

# Draft **PAS 182:2014**

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## **Smart city concept model – Guide to establishing a model for data interoperability**

Draft 2.0 for public consultation

Please submit comments through the online draft review system:

<http://drafts.bsigroup.com/Home/Details/52864> by **Friday 16 May 2014**

Thank you

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## **Publication history**

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## Contents

Foreword	5
<b>0</b> Introduction	7
<b>1</b> Scope	8
<b>2</b> Terms and definitions	9
<b>3</b> Using the SCCM	10
<b>4</b> Concepts, relationships and the SCCM	10
<b>5</b> Mapping datasets to the SCCM	13
<b>6</b> Views illustrating how concepts are typically related.	16
<b>7</b> Definition of each concept and relationship in the SCCM	27

## Annexes

Annex A (informative) Relationships in the SCCM	54
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Bibliography	56
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## List of figures

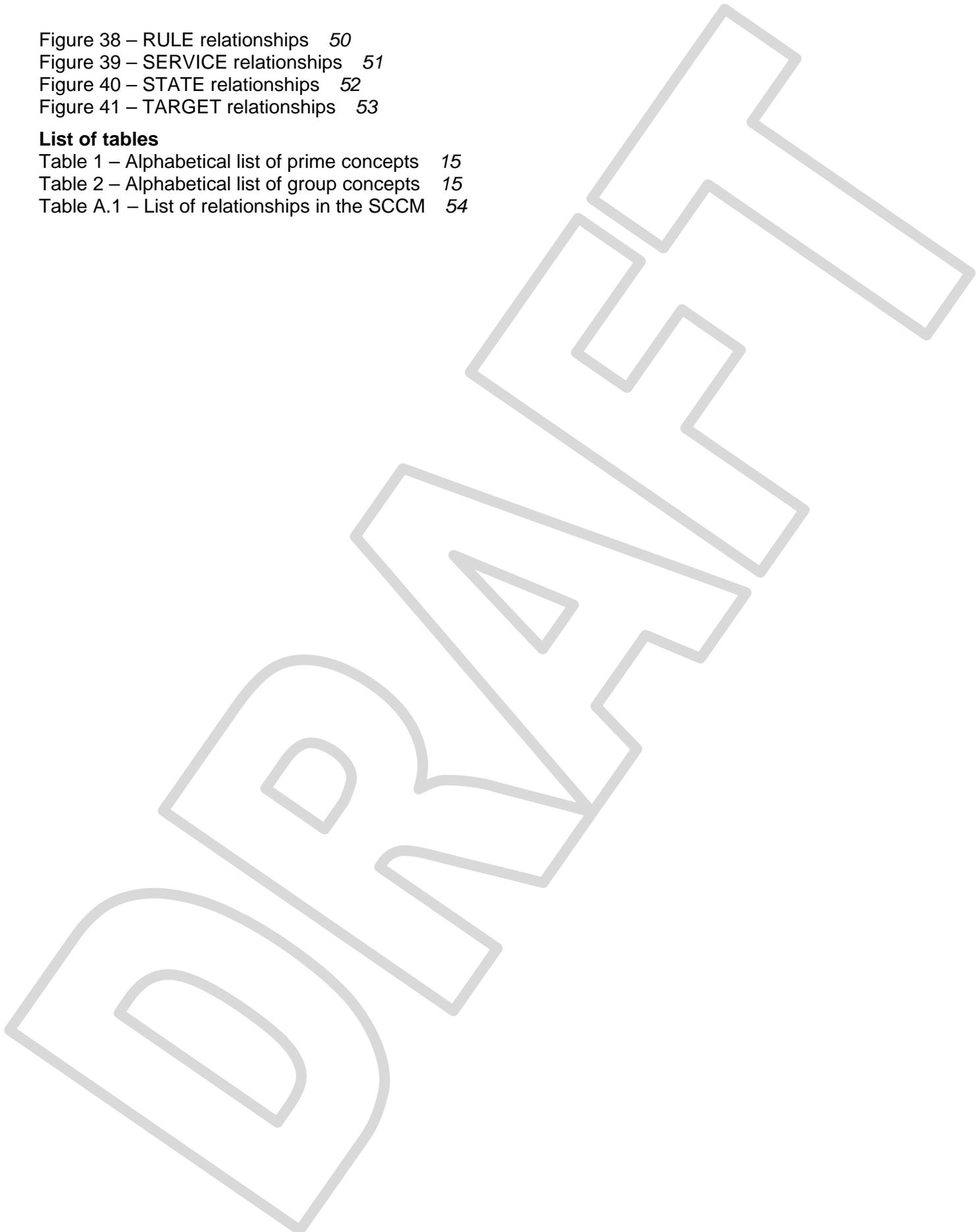
Figure 1 – Example of a directed graph	11
Figure 2 – Example of a directed graph for a concept	11
Figure 3– Example of sub-concepts	12
Figure 4 – Example of a group concept	12
Figure 5 – – Example of a dataset listing reported faults to lamp posts	13
Figure 6 – Items view	17
Figure 7 – Collections view	18
Figure 8 – Events view	19
Figure 9 – Objectives view	20
Figure 10 – Observing and responding view	21
Figure 11 – Services view	22
Figure 12 – Cases view	24
Figure 13 – Plans view	25
Figure 14 – Resources and decisions view	26
Figure 15 – ABSTRACT relationships	27
Figure 16 – ACCOUNT relationships	28
Figure 17 – AGENT relationships	29
Figure 18 – AGREEMENT relationships	30
Figure 19 – ASSUMPTION relationships	31
Figure 20 – BUILDING relationships	32
Figure 21 – CASE relationships	33
Figure 22 – COLLECTION relationships	34
Figure 23 – COMMUNITY relationships	35
Figure 24 – DECISION relationships	36
Figure 25 – EVENT relationships	37
Figure 26 – FUNCTION relationships	38
Figure 27 – ITEM relationships	39
Figure 28 – METHOD relationships	41
Figure 29 – METRIC relationships	42
Figure 30 – OBJECT relationships	42
Figure 31 – OBJECTIVE relationships	43
Figure 32 – OBSERVATION relationships	44
Figure 33 – ORGANIZATION relationships	45
Figure 34 – PERSON relationships	46
Figure 35 – PLACE relationships	47
Figure 36 – PLAN relationships	48
Figure 37 – RESOURCE relationships	49

**WARNING.** THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A PAS.  
THIS DRAFT IS NOT CURRENT BEYOND **16 MAY 2014.**

- Figure 38 – RULE relationships 50
- Figure 39 – SERVICE relationships 51
- Figure 40 – STATE relationships 52
- Figure 41 – TARGET relationships 53

**List of tables**

- Table 1 – Alphabetical list of prime concepts 15
- Table 2 – Alphabetical list of group concepts 15
- Table A.1 – List of relationships in the SCCM 54



## Foreword

This PAS was sponsored by the UK Department for Business, Skills & Innovation (BIS). Its development was facilitated by BSI Standards Limited and it was published under licence from The British Standards Institution. It came into effect on DD MM YYYY.

Acknowledgement is given to Paul Davidson, Local eGovernment Standards Body (LeGSB), as the technical author, and the following organizations that were involved in the development of this PAS as members of the Steering Group:

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The PAS process enables a guide to be rapidly developed in order to fulfil an immediate need in industry. A PAS can be considered for further development as a British Standard, or constitute part of the UK input into the development of a European or International Standard.

### Relationship with other documents

This PAS is issued as part of a suite of BSI publications related to smart cities:

- PAS 180, *Smart cities – Vocabulary*, which defines terms for smart cities, including smart cities concepts across different infrastructure and systems elements and used across all service delivery channels;
- PAS 181, *Smart city framework – Guide to establishing strategies for smart cities and communities*, gives guidance on a good practice framework for decision-makers in smart cities and communities (from the public, private and voluntary sectors) to develop, agree and deliver smart city strategies that can transform their city's ability to meet future challenges and deliver future aspirations;

- PD 8100, an overview document that will provide guidance on how to effectively communicate the value of smart cities to key decision-makers;<sup>1)</sup>
- PD 8101, a smart city planning document, which will provide guidance to local authorities on what they need to require or incentivize new infrastructure developments to support the overall smart city plans for their area.<sup>1)</sup>

### **Use of this document**

As a guide, this PAS takes the form of guidance and recommendations. It should not be quoted as if it were a specification or a code of practice and claims of compliance cannot be made to it.

It has been assumed in the preparation of this PAS that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

### **Presentational conventions**

The guidance in this PAS is presented in roman (i.e. upright) type. Any recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Spelling conforms to *The Shorter Oxford English Dictionary*. If a word has more than one spelling, the first spelling in the dictionary is used.

### **Contractual and legal considerations**

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with a PAS cannot confer immunity from legal obligations.**

<sup>1)</sup> In preparation.

## **0 Introduction**

### **0.1 General**

A defining feature of smart cities is the ability of the component systems to interoperate. This PAS gives guidance to decision-makers in cities on establishing an upper ontology for interoperability for data created, used, and maintained by a city across all sectors, on behalf of, and in collaboration with, its citizens.

Data is a resource which can transform the capability of a city and enable the development of systems and services for the benefit of all stakeholders. However, decision-makers and citizens are unlikely to have the necessary expertise and are likely to rely on data specialists to deliver benefits from data to meet the objectives for their city.

Data is often labelled using language and terms from the sector that initially collected it for the provision of a service. For example, the health sector might refer to a patient and a care plan, social services might refer to a client, the education sector might refer to a pupil and a curriculum, and the transport sector might refer to a passenger and a travel plan.

Each sector has its own models and terminologies which enable data to be discovered and understood within that sector, but form a barrier to interoperability with other sectors.

The smart city concept model (SCCM) outlined in this PAS addresses this lack of interoperability by defining an overarching framework of concepts and relationships that can be used to describe data from any sector.

Sharing data across a city requires more than the interoperability covered by the SCCM. For example, ensuring compliance, privacy, security, integrity, availability, and quality of data also needs to be considered by decision-makers.

Although these concerns are beyond the scope of this PAS, which focuses on the semantics of data, the bibliography provides a list of UK good practice materials which address these wider considerations.

It is critical that decision-makers are involved in the development of a data ecosystem to support the development of the city. In the current landscape datasets are typically created by an organization for one particular purpose, and the potential for secondary use is not unlocked.

This PAS is intended to facilitate discussions between decision-makers from each sector and the specialists who build and design the systems and services which enable the city to function. The components of the SCCM could form the basis of these discussions, acting as an upper ontology for the city. Use of the SCCM over time could increase the data literacy of non-specialists, allowing further value in city data to be unlocked.

A city-wide data ecosystem based on the SCCM, blending data from many sources, for the benefit of both the city and citizen could support the reuse of data to improve services and gain insight into the quality of life of the city's citizens.

### **0.2 Relevance**

This PAS aims to look beyond the current use of data to facilitate city services, and encourage decision-makers to explore the reuse of data as a resource to innovate the future direction of systems and services. This approach could help organizations to develop a future landscape based on the interoperability of data, an approach that is relevant not just in cities, but wherever many organizations provide many services to many communities within a place.

The SCCM assumes that structured, semi-structured and unstructured data is present in a city, and can be modelled using the concepts presented. Four key types of insight have been assumed to be required when sharing data in a city:

- Operational insight – which examines characteristics of things such as buildings, communities and organizations, using data to evidence and improve their value for the city;
- Critical insight – the real-time monitoring of incidents and current cases, involving all relevant organizations from across sectors, who work together to achieve the desired outcome or response;
- Analytical insight – the exploration of the data ecosystem to determine patterns, correlations and predictions. This allows the development or innovation of systems or services, impact assessment of proposed changes to systems or services, or the evidencing of challenges and opportunities for the city; and
- Strategic insight – an overarching approach which examines outcomes related to strategic objectives, decisions and plans. The SCCM is relevant to open data, shared under an open licence, and closed data where the security and privacy of the content is protected. Where the same concept model is applied to both, it becomes possible to track how statistics, and analytics have been derived from operational data, and to observe the impact of strategic decisions.

### **0.3 Data sharing**

The sharing of data for the benefit of all stakeholders is at the heart of smart city aspirations. Data can be used in real-time, from sensors and tracking devices, through to the use of data to develop longer term plans to improve the well-being of citizens and businesses.

The traditional approach to data-sharing has required organizations to create individual agreements for each initiative where data is shared. Where a single organization has needed to share data from many sources, this would have required a multitude of agreements, relationships, data formats, and vocabularies.

A smart city consists of organizations across all sectors, facilitated by the sharing of data, based on a common framework of its meaning, and consistent use of identifiers and classifications. Cities organized in this way could experience the following benefits:

- reduced cost as the need to recollect and verify data is removed;
- integrated city systems and services driven by data;
- a common understanding of the needs of communities;
- shared objectives, collaboratively developed and evidenced using data;
- engaged and enabled citizens and communities;
- transparency in decision-making;
- development of partnership models;
- businesses and communities co-creating innovation; and
- consequently, improved quality of life for citizens.

### **1 Scope**

This PAS describes and gives guidance on, a smart city concept model (SCCM) that can provide the basis of interoperability between component systems of a smart city at the upper ontology level. It includes:

- concepts (e.g. organization, place, community, item, metric, service, resource); and
- relationships between classes (e.g. organization has resource, event has a location).

The SCCM does not replace existing models where they exist, but by mapping from a local model to a parent model, questions can be asked about data in a new and joined-up way.

This PAS is aimed at organizations that provide services to communities in cities, and manage the resulting data, as well as decision-makers and policy developers in cities.<sup>2)</sup>

The SCCM is not exclusively applicable to cities, but is relevant wherever many organizations provide services to many communities within a place.

This PAS does not cover the data standards that are relevant to each concept in the SCCM and does not attempt to list or recommend the sources of identifiers and categorizations that cities map to the SCCM.

The PAS does not cover privacy, security, integrity availability, and quality of data.

## **2 Terms and definitions**

For the purpose of this PAS, the terms and definitions given in PAS 180 and the following apply.

### **2.1 category**

code for a definition of one or more common characteristics that can be used to classify things

### **2.2 class**

specialization of a concept with common properties that can be the template for a specific data structure

### **2.3 concept**

generalization of a type of thing; describing its essential features

### **2.4 concept model**

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

### **2.5 dataset**

managed collection of structured data

### **2.6 directed graph**

diagram in which concepts are represented as nodes, and relationships as edges between nodes, where the direction of the edges corresponds to the label for the relationship

### **2.7 entity**

thing with distinct and independent existence for which a concept can be assigned

### **2.8 identifier**

unique name or code that identifies an individual entity

### **2.9 interoperability**

ability of systems to provide services to and accept services from other systems and to use the services so exchanged to enable them to operate effectively together

[SOURCE: PAS 180:2014, **3.1.40**]

### **2.10 normalization**

reducing data to a standard form

### **2.11 ontology**

definition of a set of representational primitives with which to model a domain of knowledge

### **2.12 relationship**

way in which two concepts can be related

### **2.13 sector**

classification for organizations that provide complementary functions

1

<sup>2)</sup> Decision-makers and policy developers are further described in PAS 181.

### **2.14 smart city**

effective integration of physical, digital and human systems in the built environment to deliver a sustainable, prosperous and inclusive future for its citizens

[SOURCE: PAS 180:2014, **3.1.62**]

### **2.15 upper ontology**

ontology that describes general concepts which are applicable across sectors

## **3 Using the SCCM**

The SCCM can be used to:

- catalogue data holdings from different organizations, leading to improved discovery and reuse;
- promote definitive and authoritative identifiers and categorizations as reference information for each concept against which city data can be harmonized, and joined up;
- agree data standards for specialisms within a concept that are of particular interest to a city;
- construct a local data ecosystem where data can be contributed and consumed by different organizations and people for a city.

## **4 Concept, relationship and the SCCM**

### **4.1 Concept**

A concept defines a generalization of a type of thing. The definition of a concept in the SCCM is unlikely to be sufficient to describe a piece of data, but can be the foundation for data sharing between organizations that otherwise don't share a common business language.

Each concept has been selected for relevance in describing data that is valuable to share across a city, and applicability across different sectors.

Each concept is defined by:

- a name;
- a definition which is sufficient to consider if an entity fits a concept;
- where relevant, notes that explain how the concept is used;
- examples of classes that would fit the concept.

When considering definitions for each concept in the SCCM, the Oxford English Dictionary [1] definition for each concept was taken into account.

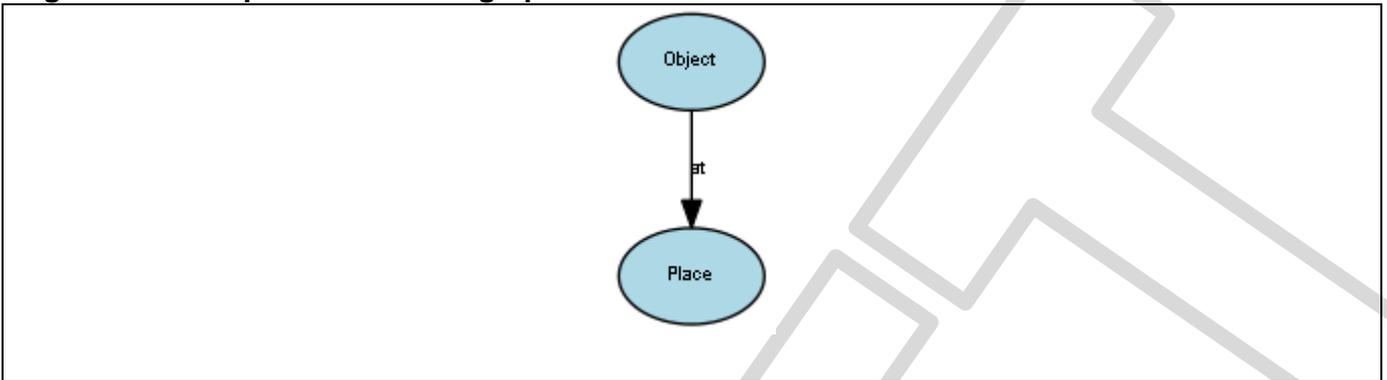
### **4.2 Relationship**

A relationship describes how two concepts are related when describing data for a city.

Concepts and relationships in the SCCM are simple truisms that apply to all sectors and uses of data across a city.

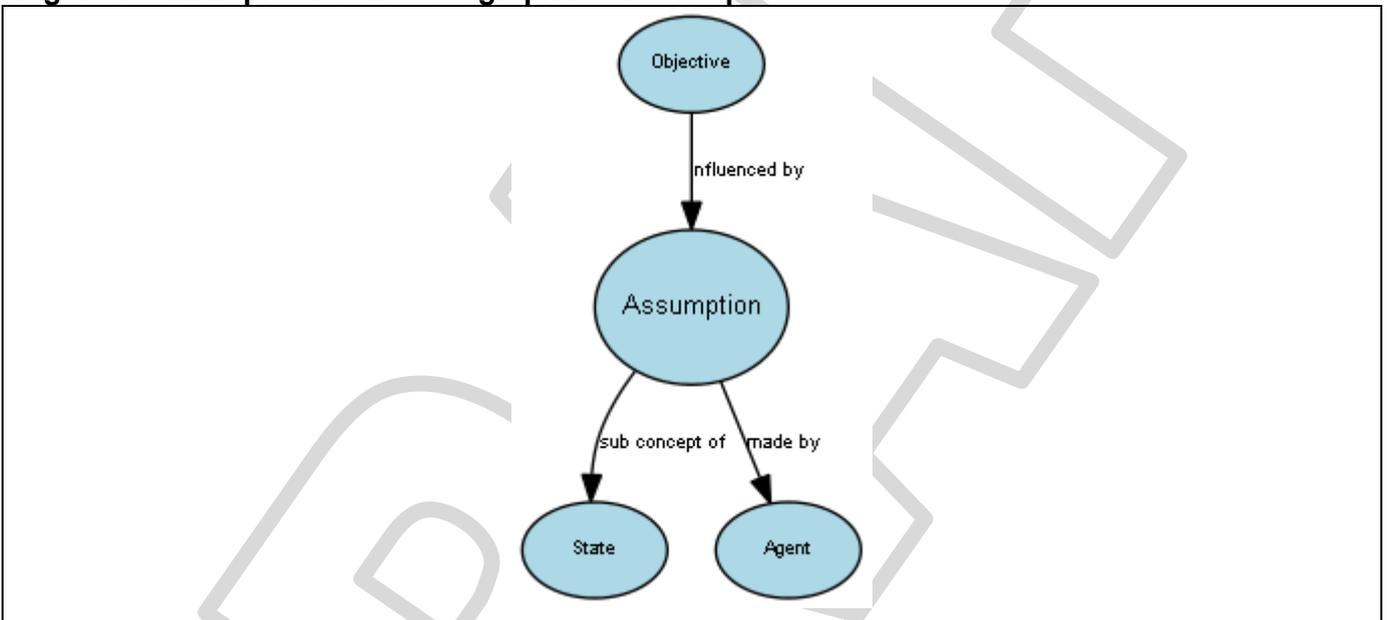
The SCCM shows concepts and relationships as directed graphs (Figure 1).

