

semantic arts

Data-Centric Transformation Made Possible

www.semanticarts.com

The 'gist' core ontology

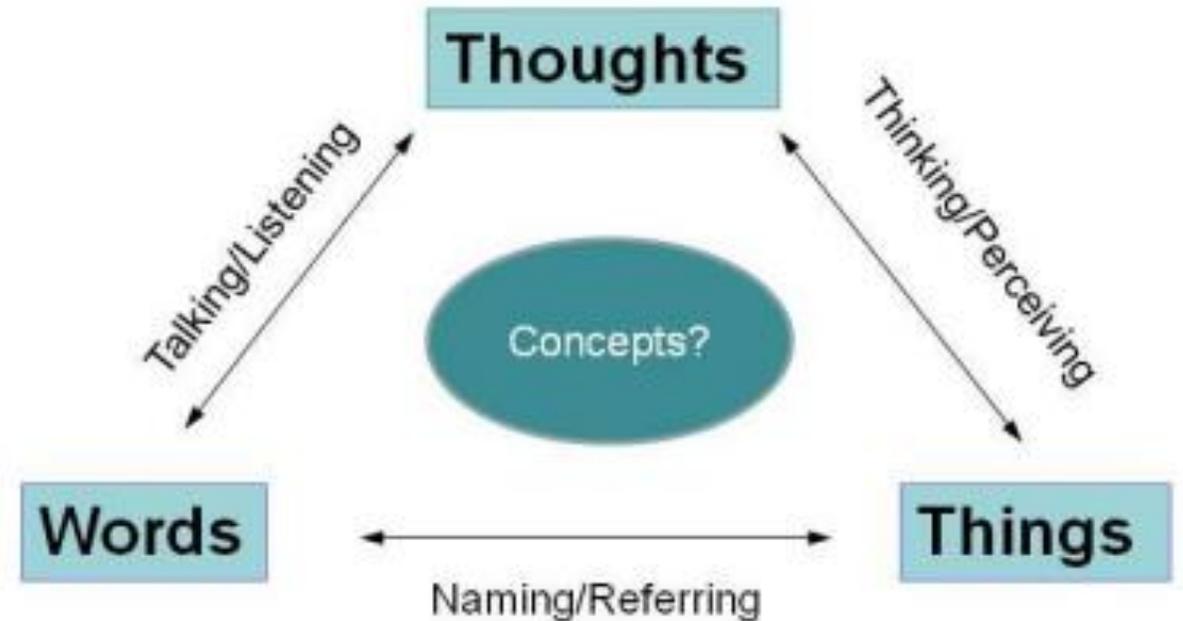
Peter Winstanley

Things and strings – semantic triangle

Natural language uses words for identity of things, but they are ambiguous

Semantic tech uses URLs/IRIs to identify entities and help remove that ambiguity.

