

Smart City Concept Model

Linking data to the Smart City Concept Model
London, 4th December 2013

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Purpose of the day

- Introduction to the Smart City Concept Model.
- Challenge and Develop the model as a part of the 1st Draft.
- Consider if a Smart City Concept Model is the foundation of joined up local services.
- Assist you with you current and future projects

- Operating since 2006
- Funded by Central Government Departments – currently
 - Department for Communities and Local Government (*DCLG*)
 - Department for Work and Pensions (*DWP*)
 - Department for Business, Innovation and Skills (*BIS*).
- Mission
 - To promote Standards for Efficiency, Transformation, and Transparency of Local Services
- People
 - All personnel are employees of local authorities, and central government departments.
- Web Site
 - <http://www.legsb.gov.uk>

Who are you?

- What's your motivation?
 - Open Data
 - Transparency
 - Systems Integration
 - Citizen Engagement
 - Data Sharing
 - Partnership working
 - Reducing Costs
 - Improvement
 - Services
 - Improve Quality of Life
 - Business Environment
 - Prosperity

- Skills / Background

In an increasingly urbanised world, a Smart City looks after its citizens by harnessing the latest data capture and communication management technologies to deliver high-value services derived via robust modelling techniques. Smart approaches to services such as transport, utilities and waste management have the potential to transform the efficiency and sustainability of urban communities, leading to significant reductions in both cost of service provision and carbon emissions, and to improve the quality of life for citizens.

However, this is a complex issue, and the scale of potential benefits is far greater if the City is viewed holistically. If individual services are developed in isolation from each other, there are significant risks that solutions created may be incompatible. There is also a need to ensure that City development reflects the aspirations of its citizens and that concerns about the appropriateness of sharing personal information between applications are addressed.

To address these risks and ensure the technology fulfils its potential, The British Standards Institution (BSI) has been commissioned by the UK Department of Business, Innovation and Skills (BIS) to formulate a Smart Cities Standards Strategy. This strategy will identify the needs and concerns of stakeholders and explore where standards might facilitate the wider uptake of the Smart Cities concept. In addition to the benefits to UK citizens of living in Smart Cities, we believe that there are significant business opportunities for UK business in establishing a lead in the design, implementation and management of Smart Cities.

- <http://shop.bsigroup.com/Browse-By-Subject/Smart-Cities/>

A City?

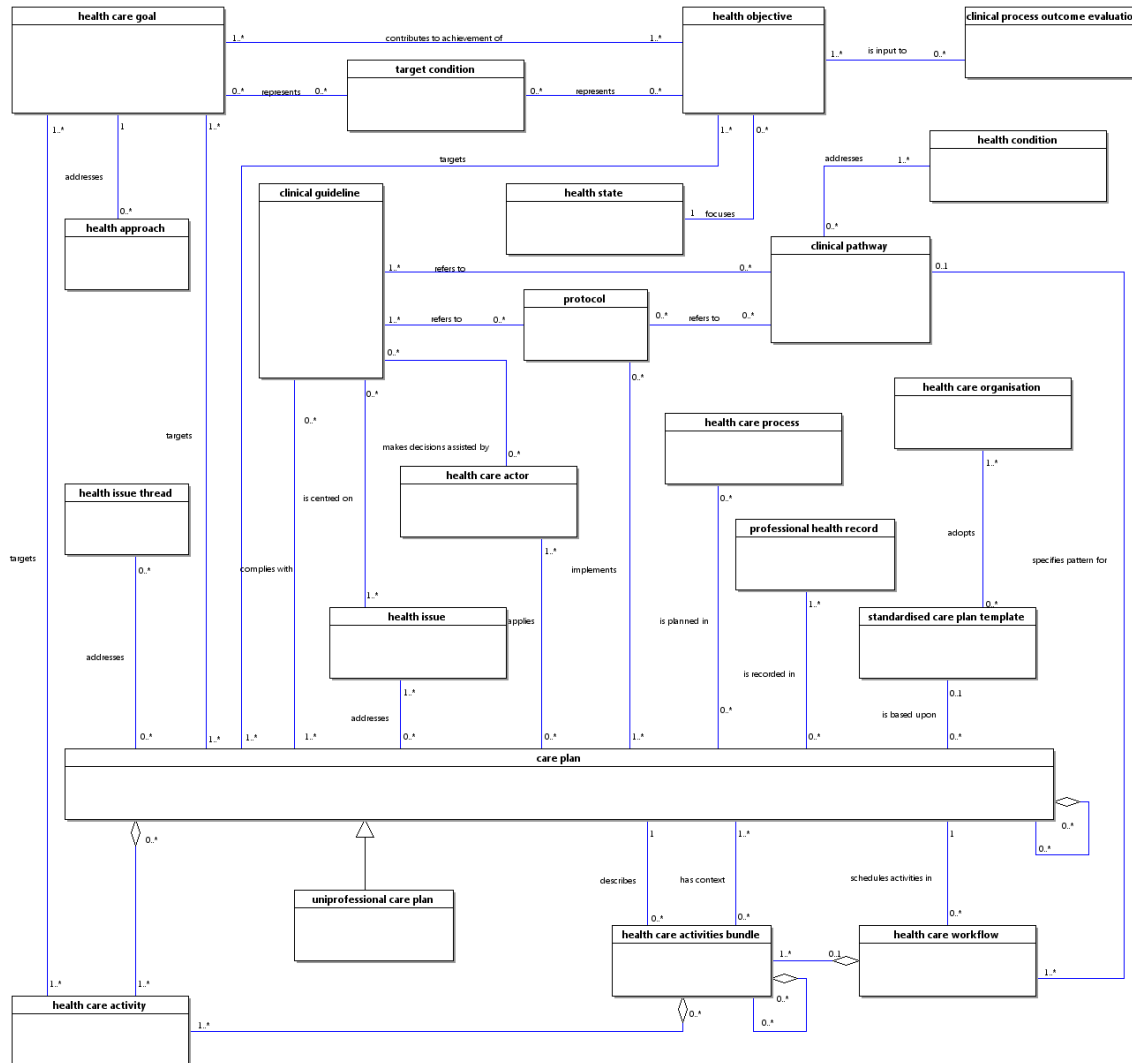
- The Smart City Concept Model is currently being developed to describe a framework in which data flowing around a city, can be discovered and joined up.
- The model is relevant where many **ORGANISATIONS** provide **SERVICES** to many **COMMUNITYs** within a **PLACE**.
- So its not just for cities! The model is relevant wherever organisations want to share data to benefit those that they serve.

A Local Data Ecosystem?