**Figure 1 – Example of a directed graph**



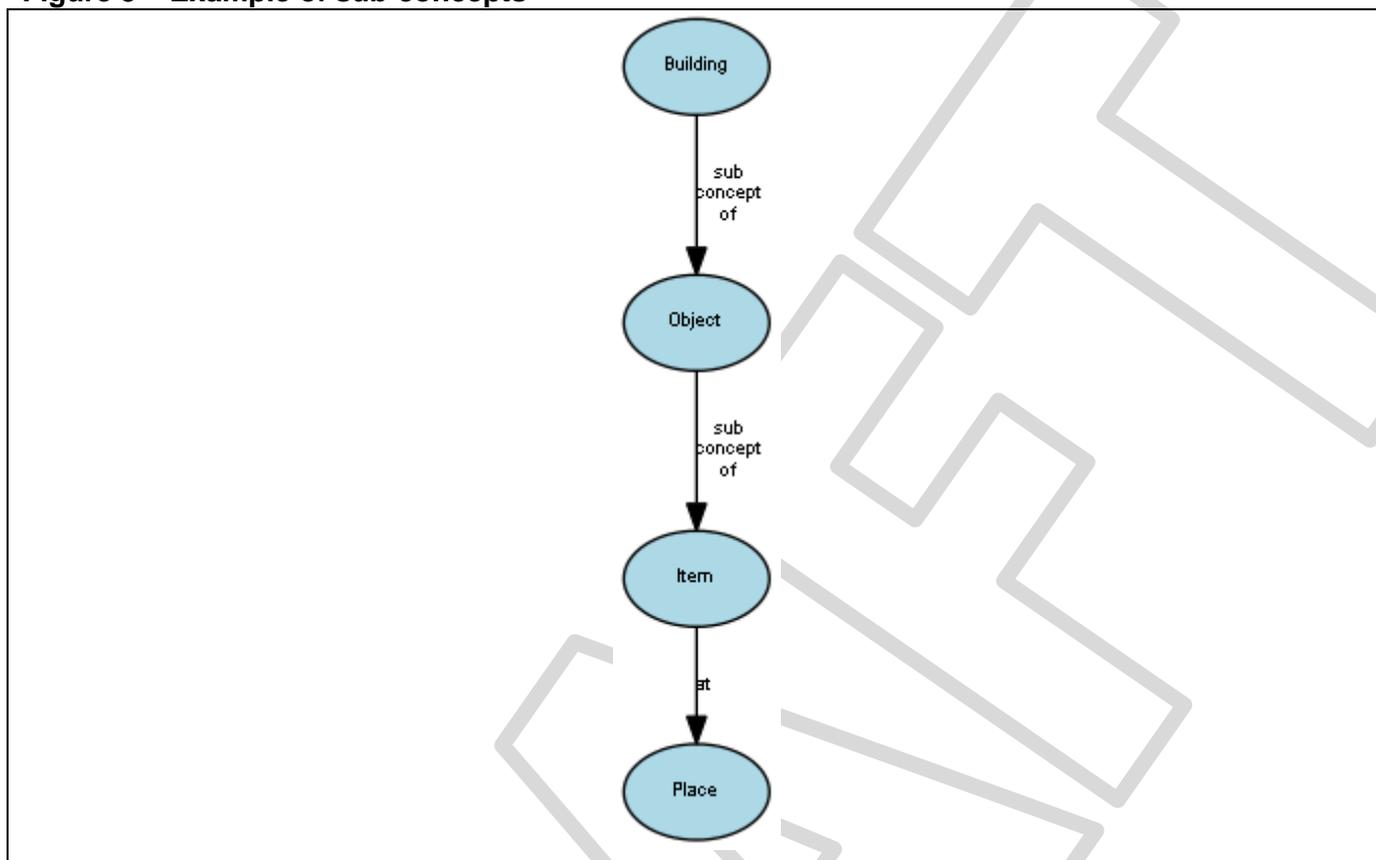
A directed graph is shown for each concept in the SCCM, defining each of the relationships for that concept (Figure 2).

**Figure 2 – Example of a directed graph for a concept**



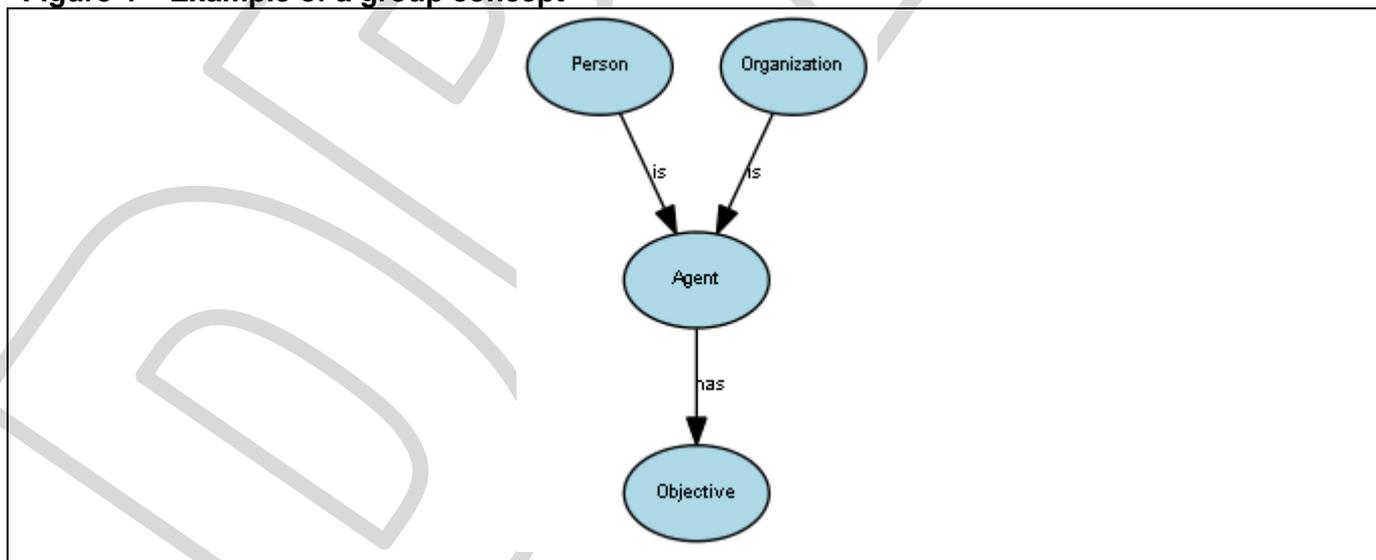
Some concepts are defined as sub-concepts of other concepts. These are defined where a concept is particularly relevant to a city, such as BUILDING. Relationships that are defined for a concept are also valid for its sub-concepts (Figure 3).

**Figure 3 – Example of sub-concepts**



Some concepts in the SCCM have been created to represent a group or choice of concepts. These are designed to reduce the number of relationships that would otherwise have been created. For example, the AGENT concept combines the concepts of PERSON and ORGANIZATION, which then enables a single relationship to be valid for both (Figure 4).

**Figure 4 – Example of a group concept**



When the SCCM is viewed in its entirety, the number of concepts and relationships can be overwhelming and it becomes hard to see how data would be mapped to it. The SCCM contains a

series of views in which a small number of concepts and relationships are selected to illustrate a data sharing scenario across a city.

Further views can be created by selecting concepts and relationships from the SCCM.

## 5 Mapping a dataset to the SCCM

### 5.1 Dataset

A dataset is a container of information, where that information has some repeating structure.

Where a dataset can be mapped to the SCCM, it can be linked to other related data and shared with organizations and people from beyond the originating sector.

The first step to mapping a dataset to the SCCM is to identify the separate types of entity that the data describes. An entity is a thing with distinct and independent existence, particularly when other data, from other sources, might also refer to the same thing. Figure 5 gives an example of a dataset in a city.

**Figure 5 – Example of a dataset listing reported faults to lamp posts**

Case Number	Lamppost Reference	Location	Reported Date	Reported By	Fault
1234	ab123	Outside number 10 Hugh Street.	04/03/2014	Bert Smith	Light flickering

In this example, there are entities for:

- the case;
- the lamp post;
- the location of the lamp post;
- the reporting of the fault;
- the person reporting the fault; and
- the condition of the lamp post.

Mapping these entities to the SCCM would give:

Entity	Concept
Case	CASE
Lamp post	OBJECT
Location	PLACE
Report	EVENT
Person	PERSON
Condition	STATE

### 5.2 Identifier and category

For entities of the same type, an organization can use a set of codes to uniquely identify an individual instance (e.g. the lamp post reference in 4.1). By using a consistent code in many datasets, an organization can join up its data where it refers to the same entity.

An organization can create its own codes, or it can reuse codes from another organization, particularly where that organization is a definitive source of information for that class of entity. For example,

Companies House provides a registration number for each company in England and could be considered the definitive source for that information.

These codes are identifiers when they can be used to name an individual instance of an entity.

Where a city can agree a common identifier set for a type of entity, different organizations can share information about it. For example, using common identifiers for lamp posts could join up data about:

- energy use;
- accidents; and
- faults.

Categories provide a set of terms that can be used to group things for a type of entity (e.g. a type of health condition). By using consistent categories for a type of entity, organizations can discover groups of data, statistics and insight.

The SCCM proposes a set of concepts that can be used to organize and promote consistent use of identifiers and categories across a city. Organizations might then also publish the types of entity that their data describes as a class.

### **5.3 Prime concept**

A prime concept is one that can be used to map city data.

Table 1 provides a list of prime concepts. Each concept is described in detail in Clause 7.

**Table 1 – Alphabetical list of prime concepts**

<b>Name</b>	<b>Definition</b>	<b>Sub-concept of</b>
ACCOUNT	A container of information, held by an AGENT, in which to record data arising from EVENTS that relate to an ITEM in a role.	ABSTRACT
AGREEMENT	A negotiated arrangement between AGENTs as to a course of action.	ABSTRACT
ASSUMPTION	A predicted future STATE upon which DECISIONs are made.	STATE
BUILDING	A man-made OBJECT with roof and walls, with a fixed PLACE, intended for sheltering PERSONs or other OBJECTs.	OBJECT
CASE	A container for information recording the history of EVENTS initiated by a SERVICE demand.	ABSTRACT
COMMUNITY	A group of PERSONs and/or ORGANIZATIONs that share common characteristics such as PLACE, circumstance, etc.	ITEM
DECISION	A conclusion or resolution reached after consideration.	ABSTRACT
EVENT	An occurrence that has or might happen over a period of time.	
FUNCTION	A COLLECTION of SERVICES.	COLLECTION
METHOD	A pre-determined procedure, or series of steps, designed to accomplish an OBJECTIVE.	ABSTRACT
METRIC	A measure of demography, characteristics, activity or performance.	STATE
OBJECT	A physical ITEM.	ITEM
OBJECTIVE	An achievement desired by an AGENT.	ABSTRACT
OBSERVATION	An EVENT in which a STATE is recorded.	EVENT
ORGANIZATION	A group of PERSONs with a collective goal.	ITEM
PERSON	An individual human being.	ITEM
PLACE	A geographic position, area, or volume.	
PLAN	A list of steps with times and RESOURCE, used to achieve an OBJECTIVE.	ABSTRACT
RULE	An explicit or understood regulation or principle governing conduct or procedure within a particular area of activity.	ABSTRACT
SERVICE	The capacity to carry out one or more METHODS.	ABSTRACT
STATE	A circumstance or condition of an ITEM at a time.	
TARGET	A desired STATE.	STATE

#### **5.4 Group concept**

A group concept is defined to represent a group or choice of concepts. It is designed to reduce the number of relationships that would otherwise have been created. It can be used to map data, where a more specific prime concept is not appropriate.

Table 2 provides a list of group concepts. Each concept is described in detail in Clause 7.

**Table 2 – Alphabetical list of group concepts**

<b>Name</b>	<b>Definition</b>	<b>Sub-concept of</b>
ABSTRACT	Existing in thought or as an idea but not having a physical existence.	ITEM
AGENT	An ITEM, but most often a PERSON, or ORGANIZATION, providing a SERVICE or taking a role in an EVENT.	
COLLECTION	A grouping of ITEMS, as defined by an AGENT, that needs to be managed, or operated upon together.	ABSTRACT
ITEM	An individual article or unit, especially one that is part of a list, collection, or set.	
RESOURCE	An ITEM that can be drawn on by an AGENT to produce a benefit.	

## **5.5 Time**

Time is not a concept in the SCCM, but does apply to every statement that can be made using the model.

Dates, times, durations and intervals appear in data for many concepts, and also describe relationships, for example:

- A PERSON may have a date of birth; and
- A PERSON may be at a PLACE, for a period of time.

## **6 Views illustrating how concepts are typically related**

### **6.1 General**

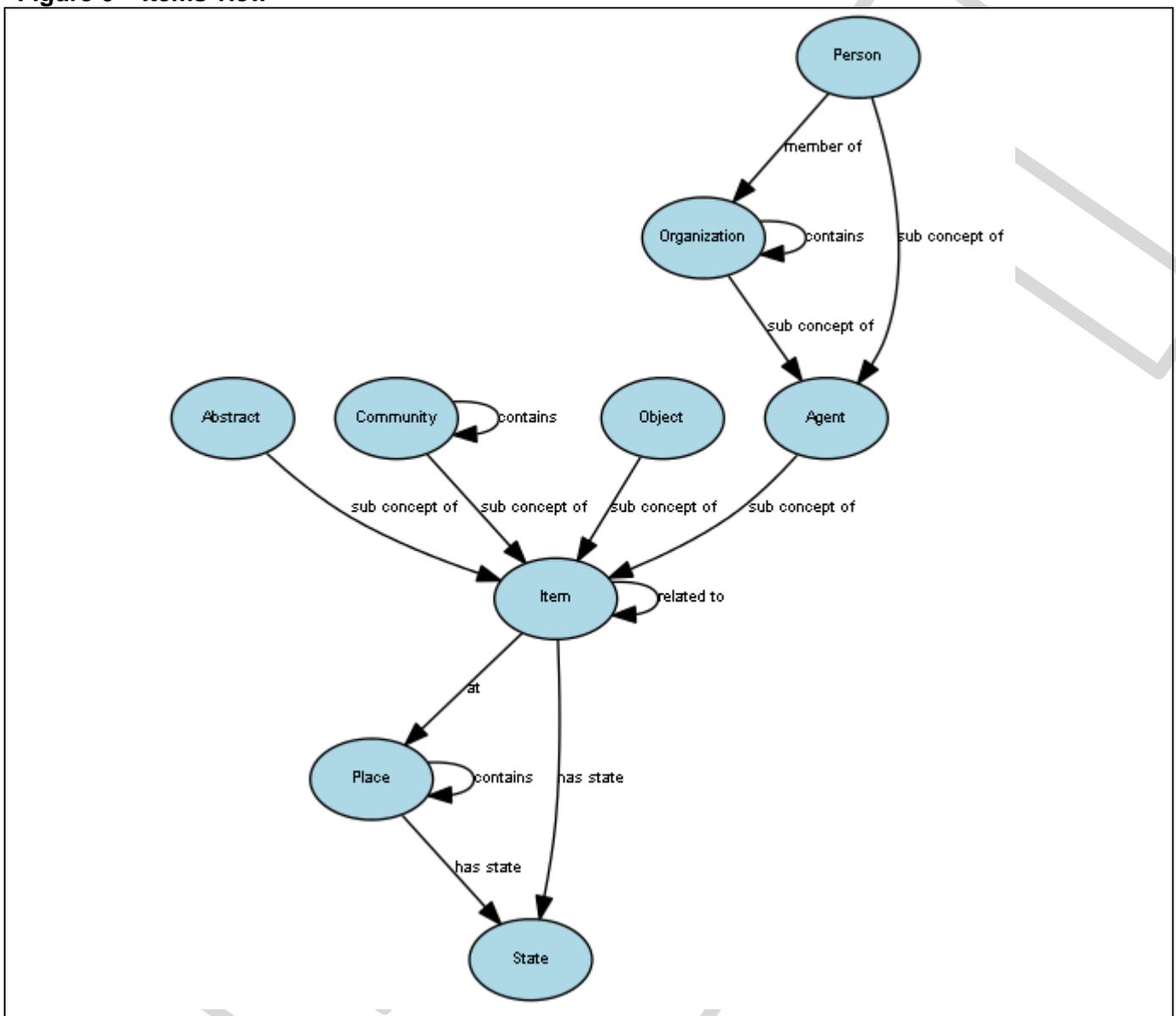
The SCCM contains a series of views in which a small number of concepts and relationships have been selected to illustrate a data sharing scenario across a city.

A full list of relationships in the model is provided at Annex A.

### **6.2 Items view**

Figure 6 shows the items view.

**Figure 6 – Items view**



A city contains ITEMS, which might be referred to in data from many organizations. Where a city can agree a common identifier for an ITEM, different organizations can provide information about it.

Most obviously, an ITEM might be an OBJECT such as a lamp post, a building, or a road, but an ITEM might also be:

- an ORGANIZATION, such as a local council, or an energy supplier;
- a PERSON, such as a resident or user of a service; or
- a COMMUNITY, such as commuters, or low income families.

The SCCM contains sub-concepts of ITEM for these. The relationships that are defined for ITEM are therefore also true for these sub-concepts.

A city also needs to refer to non-physical things such as a service, a contract, a decision, or a case. These non-physical things are also ITEMS, and the SCCM uses the sub-concept ABSTRACT to group them together. A number of further sub-concepts within ABSTRACT are defined in the SCCM.

An ITEM might be associated with a PLACE, most obviously, to describe where an ITEM is. Although ABSTRACT ITEMS don't have a physical existence, they can still be related to PLACE (e.g. to describe their coverage).

PLACE is used to describe a geographic position or area. Some PLACES are described precisely with coordinates, and boundaries, while others are less precise, perhaps just with a locality name.

Both ITEMS and PLACES can have a series of STATES over time. Typically, a STATE describes the condition of an ITEM or PLACE.

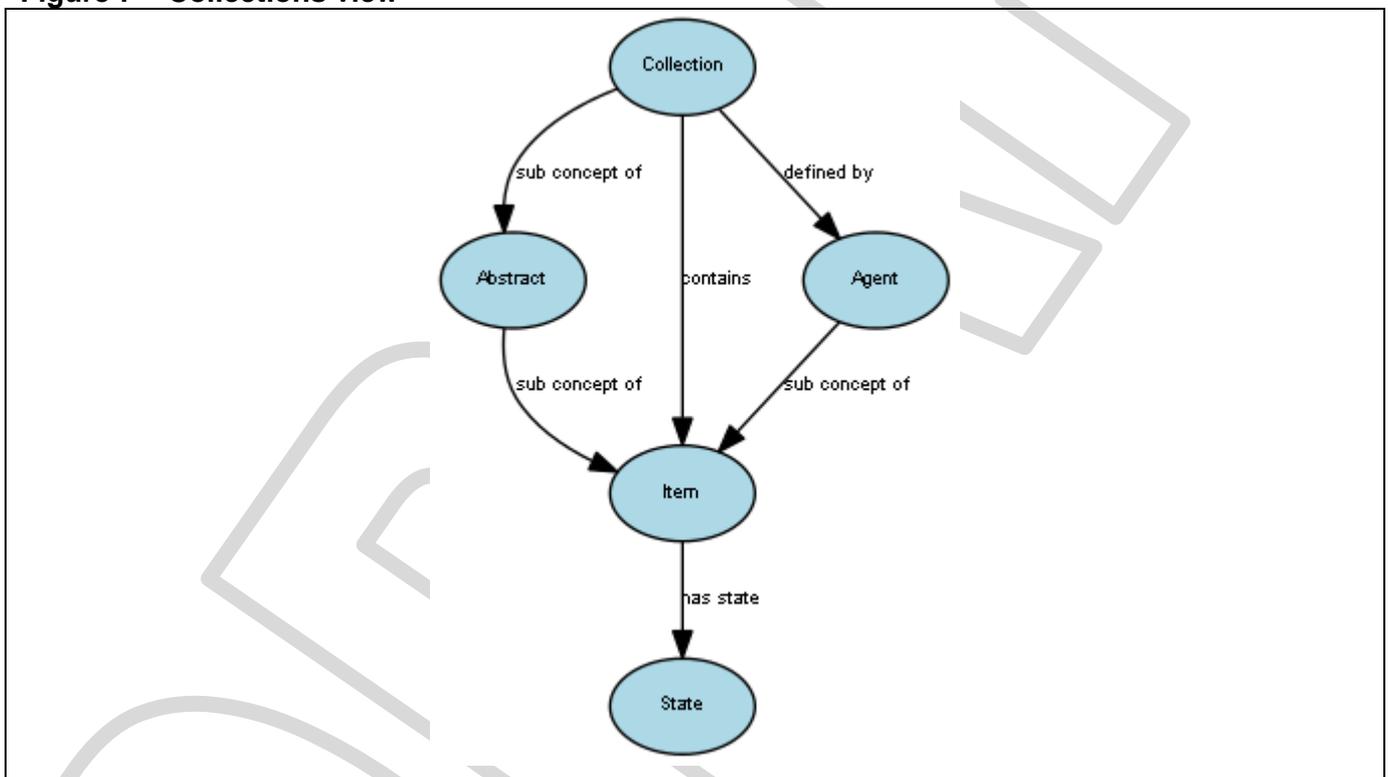
A STATE might be described subjectively, from the point of view of an observer (e.g. the building condition is poor). A STATE might also be described quantitatively (e.g. the temperature of a room), or perhaps as a statistic (e.g. a community's deprivation index).

