

Title	eStandards. Telling a story for Smart Cities
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Author	Paul Davidson, LeGSB Director of Standards, and CIO Sedgemoor District Council
Purpose	Considering the eStandards that could be applied to the vision for ‘Smart Cities’.
Type	LeGSB White Paper

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1	15/03/2013	Paul Davidson, for LeGSB	

What is a ‘Smart City’

- The term ‘Smart City’ is used by various UK, and European initiatives to describe a vision where:
 - ‘Quality of Life’ and the local economy is improved, while reducing the impact on the environmental.
 - Systems operated by various organisations are integrated.
 - Intelligence and insight is combined from many sources leading to partnership services being redesigned to meet a shared understanding of need.
 - Citizens take an active part in local decision making.
- Other terms are used to describe some of these ambitions, that can apply to places other than cities.
 - Smart Communities
 - Digital Economies
- Much of this vision relies on ready access to data, and the standards that enable it to flow seamlessly around a city. These standards include those for ...

• Syntax	Is the data in an open format that can be consumed and re-used by a range of audiences?
• Semantics	Is the meaning, and subject of the data clearly defined, or could it be mis-interpreted?
• Quality	Can we describe our data so that others can judge if it is fit for their purpose?
• Rights	Can we describe the purposes for which we allow data to be used?
• Authentication	Do we know who is accessing data?
• Transport	How do we move data, with appropriate security and assurance?
• Governance	How do we handle data to ensure that it is both protected and exploited?

Other policy agendas that have similar ambitions, data, or standards

- Other policy initiatives also have data at their heart, and are similarly reliant on standards; in many cases, the same standards.
 - Open Public Services¹ driven by the Government’s desire to make sure that everyone has access to the best possible public services, and that the best become better still.

¹ <http://www.openpublicservices.cabinetoffice.gov.uk/>

proposes that the public should have ready access to the information upon which services are designed, and how they are performing.

- Public Open Data

A set of Public Data Principles is published at data.gov.uk²

There are many reasons why a local service provider will want to publish its information as ‘Public Open Data’, including

- Transparency and Scrutiny
 - for example, expenditure, councillor allowances and expenses, senior employee salaries
- Enabling innovators to create apps, and therefore save costs in not developing facilities themselves
 - for example, roadworks.org
- Engaging local people in local decision making, and ‘open public services’
 - for example, community budgets, public building and land, forward planning,
- Communicating and improving the efficiency and effectiveness of local services
 - for example, multi-agency shared operational data, and insight
 - contextualised comparisons

- Big Data

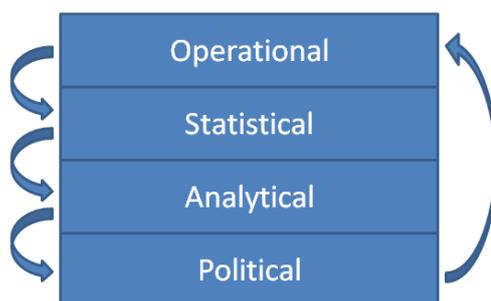
Running large scale analytics to uncover correlations and trends.

- Identity Assurance

developing a secure service that lets people log in to online government services more easily

Contexts of Public Sector Information

5. Public Sector Information can be considered over four contexts.



- Operational about real people and places, with real needs and circumstances, using real services. i.e. Case Work
- Statistical aggregated operational information organised using common classifications and segmentations
- Analytical the conclusions and assumptions drawn from an analysis of statistics, e.g. patterns, predictions, inferences, opinions
- Political the decisions taken to shape services, e.g. budgets, strategies, priorities, targets etc

6. Applying this to a ‘Smart City’ ...

Car Parks

² <http://www.data.gov.uk/blog/public-data-statement-of-principles>

Context	Insight / Service	Data
Operational	Where are Car Parks? What spaces are free now?	GIS and real-time monitoring.
Statistical	Average number of free spaces at locations and times of the day/week. Income and Expenditure on Car Parks.	Locations, Time. Budgets, Outturn
Analytical	Capacity of car parks to meet retail and employment needs.	Correlation to Town Centre shopping and employment data
Political	Car Parking Strategy	Decisions on future capacity, charges, 'park and ride' initiatives.

Food Premises

Context	Insight / Service	Data
Operational	What is the rating of a particular food premises,	Inspection report and rating of an identified premises
Statistical	How are ratings and failures spread across premises types?	Types, Locations, Outcomes of Food Premises inspections.
Analytical	How safe are our food outlets?	Correlation to health incidents.
Political	What is being done to make our food outlets safer?	Targeted training programmes. Risk Based inspections.