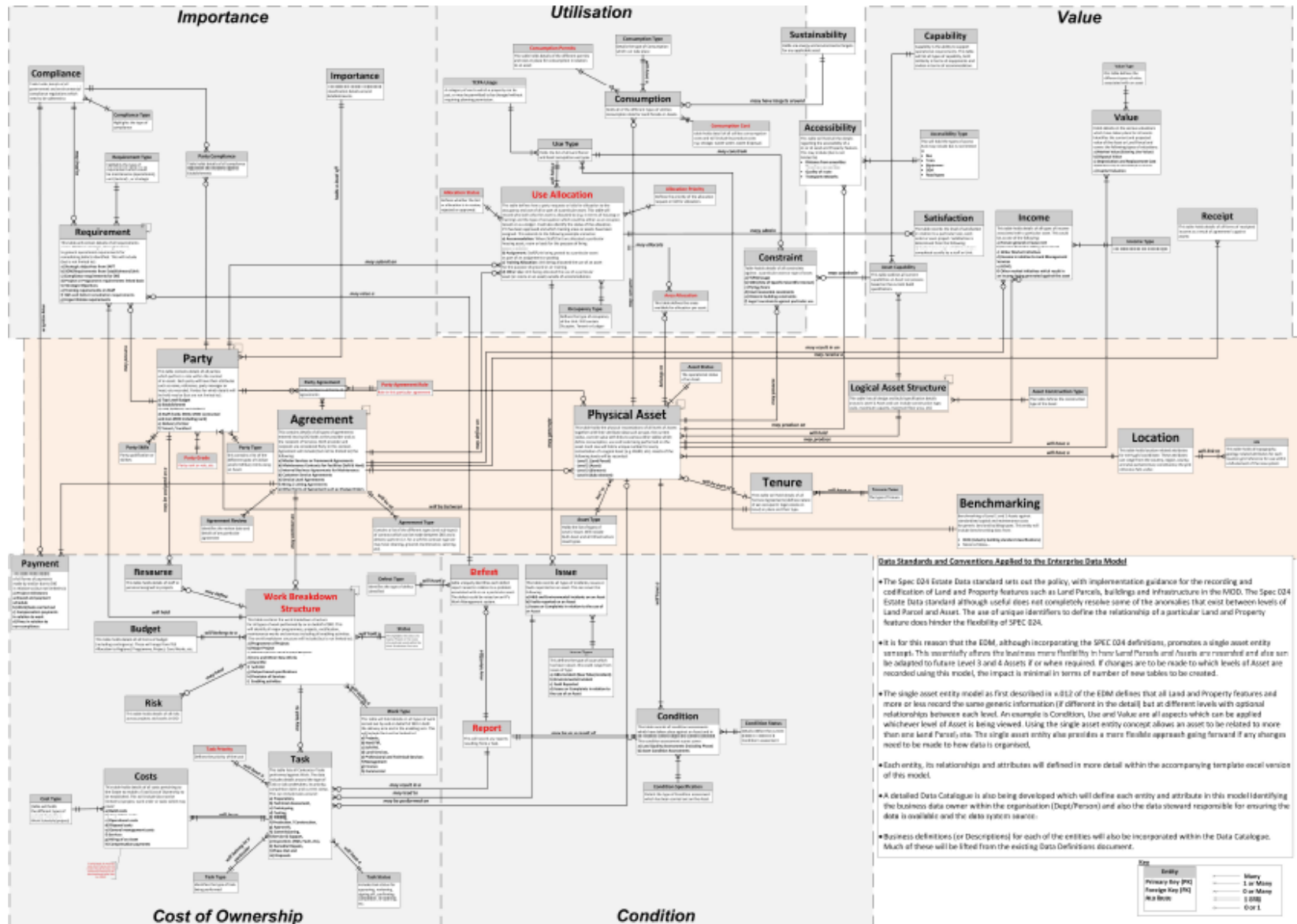
- This is a different approach to open data. It is the foundation of a 'local data ecosystem', where organisations can contribute data and also consume it, sharing at a case level, through to insight and joined up policy making.
- An ecosystem needs to have some common terms, so that data about the same thing can be linked and enriched. Those common terms can come from the Smart City Concept Model.