A smart city should base its decisions on a shared understanding of the STATE of ITEMS, either in real-time, or by implementing PLANS to bring about changes to STATES.

### 6.3 Collections view

Figure 7 shows the collections view.

**Figure 7 – Collections view**



ITEMS are often grouped together in a COLLECTION so that they can be managed, or operated upon together. For example:

- housing stock;
- vehicle fleet;
- manholes;
- roads; and
- contracts register.

COLLECTIONs are defined by AGENTs so that the actual contents are either explicitly listed, or defined by a scoping statement.

COLLECTIONs enable lists of ITEMs to be defined, created and shared across a city.

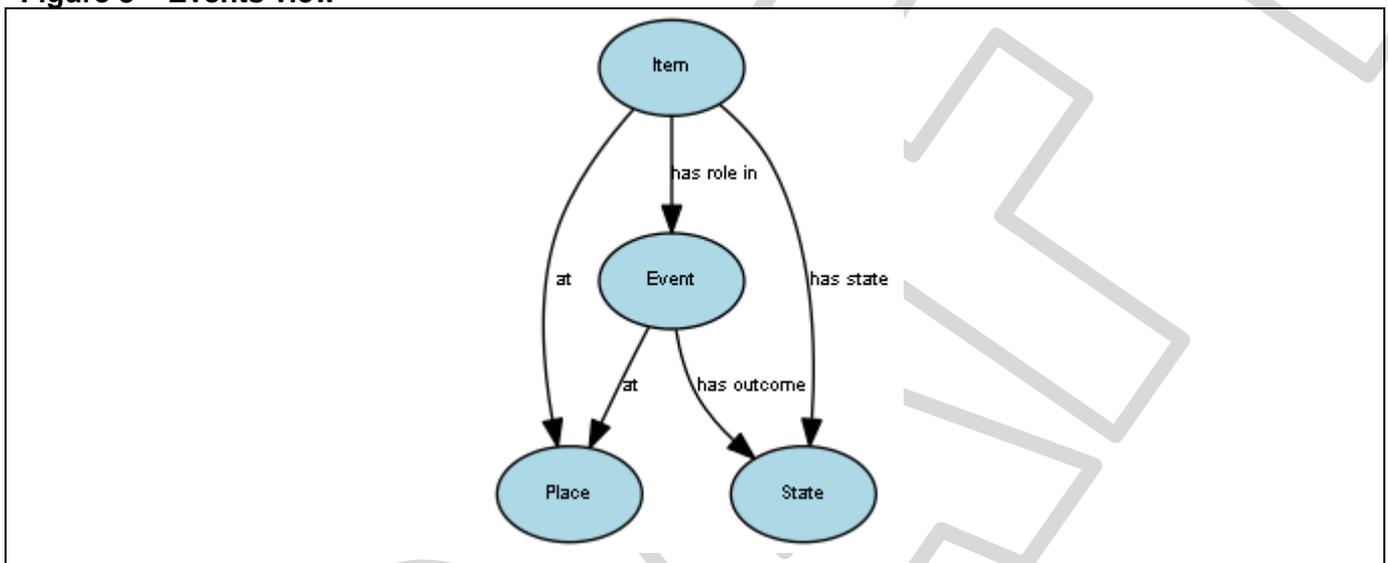
Although the contents of a COLLECTION can be physical ITEMs, a COLLECTION is an ABSTRACT ITEM.

As a COLLECTION is itself a sub-concept of ITEM, its STATE can be described and tracked over time.

#### 6.4 Events view

Figure 8 shows the events view.

**Figure 8 – Events view**



For a city, EVENTS might include:

- an incident;
- a measurement;
- a change of a setting;
- a transaction; and
- a use of a service.

An EVENT can refer to a number of ITEMs which take roles in the EVENT.

So, for example, a PERSON might take the role applicant, in one EVENT, and the same person might take the role patient, in another EVENT.

All types of ITEM can take roles in an EVENT, so for example:

- a candlestick as an OBJECT could be the murder weapon in a crime EVENT; or
- a tender as an ABSTRACT could be the subject of a contract signing EVENT.

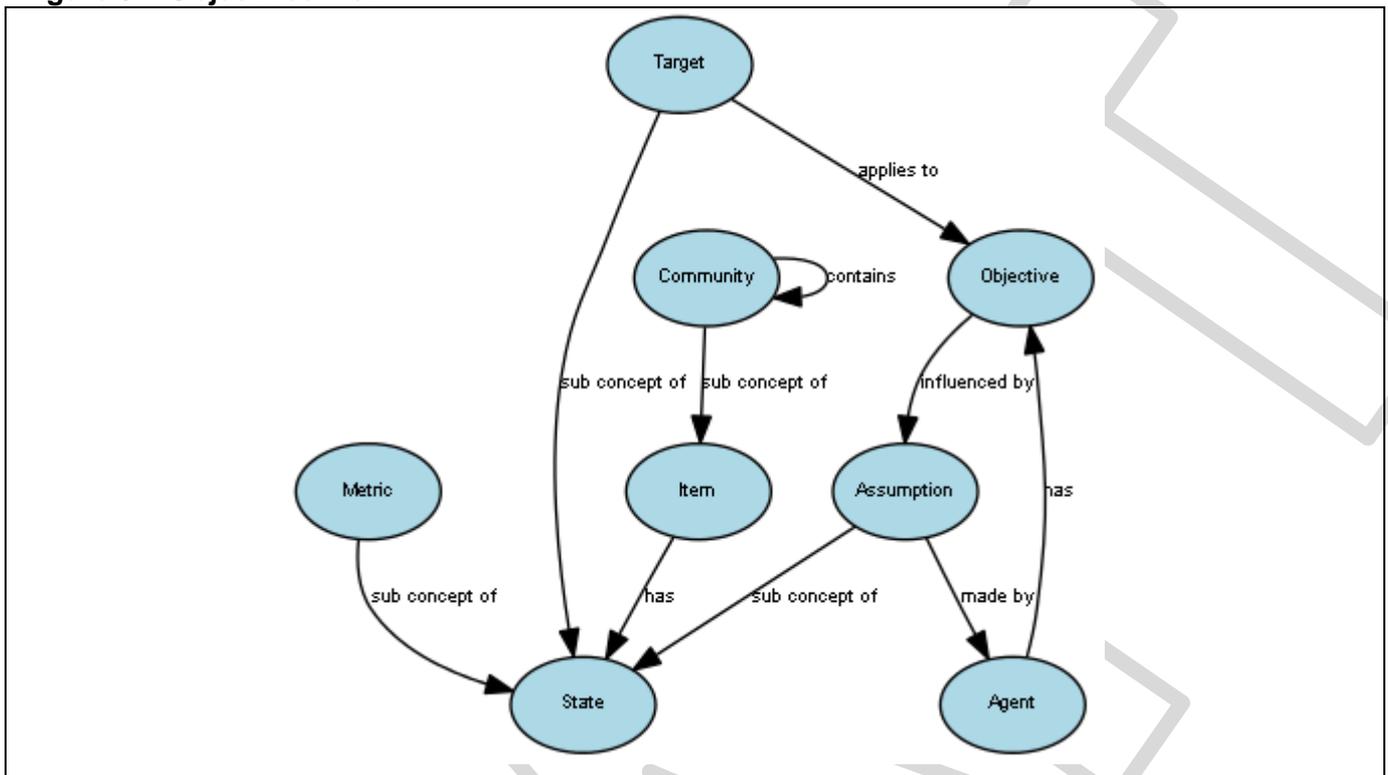
EVENTs occur over a period of time, and might cause a change in the STATE of a number of ITEMs.

For example, a driver being convicted of speeding might cause a change to the number of points on a driving licence, or to the eligibility to drive.

#### 6.5 Objectives view

Figure 9 shows the objectives view.

**Figure 9 – Objectives view**



ORGANIZATIONS and individual PEOPLE have a series of OBJECTIVES setting their reasoning and ambition for the changes that they desire. Some of these might be long term, for example:

- providing suitable housing;
- reducing carbon emissions; and
- reducing unemployment.

Others might be more immediate or real-time such as:

- optimum energy usage; and
- maintaining safe water levels.

The SCCM combines the concepts of PERSON and ORGANIZATION into the concept of AGENT. This simplifies the relationships that would often otherwise need to refer to either.

Where an OBJECTIVE can be quantified, it can be linked to a series of TARGETs which are the observable STATES of the impacted ITEMS.

OBJECTIVES can be set on the basis of a series of ASSUMPTIONs, which capture a predicted future STATE of one of more ITEMS. The gap between an ASSUMPTION and a TARGET can be used to define the change that is sought by the OBJECTIVE.

For example:

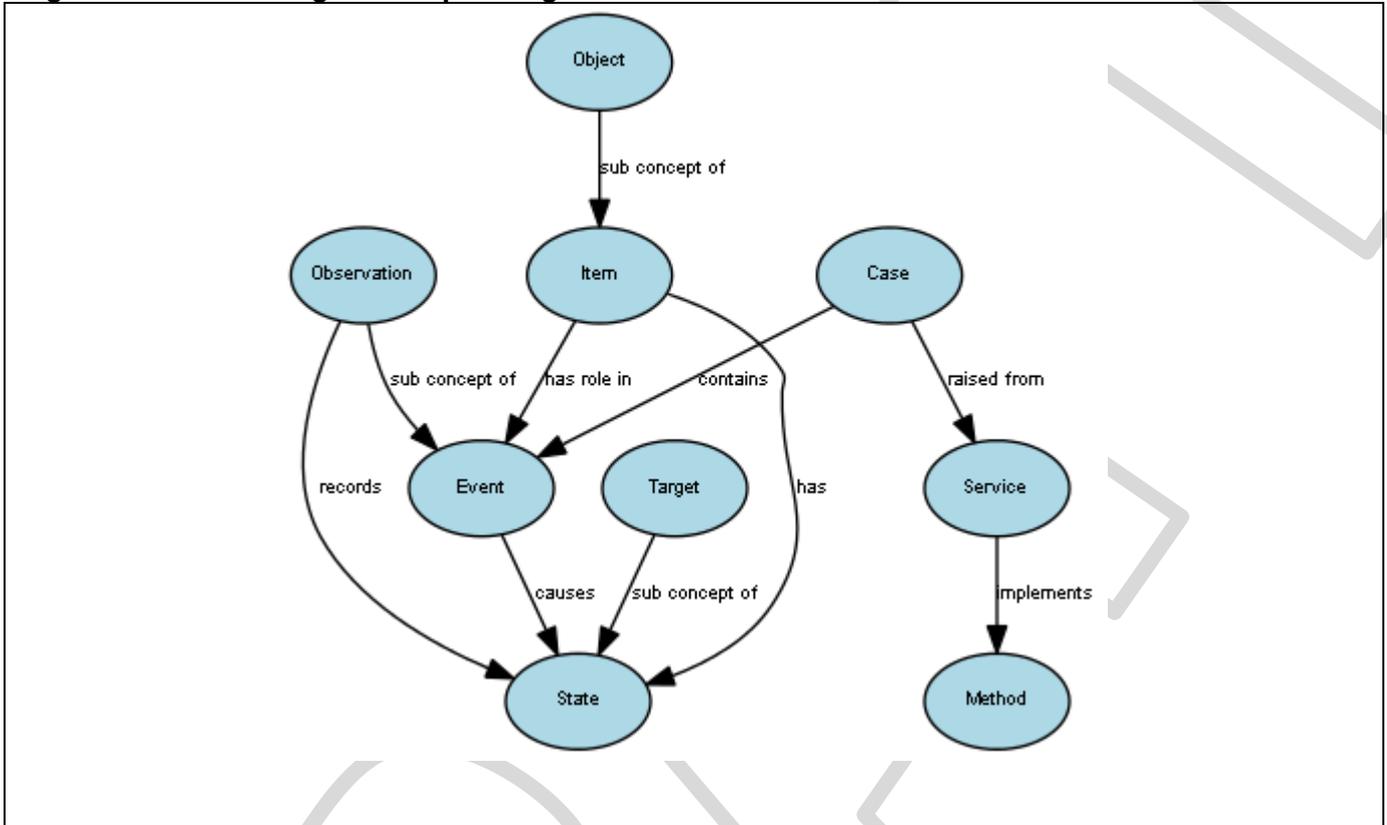
- COLLECTION: houses for rent under £400 per week;
- TARGET: 10 000 by 2016;
- OBJECTIVE: provide adequate affordable housing; and
- ASSUMPTION: 10 000 households will require affordable housing by 2016.

METRICs are regularly published which track the actual STATE of an ITEM, and can be used to consider if TARGETs have been achieved.

## 6.6 Observing and responding view

Figure 10 shows the observing and responding view.

**Figure 10 – Observing and responding view**



A city might have a series of automated SERVICES that respond in real-time to observed STATES, to adjust settings to re-establish an optimum STATE.

For example, sensors and actuators can be used to:

- manage traffic flows;
- control temperatures; and
- reduce energy consumption.

The SCCM represents a sensor as an OBJECT ITEM, which can be related to a PLACE that describes where it is.

This view depicts three stages:

- determining OBJECTIVES, and optimum STATES of a system;
- readings being taken by a sensor; and
- a service responding to inputs by changing settings.

For the first stage, the system is represented as an ITEM, for which one or more TARGET states can be defined.

For the second stage, a sensor takes a reading of the system, which is represented as an OBSERVATION EVENT capturing the STATE of an ITEM.

For the third stage, a further device or actuator might then be configured to automatically react to an observed STATE by changing settings.

The actuator is also an OBJECT, which has a role in an EVENT that changes a STATE. The change of settings is a SERVICE, implementing a METHOD, provided by an AGENT. A log of the observations, and settings is recorded in a CASE.

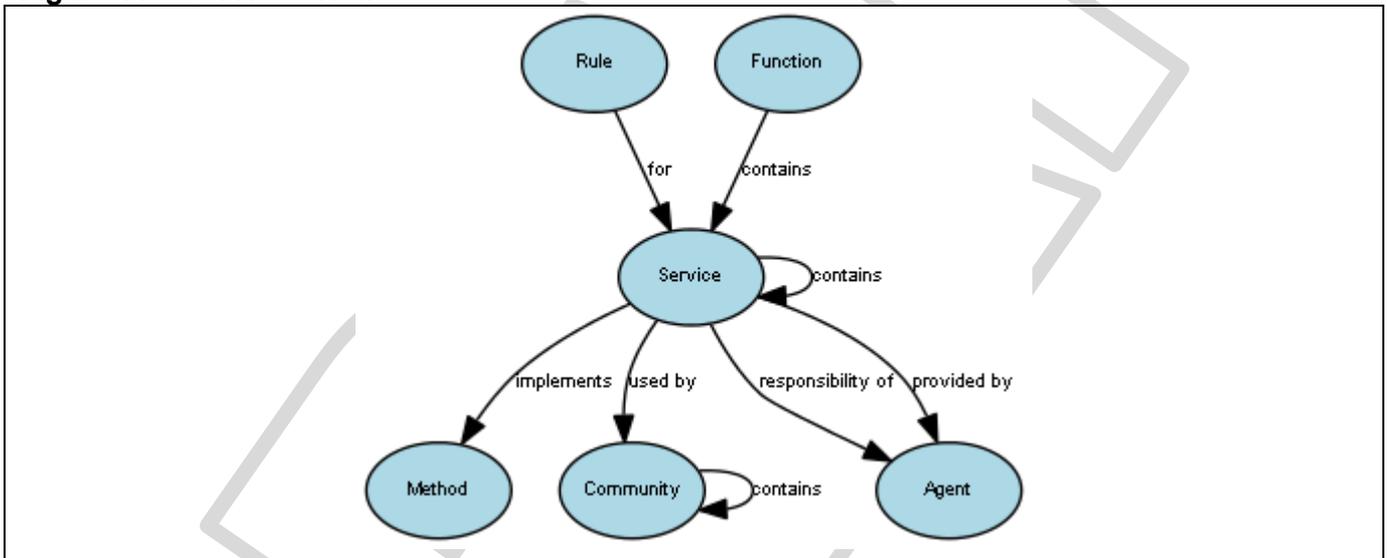
So for example:

- Stage 1: an optimum temperature (TARGET) of a room (OBJECT ITEM) can be set to reduce energy consumption (OBJECTIVE).
- Stage 2: a temperature sensor (OBJECT ITEM) takes a reading (OBSERVATION) of the temperature (STATE) of the room.
- Stage 3: a service (SERVICE) instructs (EVENT) the actuator (OBJECT ITEM) to change the valve setting (STATE) of a radiator (OBJECT ITEM). The impact of the change is then monitored via further observations recorded within the CASE.

### 6.7 Services view

Figure 11 shows the services view.

**Figure 11 – Services view**



For a city, SERVICES might include:

- energy provision;
- waste collection;
- licensing;
- car parking; and
- removing abandoned vehicles.

A SERVICE is the responsibility of an ORGANIZATION or an individual PERSON. The concepts of ORGANIZATION and PERSON are combined into the concept AGENT.

The AGENT providing a SERVICE is not necessarily the same as the AGENT responsible for it.

A SERVICE can be used by a COMMUNITY which might be, for example:

- the residents of a city;

- the long-term unemployed;
- commuters; and
- families.

As both COMMUNITY and SERVICE are sub-concepts of ITEM, their STATES can be recorded over time. For SERVICE, this enables actual and TARGET values to be recorded for throughput and performance, for example:

- the number of abandoned vehicles reported over a period; or
- the average time taken to remove a vehicle.

SERVICEs are often constrained by RULEs such as:

- legislation;
- eligibility; and
- terms and conditions.

A SERVICE implements one or more METHODs, which might be reused in other SERVICES.

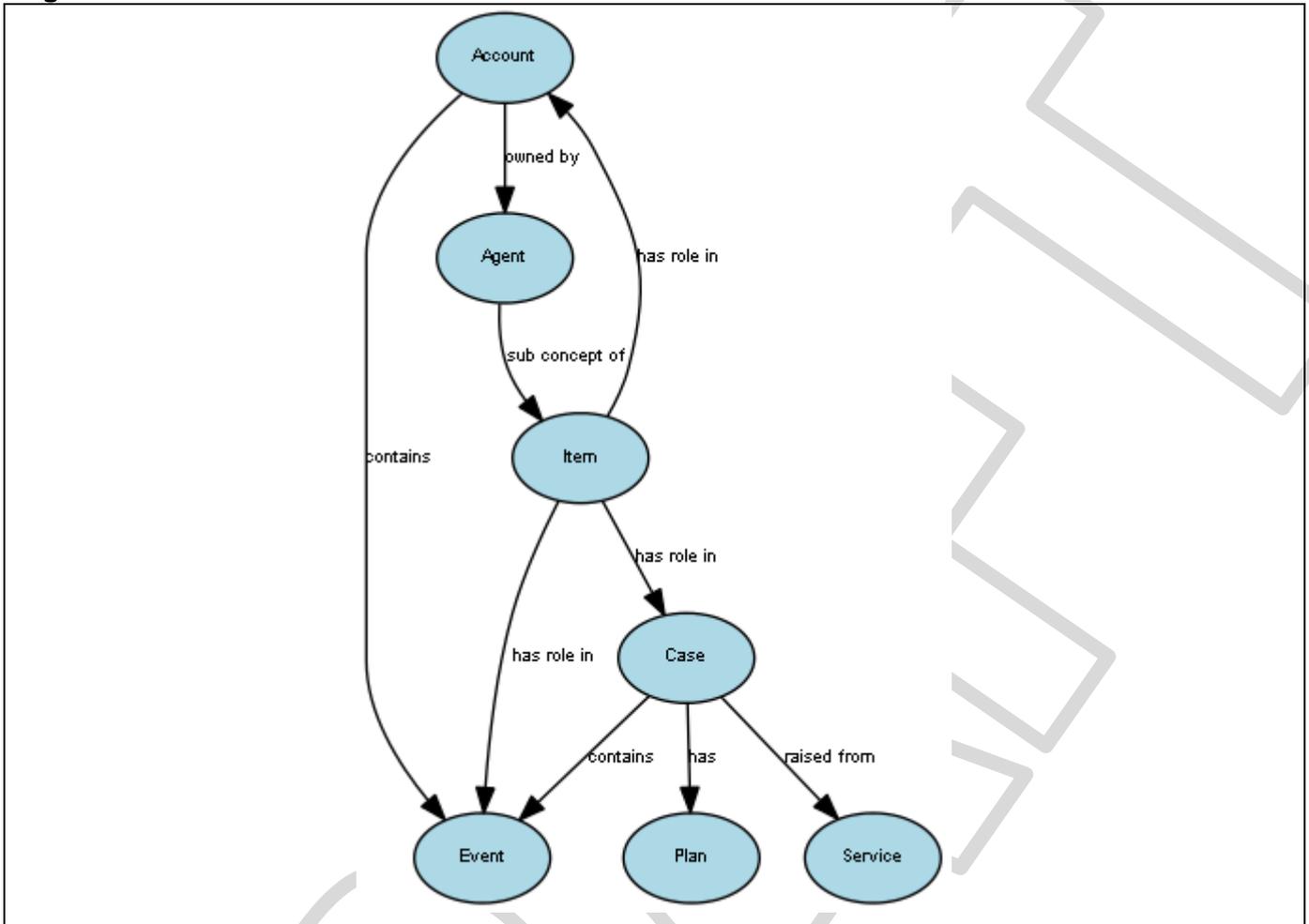
SERVICEs from many AGENTs can be grouped together into FUNCTIONs. FUNCTION is a sub-concept of COLLECTION.