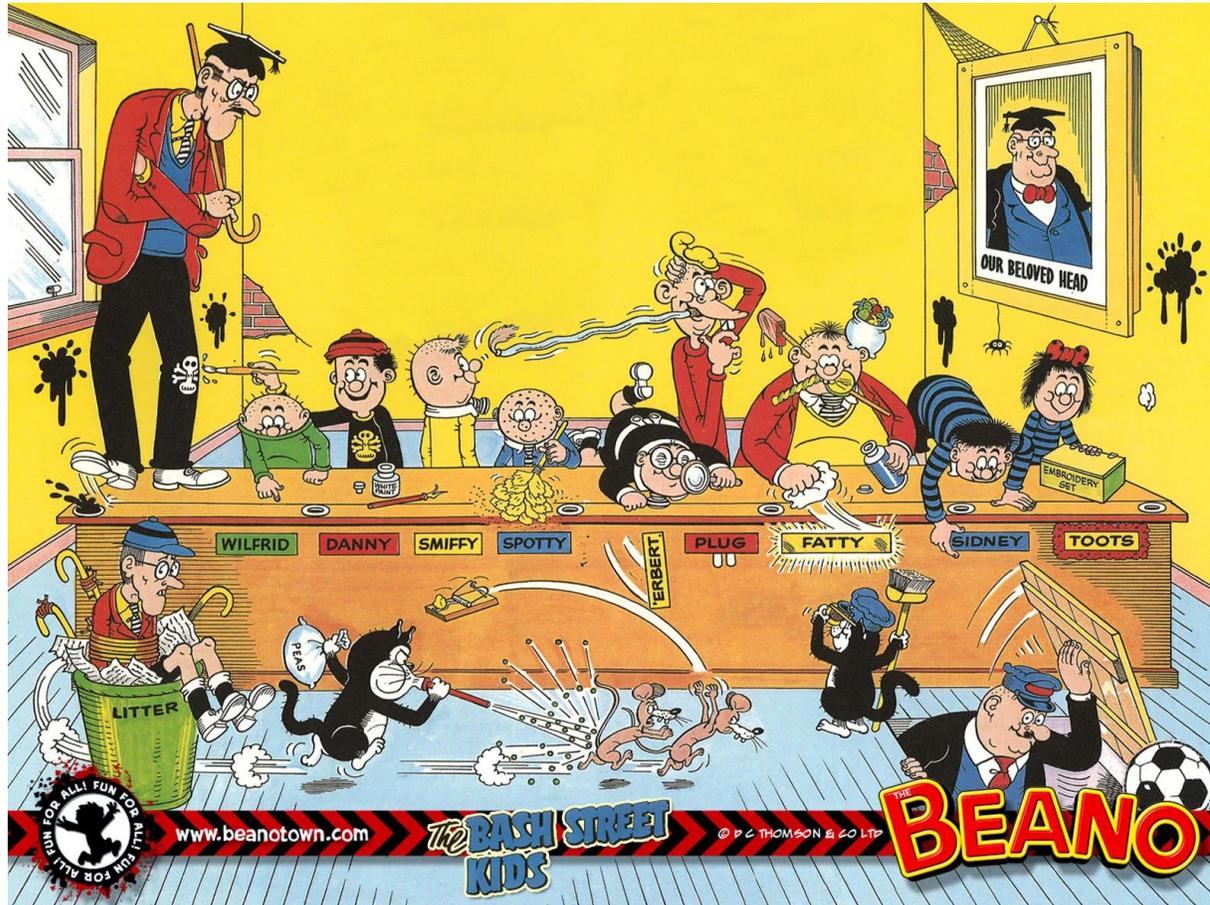
Whenever possible, use IRIs (“things”) rather than strings.



Resource Description Framework - RDF



Class and Instance



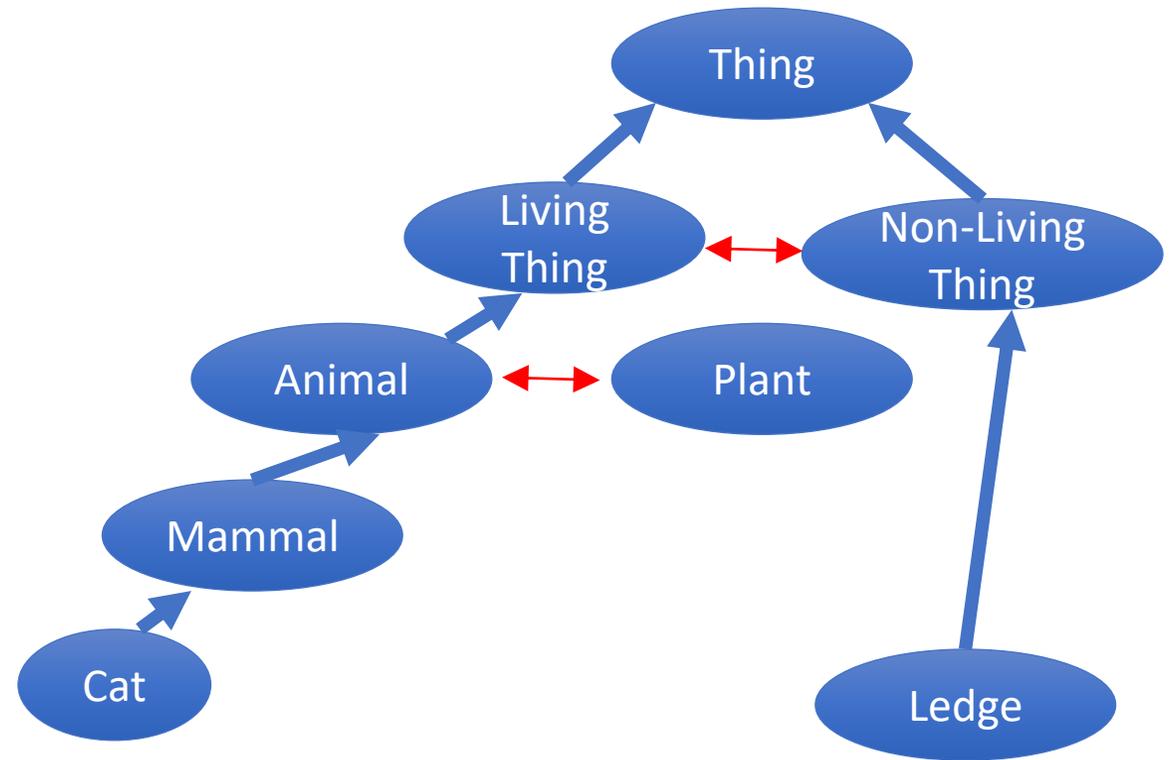
Ontologies are human constructs which provide a formal definition of concepts that we share agreement on. It is a mechanism for mutual understanding

