

A Smart City Concept Model

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To promote eStandards for Efficiency, Transformation, and Transparency of Local Services

- A Standard that supports all three, is particularly attractive
 - Predominantly about data standards
 - ... and in particular, Open Data Standards
- Standards that can be re-used across many ...
 - Disciplines / Sectors – e.g. Welfare, Health, Justice
 - Information Uses – e.g. Interoperability, public open data, evidencing policy
- Standards that local public services need ...
 - As directed by our sponsors
- Standards that build into an architecture
 - e.g. a data ecosystem

A Smart City Concept Model

- **What would be in it?**

- Concepts
 - Organisation, Location, Community, Entity, Metric, Service, Resource, Time
- Identifiers
 - Companies House, Ordnance Survey Administrative Geographies, Output Areas,
- Controlled Vocabularies defining ‘types of things’, segmentations
 - Types of Service, Resource
- Relationships between Classes
 - Organisation has Resource, Event as a Location

- **What would it support**

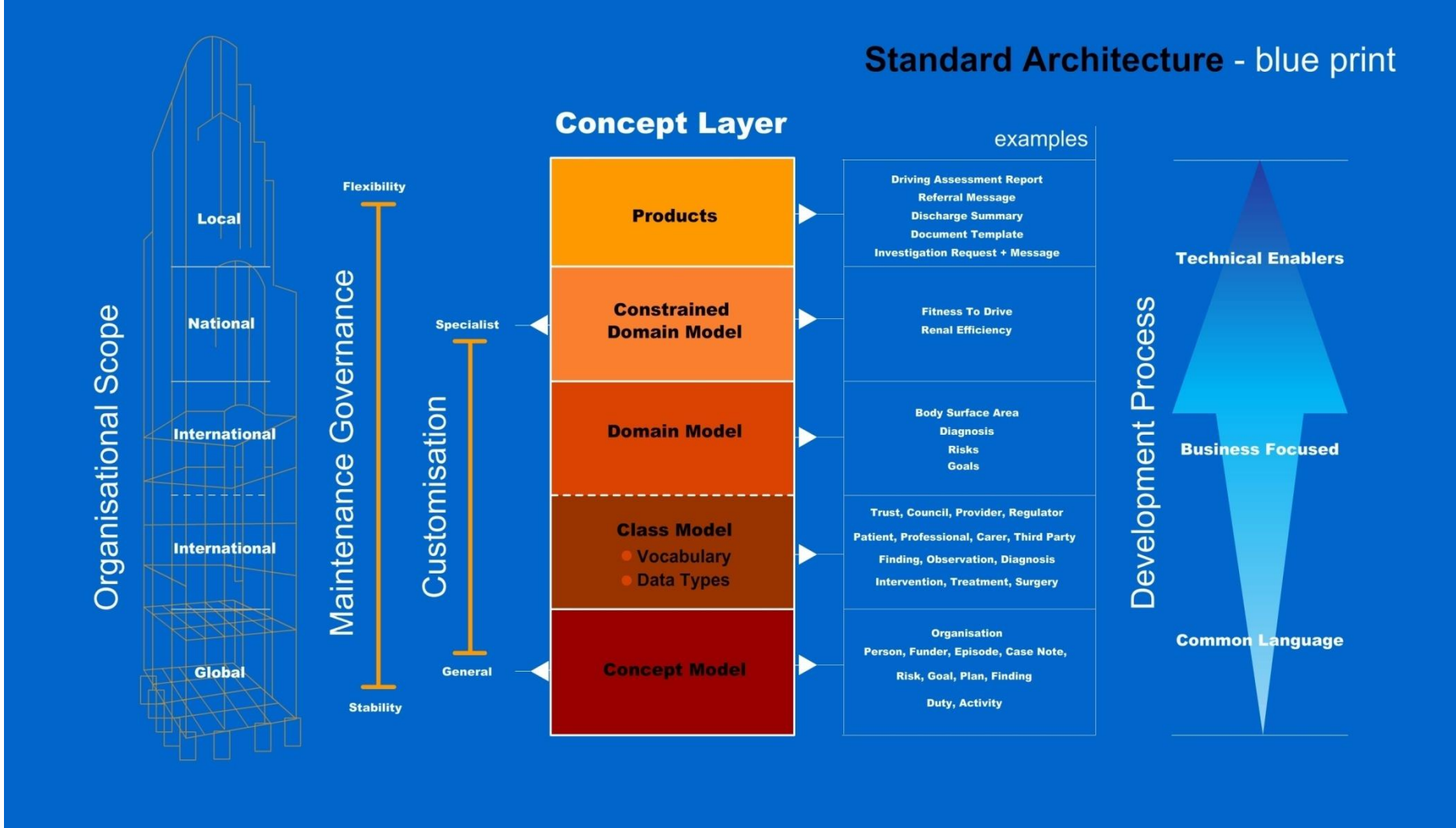
- Core Reference Data
- Publishing ‘transactional’ Open Data
- Sharing operational data
- Querying data from many sources