– Health - Care Planning

- <http://www.datadictionary.nhs.uk/contsys/>

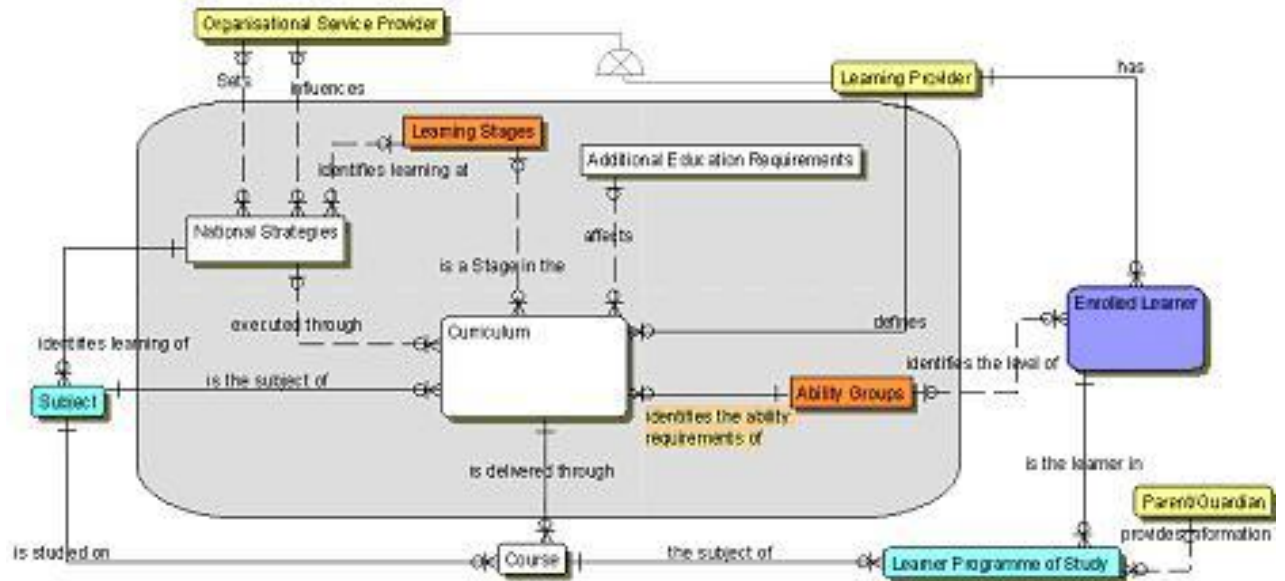


- Defence - Asset Management

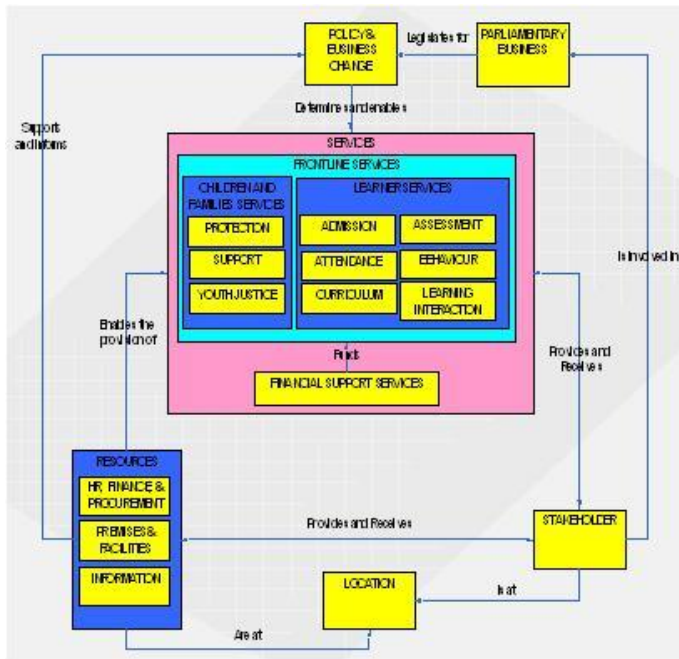


- Education

Curriculum

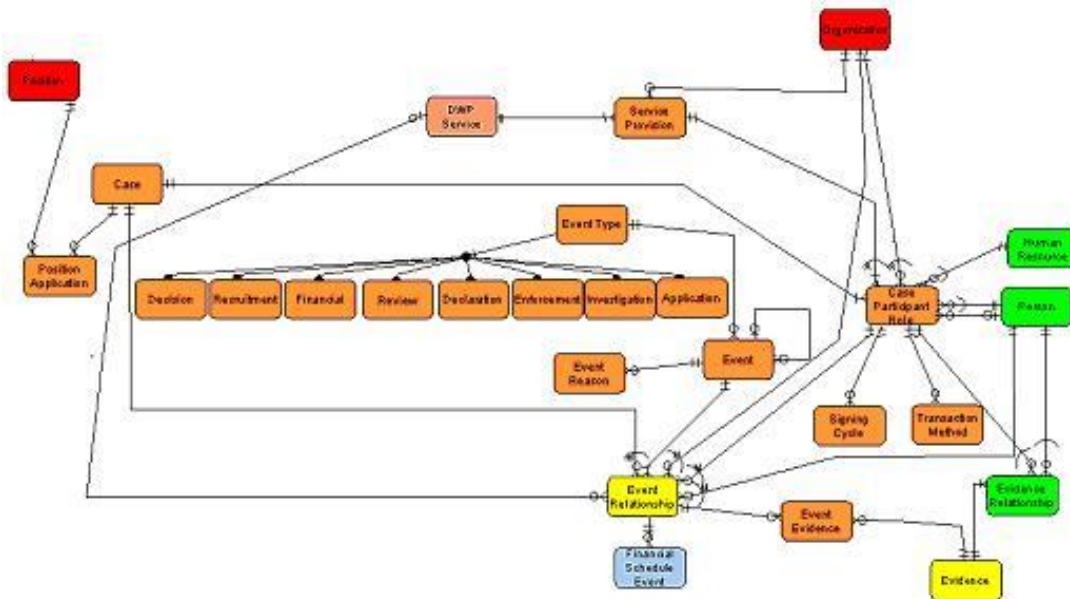
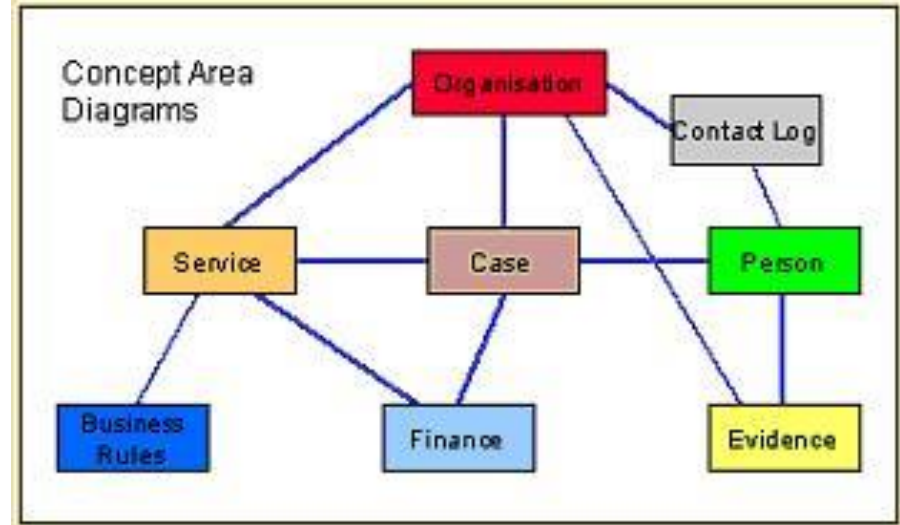