A **Class** is a set which may contain things with the same characteristics.

An **Instance** or **Individual** is a single member of that Class.

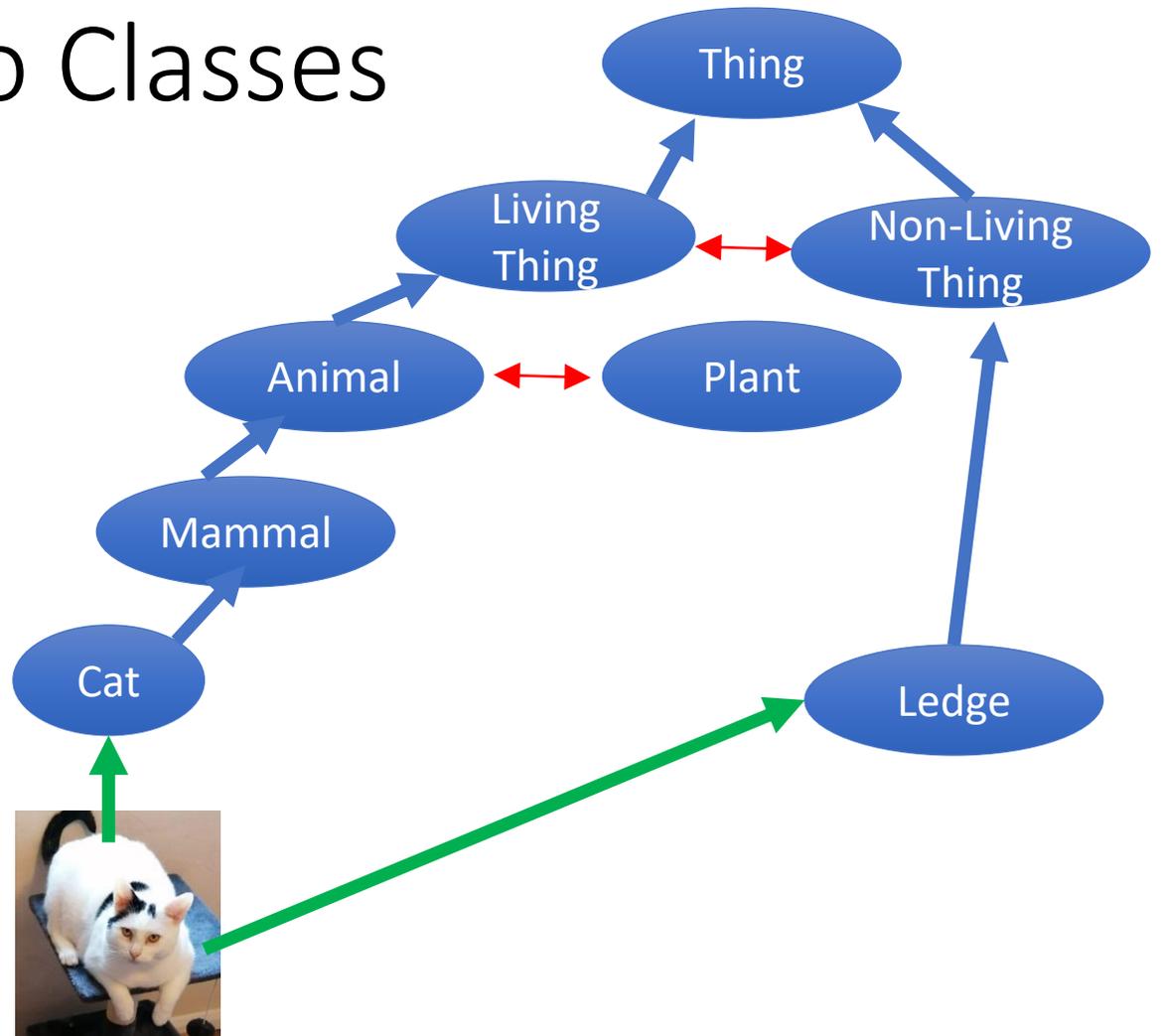
Class Definition

- via Class – Subclass relationships ()
- via Disjoint statements ()
- Class definitions must be accompanied by natural language specifications