A Public Service Concept Model

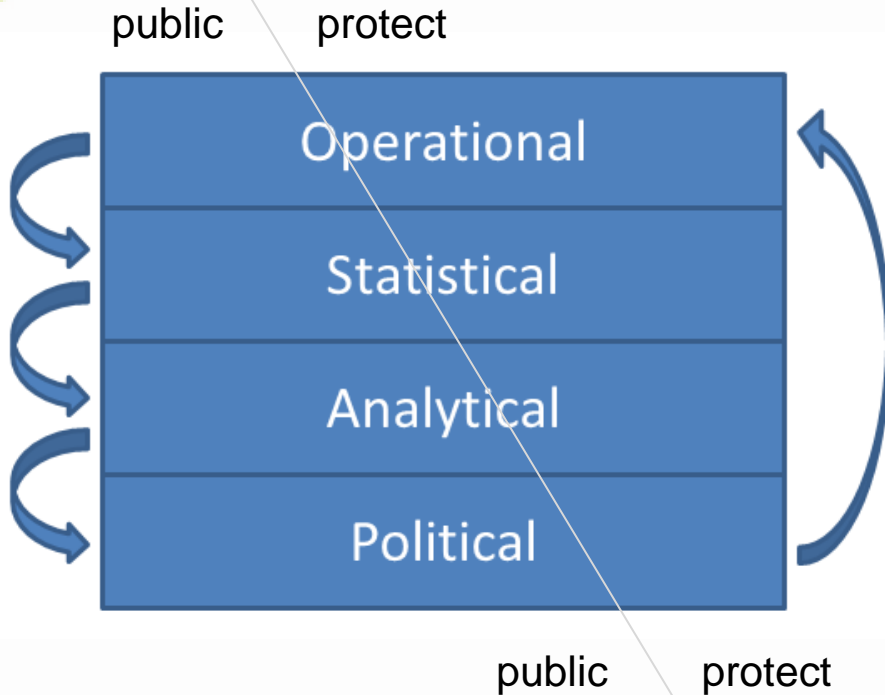
- A proof of concept with
 - Health, Local Government, Ministry of Justice, MoD, Department of Communities and Local Government, Oxford University
 - See <http://www.pauldcdaavidson.com/pscm>
 - Resulting in
 - <https://www.gov.uk/government/publications/uk-government-ict-strategy-resources>
- Now
 - A part of the ‘Metadata Working Group’ standards ‘challenge’ to the Standards Hub
 - See <http://standards.data.gov.uk/challenge/describing-and-sharing-our-information>



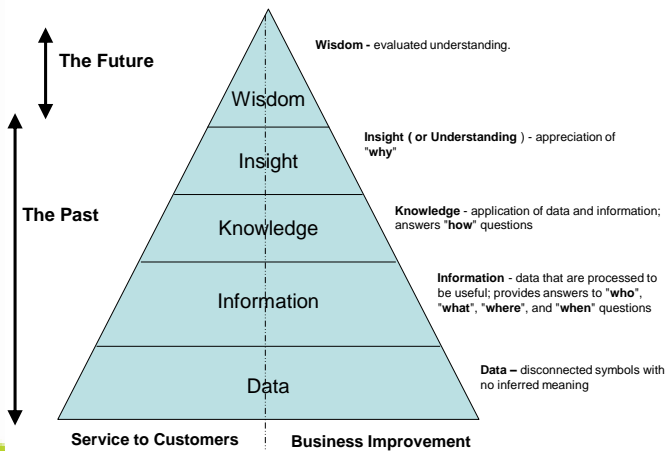
Other types of model



Making local links



- **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.



A Concept Model?

What is a Concept Model?

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

Wikipedia says **... 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.**

For the purposes of the Public Service Concept Model (PSCM), we shall say:-

A small set of defined 'concepts' and the relationships between them, chosen to be independent of design or implementation concerns.