Services



- DWP

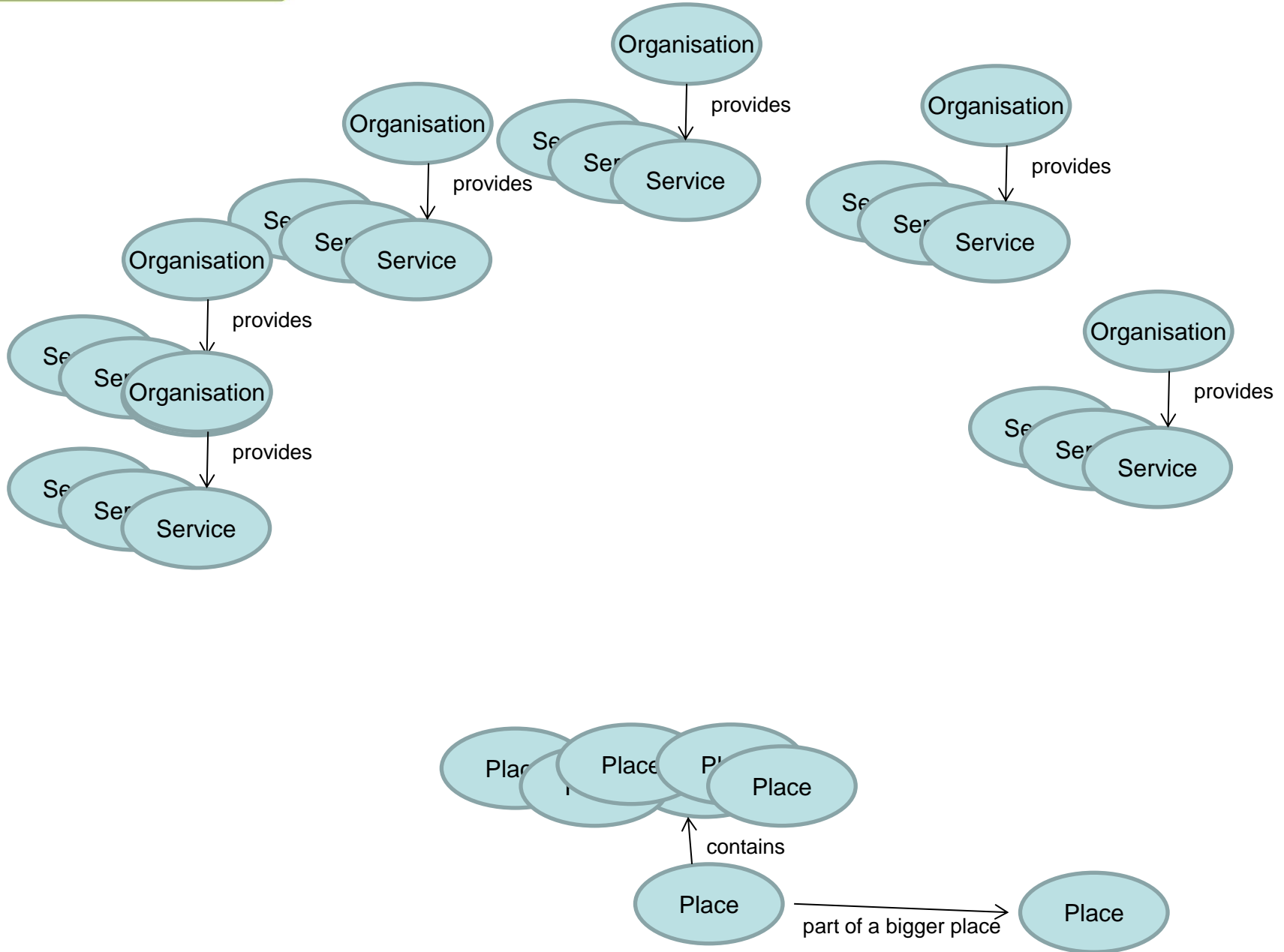
Concept Areas



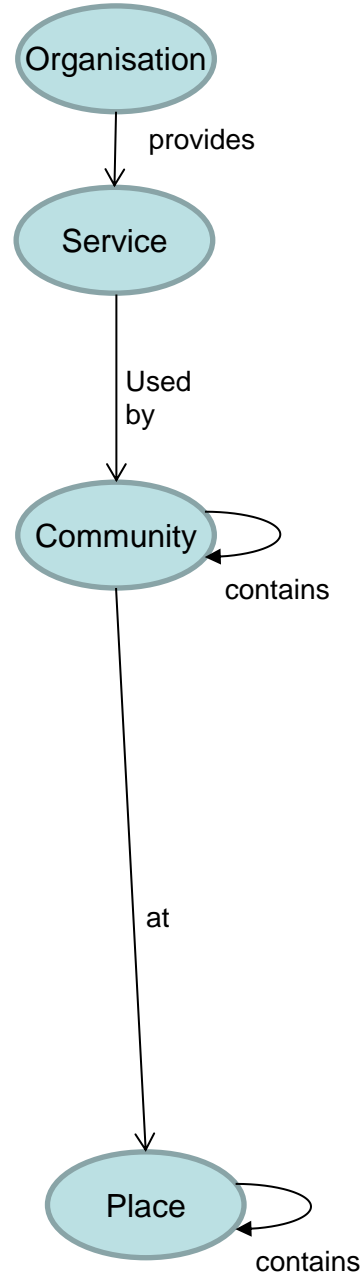
Cases

UNCLASSIFIED

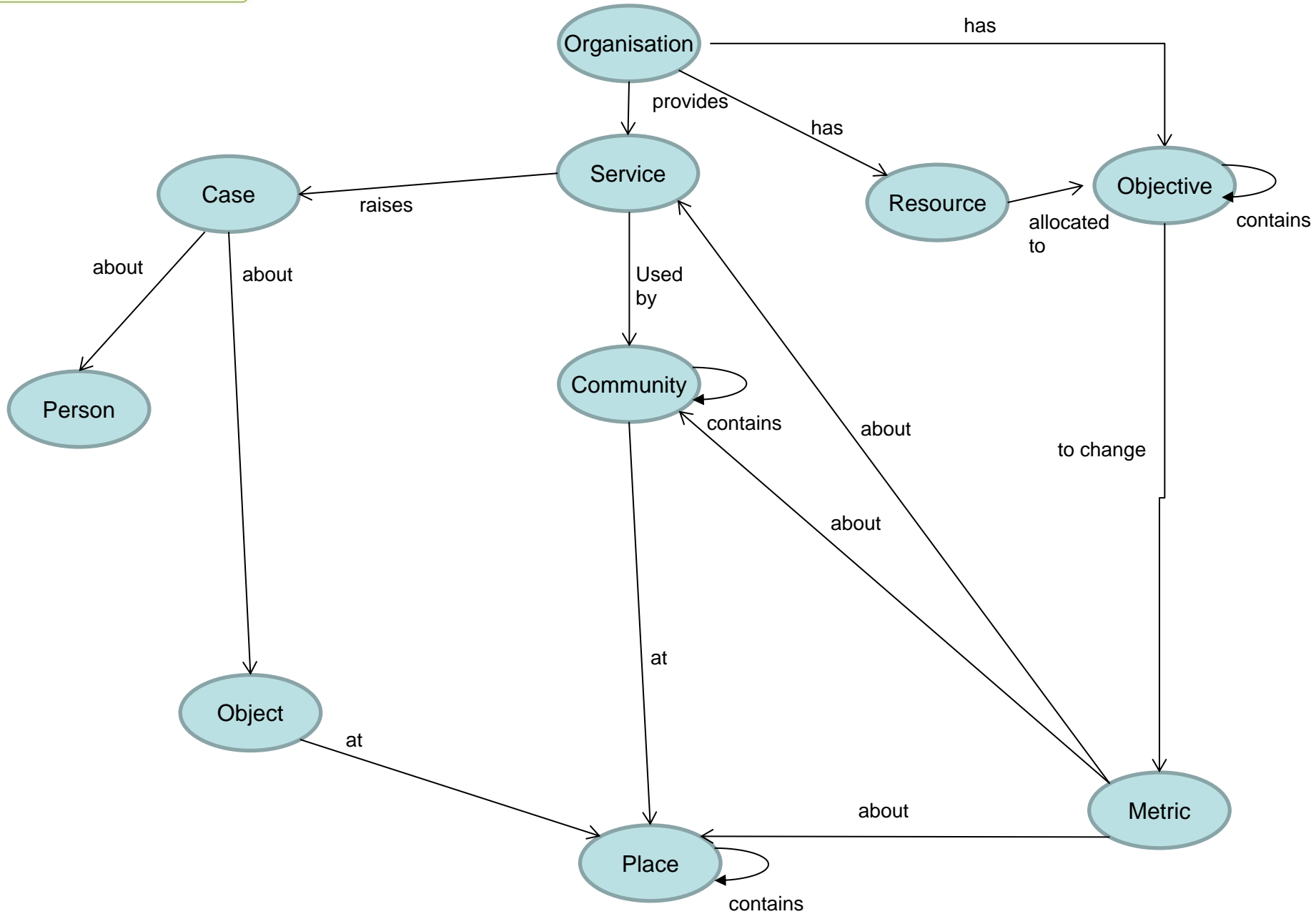
An Ecosystem?