How data flows across and between each context

7. Taking an example of 'Troubled Families', a City may establish objectives to ...

- improve the 'quality of life' for selected individual families;
- reduce the impact of families on a neighbourhood;
- reduce the cost of reacting to incidents caused by selected families, by intervening earlier with proactive services.

8. This requires a smart approach in which ...

- common objectives and perhaps pooling of budgets, are reached across many agencies, based upon ...;
- a shared set of assumptions and forecasts ...; derived from
- statistics with common segmentations to describe types and impacts of families, drawn from ...
- sharing of sensitive personal data across many public and voluntary agencies, and their agents.

9. Standards to make this work include ...

- common ‘information governance’ measures so that data is handled appropriately to maintain confidentiality and integrity;
- identifiers for individuals across many organisations and disciplines;
- data sharing protocols, to match purpose to a legal basis to share;
- authentication of people to access and submit, their own information;
- a shared concept model, inherited from a simple upper ontology, to describe the semantics of the data;
- vocabularies to list categorisations such as ‘service types’, and ‘functions’;
- common segmentations such as ‘risk group’, ‘intervention type’;

10. ... and a re-useable means to integrate or publish information.

Smart Cities need 5* Data

11. The Department for Communities and Local Government have advised Local Authorities in England to aspire to publishing their public data as 5* data (that is, using Linked Data as described by the world wide web consortium)..

- ★ Available on the web (whatever format) *but with an open licence, to be Open Data*
- ★★ Available as machine-readable structured data (e.g. excel instead of image scan of a table)
- ★★★ as (2) plus non-proprietary format (e.g. CSV instead of excel)
- ★★★★ All the above plus, Use open standards from W3C (RDF and SPARQL) to identify things, so that people can point at your stuff
- ★★★★★ All the above, plus: Link your data to other people’s data to provide context

<http://www.w3.org/DesignIssues/LinkedData.html>

12. 5* data is a mechanism that uses the scalability of the web to enable each individual organisation serving a city, to publish just their own data, such that it can be joined up, and re-presented by any other organisation later. This then is in preference to a single organisation attempting to warehouse all of the information.

13. 5* data can provide an open ‘api’³ to a city. The approach uses the RDF⁴ data model and provides for ...

- | | |
|---|---|
| <ul style="list-style-type: none"> • Each organisation that is responsible for naming a category of ‘thing’ in the city, can give each one an address on the web with a URI⁵. | <p>(Not to be confused with a URL, which provides a location on the web where more information can be found out about that ‘thing’).</p> <p>A category of ‘thing’ may be lampposts, or manhole covers, or buildings, or rivers and so on.</p> <p>A URI might look like
 http://data.trustedorg.uk/id/lamppost/1234</p> |
|---|---|

The cabinet Office issue design guidance for URIs⁶.

- | | |
|---|---|
| <ul style="list-style-type: none"> • Static facts about each ‘thing’, named with a URI, can then | <p>Information can be published for each URI via URLs(s) as either web pages, or more usefully, in a machine-readable form such as XML.</p> |
|---|---|

³ http://en.wikipedia.org/wiki/Application_programming_interface

⁴ http://en.wikipedia.org/wiki/Resource_Description_Framework

⁵ http://en.wikipedia.org/wiki/Uniform_resource_identifier

⁶ <https://www.gov.uk/government/publications/designing-uri-sets-for-the-uk-public-sector>

be published

So a URI for a lamppost might be described by a URLs such as
<http://data.trustedorg.uk/doc/lamppost/1234.html>
<http://data.trustedorg.uk/doc/lamppost/1234.xml>

which could then describe its

- Location
 - Height
 - Wattage
- ... and so on.

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- Transactional information can then be published as statements that refer to the 'things' named by URI(s).

5* data uses the RDF data model to make a series of statements that relate URIs to either

- literal values
- other URIs

... via a property.

So, for example

URI for ...	Property	Literal or URI
Lamppost 123	Energy used	"20kW-h"
Car Park 2	Spaces Used	"80"
Car Park 2	Lit by	Lamppost 123

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- The credibility of facts and statements can in part come from the domain in which the data is routed.

So for instance, a URI or a Statement that is rooted in

- data.utopia.gov.uk

... is more believable than the same statement rooted at

- fly.bynight.com

14. You can find out more about how Linked Data is being deployed to describe UK Public Services at <http://data.gov.uk/linked-data>