... and add ... which

- represent simple truisms;
- are sufficient to be applied to any part of the public sector;
- are unaffected by structural changes of government;
- are simple, easy to read, and well understood by anyone interested in public sector information.

The model contains three levels:

- Level 1 - A small set of concepts with a short definition for each.
- Level 2 - For each concept, 'defining' relationships to other concepts in the model; i.e. relationships that should normally be present as a concept is used, e.g. EVENT occurs at a TIME
- Level 3 - Patterns of Use, depicting common scenarios in which a set of concepts and relationships are used, e.g. 'Case Management', 'Strategic Planning'

Why?

- Departmental concept models are often complex and can be hard to understand, particularly if you are not a professional in that area, however, they typically contain simple patterns which could be applied to all public sector services.
- For instance
 - a PATIENT with a CONDITION has a TREATMENT at a HOSPITAL from a DOCTOR and FEELS BETTER
 - PUPIL taking a SUBJECT has a LESSON at a SCHOOL from a TEACHER and gains a QUALIFICATION
- These could both be considered as
 - a PERSON has a NEED uses a SERVICE from an ORGANISATION at a LOCATION delivered by a ROLE and achieves an OUTCOME.

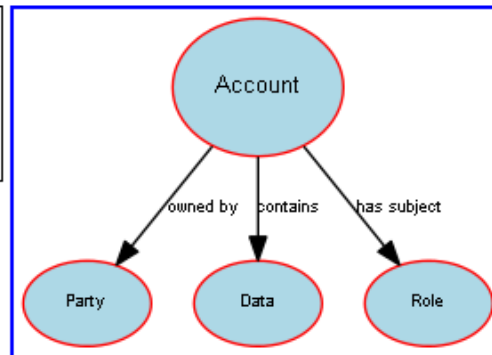
For example

Concept

Name	Account
Revision	3
Definition	A container, held by an Organisation, in which to record Data arising from Events that relate to an Entity in the context of a specific Role.
Model	Public Sector Concept Model
Notes	The specific role may pertain to either a Party or to an Object (such as a tree subject to a preservation order)
Examples	<ul style="list-style-type: none"> * A patient record * An ongoing claim for benefit * A driver's licence * A food premises inspection history * An equipment log

Relationships

				Defining?
Account	ownedBy	Party	yes	
Account	contains	Data	yes	
Account	hasSubjectRole	Role	yes	



