

City Technology Platform

Technical Architecture Context



Intro

A major component of the £24m Future City Demonstrator award from the Technology Strategy Board (TSB) has been the design and development of the City Technology Platform (CTP).

Technical Architecture Background

The Future City | Glasgow programme is composed of three sub-programmes:

- 1. Glasgow Operations Centre**
- 2. City Technology Platform**
- 3. City Demonstrators**

These sub-programmes are described on:

<http://futurecity.glasgow.gov.uk/>

These programmes address four challenge areas within the city: **1) Health, 2) Transport, 3) Energy and 4) Public Safety.** They are structured according to what we believe are three cornerstones of a future city:

- 1. Innovation and Engagement**
- 2. Management and Control**
- 3. Connected Assets**

The goal of **Innovation and Engagement** is to increase participation across all sectors in the city through increased access to data. New communities can be formed and collaborate towards common goals within the city.

The goal of **Management and Control** is to make city and community services more efficient and effective. Services can respond to events (of all scales) within the city through consolidated organisational structures, datasets, processes and locations (the Glasgow Operations Centre).

The goal of **Connected Assets** is to use new digital technologies to improve the efficiency and effectiveness of asset maintenance, and create new ways of delivering city services (such as CCTV, Intelligent Street Lights).

The common theme is **data**, which all cities have in abundance, but are unable to fully exploit because it is closed, not shared, and not open. Our aim is to demonstrate how a Future City uses data to reach these goals.

Innovation & Engagement

Figure 1: Strategic Themes of the Future Cities Demonstrator Programme.



The City Technology Platform focuses on “**Innovation and Engagement**”. It creates communities that work together to address challenges within the city through the increased availability of city data. The Future Cities Demonstrator Programme has adopted a twin track approach to create these communities with parallel work-streams. **Work-stream 1 (Prototyping)** is an agile track to develop prototype “portals” based on open source software to engage and build communities early and to gain experience and feedback that has been used to inform our strategy. The prototypes can be viewed via <http://open.glasgow.gov.uk> and <http://data.glasgow.gov.uk>. Early engagement around these prototypes is being promoted via Twitter (@openglasgow) and will culminate in a series of hackathon events in early 2014.

Work-stream 2 (Platform) is a strategic work-stream that has been used to analyse short, medium and long term user requirements for the platform, develop a strategy for the platform (including a set of principles, now referred to as the “[Open Manifesto](#)”, and a (functional) reference architecture). The purpose of this work-stream has been to both ensure the sustainability and legacy of the City Technology Platform and to set out a vision that the Future Cities Demonstrator Programme can use to engage partners and suppliers to develop roadmaps.

Objectives of the Platform

The platform aims to bring together communities across the city and across the public, private, academic, voluntary sectors and citizens. It will deliver better outcomes through open data, innovation and engagement in the city. This is illustrated in Figure 2.

Figure 2: Bridging the gap between communities and outcomes through the City Technology Platform.



Operating Model

To reach these goals, we have adopted an operating model for the open data community which aligns with the following three primary roles and the model developed by the UK National Archives:

Data Provider

A **Data Provider** – who provides raw data sets, has responsibility for the quality and integrity of the data, and publishes and catalogues the data being provided.

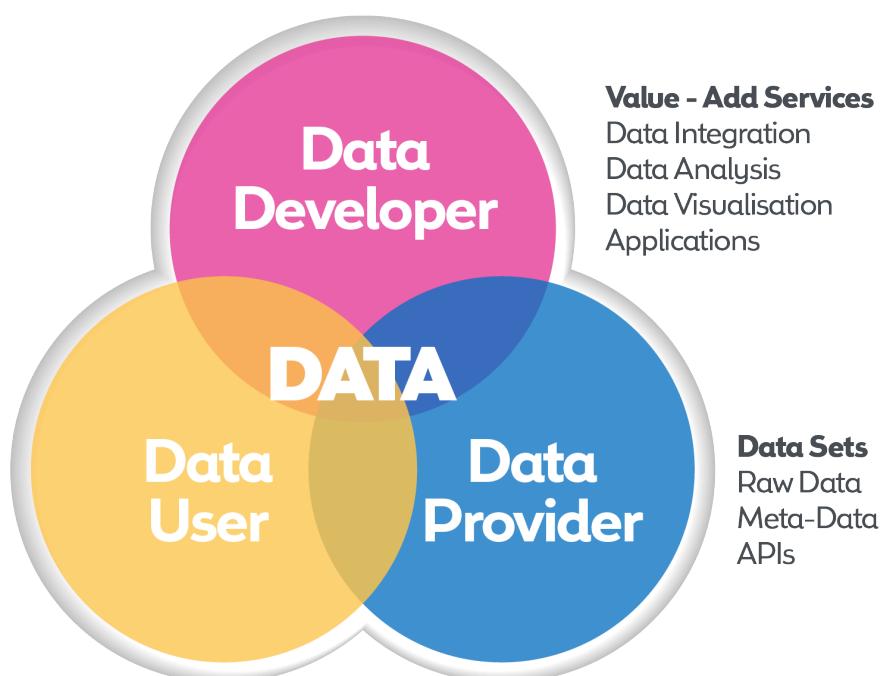
Data Developer

A **Data Developer** – who takes raw data sets made available and creates value in a number of ways such as developing applications using the data, analysing the data, integrating it with others, or simply creating interesting visualisations of the data.

Data User

A **Data User** – an end-user who is presented with data, as raw data or through the value-adds provided by the developer, in everyday life.