Allocating Instances to Classes

- via `rdf:type` (is a) relationships to 1 or more Classes ()



Properties (predicates)

Properties describe the meanings of

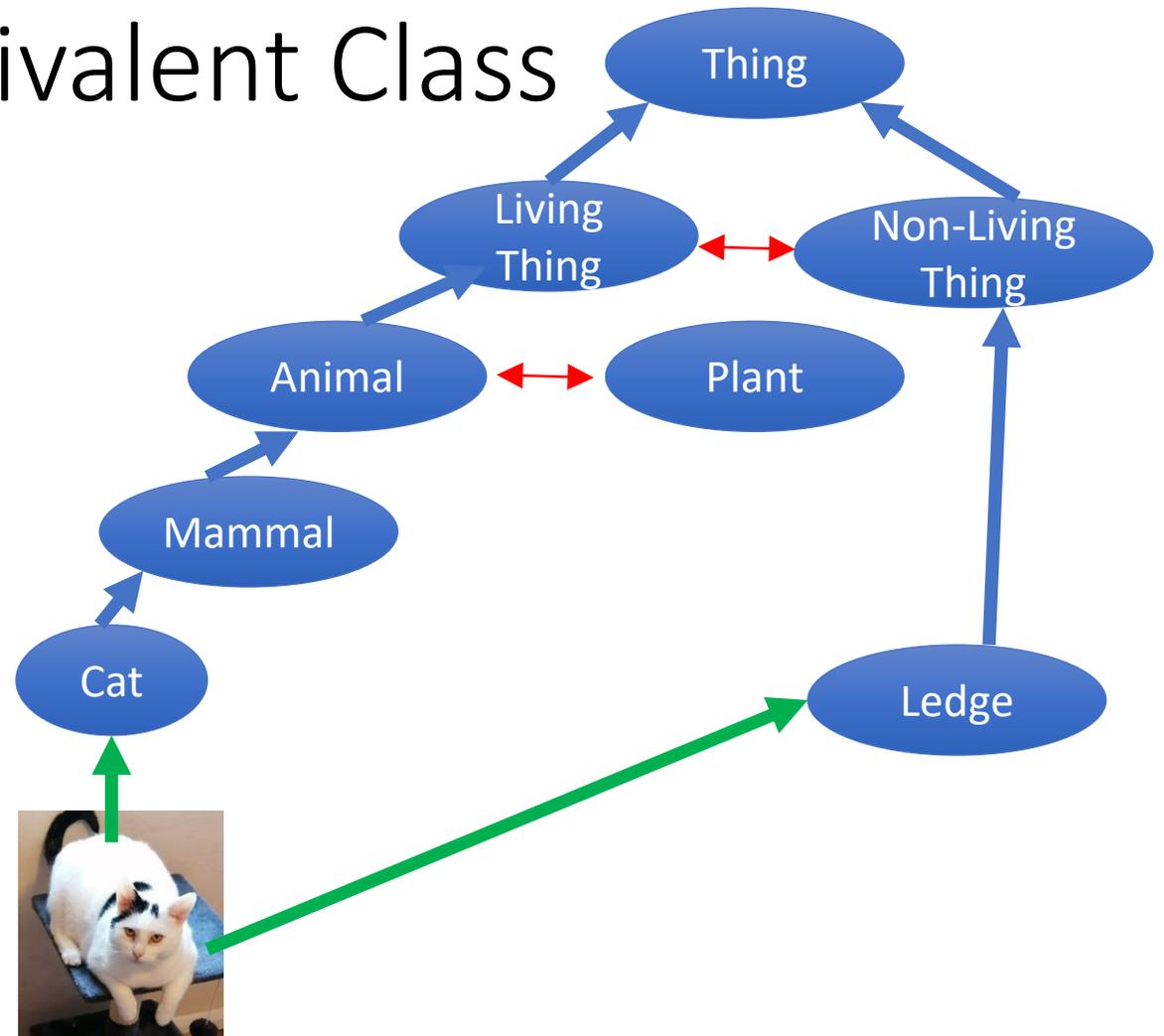
- relationships between instances of one class to other instances
- relationships between instances of one class to attributes