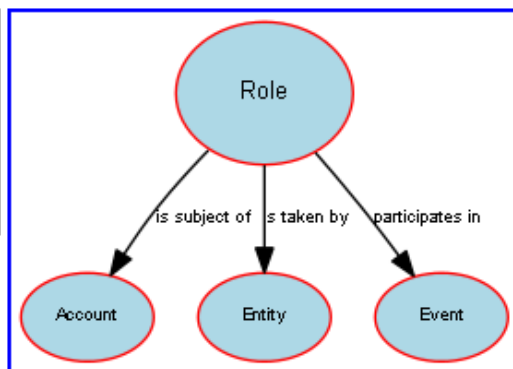
For example

Concept

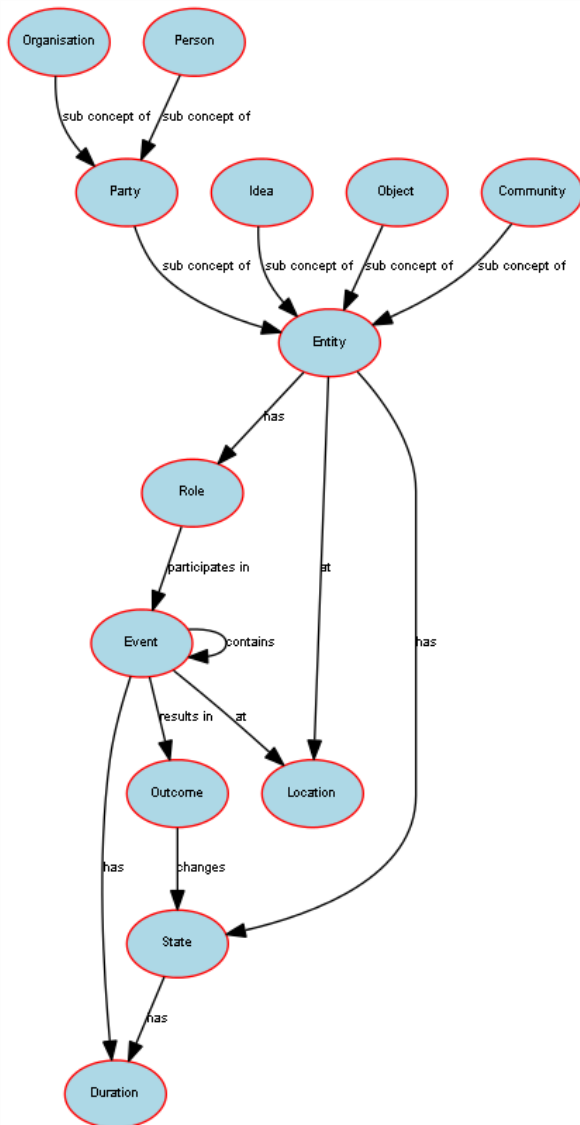
Name	Role
Revision	1
Definition	The manner in which an Entity participates in an Event
Model	Public Sector Concept Model
Notes	<p>A Role is not to be confused with the actual identity of an Entity. For example, the Person 'John Smith' should not be confused with his various roles of teacher, husband, club member etc.</p> <p>Roles are not restricted to Parties, for example a candlestick can take a roles of 'weapon' or 'evidence'.</p>
Examples	<ul style="list-style-type: none"> * Applicant * Victim * Service Provider

Relationships

				Defining?
Account	hasSubjectRole	Role		yes
Entity	hasRole	Role		
Role	participatesIn	Event		yes
Case	isAboutRole	Role		yes



and a pattern



See

<http://www.pauldcdaavidson.com/pscm/index.php?Action=ShowView&Id=1>

Identifiers for

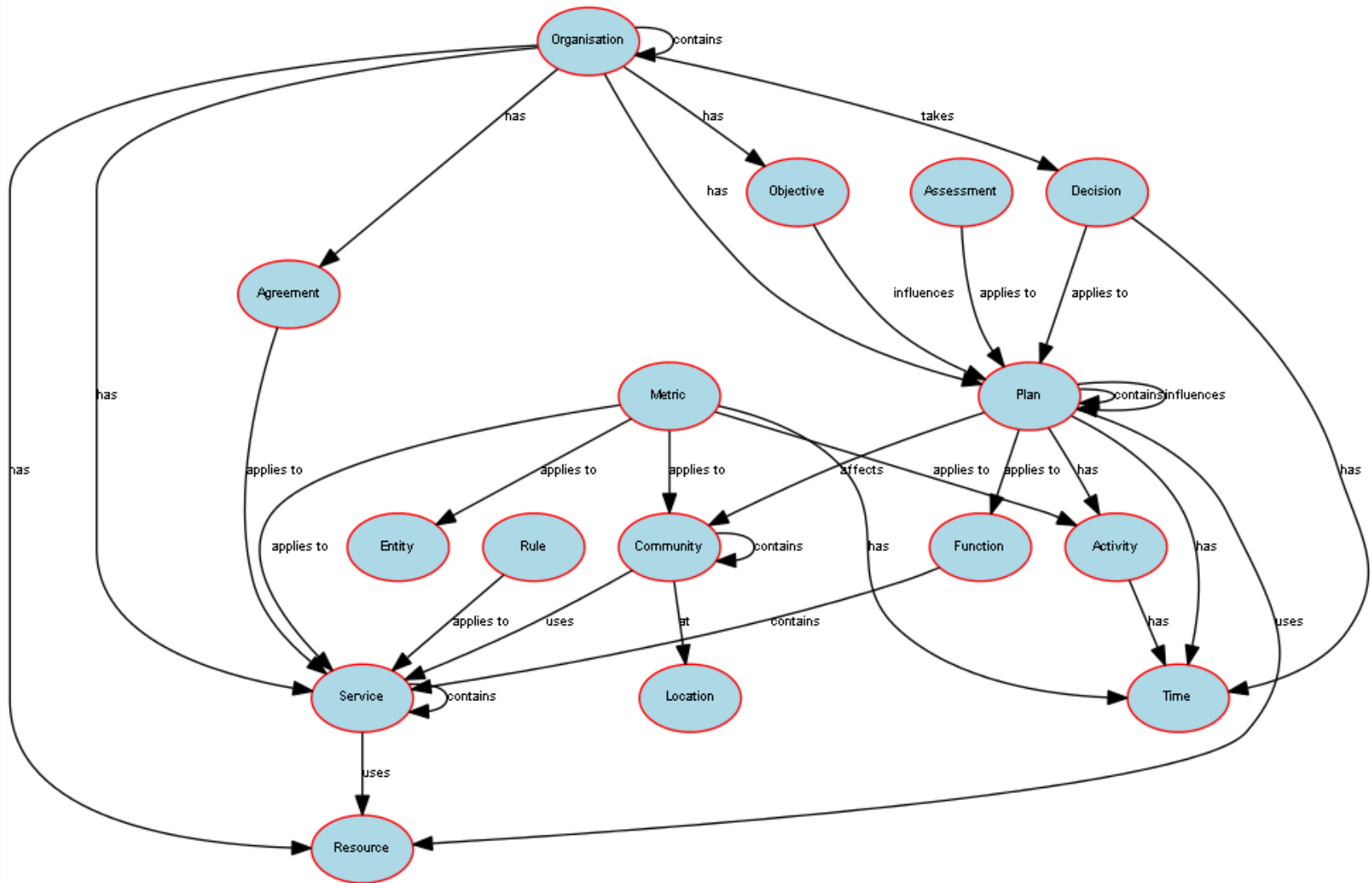
- Locations
- Organisations
- Objects
- Communities
- Roles
- Time