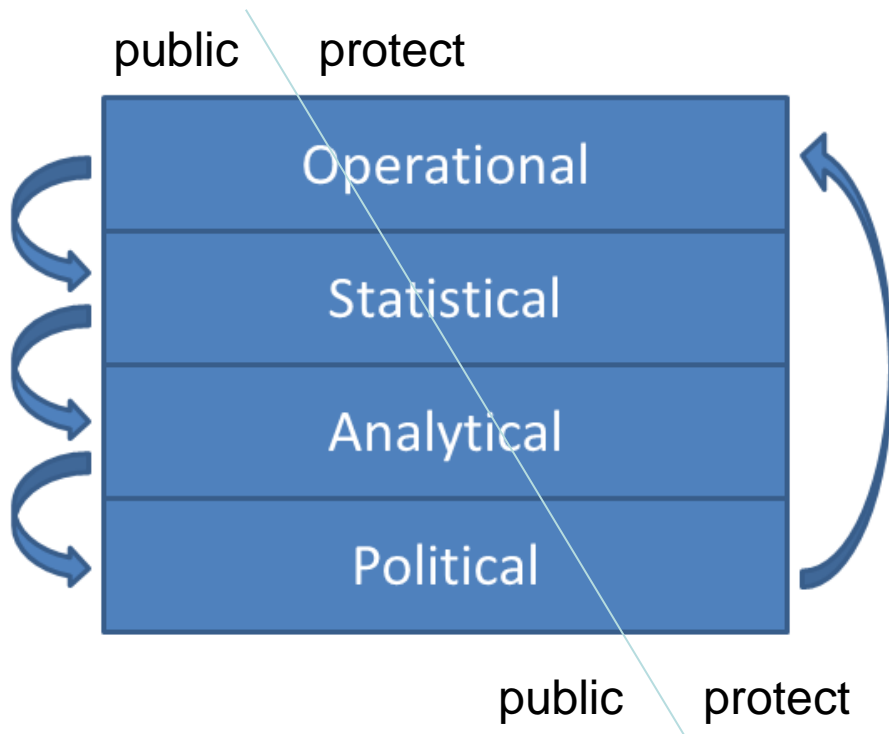
An Ecosystem?



An Ecosystem?



Context



- OPERATIONAL - Data about real people and places, with real needs and circumstances, using real services, i.e. case work
- STATISTICAL - Aggregated operational data – organised using common classifications and segmentations
- ANALYTICAL - The conclusions drawn from an analysis of statistical data
- POLITICAL - The decisions taken to shape services, e.g. budgets, strategies, priorities, targets etc.

So - A Local Data Ecosystem?

- Do we need it?
- Who is it for?
- What type of data would you expect it to contain?
- How would it improve your business / service?

Concept 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.

Dataset	Entities	Concept
Payments to Suppliers	<ul style="list-style-type: none"> • The Council • Supplier • Payment 	<ul style="list-style-type: none"> • ORGANISATION • ORGANISATION • EVENT
Ward Statistics	<ul style="list-style-type: none"> • Ward • Residents of the Ward • Statistic 	<ul style="list-style-type: none"> • PLACE • COMMUNITY • METRIC
Local Area Profile	<ul style="list-style-type: none"> • Town • Residents of Town • Statistic • Priority 	<ul style="list-style-type: none"> • PLACE • COMMUNITY • METRIC • OBJECTIVE
JSA Claimants	<ul style="list-style-type: none"> • Geography • Profiles of Working Age Population • Counts of Claimants • .. of Job Seekers Allowance 	<ul style="list-style-type: none"> • PLACE • COMMUNITY • METRIC • SERVICE
predicted increase in energy requirement over time.	<ul style="list-style-type: none"> • Zones • Energy Use 	<ul style="list-style-type: none"> • PLACE • METRIC
Network Investments Plans	<ul style="list-style-type: none"> • Energy Network • Target Capacity • Investment • Plan 	<ul style="list-style-type: none"> • SERVICE • OBJECTIVE • RESOURCE • PLAN

Dataset	Entities	Concept
Local Authority Land and Property	<ul style="list-style-type: none"> • Land / Property • Location • Condition • Owner • Service 	<ul style="list-style-type: none"> • ENTITY • PLACE • STATE • ORGANISATION • SERVICE
Service Volumes by Channel	<ul style="list-style-type: none"> • Service • Counts 	<ul style="list-style-type: none"> • SERVICE • METRIC
Location of Rail Stations	<ul style="list-style-type: none"> • Station • Location • Train Service 	<ul style="list-style-type: none"> • BUILDING • PLACE • SERVICE
Location of Car Parks	<ul style="list-style-type: none"> • Location • Service 	<ul style="list-style-type: none"> • PLACE • SERVICE
Traffic Counts	<ul style="list-style-type: none"> • Road / Junction • Location • Count • Region 	<ul style="list-style-type: none"> • OBJECT • PLACE • METRIC • PLACE

Strategic Data?

Dataset	Entities	Concept
Budget	<ul style="list-style-type: none"> • Fund • Income/Expenditure Account • Transactions 	<ul style="list-style-type: none"> • RESOURCE • ACCOUNT • EVENT
Priorities	<ul style="list-style-type: none"> • Partnership • Priority • Baseline • Target • Target Group 	<ul style="list-style-type: none"> • ORGANISATION • OBJECTIVE • METRIC • METRIC • COMMUNITY
Plans	<ul style="list-style-type: none"> • Plan • Resource • Period • Actions 	<ul style="list-style-type: none"> • PLAN • RESOURCE • TIME • EVENT
Performance	<ul style="list-style-type: none"> • Service • Measure 	<ul style="list-style-type: none"> • SERVICE • METRIC

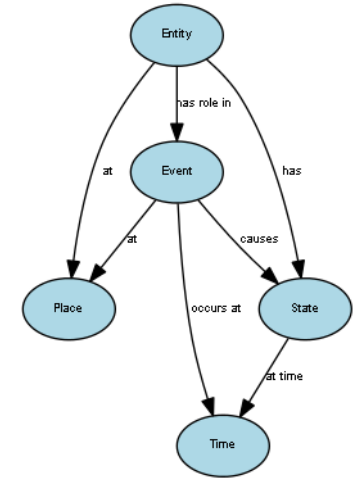
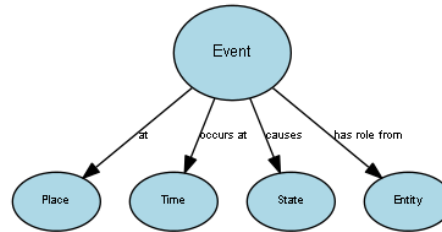
- <http://www.smartcityconceptmodel.com/>
- Currently 18 Concepts
 - a page describing each
- 4 Group Concepts
- Some Relationships
- 5 useful 'views'
 - showing how concepts are typically related
- 1 useless 'view'

The Smart City Concept Model

Model

Name Smart City Concept Model

Version 0.0.2



Views

[Items](#)

[Events](#)

[Services](#)

[Cases](#)

[Objectives](#)

[All](#)