Properties provide the mechanism for inference about instances

Properties should be described in relation to each other (sub-property) and also a full natural language description so that people can agree on their meaning and usage.

Class Definition – Equivalent Class

- Properties can be used to define complex “equivalent” classes.
- Cat is equivalent to
 - a Mammal
 - with pointed ears
 - with retractable claws
 - with a long tail
 - with up to 4 legs
 - makes a purring noise
 - etc



Save time, ensure interoperability: use a core ontology

- A Starter Palette of Classes and Properties

A Selection of gist Top Classes

Category

A concept or label used to categorize other instances informally. Things that can be thought of as types are usually Categories.

Collection

Any identifiable grouping of instances. For instance, a jury is a collection of people.

Organization

A generic organization that can be formal or informal, legal or non-legal. It can have members, or not.

Commitment

An obligation (possibly unilateral).

Place

Union of all the geo classes

Event

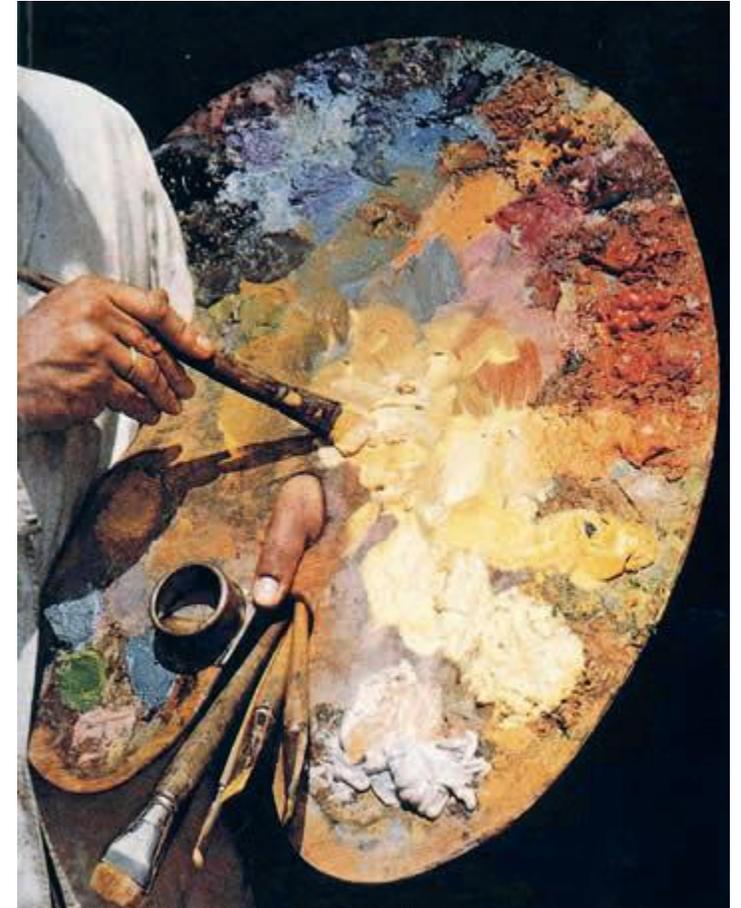
Something happening over some period of time, often characterized as some kind of activity being carried out by some person, organization, or software application.