Expressed as ...

- RDF Schema, (but see profiles later)

```
<?xml version="1.0"?>
- <rdf:RDF xml:base="http://data.pscm.info/pscm/"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns="http://data.pscm.info/pscm/">
  - <rdfs:Class rdf:ID="Account">
    <rdfs:label>Account</rdfs:label>
    <rdfs:comment>A container, held by an Organisation, in which to record Data
      arising from Events that relate to an Entity in the context of a specific
      Role.</rdfs:comment>
  </rdfs:Class>
  - <rdfs:Class rdf:ID="Activity">
    <rdfs:label>Activity</rdfs:label>
    <rdfs:comment>A planned Event.</rdfs:comment>
    <rdfs:subClassOf rdf:resource="#Event"/>
  </rdfs:Class>
  - <rdfs:Class rdf:ID="Agreement">
    <rdfs:label>Agreement</rdfs:label>
    <rdfs:comment>An arrangement between two or more Parties.</rdfs:comment>
  </rdfs:Class>
  - <rdfs:Class rdf:ID="Assessment">
    <rdfs:label>Assessment</rdfs:label>
    <rdfs:comment>The output of a study that reaches conclusions to inform a
      Decision.</rdfs:comment>
  </rdfs:Class>
  - <rdfs:Class rdf:ID="Case">
    <rdfs:label>Case</rdfs:label>
    <rdfs:comment>A container which records the history of Events and Decisions
      initiated by a particular Service Demand.</rdfs:comment>
  </rdfs:Class>
```

For Local Public Services



URIs, URI Sets, Triples, etc

- Publishing local 5* data - <http://legsb.i-network.org.uk/resources/publishinglocal5stardata/>
 - UkGovLd Group - <http://data.gov.uk/linked-data/UKGovLD>, <https://groups.google.com/forum/?fromgroups#!forum/ukgovld>
- URI - a string of characters, used to identify a 'thing'.
 - e.g. <http://data.sedgemoor.gov.uk/id/council/organisation/1>
- URI Set – Collections of URIs, about the same concept, governed from an authority
 - E.g. <http://local.data.gov.uk/id/councils>
- Registry – to enable an authority to declare a URI set
 - See <http://www.slideshare.net/der42/ukgovld-registryintro>
- RDF – Resource Description Framework – W3C data model to make assertions as triples
- Ontology/vocabulary – to define the classes and relationships that can be asserted as a triple
 - E.g. a Smart Cities Concept Model
- Triplestore – a database to contain triples, administered by an authority.
 - Perhaps a TripleStore for a city
- SPARQL – query language to query a triplestore over http
 - The API for a city