Prime Concepts

Account	A container of information, held by an AGENT, in which to record data arising from EVENTS that relate to an ENTITY in a specific ROLE.
Agreement	A negotiated arrangement between AGENTS as to a course of action
Building	A man-made OBJECT with roof and walls, with a fixed PLACE, intended for sheltering PERSONS or other OBJECTS.
Case	A container for information recording the history of EVENTS initiated by a SERVICE Demand.
Community	A group of PERSONS and/or ORGANISATIONS that share common characteristics such as location, circumstance etc.
Decision	A conclusion or resolution reached after consideration
Event	An occurrence that has or may happen over a period of TIME.
Metric	A measure of demography, characteristics, activity or performance
Object	A physical ENTITY
Objective	A set of STATES desired by an AGENT.
Organisation	A group of PERSONS with a collective goal.
Person	An individual human being, while alive.
Place	A geographic position, area, or volume.
Plan	A list of steps with TIME and RESOURCE, used to achieve an OBJECTIVE.
Resource	The capacity that can be derived from an ENTITY to produce a benefit.
Rule	an explicit or understood regulation or principle governing conduct or procedure within a particular area of activity
Service	The capacity to carry out a Procedure.
State	A circumstance or condition of an ENTITY at a TIME.
Time	TIME is a dimension in which EVENTS can be ordered from the past through the present into the future, and also the measure of durations of EVENTSs and the intervals between them.

Group Concepts

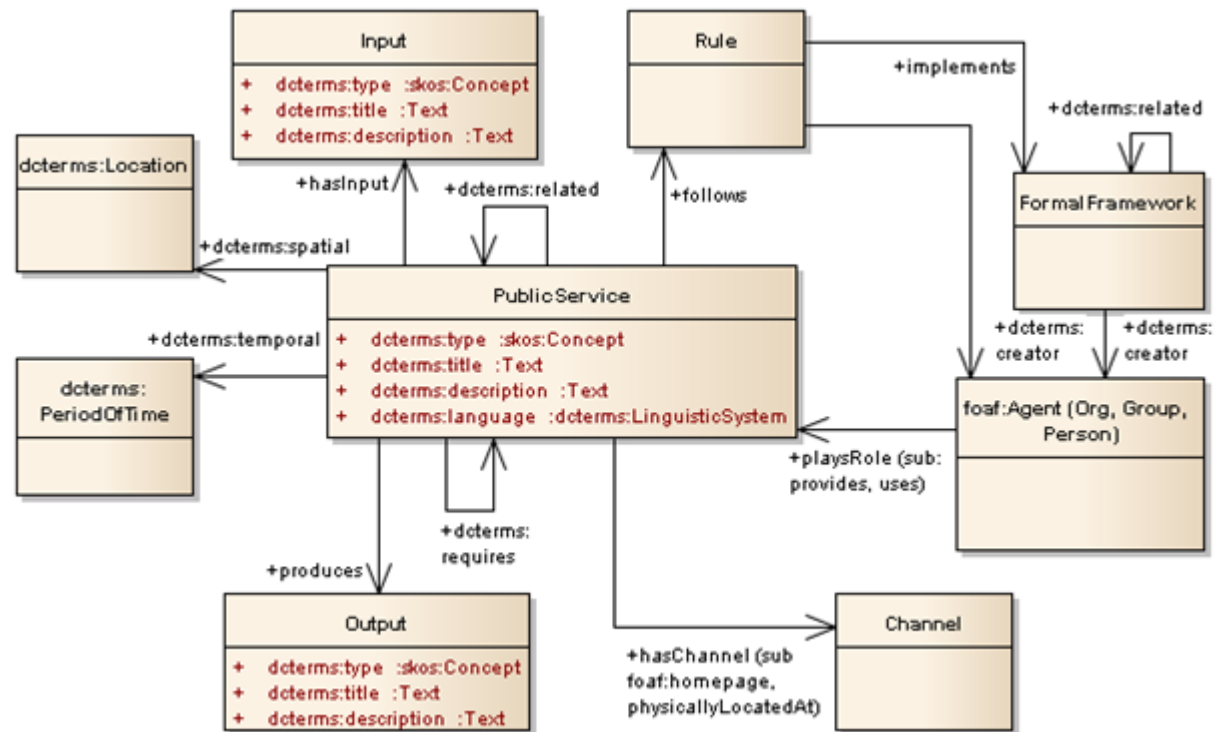
[Agent](#) An ENTITY, but most often a PERSON, or ORGANISATION, providing a SERVICE or taking a ROLE in an EVENT

[Entity](#) Something that has a distinct, separate existence.

- For example – Community
- A Definition
 - A group of PERSONs and/or ORGANISATIONS that share common characteristics such as location, circumstance etc.
- Notes and Examples
- Links to sources of definitions
- How this concept is typically related others.
- Comments

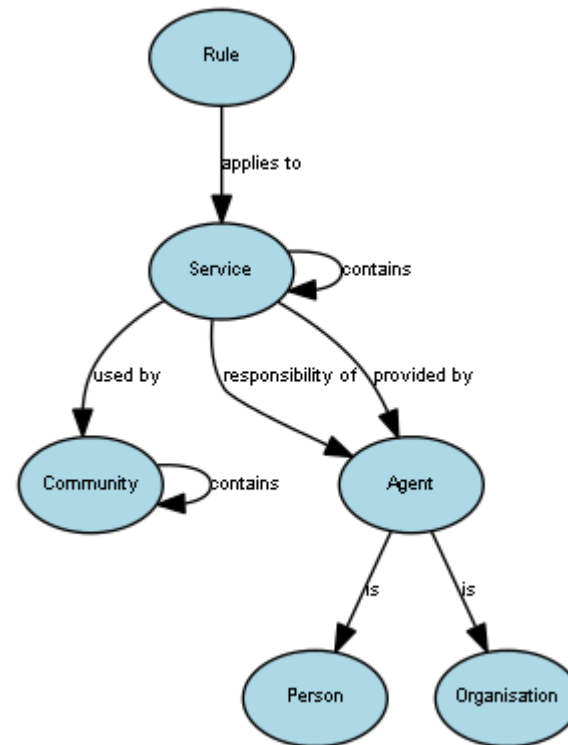
Concepts and Classes

- Concepts often have existing Class models, often more than one.
- Here is a class model for a 'Public Service' from the European Commission (the 'Interoperability Solutions for Public Administrations' program).
 - There are many strands to this but the most relevant ones for PAS 182 are the Core Vocabularies. This is an attempt by the EC to gather stakeholders from across Europe and agree on a baseline data model that can then be extended and specialised as required. 4 Core Vocabularies have been developed.