Physical Identifiable Item

You could, at least in principle, put an RFID tag on members of this class. Physical things are made of something. E.g., statues are made of bronze.

Intention

Goal, desire, aspiration. This is the "teleologic" aspect of the system that indicates things are done with a purpose.



By Mlaoxve - http://en.wikipedia.org/wiki/Image:Oil_painting_palette.jpg,

Enterprise Lingua franca?: use a core ontology

- A Common Vocabulary

Home / All courses / Shared project vocabulary



Shared project vocabulary

£8.00

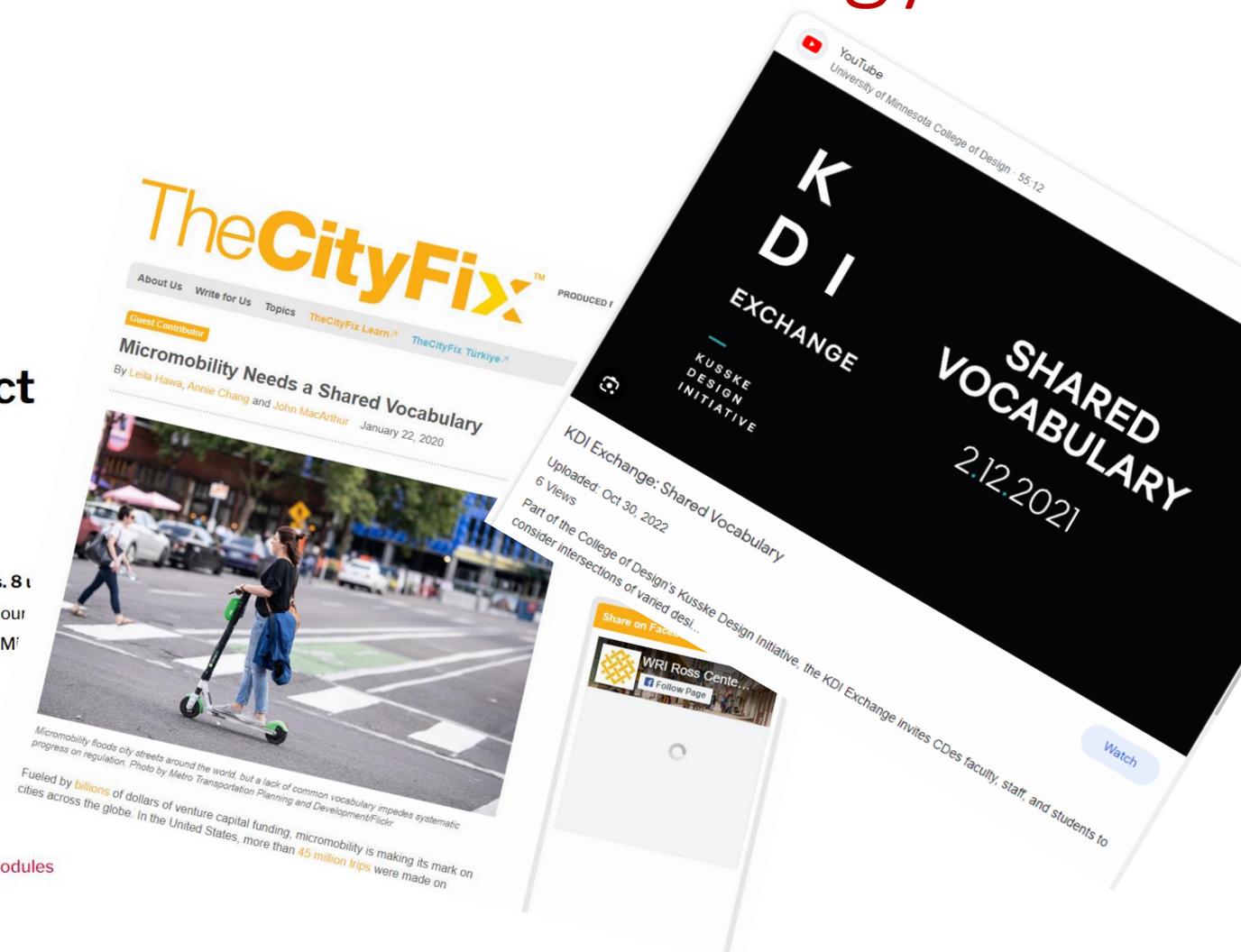
Individual module. 15 to 30 minutes. 8 for 1 person. Study online as part of our series for beginners and refreshers. Module gap fill.

