

Title	PAS182, Smart City Concept Model – Product Description
Revision	1
Status	Draft
Date	14 th September 2013
Author	Paul Davidson, LeGSB Director of Standards, and CIO Sedgemoor District Council
Purpose	To define the output of the Smart City Concept Model project with BSI, that will become BSI PAS182. To propose options to the project steering group.
Type	Product Description

Revision	Date	Author	Notes
1	14/09/2013	Paul Davidson, for LeGSB	

1 About this document.

- 1.1 This document is a product description defining one of the outputs from the ‘Smart City Concept Model’ project, led by the British Standards Institute, and for which, LeGSB are the ‘Technical Author’.
- 1.2 This product description defines PAS 182, the ‘Smart City Concept Model’, and in particular
 - Gives objectives of the PAS
 - Defines the content of the PAS
 - States for whom it is applicable
 - States any limitations, and exclusions
- 1.3 In this draft form, the document offers options and choices for the project steering group to consider, leading to a baselined version.

2 The Product.

- 2.1 The product is the ‘Smart City Concept Model’, which will be published by BSI as PAS 182.
- 2.2 For this purpose, our definition of a concept model builds on definitions from

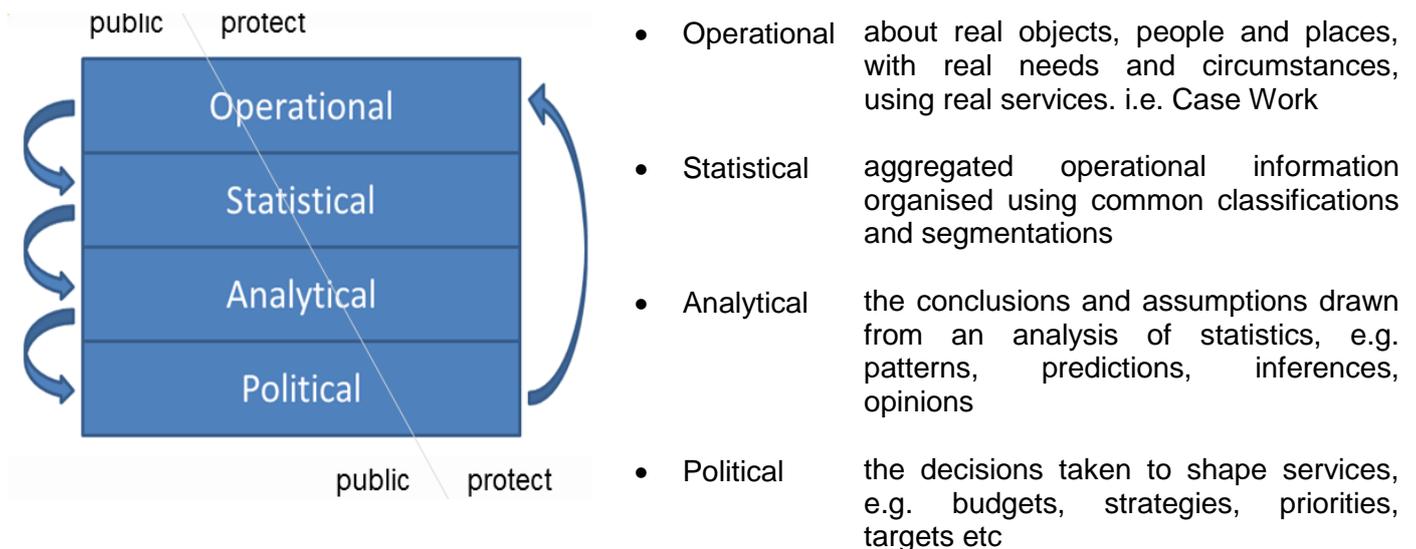
ISO 1087-1:2000	Concept System: a set of concepts structured according to the relations among them.
-----------------	--

Wikipedia	Conceptual model (computer science): ... a conceptual model represents 'concepts' (entities) and relationships between them ... explicitly chosen to be independent of design or implementation concerns The conceptual model attempts to clarify the meaning of various, usually ambiguous terms, and ensure that problems with different interpretations of the terms and concepts cannot occur. Such differing interpretations could easily cause confusion amongst stakeholders, especially those responsible for designing and implementing a solution, where the conceptual model provides a key artefact of business understanding and clarity.
-----------	---

2.3 For the Smart City Concept Model, our definition of ‘concept model’ is

PAS182	Conceptual model: A set of defined concepts and the relationships between them, chosen to be independent of design or implementation concerns, that can be used to describe a domain.
--------	--

2.4 The Smart City Concept Model, will be relevant to information in the following four contexts:



2.5 The Smart City Concept Model, will provide a framework in which

- information can be shared and understood between organisations and people at each level, e.g. sharing real time operations and casework data, sharing statistics;
- the derivation of data in each layer can be linked back to data in the previous layer, e.g. the assumptions upon which a decision was taken;
- the impact of a decision can be observed back in operational data.

3 Purpose

3.1 A defining feature of Smart Cities is the ability of the component systems to interoperate. The optimal use of resources across a complex urban environment depends on the interaction between different city services and systems. To identify the most effective use of resources therefore requires communication between the different component systems.