A FUNCTION can list the services that serve a particular COMMUNITY, for example, waste management (FUNCTION) might contain SERVICES for refuse collection, recycling, waste disposal, and those SERVICES might be provided by different ORGANIZATIONs in the city.

### **6.8 Cases view**

Figure 12 shows the cases view.

**Figure 12 – Cases view**



A CASE is raised when a SERVICE is used.

For a city, a CASE might be:

- a crime investigation;
- a planning application; or
- rectifying a fault on a network.

A CASE contains the EVENTS that are relevant to an individual use of a SERVICE, until the CASE is closed.

For some CASEs, a PLAN might be devised giving estimated times and RESOURCES for future EVENTS.

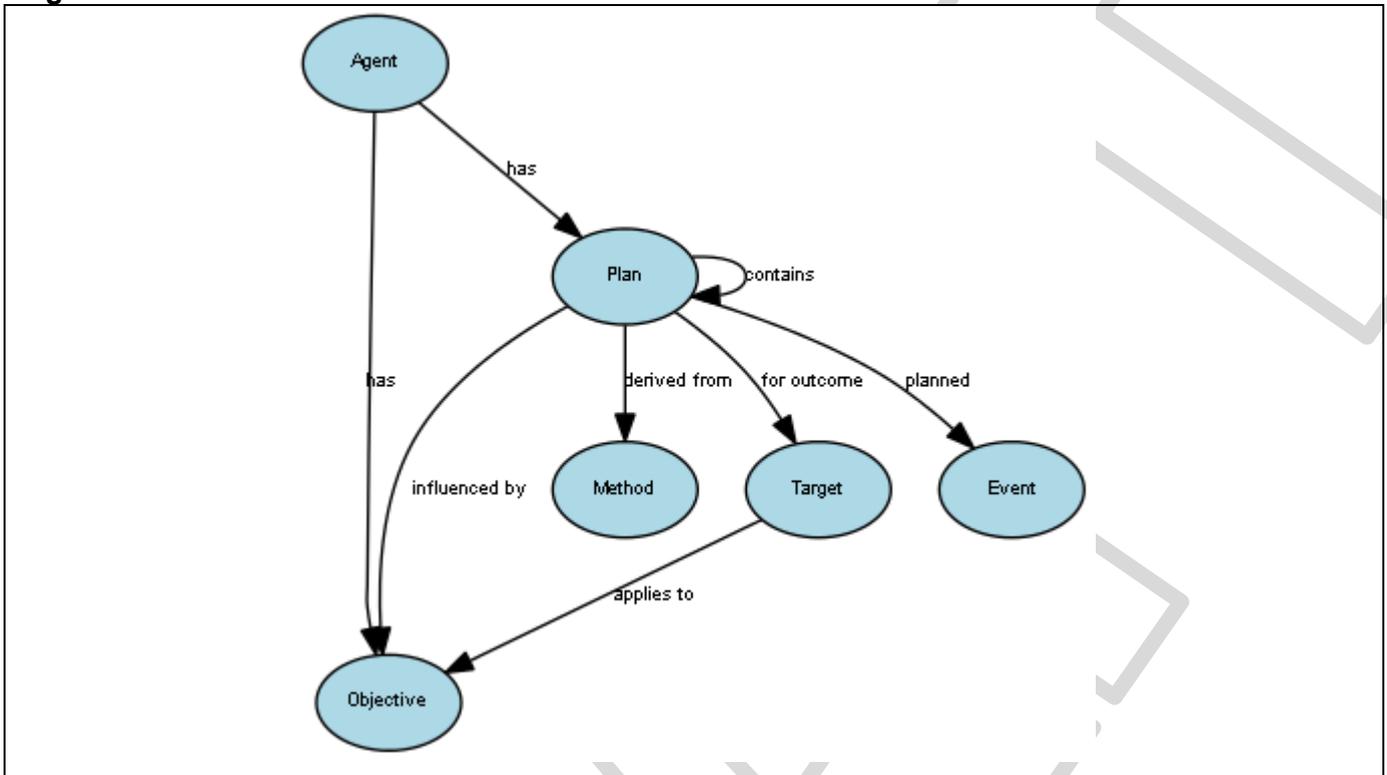
An AGENT might maintain a series of ACCOUNTs, that contain a history of EVENTS that apply to one or more ITEMS, for example:

- a medical history;
- a customer history;
- a criminal record; or
- a building maintenance record.

## 6.9 Plans view

Figure 13 shows the plans view.

**Figure 13 – Plans view**



A PLAN records the steps and decision points that are applied to achieve a TARGET STATE of an ITEM or PLACE, as a part of addressing an OBJECTIVE.

A PLAN might be derived from existing METHODS which have been devised to achieve the desired outcome.

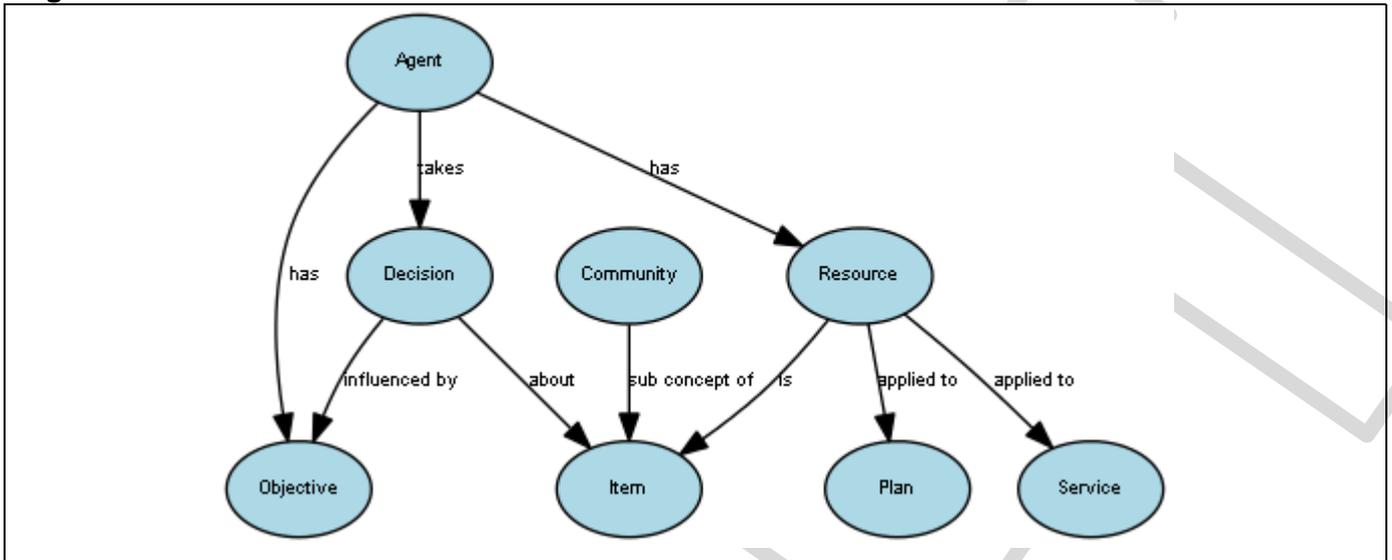
As a PLAN is enacted, EVENTS occur that record the actual outcomes as compared to those planned.

A city might wish to discover and track the PLANS from many AGENTS that apply to OBJECTIVES for ITEMS or PLACES.

## 6.10 Resources and decisions view

Figure 14 shows the resources and decisions view.

**Figure 14 – Resources and decisions view**



A RESOURCE is an ITEM that can be put to use, for a benefit.

A RESOURCE can be allocated to a SERVICE or a PLAN.

AGENTS take DECISIONS about ITEMS which are influenced by OBJECTIVES. A DECISION can be made about the application of a RESOURCE.

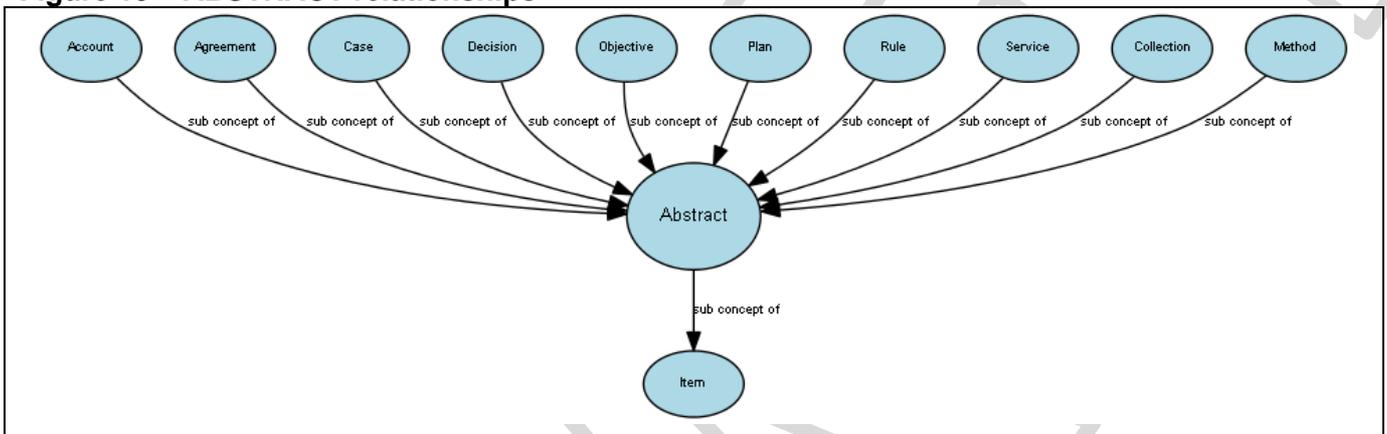
A city might engage stakeholders about DECISIONS, and particularly about how RESOURCES are allocated over SERVICES and PLANS to achieve OBJECTIVES.

**7 Definition of each concept and relationship in the SCCM**

**7.1 ABSTRACT**

<b>Definition</b>	Existing in thought or as an idea but not having a physical existence.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Fear of crime</li> <li>• Knowledge</li> </ul>
<b>Relationships</b>	See Figure 15

**Figure 15 – ABSTRACT relationships**



**Sub-concept of**

ITEM

**Sub-concepts**

ACCOUNT

AGREEMENT

CASE

COLLECTION

DECISION

METHOD

OBJECTIVE

PLAN

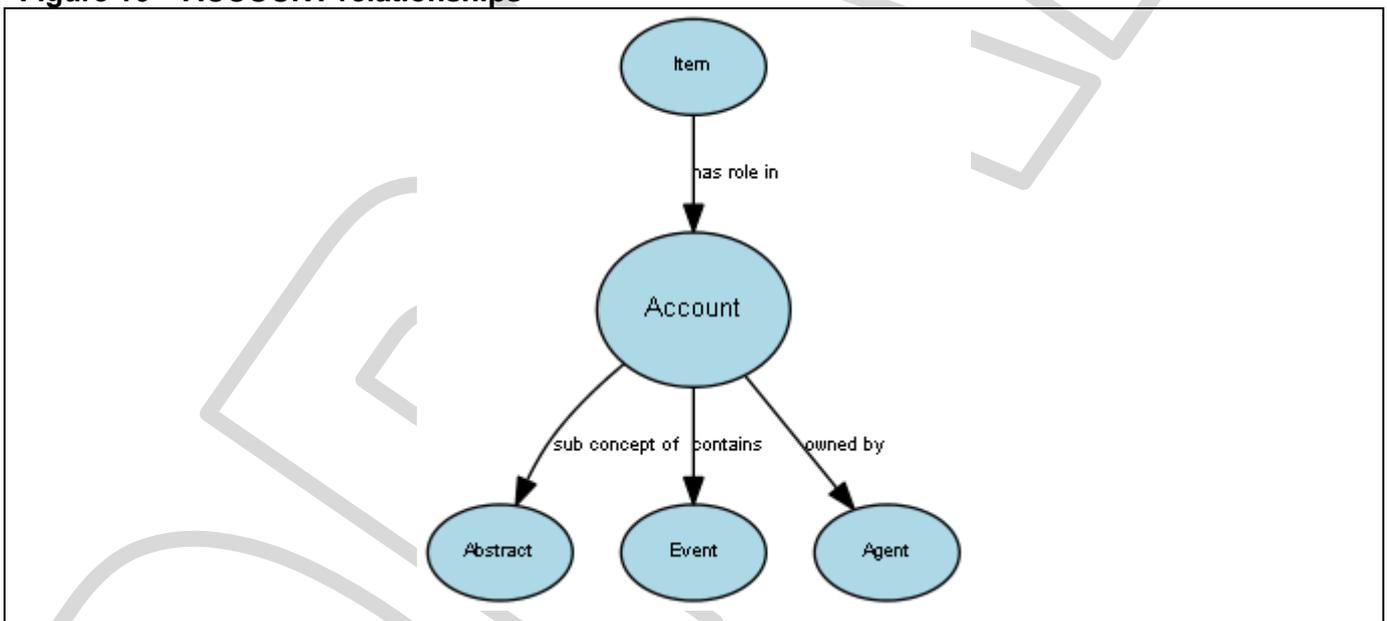
RULE

SERVICE

## 7.2 ACCOUNT

<b>Definition</b>	A container of information, held by an AGENT, in which to record data arising from EVENTS that relate to an ITEM in a role.
<b>Notes</b>	One of the Oxford English Dictionary's definitions of ACCOUNT is "a report or description of an event or experience" [1]. An ACCOUNT then is a set of information that relates to one or more EVENTS. Those EVENTS have an ITEM in common in a role and thus the ACCOUNT becomes a history of information about that role.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• A customer account at a business</li> <li>• The history of a building</li> <li>• Regular welfare payments to a claimant</li> <li>• A medical history of a patient</li> <li>• Transactions that have been posted to a budget</li> </ul>
<b>Relationships</b>	See Figure 16

**Figure 16 – ACCOUNT relationships**

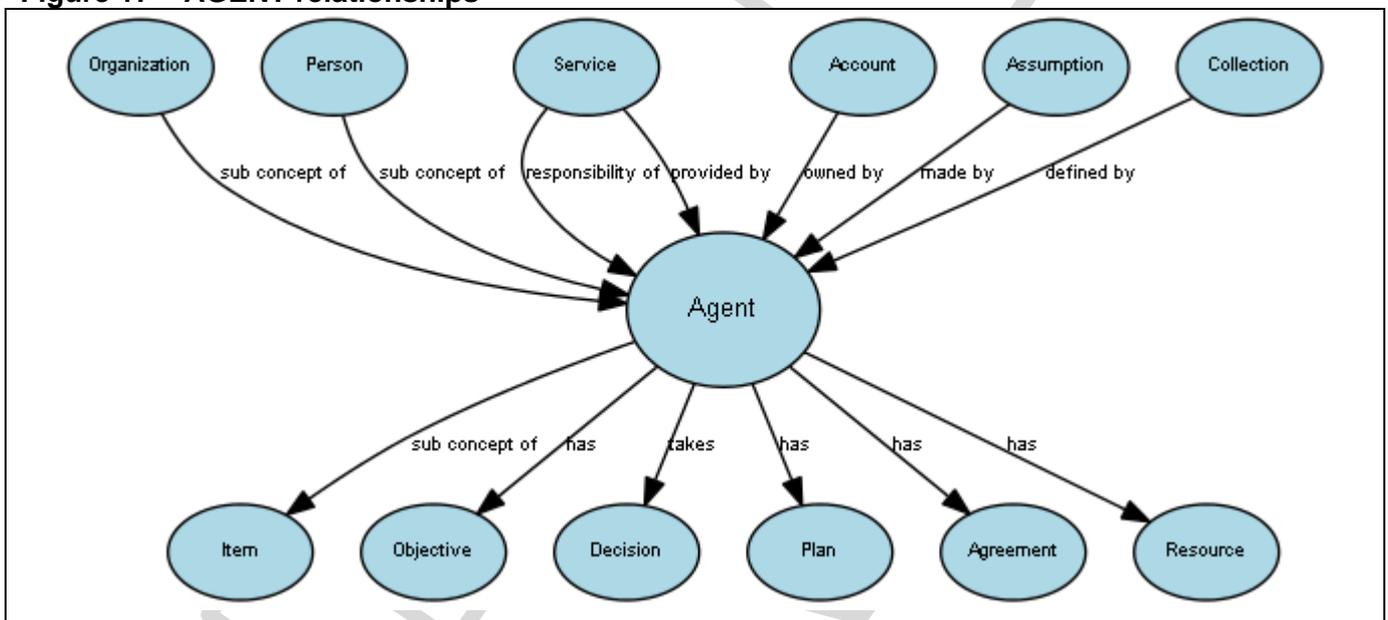


	<b>Relationship</b>		<b>Inverse</b>
ACCOUNT	contains	EVENT	containedIn
ACCOUNT	ownedBy	AGENT	owns
ACCOUNT	hasRoleFrom	ITEM	hasRoleIn
<b>Sub-concept of</b>			
ABSTRACT			

### 7.3 AGENT

<b>Definition</b>	A PERSON, or ORGANIZATION, providing a SERVICE or taking a role in an EVENT.
<b>Notes</b>	One of the Oxford Dictionary's definitions of AGENT is "a person or thing that takes an active role or produces a specified effect" [1]. An AGENT is used to make relationships where the type of ITEM could be either a PERSON or an ORGANIZATION.
<b>Examples</b>	Supplier
<b>Relationships</b>	See Figure 17

**Figure 17 – AGENT relationships**



	<b>Relationship</b>		<b>Inverse</b>
AGENT	hasAgreement	AGREEMENT	agreementWith
AGENT	hasObjective	OBJECTIVE	objectiveOf
AGENT	hasPlan	PLAN	planOf
AGENT	hasResource	RESOURCE	resourceOf
AGENT	takesDecision	DECISION	decisionTakenBy
AGENT	makesAssumption	ASSUMPTION	assumptionMadeBy
AGENT	definesCollection	COLLECTION	collectionDefinedBy
AGENT	owns	ACCOUNT	ownedBy

	<b>Relationship</b>		<b>Inverse</b>
AGENT	provides	SERVICE	providedBy
AGENT	responsibleFor	SERVICE	responsibilityOf

