for Open Glasgow.