3.2 Data sharing between agencies is at the heart of the development of smart cities, however, one of the main barriers is that each agency may describe common concepts using different terminology, and identifiers. This leads to difficulty in discovering and combining data sets to gain a better picture of the behaviours and needs of the residents and businesses in a city.

- 3.3 The Smart City concept Model addresses the lack of an overall interoperability framework that can work across systems, enabling information from many sources to be normalised, classified and provided as a service.
- 3.4 Modern, knowledge-based service delivery underpinned by effective information architecture and open standards will support service providers across the city to build more transparent, trusted and efficient information exchange processes and hence enable future cities to move towards smarter city concepts.
- 3.5 The 'Smart City Concept Model' will not replace existing models where they exist; but by simple mapping from a local model to a parent model, questions can be asked about data in a new and joined up way.
- 3.6 The model will be the framework to enable a city to:
- map existing business concept models to concepts in the SCCM;
 - create new business concept models, where none exist;
 - catalogue business/public data holdings leading to improved discovery and re-use;
 - re-use standards, patterns and components that act on a concept;
 - re-use services and solutions;
 - promote a master data approach where definitive and authoritative reference information is published for each concept;
 - support requirements definition and procurement.

4 Composition

- 4.1 The Smart City Concept Model will define a set of concepts, such as
- Organisation
 - Location
 - Community
 - Entity
 - Metric
 - Service
 - Resource
 - Time

- 4.2 Each concept will be described by:

		Example
Concept Name	A name to identify the concept.	Location
Definition	Text to describe a concept sufficiently.	An identifiable geographical point, line, area or volume
Source	Sources from which the definition has been derived	Public Service Concept Model
Examples	Examples of types of objects that fit the concept.	Administrative Area
Examples of usage in the Model	Text to explain why the concept is useful to the model	Location is necessary to describe <ul style="list-style-type: none"> • where physical objects are

		• Area to which statistics apply

4.3 Some concepts may be further split into sub-concepts.

4.4 Optional Content for each Concept

		Example
Typical Attributes	A number of attributes that could be used to describe an object	coordinate
Existing standards that can be used to describe an object that fits the concept.	A non-exhaustive list of some of the existing data standards that are commonly used for that concept.	WGS84 Gemini 2
Examples of schemes that give identifiers to objects that fit the concept.	A non-exhaustive list of some of the schemes that provide Identifiers, relevant in the UK, to objects that fit the concept.	Ordnance Survey URI Sets
Examples of schemes that give categorisations to objects that fit the concept.	A non-exhaustive list of some of the schemes that provide categories, relevant in the UK, to objects that fit the concept.	Inspire Feature Catalogue

4.5 Useful Relationships between Concepts will be defined, which are relevant to how data may flow around a Smart City.

		Example
Domain Concept	The subject of the relationship	Community
Range Concept	The object of the relationship	Area
Relationship Name	A name to identify the relationship.	located at
Cardinality	The number of times that concepts can be related using the relationship. <ul style="list-style-type: none"> • Many to many • One to Many • One to One 	Many to One
Definition	Text to describe the relationship sufficiently.	Describing the Area that a Community is contained in.
Source	Sources from which the relationship has been derived	Public Service Concept Model
Examples	Examples of relationships between objects	'Long Term Unemployed in Glasgow' located at 'The City of Glasgow'
Usage in the Model	Text to explain why the relationship is useful to the model	Enables a common understanding of communities.

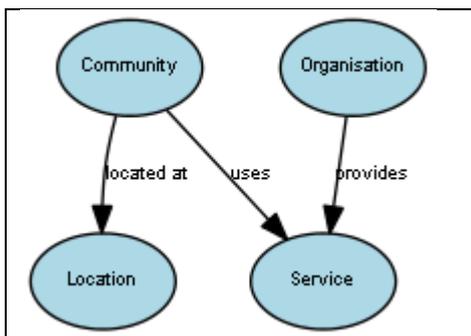
- 4.6 Illustrations of how the model can be used within a Smart City to achieve the benefits listed in the 'Purpose' section.

5 Derivation

- 5.1 Components of the model will be described using existing 'open' definitions which will be attributed to the source.
- 5.2 The model will be based on, but not limited to, the Public Service Concept Model, which was proposed in 2012 by a pan government group of information specialists.
<http://www.pauldc davidson.com/pscm/index.php?Action=ShowModel&Id=3>

6 Format and presentation

- 6.1 The PAS will be published in PDF form.
- 6.2 BSI will finalise the document for
- Colour design and print
 - Images to be used
 - Logos
- 6.3 The model will be presented within the PAS as one or more diagrams, and tables describing the concepts and relationships.
- 6.4 Diagrams will be 'Directed Graphs' (http://en.wikipedia.org/wiki/Directed_graph) in which concepts are represented as nodes, and relationships as edges. For example



- 6.5 Optional formats. The model may also be published as
- UML
 - RDF Schema

7 Quality criteria

- 7.1 It is expected that a PAS of this complexity would not exceed 30 pages.
- 7.2 The model ...
 - 7.2.1 will contain a small number of concepts, say between 10 and 30;
 - 7.2.2 should be applicable to any city in the world;
 - 7.2.3 will avoid terminology that favours a particular sector or usage;
 - 7.2.4 will be easy to read and understand by a non-technical audience.