**Sub-concept of**

ITEM

**Sub-concepts**

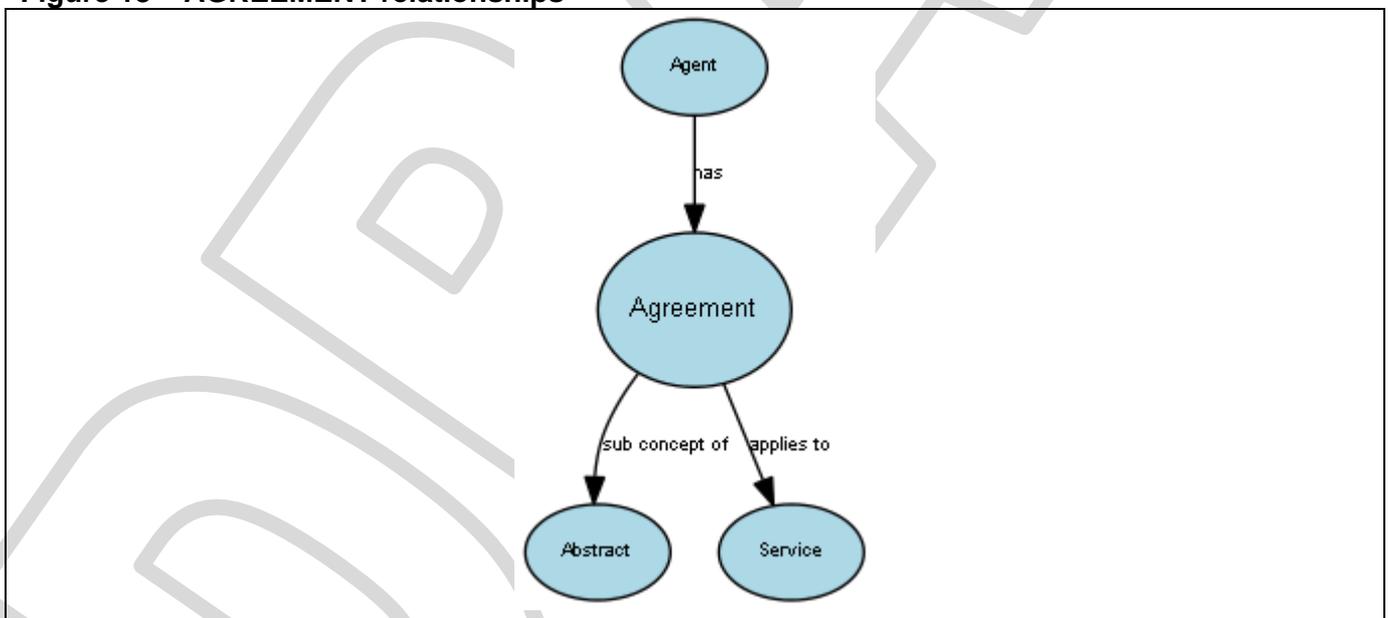
ORGANIZATION

PERSON

**7.4 AGREEMENT**

<b>Definition</b>	A negotiated arrangement between AGENTs as to a course of action.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Contract</li> <li>• Memorandum of understanding</li> <li>• Code of connection</li> </ul>
<b>Relationships</b>	See Figure 18

**Figure 18 – AGREEMENT relationships**



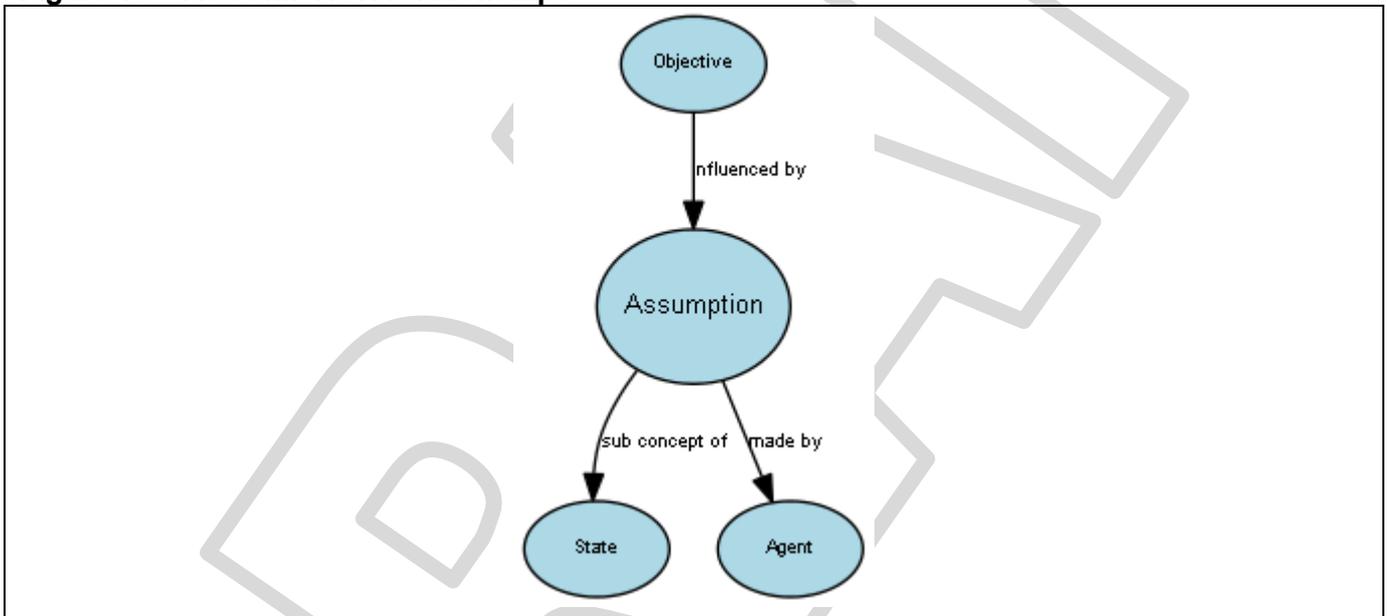
	<b>Relationship</b>		<b>Inverse</b>
AGREEMENT	appliesTo	SERVICE	subjectOf
AGREEMENT	agreementWith	AGENT	hasAgreement

**Sub-concept of**  
ABSTRACT

**7.5 ASSUMPTION**

<b>Definition</b>	A predicted future STATE upon which DECISIONS are made.
<b>Notes</b>	An ASSUMPTION about the future STATE of an ITEM might be usefully shared across a city.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Forecast</li> <li>• Extrapolation</li> </ul>
<b>Relationships</b>	See Figure 19

**Figure 19 – ASSUMPTION relationships**



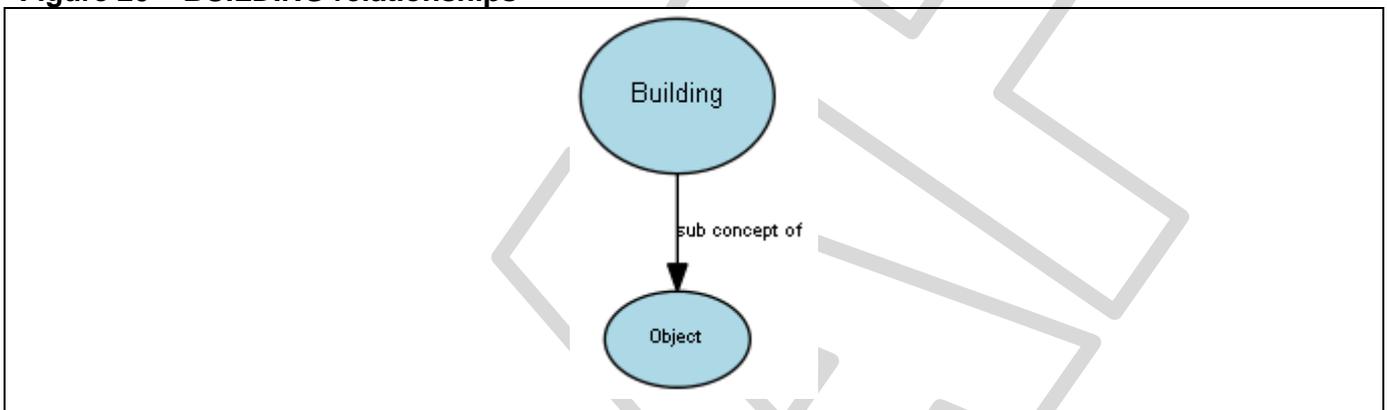
	<b>Relationship</b>		<b>Inverse</b>
ASSUMPTION	assumptionMadeBy	AGENT	makesAssumption
ASSUMPTION	influences	OBJECTIVE	influencedBy

**Sub-concept of**  
STATE

## 7.6 BUILDING

<b>Definition</b>	A man-made OBJECT with roof and walls, with a fixed PLACE, intended for sheltering PERSONS or other OBJECTs.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• A house</li> <li>• A factory</li> <li>• A station</li> <li>• An office</li> </ul>
<b>Relationships</b>	See Figure 20

**Figure 20 – BUILDING relationships**



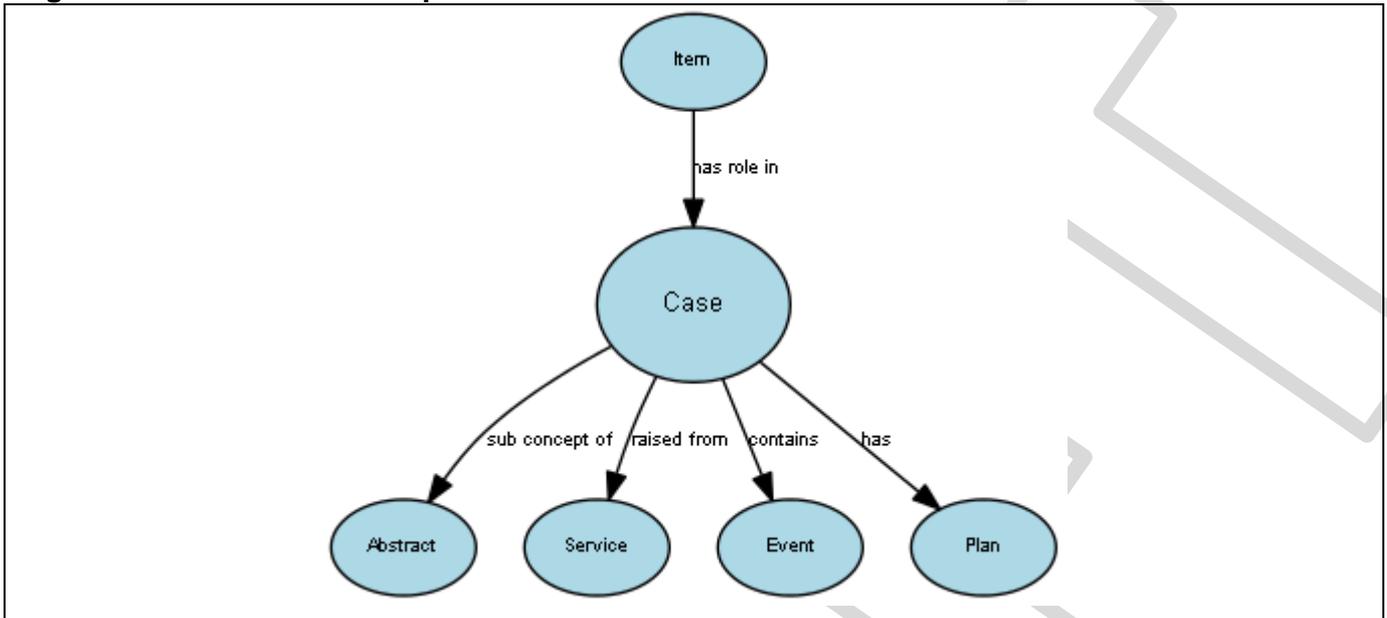
**Sub-concept of**

OBJECT

## 7.7 CASE

<b>Definition</b>	A container for information recording the history of EVENTS initiated by a SERVICE demand.
<b>Notes</b>	When a SERVICE is used, it typically raises a CASE where information is contained through to the resolution of the CASE.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• A planning application</li> <li>• An incident of fraud</li> </ul>
<b>Relationships</b>	See Figure 21

**Figure 21 – CASE relationships**



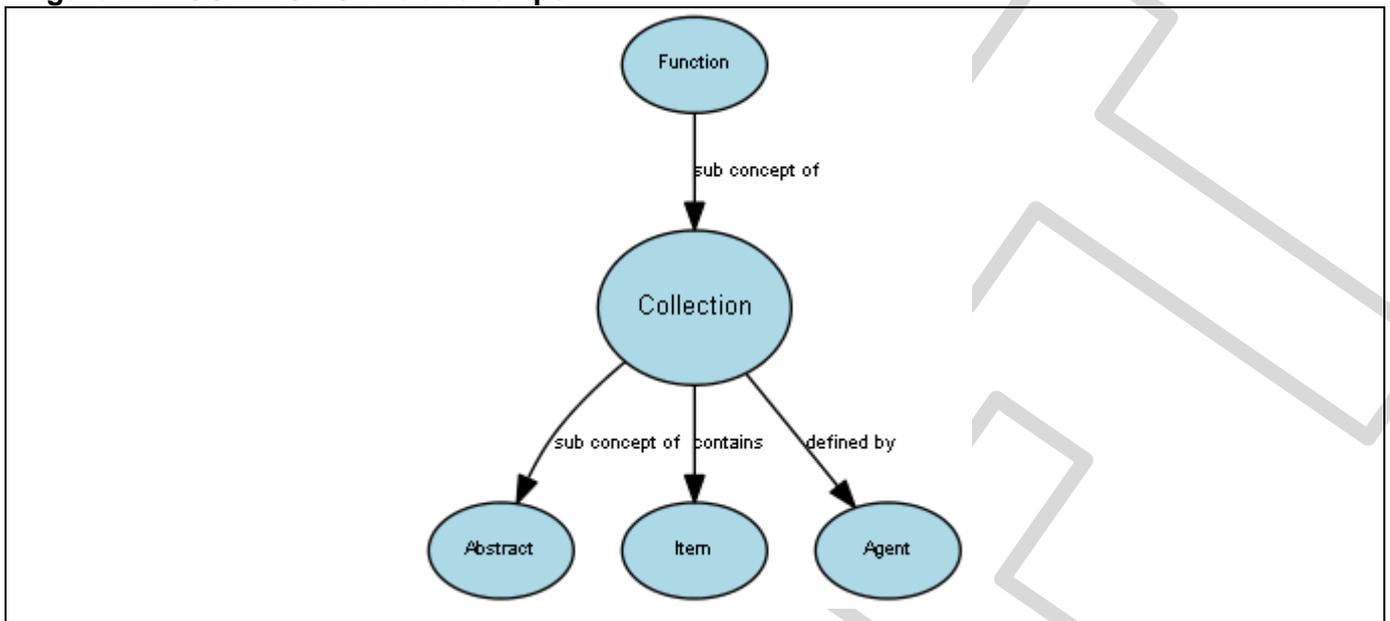
	Relationship		Inverse
CASE	caseHasPlan	PLAN	planForCase
CASE	contains	EVENT	containedIn
CASE	raisedFrom	SERVICE	raises
CASE	hasRoleFrom	ITEM	hasRoleIn

**Sub-concept of**  
ABSTRACT

## 7.8 COLLECTION

<b>Definition</b>	A grouping of ITEMS, as defined by an AGENT, that need to be managed, or operated upon together.
<b>Notes</b>	A COLLECTION is defined by an AGENT. The contents of a COLLECTION might be explicitly itemized (e.g. a jewellery collection) or be defined by a scoping statement (e.g. the properties available for rent).
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Stock</li> <li>• Lamp posts</li> </ul>
<b>Relationships</b>	See Figure 22

**Figure 22 – COLLECTION relationships**



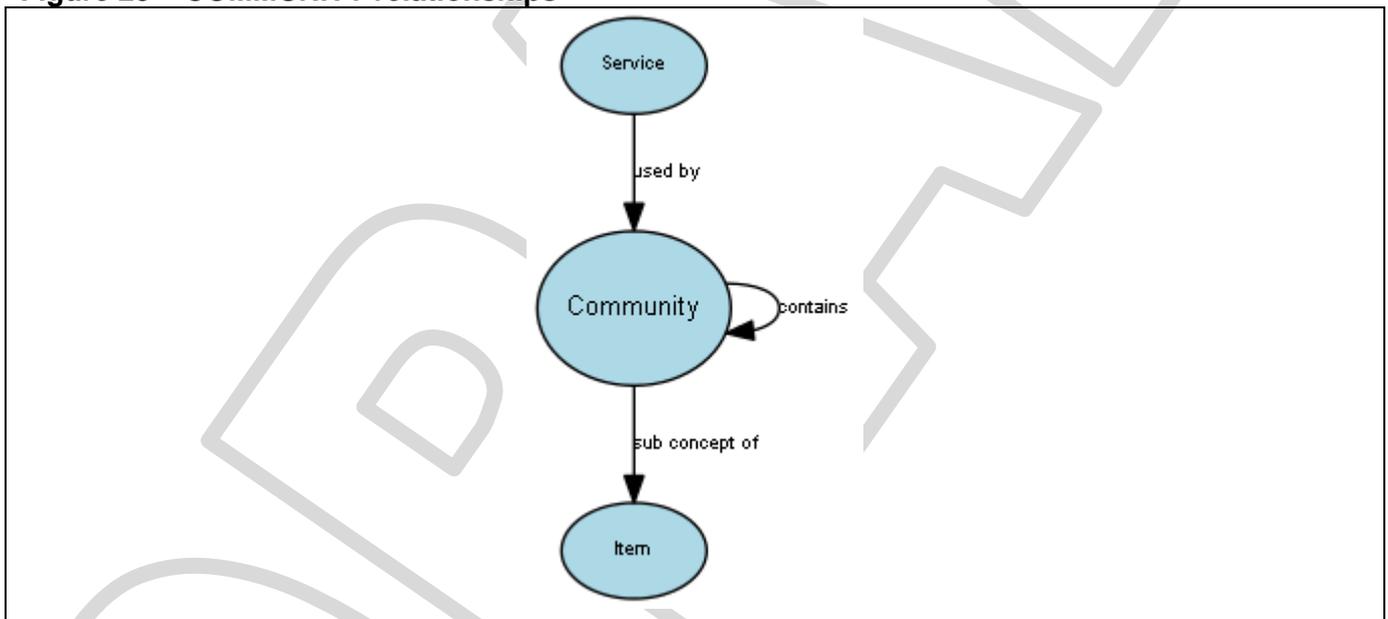
	<b>Relationship</b>		<b>Inverse</b>
COLLECTION	collectionContains	ITEM	containedInCollection
COLLECTION	collectionDefinedBy	AGENT	definesCollection
<b>Sub-concept of</b>			
ABSTRACT			
<b>Sub-concepts</b>			
FUNCTION			

## 7.9 COMMUNITY

<b>Definition</b>	A group of PERSONs and/or ORGANIZATIONs that share common characteristics such as PLACE, circumstance, etc.
<b>Notes</b>	<p>A COMMUNITY is defined by an AGENT, in terms of the common characteristics of the PERSONs and/or ORGANIZATIONs that are contained in it.</p> <p>The STATE of a COMMUNITY can be tracked without having to know the identity of each PERSON and ORGANIZATION.</p> <p>A COMMUNITY might be composed of more than one COMMUNITY. For example:</p> <ul style="list-style-type: none"> <li>• the business sector might be composed of the industrial sector, the tourism sector, the financial services sector, etc; or</li> <li>• the youth of a town are contained in the residents of a town.</li> </ul> <p>The actual PERSONs or ORGANIZATIONs might change without changing the identity of a COMMUNITY, for example the long-term unemployed in a city</p>

	<p>remains the same <b>COMMUNITY</b> even though some people have left it, and others have joined it.</p> <p>Members of a <b>COMMUNITY</b> do not need to be aware of each other, and are not acting with a collective goal. If they are, then they are an <b>ORGANIZATION</b>. For example, long-term unemployed is a <b>COMMUNITY</b>, whereas the jobseekers club is an <b>ORGANIZATION</b>.</p>
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Residents of a city or town</li> <li>• Commuters</li> <li>• Carers</li> <li>• Long-term unemployed</li> <li>• Low income families</li> <li>• The tourism industry</li> <li>• The retail sector</li> </ul>
<b>Relationships</b>	See Figure 23