It is worth highlighting that any participant within the city (e.g. citizen, elected member and public sector, private sector, 3rd sector or academic sector organisations) could play any (and more than one) of the roles at any one point in time.



Solution Principles

The Future Cities Demonstrator Programme provides a unique opportunity to demonstrate the value of Future Cities principles and technologies at scale within the UK. A key driver is to create innovation and business opportunities both within Glasgow and across the rest of the UK.

We believe it is important that the City Technology Platform delivers not just a solution to the immediate goals and requirements but creates a heterogeneous Future Cities platform that will be used to facilitate the development of innovative “future cities” products. This approach promotes innovation, develops new partnerships and drives competition within the future cities marketplace in Glasgow and the UK.

We have identified the following principles that underpin this ambition.



1. Open

Why – We believe that an open platform will create greater opportunities for Glasgow and UK business than simply publishing open data from the platform. We believe that this can be used to 1) explore new business models and 2) facilitate innovation.

What – We want to create an open platform (which provides Open APIs) that drives innovation within the platform itself (rather than just the data made available from the platform) and provides a place where businesses can promote innovative products.

How – We aim to work in collaboration with a company who shares our vision, who can provide open APIs, and will play an active role in facilitating innovation with 3rd parties.

2. Community Engagement

Why – We believe that opening up data is a means to an end; opening up data does not itself deliver better decision-making. Our aim is to unleash the value of data by focusing attention on the fostering of the communities that can create value from the data, and to promote cross-sector collaboration within the city that maximises the use of data to deliver outcomes for the city.

What – We want to create an ecosystem of communities that can address challenges within the city through greater access to data. We see the creation and facilitation of these communities as important as improving the access to the data itself.

How – We aim to create communities of interest. These communities could consist of citizens, elected members, public sector, private sector and the academic sector. We wish to enable data providers to promote data within communities, and to use them to create value and address city challenges such as Health, Energy, Transport, Public Safety etc.

3. Consumerisation

Why – We believe that to increase the engagement of communities (particularly citizens and businesses) with data, we need to make it easily accessible, easy to understand, and easy to use. *Data needs to be “consumable”.*

What – We recognise that different users want to consume data in different ways. Citizens are likely to wish to engage with data through easy-to-understand maps and visualisations (e.g. infographics, dashboards, etc.). Developers are likely to wish to engage through well-formed web-based APIs.

How – In many cases the raw data feeds published by data providers will not be designed for open consumption by citizens and developers. We aim to provide capabilities that allow data formats to be transformed, consumerised and therefore more accessible, through the use of the W3C five-star Openness rating scheme. We also aim to provide toolkits to citizens and businesses that allow them to create their own views of data through configurable visualisation tools, etc.

4. Enrichment

Why – We know that data providers are concerned about publishing open data, in particular about privacy and accuracy. We believe that providing the tools that help data providers to overcome their concerns will accelerate the adoption of open data.

What – We want to provide capabilities within the platform that assist data providers to 1) protect the privacy of their data, 2) enrich data (including increasing the “openness” of their data).

How – We aim to provide value-added functions to data providers that allow them to obfuscate data, and where required, increase the quality and/or openness of their data.

5. Scalability and Flexibility

Why – A major challenge for the platform will be its ability to scale to meet growth in demand which is currently difficult to predict. This increased demand will come from increased take-up of data publishers, increased number of data sets, greater publication of real-time data, and ultimately increased demand from the citizens of Glasgow and beyond. It could potentially come from the expansion of the platform in the future to other cities and local authorities.

What – We want to build a platform that is designed to be scalable by default.

How – We aim to adopt a cloud-computing approach to scaling the platform and will be seeking innovative technical and commercial proposals that will allow full flexibility to expand the platform with the growth (and seasonal effects) in demand.

6. Real-Time

Why – Cities operate in real-time. People interact with the services delivered within the city in real-time.

What – We want to build a platform that provides access to data of all velocities (from fairly static data such as locations, through to real-time dynamic data).

How – We have categorised data according to the following timeliness patterns. We value architecture proposals that provide a seamless approach to providing the services described within the reference architecture across all of these data timeliness patterns:

- **Bulk:** Data is available via an offline cache (e.g. statistical information)
- **On-Demand:** Up-to-date information can be requested on an on-demand basis (e.g. a calendar)
- **Quasi-Real-Time:** Time-based data is made available on a period basis (e.g. energy information)
- **Real-Time:** Time-based information is presented at that point in time (e.g. traffic information)

7. Secure

Why – We believe that security and the management of privacy are enablers for opening up data rather than a barrier. However, to succeed, security has to be built into the platform in a proportionate manner that protects the integrity of the platform and its users. Security protects the data that needs to be protected to gain the appropriate level of trust from users, and to comply with regulation.

What – The opening of data does not mean that secure perimeters are removed; it implies that the secure perimeter needs to move and new security controls need to be adopted to mitigate threats and vulnerabilities to allow the city to operate more seamlessly. As per the principles of the Open Manifesto, we will comply with information regulations such as the Data Protection Act, and in addition, as the provider of the platform for open data, we have a duty of care to protect the users of the platform from malicious attack.

How – We aim to build proportionate security into every layer of the architecture in line with ISO27001. By proportionate we mean we will use risk assessments to determine business impact levels at different layers of the architecture and will apply controls associated with that impact level at that layer of the architecture.

Where data is open, we will apply appropriate controls to protect the integrity of the platform and to protect users of the platform (and the organisations to which they belong). Where data has yet to be published, additional controls will need to be in place to protect the privacy of the data.

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