A View

- For example – Items
- A Diagram
 - Showing relevant concepts and relationships
- A commentary
- Comments



- Examples
 - Location of UK Rail Stations
 - Payments to Suppliers
 - Land and Property
- Smart City Concept Model Decision Tree

• [a person, group of people, or an organisation?](#)

• [a thing?](#)

• [a place?](#)

• [an event?](#)

• [a time?](#)

• [none of these](#)

- Identifiers
 - A code to mean an individual instance of a concept.
 - To share, and enrich, data about the same ‘thing’.
 - As Linked Data, a URI

- Categories
 - A code to mean a segmentation of a concept.
 - A way of grouping and discovering ‘things’.
 - Also a URI

Identifiers for 'things'

- Companies
 - All UK companies are registered at *Companies House*
 - Each is given a Registration Number
 - Builds into a URI Set

- For example
<http://business.data.gov.uk/id/company/02050399>

- *URI*
 - Uniform Resource Identifier
 - a component of the World Wide Web
 - provide a means of uniquely naming a 'Thing'
 - A web address for a fact
 - Can be 'looked up' over the web to give
 - *html*
 - *data*

- Guidance
 - Designing *URI* Sets for the UK Public Sector
 - <https://www.gov.uk/government/publications/designing-uri-sets-for-the-uk-public-sector>

For human consumption

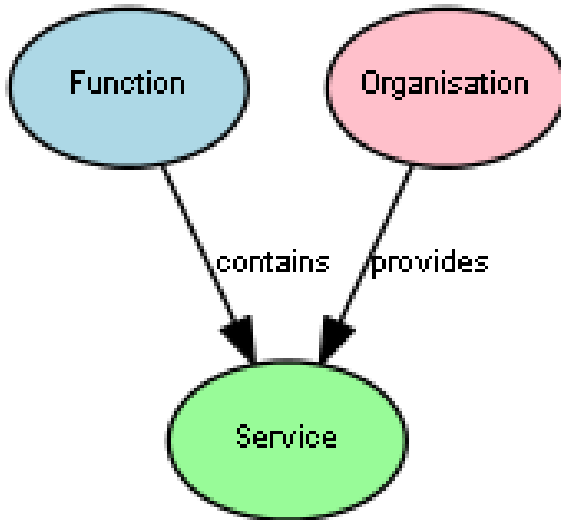
CompanyName ZENITH PRINT (UK) LIMITED
CompanyNumber 02050399
RegAddress
AddressLine1 ZENITH HOUSE
AddressLine2 MOY ROAD INDUSTRIAL ESTATE
PostTown TAFFS WELL
County CARDIFF
Postcode CF15 7QR
CompanyCategory Private Limited Company
CompanyStatus Active
CountryOfOrigin United Kingdom
IncorporationDate 28/08/1986
PreviousNames
CONDate 22/03/1996
CompanyName ZENITH TREFOREST PRESS LIMITED
PreviousNames
CONDate 22/04/1993
CompanyName ZENITH COLOUR PRINTING LIMITED
Accounts
AccountRefDay 31
AccountRefMonth 03
NextDueDate 31/12/2012
LastMadeUpDate 31/03/2011
AccountCategory TOTAL EXEMPTION SMALL
Returns
NextDueDate 28/01/2012
LastMadeUpDate 31/12/2010
Mortgages
NumMortCharges 6
NumMortOutstanding 2
NumMortPartSatisfied 0
NumMortSatisfied 4
SICCodes
SicText 9999 - Dormant Company