**Figure 23 – COMMUNITY relationships**

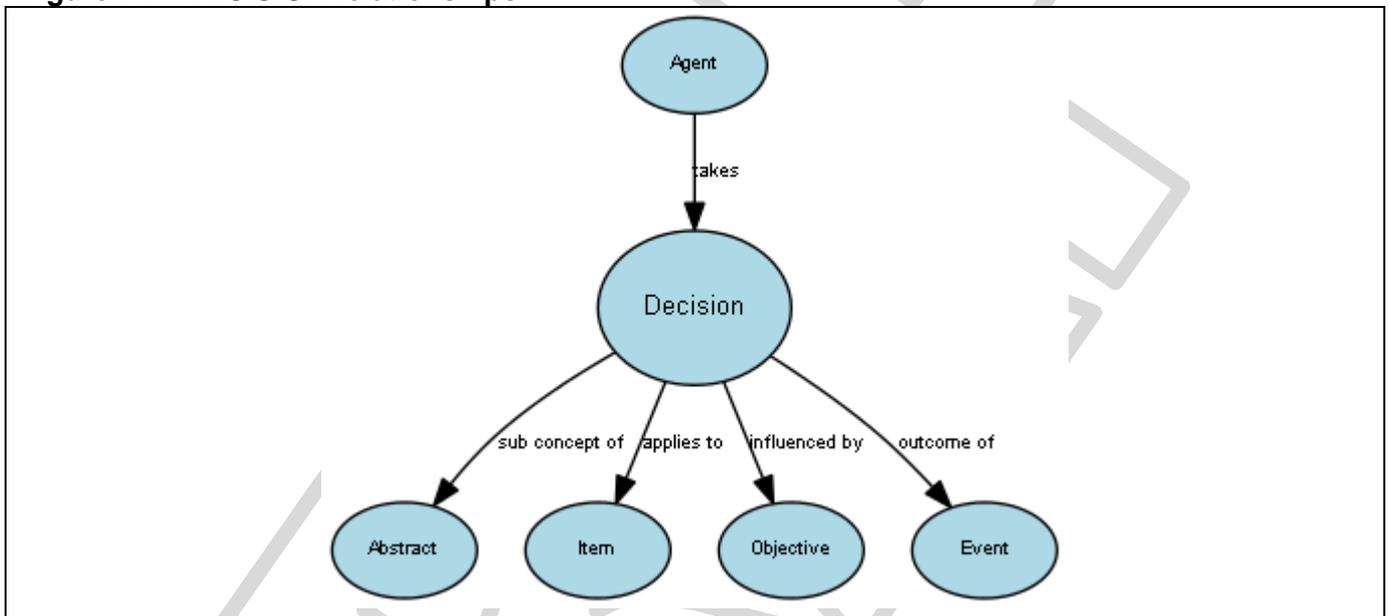


	<b>Relationship</b>	<b>Inverse</b>
COMMUNITY	contains	COMMUNITY containedIn
COMMUNITY	containedIn	COMMUNITY contains
COMMUNITY	uses	SERVICE usedBy
<b>Sub-concept of</b>		
ITEM		

## 7.10 DECISION

<b>Definition</b>	A conclusion or resolution reached after consideration [1].
<b>Notes</b>	A DECISION is the outcome of an EVENT, and not the event itself. A DECISION, taken by an AGENT, has an effect on a number of ITEMS, and is be influenced by OBJECTIVEs.
<b>Examples</b>	<ul style="list-style-type: none"> <li>To provide RESOURCES</li> <li>To agree a PLAN</li> </ul>
<b>Relationships</b>	See Figure 24

**Figure 24 – DECISION relationships**



	<b>Relationship</b>		<b>Inverse</b>
DECISION	appliesTo	ITEM	subjectOf
DECISION	influencedBy	OBJECTIVE	influences
DECISION	outcomeOf	EVENT	hasOutcome
DECISION	decisionTakenBy	AGENT	takesDecision

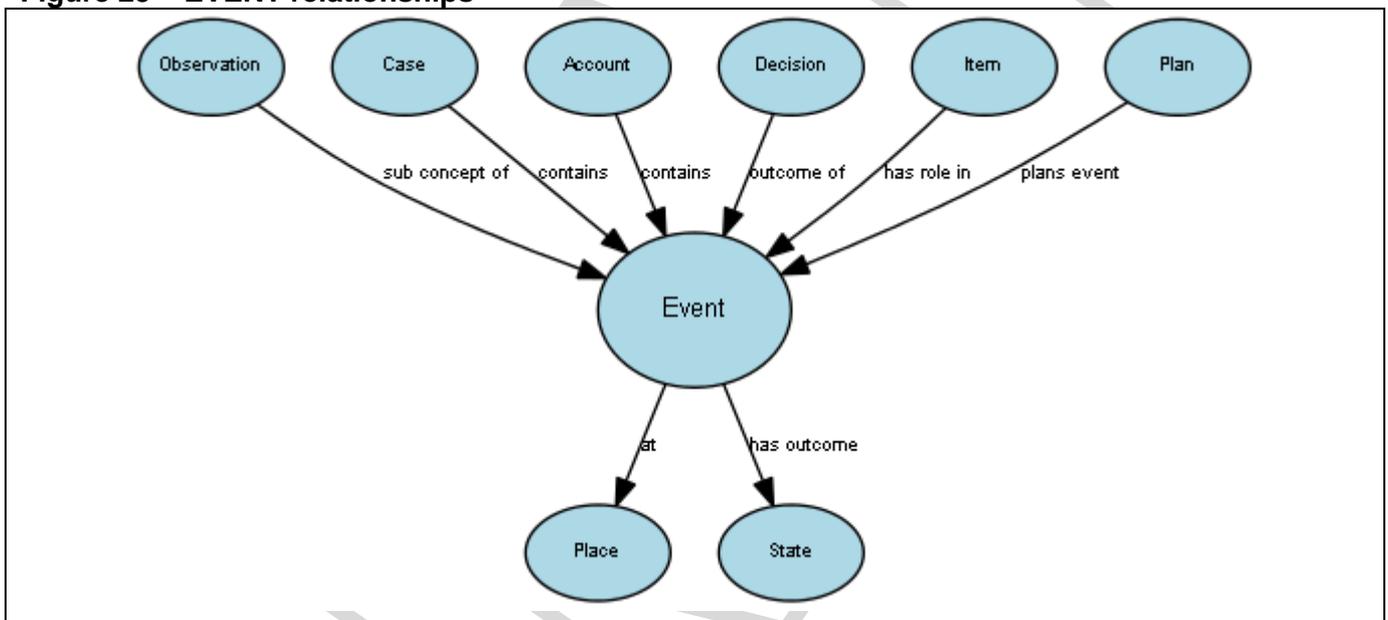
**Sub-concept of**  
ABSTRACT

## 7.11 EVENT

<b>Definition</b>	An occurrence that has happened or might happen over a period of time.
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<b>Notes</b>	<p>An <b>EVENT</b> might occur over a short period of time (e.g. a lightning flash), or a long period of time (e.g. formation of the continents).</p> <p>An <b>EVENT</b> refers to a number of <b>ITEMS</b> which take roles in the <b>EVENT</b>, for example, a <b>PERSON</b> may take the role applicant, in one <b>EVENT</b>, and the same person may take the role patient, in another <b>EVENT</b>.</p> <p>All types of <b>ITEM</b> can take roles in an <b>EVENT</b>, for example:</p> <ul style="list-style-type: none"> <li>• a candlestick as an <b>OBJECT</b> could be the murder weapon in a crime <b>EVENT</b>;</li> <li>• a tender as an <b>ABSTRACT</b> could be the subject of a contract-signing <b>EVENT</b>.</li> </ul>
<b>Examples</b>	<ul style="list-style-type: none"> <li>• An accident</li> <li>• A birth</li> <li>• An application for a service</li> </ul>
<b>Relationships</b>	See Figure 25

**Figure 25 – EVENT relationships**



	<b>Relationship</b>		<b>Inverse</b>
EVENT	atPlace	PLACE	placeOf
EVENT	hasOutcome	STATE	outcomeOf
EVENT	containedIn	ACCOUNT	contains
EVENT	containedIn	CASE	contains
EVENT	hasRoleFrom	ITEM	hasRoleIn
EVENT	hasOutcome	DECISION	outcomeOf
EVENT	eventPlannedIn	PLAN	planForEvent

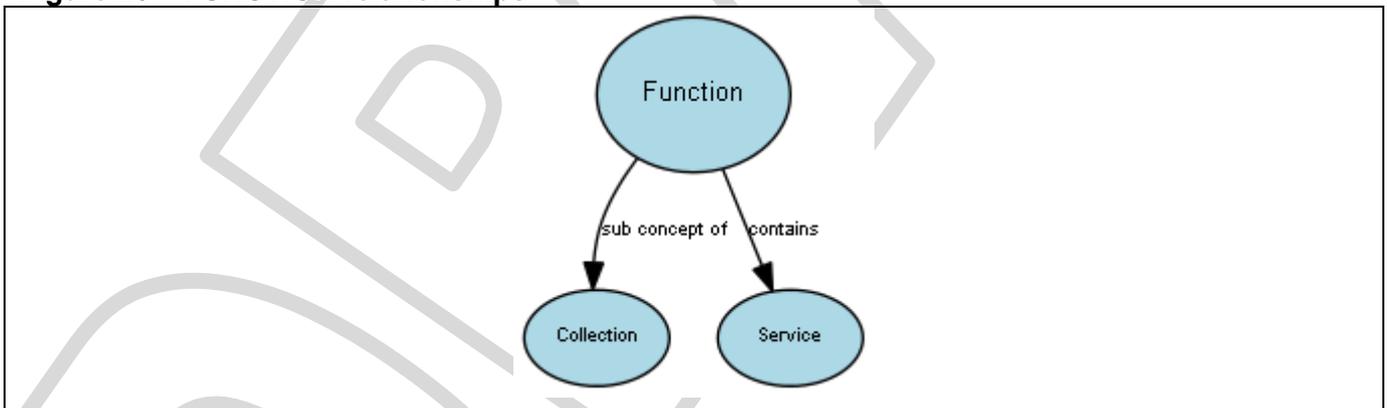
**Sub-concepts**

OBSERVATION

**7.12 FUNCTION**

<b>Definition</b>	A COLLECTION of SERVICES
<b>Notes</b>	<p>A FUNCTION might be made up of SERVICES from many ORGANIZATIONS. A SERVICE might appear in many FUNCTIONS. A FUNCTION might be defined to:</p> <ul style="list-style-type: none"> <li>• bring together the SERVICES that are relevant to a COMMUNITY, and/or a PLACE; or</li> <li>• combine SERVICES for accounting purposes.</li> </ul>
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Education</li> <li>• Waste management</li> <li>• Translation services</li> </ul> <p>The United Nations provide a category list of the functions of government at: <a href="http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=4">http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=4</a> [2]. The ESD Toolkit provide a lists of Functions at: <a href="http://id.esd.org.uk/list/functions">http://id.esd.org.uk/list/functions</a> [3].</p>
<b>Relationships</b>	See Figure 26

**Figure 26 – FUNCTION relationships**

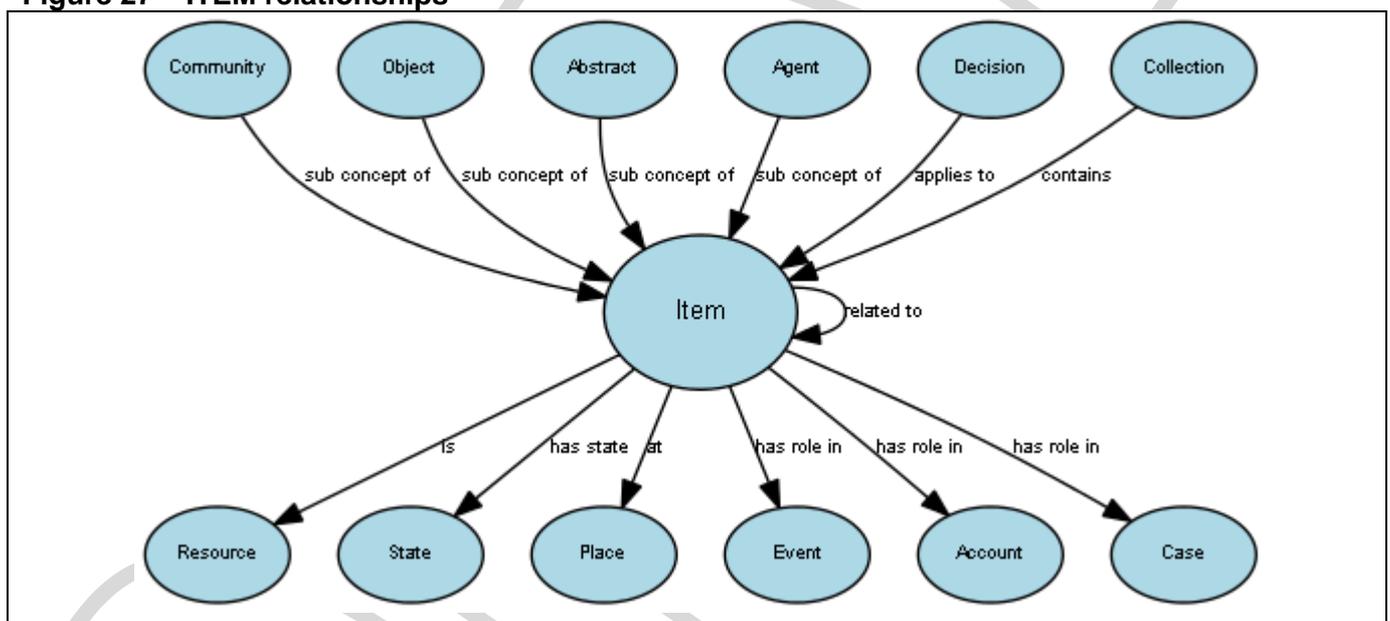


	<b>Relationship</b>		<b>Inverse</b>
FUNCTION	contains	SERVICE	containedIn
<b>Sub-concept of</b>			
COLLECTION			

### 7.13 ITEM

<b>Definition</b>	An individual article or unit, especially one that is part of a list, collection, or set [1].
<b>Notes</b>	<p>Most ITEMS, except those that are ABSTRACT, can be associated with a PLACE.</p> <p>An ITEM has a STATE (conditions or circumstances), which can change over TIME.</p> <p>Usually, data refers directly to a sub-concept of ITEM:</p> <ul style="list-style-type: none"> <li>• OBJECT;</li> <li>• PERSON;</li> <li>• ORGANIZATION;</li> <li>• COMMUNITY; and</li> <li>• ABSTRACT.</li> </ul>
<b>Examples</b>	See sub-concepts for examples.
<b>Relationships</b>	See Figure 27

**Figure 27 – ITEM relationships**



	<b>Relationship</b>		<b>Inverse</b>
ITEM	atPlace	PLACE	placeOf
ITEM	hasRoleIn	ACCOUNT	hasRoleFrom
ITEM	hasRoleIn	CASE	hasRoleFrom
ITEM	hasRoleIn	EVENT	hasRoleFrom
ITEM	hasState	STATE	stateOf

	<b>Relationship</b>		<b>Inverse</b>
ITEM	relatedTo	ITEM	
ITEM	subjectOf	DECISION	appliesTo
ITEM	containedInCollection	COLLECTION	collectionContains

**Sub-concepts**

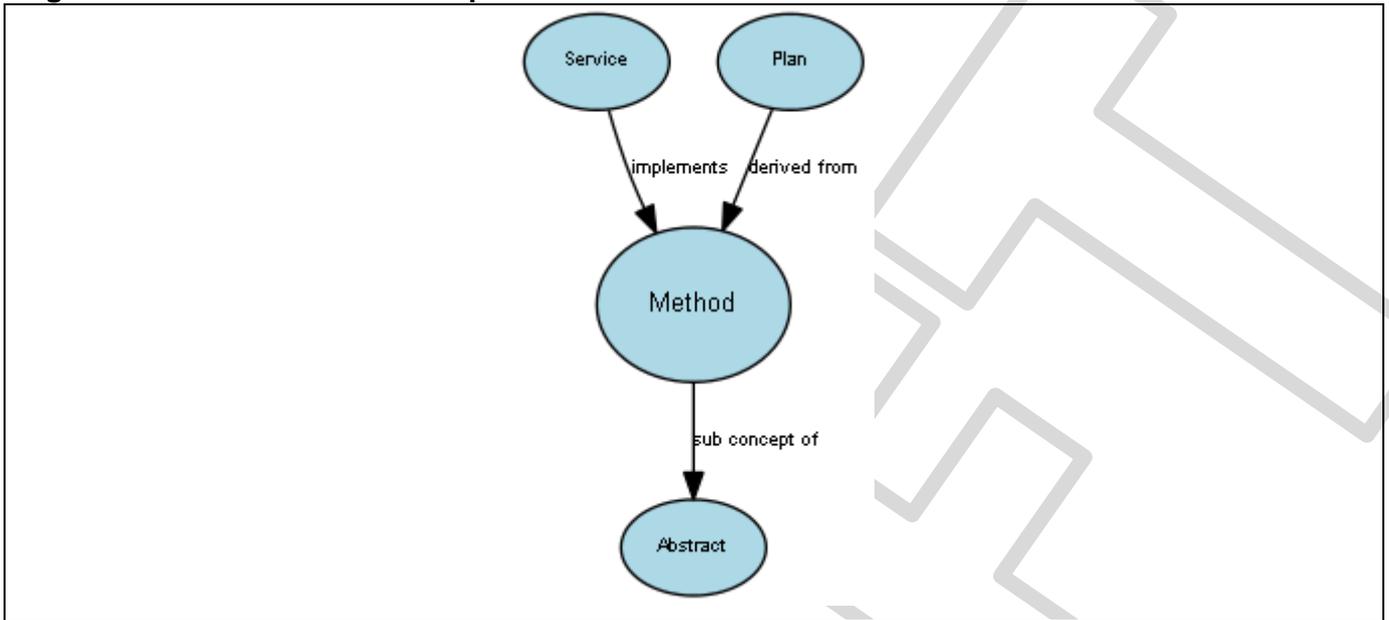
ABSTRACT  
COMMUNITY  
OBJECT  
AGENT

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**7.14 METHOD**

<b>Definition</b>	A pre-determined procedure, or series of steps, designed to accomplish an OBJECTIVE.
<b>Notes</b>	A number of METHODS might be associated with a SERVICE as options for achieving an OBJECTIVE.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Payment method</li> <li>• Customer contact method</li> <li>• Debt recovery method</li> <li>• Medical procedure</li> <li>• MOT procedure</li> </ul>
<b>Relationships</b>	See Figure 28

**Figure 28 – METHOD relationships**

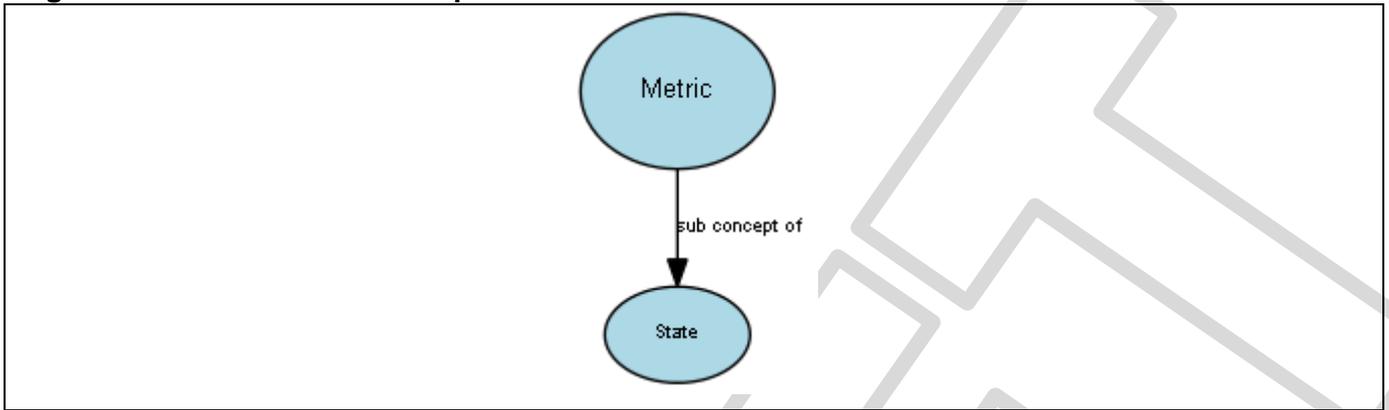


	Relationship		Inverse
METHOD	derivationOfPlan	PLAN	planDerivedFromMethod
METHOD	methodImplementedIn	SERVICE	serviceImplementsMethod
<b>Sub-concept of</b> ABSTRACT			

**7.15 METRIC**

<b>Definition</b>	A measure of demography, characteristics, activity or performance.
<b>Notes</b>	METRICs are often collected as statistics which describe the STATE of a SERVICE, COMMUNITY, or PLACE.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Performance indicator</li> <li>• Deprivation index</li> <li>• Traffic count</li> </ul>
<b>Relationships</b>	See Figure 29