- <http://www.openpublicdata.com>

Open Public Data- edit Item

ops:Agreement

id	23
Reference	<input type="text"/>
Name	Electricity Supply
Type	Contract
Category	09310000 - Electricity
Description	<input type="text"/>
Estimated Total Contract Value	255000
Same as	<input type="text"/>
Period	Start <input type="text" value="day 01 month 12 year 2012"/>
	End <input type="text" value="day 30 month 11 year 2015"/>

```
<http://data.sedgemoor.gov.uk/id/contracts/agreement/23>
  a ops:Agreement ;
  skos:prefLabel ""Electricity Supply"" ;
  ops:classification ""09310000 - Electricity"" ;
  dcterms:type ""Contract"" ;
  ops:estimatedtotalcontractvalue ""255000"" ;
  .
```

```
<http://data.sedgemoor.gov.uk/id/contracts/agreement/23> ops:hasPeriod <http://data.sedgemoor.gov.uk/id/contracts/period/23> .
```

```
<http://data.sedgemoor.gov.uk/id/contracts/period/23>
  a ops:Period ;
  ops:periodStart ""2012-12-01"" ;
  ops:periodEnd ""2015-11-30"" ;
  .
```

```
<http://data.sedgemoor.gov.uk/id/contracts/agreement/23> ops:awardedBy <http://data.sedgemoor.gov.uk/id/council/organisation/1> .
```

```
<http://data.sedgemoor.gov.uk/id/contracts/agreement/23> ops:awardedTo <http://data.sedgemoor.gov.uk/id/contracts/organisation/23> .
```

```
<http://data.sedgemoor.gov.uk/id/contracts/organisation/23>
  a org:Organization ;
  skos:prefLabel ""Eon UK plc, "" ;
  .
```

An api for a city?

Awards

id	Reference	Name	Type	Category	Estimated Total Contract Value	awarded by		Period	
						Name	Type	Start	End
http://data.sedgemoor.gov.uk/id/contracts/agreement/1		Multi-Functional Devices	Contract	30120000 - Photocopying and offset printing equipment	0			01 June 2008	02 June 2013
http://data.sedgemoor.gov.uk/id/contracts/agreement/2		Banking Services	Contract	66000000 - Financial and insurance services	0			01 April 2009	01 April 2013
http://data.sedgemoor.gov.uk/id/contracts/agreement/3		Harbour Master and Pilotage	Contract	90700000 - Environmental services	0			01 April 2009	30 June 2013
http://data.sedgemoor.gov.uk/id/contracts/agreement/4		Pest Control	Contract	90922000 - Pest-control services	0			23 April 2009	23 April 2013
http://data.sedgemoor.gov.uk/id/contracts/agreement/5		Tankering Services	Contract	90000000 - Sewage, refuse, cleaning and environmental services	5000			13 September 2010	12 September 2013
http://data.sedgemoor.gov.uk/id/contracts/agreement/6		Legal support to support Hinkley Point C	Contract	79110000 - Legal advisory and representation services	100000			01 October 2010	01 October 2012

```

?uri ops:awardedBy <http://data.sedgemoor.gov.uk/id/council/organisation/1> .
{SELECT DISTINCT ?uri ?p5 ?p7 ?p9 ?p11 ?p13 ?p15 ?p17 ?p19 ?p21 ?p23 ?p25 WHERE {

?uri rdf:type ops:Agreement .
OPTIONAL { ?uri ops:reference ?p5 . }
OPTIONAL { ?uri skos:prefLabel ?p7 . }
OPTIONAL { ?uri dcterms:type ?p9 . }
OPTIONAL { ?uri ops:classification ?p11 . }
OPTIONAL { ?uri ops:estimatedtotalcontractvalue ?p13 . }
OPTIONAL { ?uri ops:awardedBy ?p15 . }
OPTIONAL { ?p15 skos:prefLabel ?p17 . }
OPTIONAL { ?p15 org:classification ?p19 . } }
OPTIONAL { ?uri ops:hasPeriod ?p21 . }
OPTIONAL { ?p21 ops:periodStart ?p23 . }
OPTIONAL { ?p21 ops:periodEnd ?p25 . } }

```


Profiles?

- W3C - <https://www.w3.org/2012/12/rdf-val/participate.php>

- To

- define how a dataset has used classes, properties, uri-sets etc, from many ontologies/sources.
- invite others with similar data to use the same profile, and therefore find that their data can be queried together.
- be able to register a dataset so that it can be discovered by its 'Profile'.
- be able to 'query', and present a dataset (or across many datasets) by referring to its 'profile'
- be able to validate that a dataset does conform to a 'profile'
- enable others to create a new profile by adapting an existing one.
- be able to create a register of good practice 'patterns' for commonly recurring data structures, that can then be re-used.

Legsb
The Local e-Government Standards Body

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www.legsb.gov.uk