For machines, as XML

```
<?xml version="1.0" encoding="UTF-8"?>
<Result xmlns="http://www.companieshouse.gov.uk/terms/xxx">
- <primaryTopic href="http://business.data.gov.uk/id/company/02050399">
  <CompanyName>ZENITH PRINT (UK) LIMITED</CompanyName>
  <CompanyNumber>02050399</CompanyNumber>
- <RegAddress href="http://data.companieshouse.gov.uk/doc/company/02050399#RegAddress">
  <AddressLine1>ZENITH HOUSE</AddressLine1>
  <AddressLine2>MOY ROAD INDUSTRIAL ESTATE</AddressLine2>
  <PostTown>TAFFS WELL</PostTown>
  <County>CARDIFF</County>
  <Postcode>CF15 7QR</Postcode>
</RegAddress>
  <CompanyCategory>Private Limited Company</CompanyCategory>
  <CompanyStatus>Active</CompanyStatus>
  <CountryOfOrigin>United Kingdom</CountryOfOrigin>
  <IncorporationDate>1986-08-28</IncorporationDate>
- <PreviousNames href="http://data.companieshouse.gov.uk/doc/company/02050399#PreviousNames">
  <CONDate>1996-03-22</CONDate>
  <CompanyName>ZENITH TREFOREST PRESS LIMITED</CompanyName>
</PreviousNames>
- <Accounts href="http://data.companieshouse.gov.uk/doc/company/02050399#Accounts">
  <AccountRefDay>31</AccountRefDay>
  <AccountRefMonth>03</AccountRefMonth>
  <NextDueDate>2013-12-31</NextDueDate>
  <LastMadeUpDate>2012-03-31</LastMadeUpDate>
  <AccountCategory>TOTAL EXEMPTION SMALL</AccountCategory>
</Accounts>
```

```
<rdf:RDF xmlns:cs0="http://www.companieshouse.gov.uk/terms/" xmlns:foaf="http://xmlns.com/foaf/0.1/"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#">
  <rdf:Description rdf:about="http://data.companieshouse.gov.uk/doc/company/02050399#RegAddress">
    <cs0:PostTown>TAFFS WELL</cs0:PostTown>
    <cs0:County>CARDIFF</cs0:County>
    <cs0:Postcode>CF15 7QR</cs0:Postcode>
    <cs0:AddressLine1>ZENITH HOUSE</cs0:AddressLine1>
    <cs0:AddressLine2>MOY ROAD INDUSTRIAL ESTATE</cs0:AddressLine2>
  </rdf:Description>
  <rdf:Description rdf:about="http://data.companieshouse.gov.uk/doc/company/02050399">
    <foaf:primaryTopic rdf:resource="http://business.data.gov.uk/id/company/02050399"/>
  </rdf:Description>
  <rdf:Description rdf:about="http://business.data.gov.uk/id/company/02050399">
    <cs0:Mortgages rdf:resource="http://data.companieshouse.gov.uk/doc/company/02050399#Mortgages"/>
    <cs0:CompanyStatus>Active</cs0:CompanyStatus>
    <cs0:IncorporationDate>28/08/1986</cs0:IncorporationDate>
    <cs0:SICCodes rdf:resource="http://data.companieshouse.gov.uk/doc/company/02050399#SICCodes"/>
    <cs0:CompanyName>ZENITH PRINT (UK) LIMITED</cs0:CompanyName>
    <cs0:CountryOfOrigin>United Kingdom</cs0:CountryOfOrigin>
    <cs0:PreviousNames rdf:resource="http://data.companieshouse.gov.uk/doc/company/02050399#PreviousNames"/>
    <cs0:CompanyNumber>02050399</cs0:CompanyNumber>
    <cs0:Address rdf:resource="http://data.companieshouse.gov.uk/doc/company/02050399#RegAddress"/>
    <cs0:CompanyCategory>Private Limited Company</cs0:CompanyCategory>
    <cs0>Returns rdf:resource="http://data.companieshouse.gov.uk/doc/company/02050399#Returns"/>
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Categories



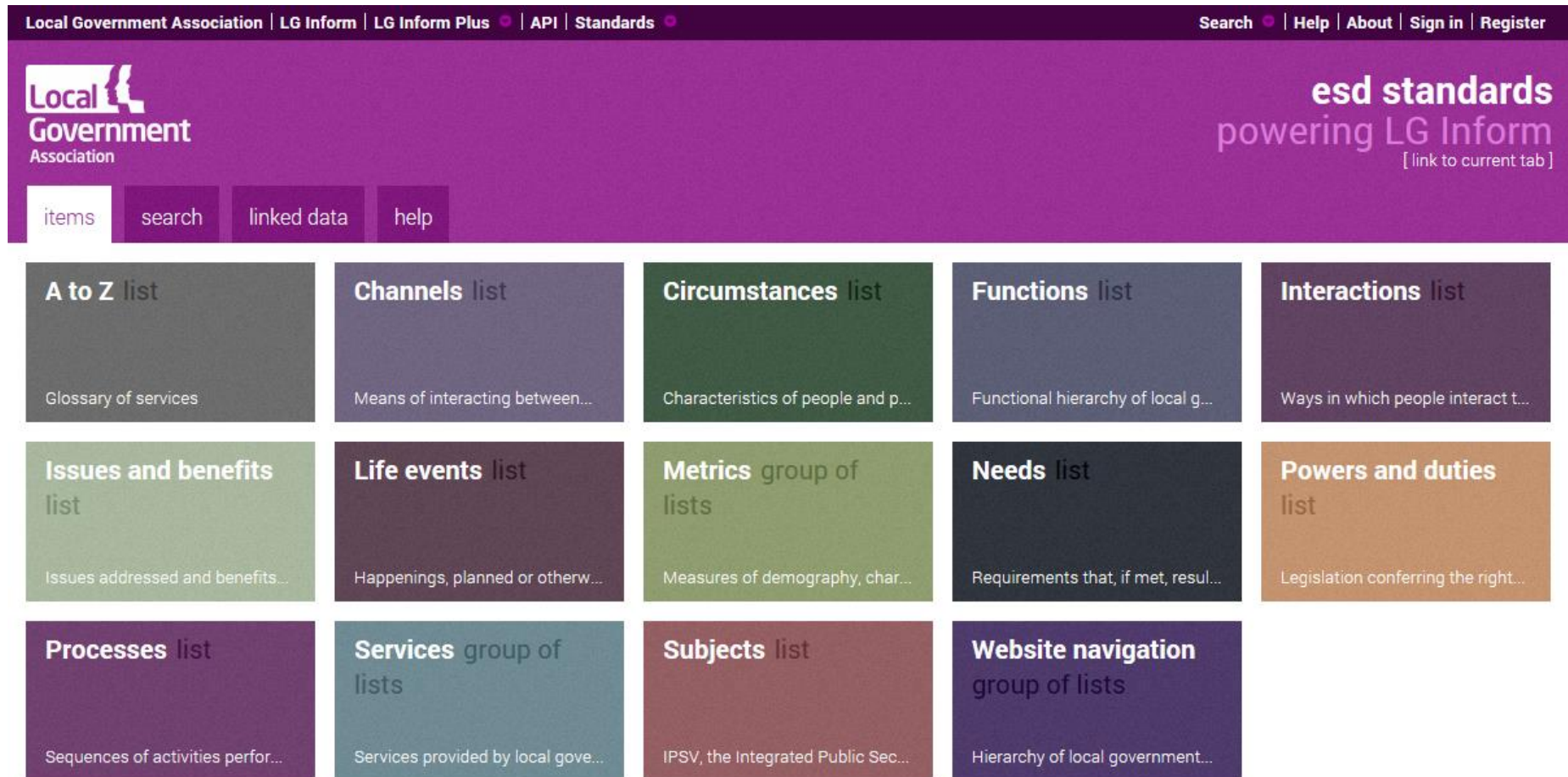
Each concept is categorised by a list of terms, which cross-reference to other concepts.

<http://opendatacommunities.org/def/local-government/DistrictCouncil>

<http://id.esd.org.uk/service/524>



<http://standards.esd.org.uk/>



The screenshot shows the website interface for 'esd standards'. At the top, there is a navigation bar with links for 'Local Government Association', 'LG Inform', 'LG Inform Plus', 'API', and 'Standards'. On the right side of the navigation bar, there are links for 'Search', 'Help', 'About', 'Sign in', and 'Register'. Below the navigation bar, the 'Local Government Association' logo is on the left, and the text 'esd standards powering LG Inform' is on the right, with a link to the current tab. A secondary navigation bar contains buttons for 'items', 'search', 'linked data', and 'help'. The main content area is a grid of 16 colored boxes, each representing a different category of standards. Each box has a title and a brief description.

Category	Description
A to Z list	Glossary of services
Channels list	Means of interacting between...
Circumstances list	Characteristics of people and p...
Functions list	Functional hierarchy of local g...
Interactions list	Ways in which people interact t...
Issues and benefits list	Issues addressed and benefits...
Life events list	Happenings, planned or otherw...
Metrics group of lists	Measures of demography, char...
Needs list	Requirements that, if met, resul...
Powers and duties list	Legislation conferring the right...
Processes list	Sequences of activities perfor...
Services group of lists	Services provided by local gove...
Subjects list	IPSV, the Integrated Public Sec...
Website navigation group of lists	Hierarchy of local government...

- What is the spine of reference data for the city?
 - Selecting common Identifiers and Categories for
 - Place, Organisation, Object, Community, etc
- What ‘classes’ can be shared across a city.

- You are a group of ‘city leaders’
 - From various organisations across the city
- Select 2 or more datasets that would be valuable to share across the city.
- Add them to the Smart City Concept Model web tool
 - Describe the columns
- Pull out the ‘things’ that the dataset is describing
 - Add them as Entities
 - Can you find a Concept for them?
- Link the Entities
 - And visualise the results
- What Identifiers and Categories ...
 - Are in the data? or could be in the data
 - Create them and link to the entities via a ‘class’

Scenarios

Objectives about a place or community	Local Planning Policy / Land Use
Statistics about a place or community	Demographics.
Services at a place for a community	Car Parks Energy provision Care Homes
Cases for a service	Incidents – e.g. Fires Applications – e.g. Planning Applications Use – e.g. Ticket data



An API to the City of Utopia

- A Linked Data Triple Store
- Query data from many organisations, for example
 - A dashboard for a community
 - Local Area Profiles
- Real-Time data
 - Traffic, Energy, News
- A platform for local Apps
- As a secure multi-agency case management system

- Questions
 - Are these the right Concepts?
 - Are they defined correctly?
 - Do we need more sub-concepts?
 - Do we need more concepts?
- Is the model useful?
 - What would make it more useful.
- Using the site
 - To make comments on the model
 - To model and join up data

Thank you

- Paul Davidson
 - paul.davidson@sedgemoor.gov.uk
 - Director of Standards for the Local eGovernment Standards Body (LeGSB)
 - <http://www.legs.gov.uk>