**Figure 29 – METRIC relationships**

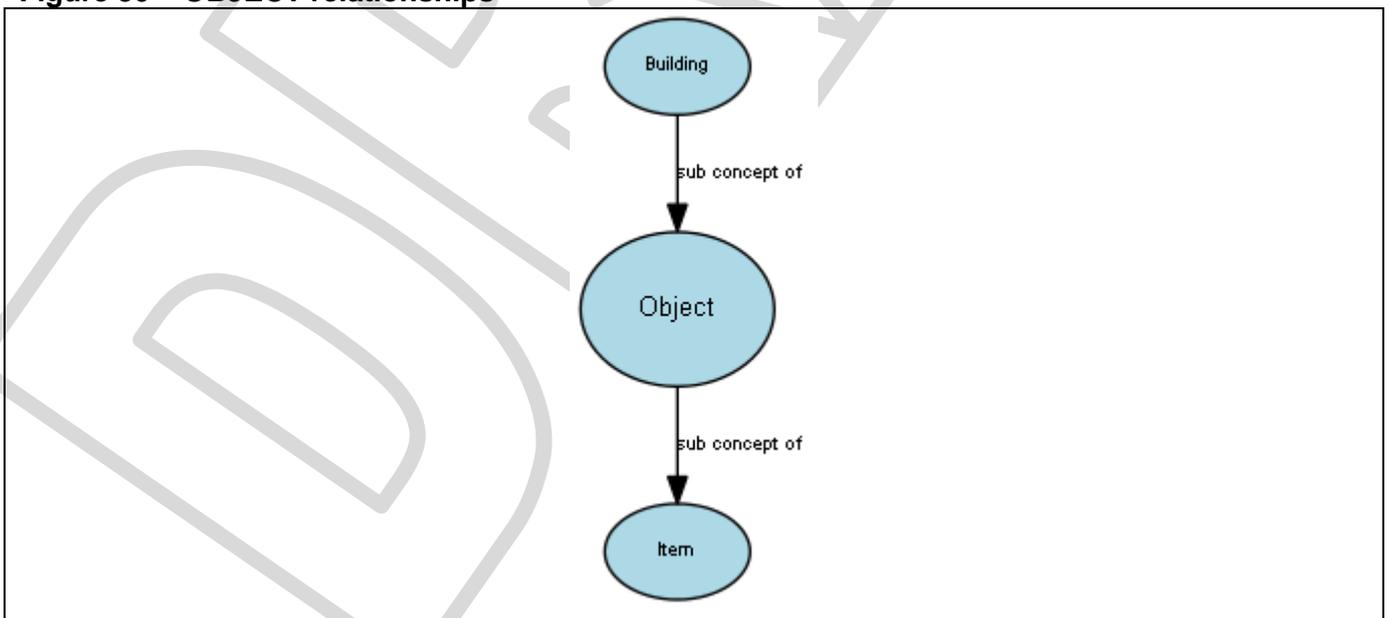


**Sub-concept of**  
STATE

**7.16 OBJECT**

<b>Definition</b>	A physical ITEM
<b>Notes</b>	An OBJECT is a physical thing that is contained in a city.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• A building</li> <li>• A road</li> <li>• A car</li> <li>• A lamp post</li> </ul>
<b>Relationships</b>	See Figure 30

**Figure 30 – OBJECT relationships**



**Sub-concept of**

ITEM

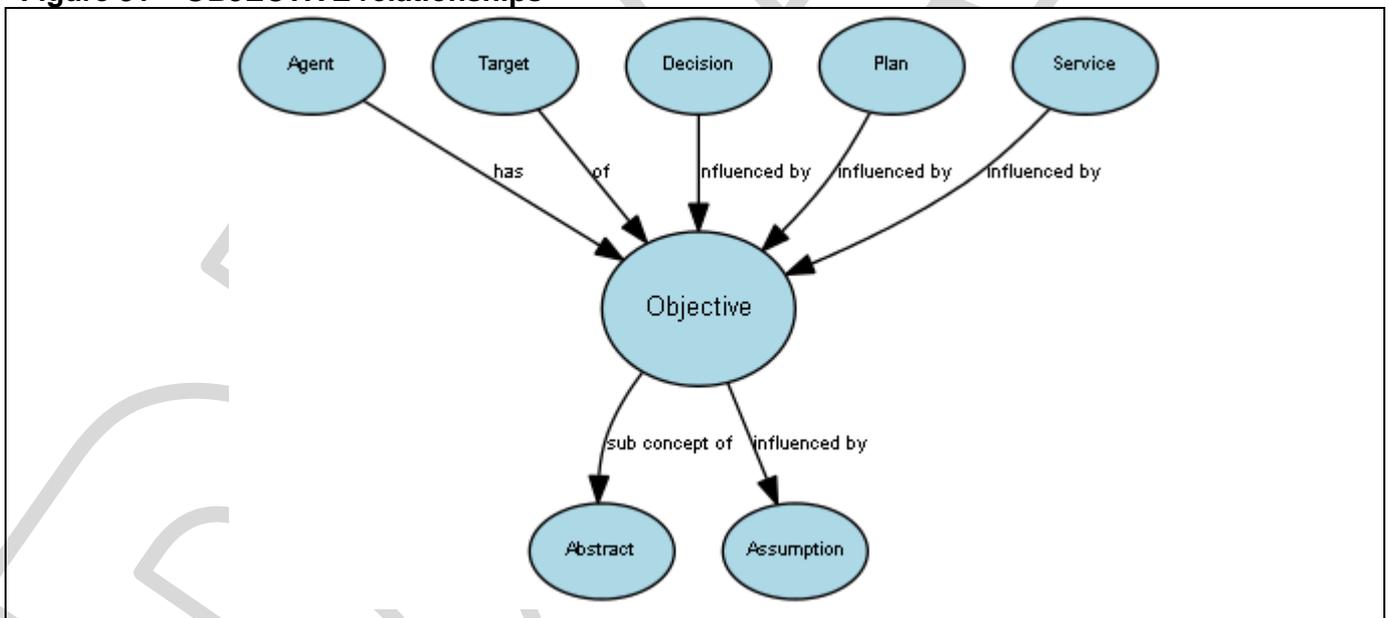
**Sub-concepts**

BUILDING

**7.17 OBJECTIVE**

<b>Definition</b>	An achievement desired by an AGENT.
<b>Notes</b>	An OBJECTIVE refers to a desired change of condition or circumstances of something (an ITEM). Where the change can be quantified, the OBJECTIVE might be linked to one or more TARGETS.  Where OBJECTIVES are set for a COMMUNITY, the desire might be to change the size of the community, or the well-being of the PERSONS or ORGANIZATIONS in it.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Create new jobs in the energy sector</li> <li>• Reduce carbon emissions in a city by 25% within 5 years</li> </ul>
<b>Relationships</b>	See Figure 31

**Figure 31 – OBJECTIVE relationships**



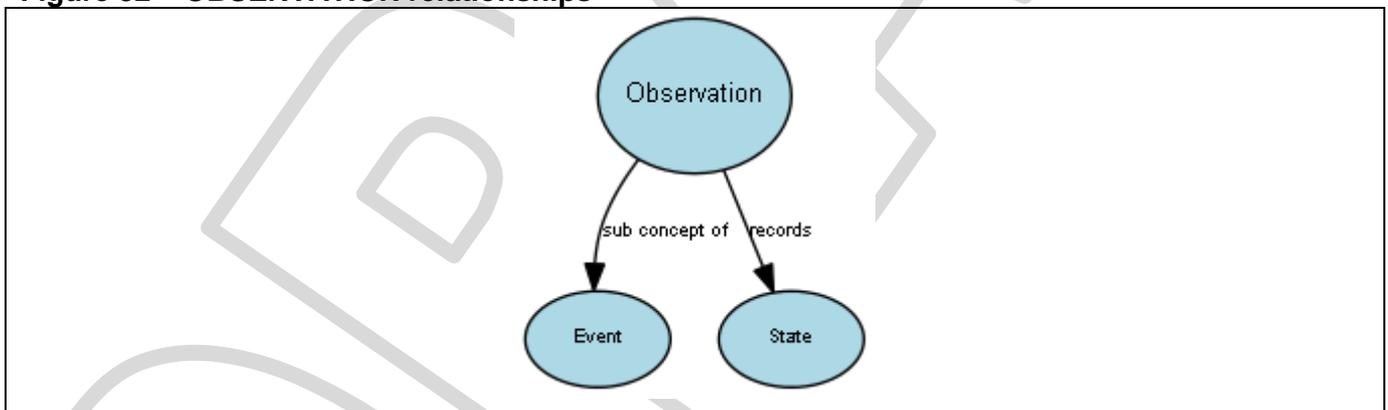
	<b>Relationship</b>		<b>Inverse</b>
OBJECTIVE	influencedBy	ASSUMPTION	influences
OBJECTIVE	objectiveOf	AGENT	hasObjective

	<b>Relationship</b>		<b>Inverse</b>
OBJECTIVE	influences	SERVICE	influencedBy
OBJECTIVE	influences	DECISION	influencedBy
OBJECTIVE	influences	PLAN	influencedBy
OBJECTIVE	objectiveHasTarget	TARGET	targetOfObjective
<b>Sub-concept of</b>			
ABSTRACT			

### 7.18 OBSERVATION

<b>Definition</b>	An EVENT in which a STATE is recorded.
<b>Notes</b>	The Open Geospatial Consortium [3] defines an observation as “an act at a discrete instant or period, through which a number or term is assigned to a phenomenon using a procedure, such as a sensor, instrument, or algorithm”.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Sensor reading</li> <li>• Medical assessment</li> </ul>
<b>Relationship</b>	See Figure 32

**Figure 32 – OBSERVATION relationships**

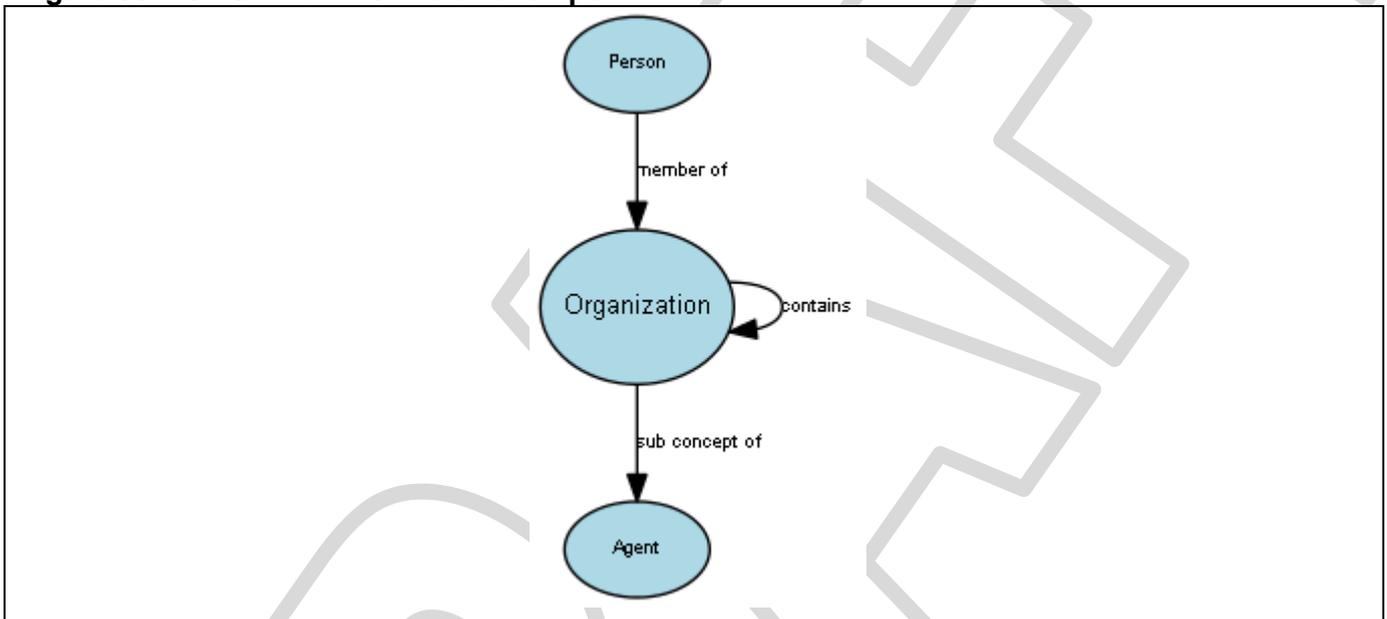


	<b>Relationship</b>		<b>Inverse</b>
OBSERVATION	records	STATE	isRecordedBy
<b>Sub-concept of</b>			
EVENT			

### 7.19 ORGANIZATION

<b>Definition</b>	A group of PERSONS with a collective goal.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• A business</li> <li>• A public sector body</li> <li>• A charity</li> <li>• A household</li> </ul>
<b>Relationships</b>	See Figure 33

**Figure 33 – ORGANIZATION relationships**

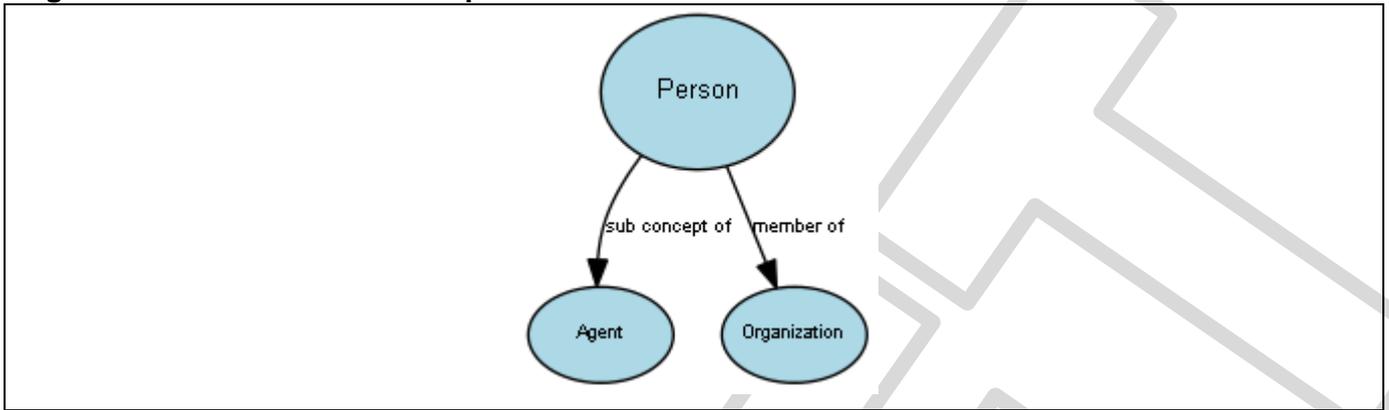


	<b>Relationship</b>		<b>Inverse</b>
ORGANIZATION	contains	ORGANIZATION	containedIn
ORGANIZATION	containedIn	ORGANIZATION	contains
ORGANIZATION	hasMember	PERSON	memberOf
<b>Sub-concept of</b>			
AGENT			

### 7.20 PERSON

<b>Definition</b>	An individual human being [1].
<b>Relationships</b>	See Figure 34

**Figure 34 – PERSON relationships**

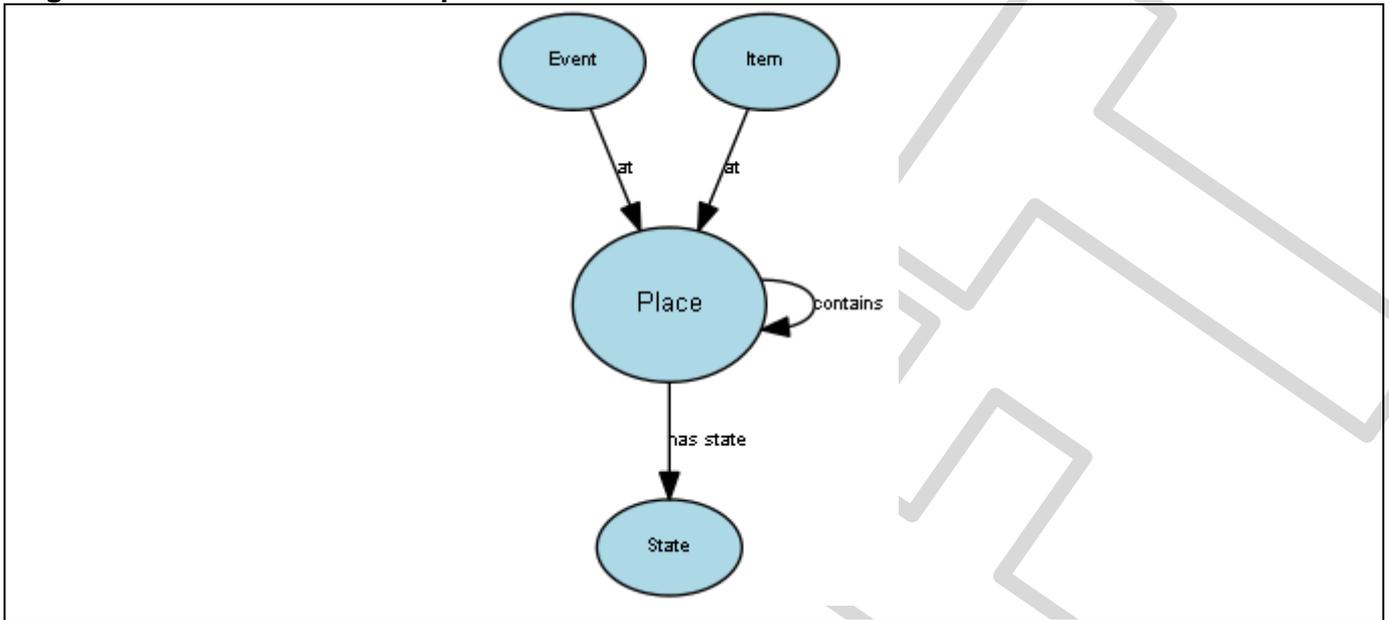


	Relationship		Inverse
PERSON	memberOf	ORGANIZATION	hasMember
Sub-concept of			
AGENT			

**7.21 PLACE**

<b>Definition</b>	A geographic position, area, or volume.
<b>Notes</b>	A PLACE might have definite or indefinite boundaries.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• A point defined by coordinates, e.g. the location of an incident</li> <li>• An area defined by a set of coordinates, e.g. a school catchment area</li> <li>• A place referred to only by a name without attempting to define the area exactly, e.g. a town</li> </ul>
<b>Relationships</b>	See Figure 35

**Figure 35 – PLACE relationships**

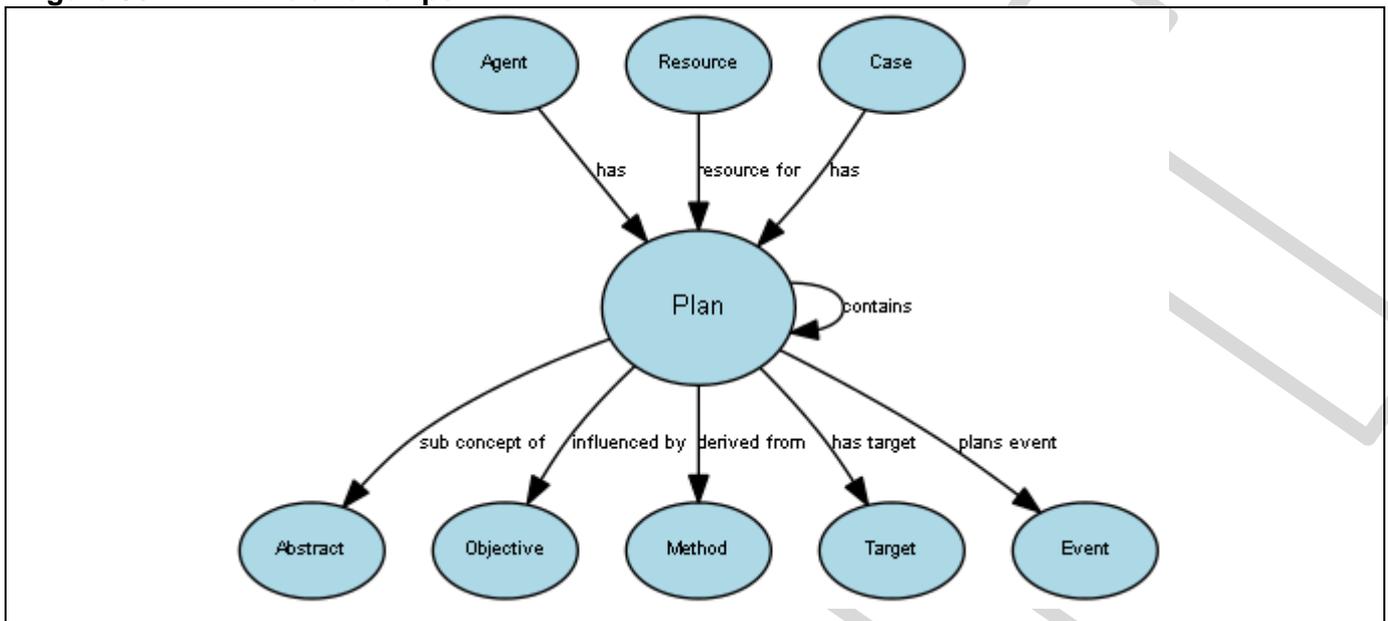


	<b>Relationship</b>		<b>Inverse</b>
PLACE	contains	PLACE	containedIn
PLACE	hasState	STATE	stateOf
PLACE	placeOf	ITEM	atPlace
PLACE	placeOf	EVENT	atPlace
PLACE	containedIn	PLACE	contains

**7.22 PLAN**

<b>Definition</b>	A list of steps with times and RESOURCE, used to achieve an OBJECTIVE.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Corporate plan</li> <li>• Community plan</li> <li>• Marketing plan</li> <li>• Project plan</li> <li>• Strategy</li> </ul>
<b>Relationships</b>	See Figure 36

**Figure 36 – PLAN relationships**



	<b>Relationship</b>		<b>Inverse</b>
PLAN	contains	PLAN	containedIn
PLAN	hasTarget	TARGET	targetOf
PLAN	influencedBy	OBJECTIVE	influences
PLAN	planDerivedFromMethod	METHOD	derivationOfPlan
PLAN	planForEvent	EVENT	eventPlannedIn
PLAN	planForCase	CASE	caseHasPlan
PLAN	containedIn	PLAN	contains
PLAN	planOf	AGENT	hasPlan
PLAN	usesResource	RESOURCE	resourceFor

**Sub-concept of**

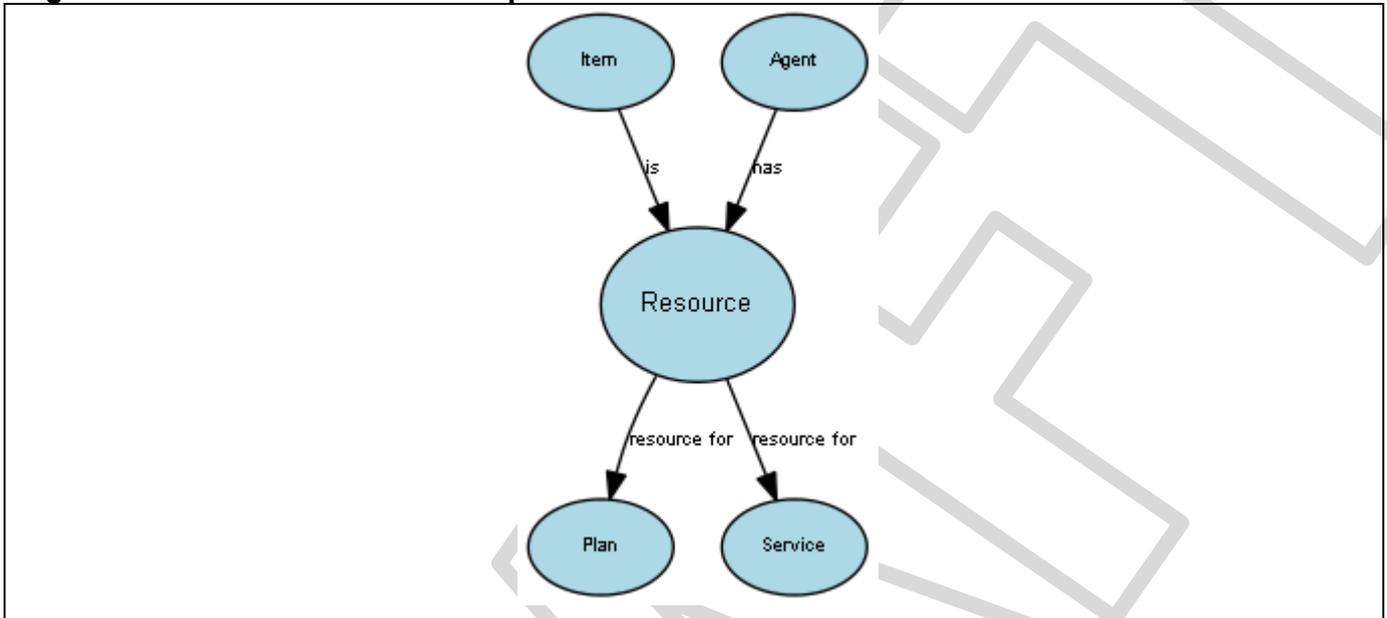
ABSTRACT

**7.23 RESOURCE**

<b>Definition</b>	An ITEM that can be drawn on by an AGENT to produce a benefit.
<b>Notes</b>	A RESOURCE is available to an AGENT to allocate to SERVICES and PLANS to achieve OBJECTIVES.
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Materials</li> <li>• Money</li> <li>• Staff</li> </ul>

	<ul style="list-style-type: none"> <li>Assets</li> </ul>
<b>Relationships</b>	See Figure 37

**Figure 37 – RESOURCE relationships**

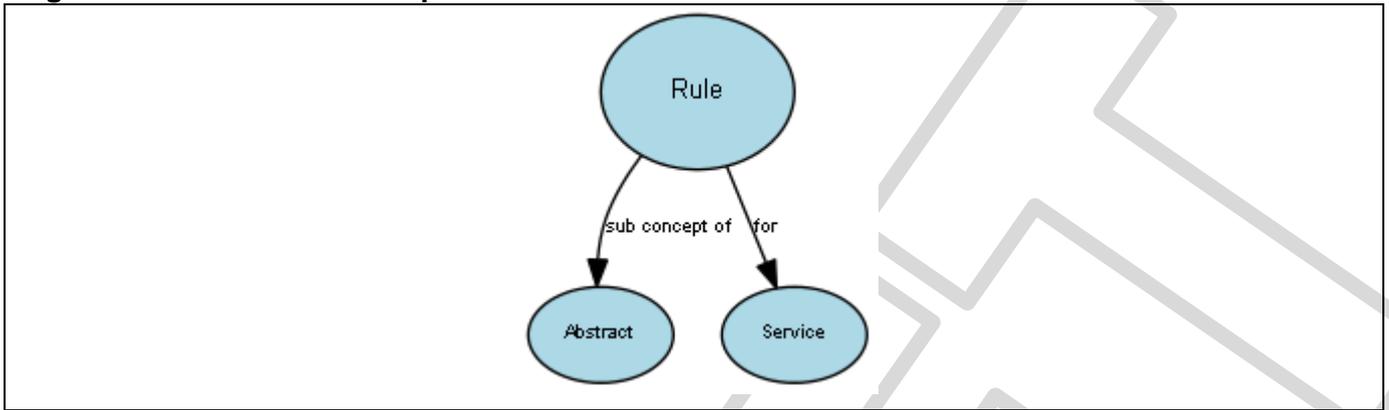


	<b>Relationship</b>		<b>Inverse</b>
RESOURCE	resourceFor	PLAN	usesResource
RESOURCE	resourceFor	SERVICE	usesResource
RESOURCE	resourceOf	AGENT	hasResource

**7.24 RULE**

<b>Definition</b>	An explicit or understood regulation or principle governing conduct or procedure within a particular area of activity.
<b>Notes</b>	A RULE can constrain the design of a SERVICE.
<b>Examples</b>	<ul style="list-style-type: none"> <li>Legislation</li> <li>Eligibility</li> <li>Principle</li> <li>Policy</li> </ul>
<b>Relationships</b>	See Figure 38

**Figure 38 – RULE relationships**

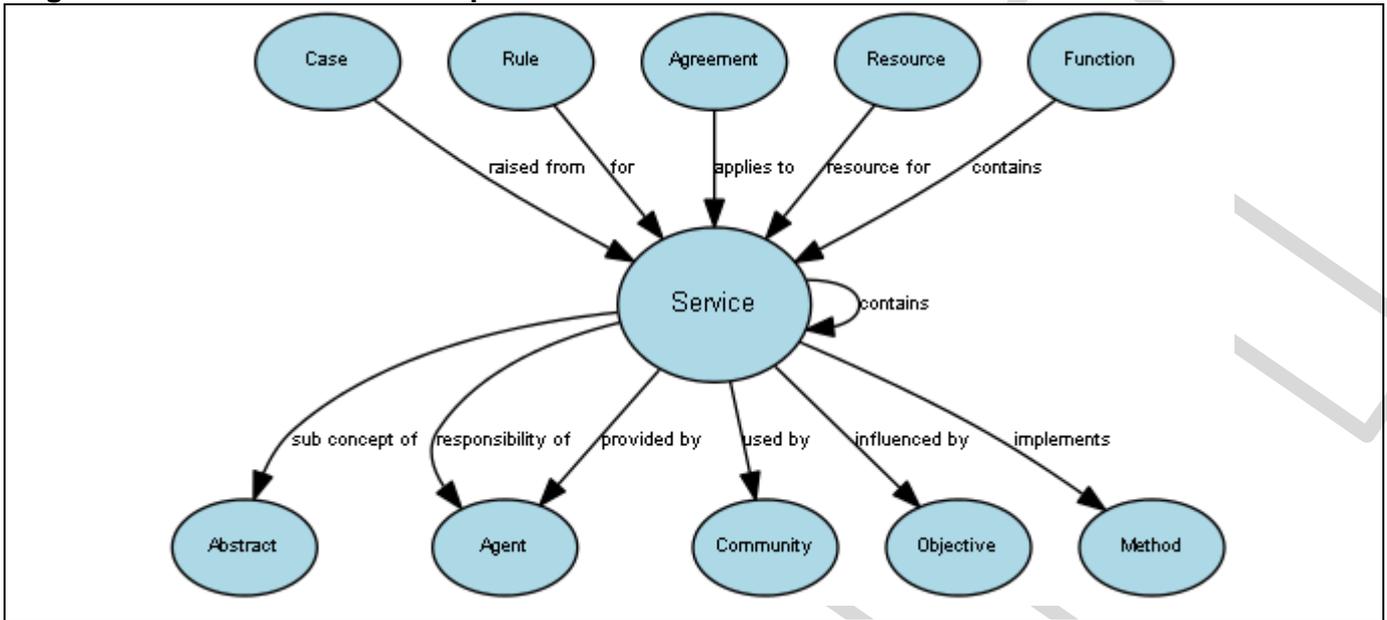


	Relationship		Inverse
RULE	ruleFor	SERVICE	hasRule
Sub-concept of			
ABSTRACT			

**7.25 SERVICE**

<b>Definition</b>	The capacity to carry out one or more METHODS.
<b>Notes</b>	<p>A SERVICE exists even if it is not accessed. For example, an advice hotline exists as a SERVICE even if nobody calls it.</p> <p>A SERVICE is typically targeted at a COMMUNITY.</p> <p>A SERVICE can consume RESOURCES and give benefit.</p> <p>A CASE contains information about an instance of a use of a SERVICE.</p>
<b>Examples</b>	<ul style="list-style-type: none"> <li>• A hairdressing service</li> <li>• A street cleaning service</li> <li>• An energy supply</li> <li>• An advice service</li> </ul>
<b>Relationships</b>	See Figure 39

**Figure 39 – SERVICE relationships**



	<b>Relationship</b>		<b>Inverse</b>
SERVICE	contains	SERVICE	containedIn
SERVICE	influencedBy	OBJECTIVE	influences
SERVICE	providedBy	AGENT	provides
SERVICE	responsibilityOf	AGENT	responsibleFor
SERVICE	serviceImplementsMethod	METHOD	methodImplementedIn
SERVICE	usedBy	COMMUNITY	uses
SERVICE	subjectOf	AGREEMENT	appliesTo
SERVICE	containedIn	SERVICE	contains
SERVICE	containedIn	FUNCTION	contains
SERVICE	raises	CASE	raisedFrom
SERVICE	usesResource	RESOURCE	resourceFor
SERVICE	hasRule	RULE	ruleFor

**Sub-concept of**

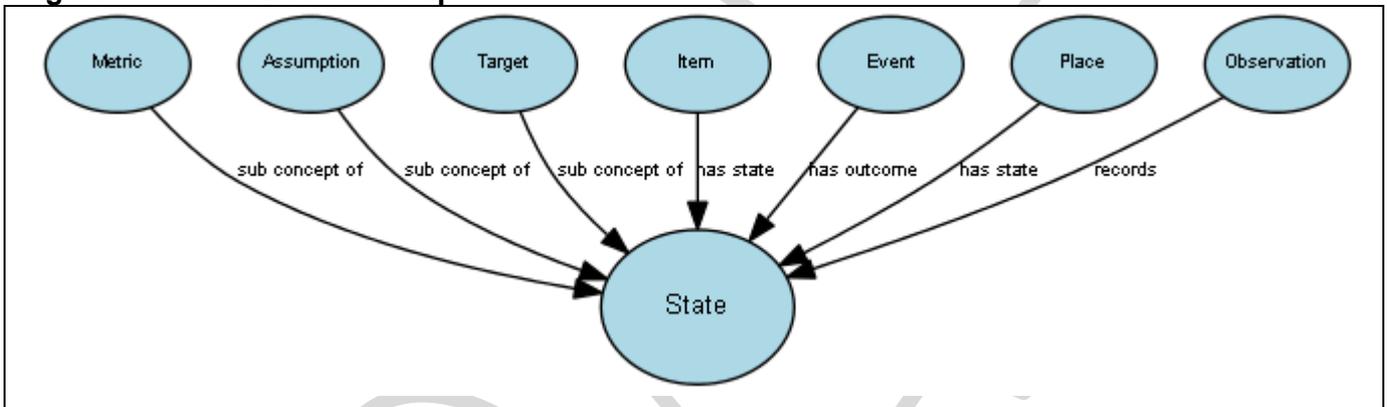
ABSTRACT

**7.26 STATE**

<b>Definition</b>	A circumstance or condition of an ITEM at a time.
<b>Notes</b>	An ITEM might have a series of STATES describing condition or circumstance, at

	<p>particular TIMES.</p> <p>For example, a PERSON might be unemployed in June and employed in July.</p> <p>Changes to STATE are often the outcome of EVENTS.</p> <p>An OBJECTIVE can be described in terms of a desired change of STATE.</p> <p>A STATE can be actual or potential.</p>
<b>Examples</b>	<ul style="list-style-type: none"> <li>• Income</li> <li>• Housing</li> <li>• Repair</li> </ul>
<b>Relationships</b>	See Figure 40

**Figure 40 – STATE relationships**



	<b>Relationship</b>		<b>Inverse</b>
STATE	outcomeOf	EVENT	hasOutcome
STATE	stateOf	ITEM	hasState
STATE	stateOf	PLACE	hasState
STATE	isRecordedBy	OBSERVATION	records

**Sub-concepts**

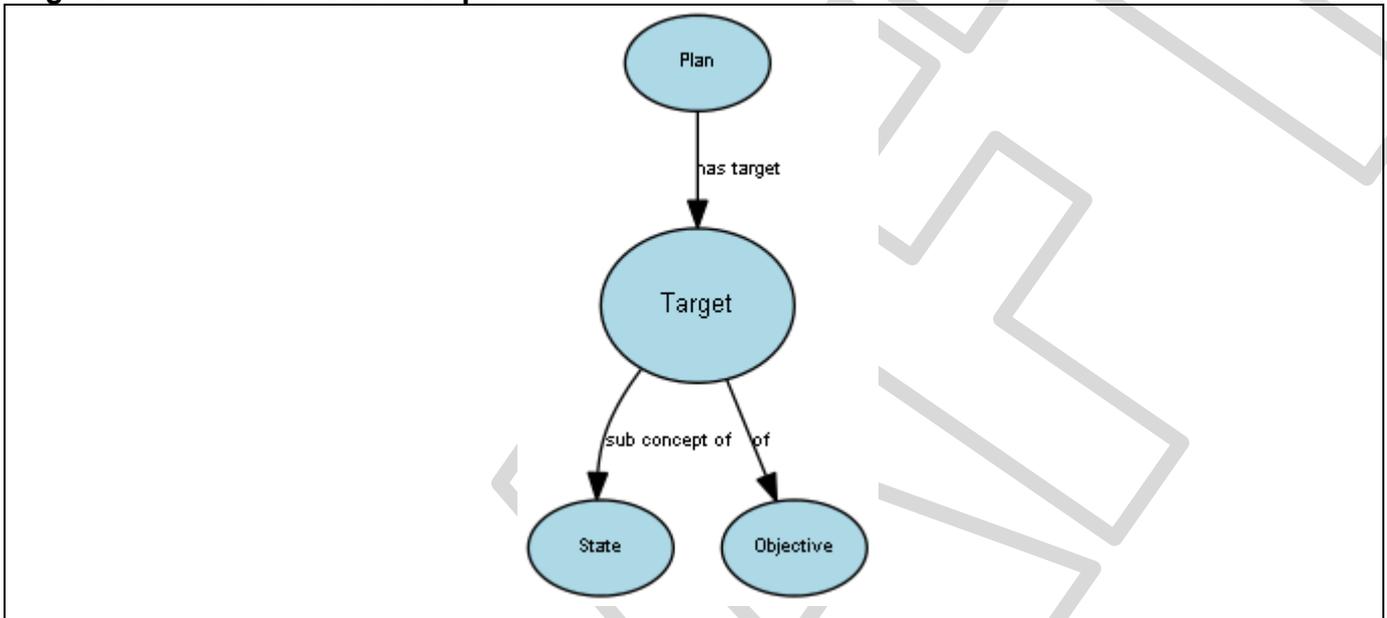
ASSUMPTION  
METRIC  
TARGET

**7.27 TARGET**

<b>Definition</b>	A desired STATE.
<b>Notes</b>	A TARGET provides a value at a time in the future, for a STATE. TARGETs are linked to OBJECTIVEs which are in turn linked to the AGENT that has set the

	<p><b>TARGET.</b></p> <p>An <b>OBJECTIVE</b> might have many <b>TARGET</b>s over time, and a <b>TARGET</b> might relate to many <b>OBJECTIVES</b>.</p>
<b>Relationships</b>	See Figure 41

**Figure 41 – TARGET relationships**



	<b>Relationship</b>		<b>Inverse</b>
TARGET	targetOfObjective	OBJECTIVE	objectiveHasTarget
TARGET	targetOf	PLAN	hasTarget
<b>Sub-concept of</b>			
STATE			

**Annex A (informative)**  
**Relationships in the SCCM**

**Table A.1 – List of relationships in the SCCM**

Property	Label	Inverse	Inverse Label	Subject Concepts	Object Concepts
appliesTo	applies to	subjectOf	subject of	DECISION	ITEM
				AGREEMENT	SERVICE
assumptionMadeBy	made by	makesAssumption	makes	ASSUMPTION	AGENT
atPlace	at	placeOf	place of	ITEM	PLACE
			of	EVENT	PLACE
caseHasPlan	has	planForCase	for	CASE	PLAN
collectionContains	contains	containedInCollection	contained in	COLLECTION	ITEM
collectionDefinedBy	defined by	definesCollection	defines	COLLECTION	AGENT
contains	contains	containedIn	contained in	ORGANIZATION	ORGANIZATION
				SERVICE	SERVICE
				ACCOUNT	EVENT
				PLAN	PLAN
				FUNCTION	SERVICE
				PLACE	PLACE
				COMMUNITY	COMMUNITY
				CASE	EVENT
hasAgreement	has	agreementWith	with	AGENT	AGREEMENT
hasObjective	has	objectiveOf	of	AGENT	OBJECTIVE
hasOutcome	has outcome	outcomeOf	outcome of	EVENT	STATE
hasPlan	has	planOf	of	AGENT	PLAN
hasResource	has	resourceOf		AGENT	RESOURCE
hasRoleIn	has role in	hasRoleFrom	has role from	ITEM	ACCOUNT
				ITEM	CASE
				ITEM	EVENT
hasState	has state	stateOf	state of	ITEM	STATE
				PLACE	STATE
hasTarget	has target	targetOf	target of	PLAN	TARGET
influencedBy	influenced by	influences	influences	SERVICE	OBJECTIVE
				DECISION	OBJECTIVE
				PLAN	OBJECTIVE
				OBJECTIVE	ASSUMPTION
memberOf	member of	hasMember	has member	PERSON	ORGANIZATION
outcomeOf	outcome of	hasOutcome	has outcome	DECISION	EVENT

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ownedBy	owned by	owns	owns	ACCOUNT	AGENT
planDerivedFromMethod	derived from	derivationOfPlan	derivation of	PLAN	METHOD
planForEvent	plans event	eventPlannedIn	planned in	PLAN	EVENT
providedBy	provided by	provides	provides	SERVICE	AGENT
raisedFrom	raised from	raises	raises	CASE	SERVICE
records	records	isRecordedBy	recorded by	OBSERVATION	STATE
relatedTo	related to			ITEM	ITEM
resourceFor	resource for	usesResource	uses	RESOURCE	PLAN
				RESOURCE	SERVICE
responsibilityOf	responsibility of	responsibleFor	responsible for	SERVICE	AGENT
ruleFor	for	hasRule	has	RULE	SERVICE
serviceImplementsMethod	implements	methodImplementedIn	implemented in	SERVICE	METHOD
takesDecision	takes	decisionTakenBy	taken by	AGENT	DECISION
targetOfObjective	of	objectiveHasTarget	has	TARGET	OBJECTIVE
usedBy	used by	uses	uses	SERVICE	COMMUNITY

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