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Chunked thought?: use a core ontology

- A Tool for Thought

Chunking of ideas in line with the shared vocabulary of the upper ontology is an effective way to improve collaborative problem-solving within enterprises and other communities.



'gist' – a core ontology for any business type

- open license – Creative Commons 3.0 Attribution ShareAlike
- <https://www.semanticarts.com/gist/>
- <https://github.com/semanticarts/gist>
- Ontology IRI: <https://w3id.org/semanticarts/ontology/gistCore>

‘gist’ – the “Goldilocks” level of abstraction

Too Abstract



Too Detailed

<https://digitalcollections.nypl.org/items/69b7beff-1641-5768-e040-e00a18061dc2>

Scope of 'gist'

- Persons & Organizations
- Physical things & substances
- Places
- Addresses & Identifiers
- Events
- Time & Temporality
- Intellectual Property
- Categories & Collections
- Intention
- Commitments & Offers
- Catalog Items, Products & Services
- Templates & Tasks
- Content, Media & Language
- Quantities, Units & Measures
- Schema Metadata

Persons and Organizations

Many things involve either a Person or an Organization and you don't know which beforehand.

- Party to an agreement / contract / sale
- Party on either side of an Obligation (giver/recipient)
- Allocate Identifiers
- Send or receive Messages
- Can own, govern and recognize –or– be owned, governed and recognized
- Has an address for receiving communications

Persons and Organizations (in Protege)

gist:Person — <https://ontologies.semanticarts.com/gist/Person>

Annotations Usage

Show: - this disjoints - named sub/superclasses

Found 47 uses of gist:Person

- gist:Agreement
 - gist:Agreement **EquivalentTo** gist:Commitment **and** (gist:hasParty **some** (gist:Organization **or** gist:Person)) **and** (gist:hasDirectPart **min** 2 gist:Obligation)
- gist:Category
 - gist:Category **SubClassOf** gist:isAllocatedBy **some** (gist:IntellectualProperty **or** gist:Organization **or** gist:Person)
- gist:comesFromAgent
 - gist:comesFromAgent **Range** gist:Organization **or** gist:Person
- gist:Commitment
 - gist:Commitment **EquivalentTo** (gist:Requirement **or** gist:Restriction) **and** (gist:hasGiver **some** (gist:Organization **or** gist:Person)) **and** (gist:isCategorizedBy **some** gist:DegreeOfCommitment)
- gist:ContingentObligation
 - gist:ContingentObligation **EquivalentTo** gist:Commitment **and** (gist:hasGiver **some** (gist:Organization **or** gist:Person)) **and** (gist:isTriggeredBy **some** gist:Event)
- gist:ControlledVocabulary
 - gist:ControlledVocabulary **EquivalentTo** gist:Collection **and** (gist:hasMember **some** gist:Category) **and** (gist:isGovernedBy **some** (gist:Organization **or** gist:Person))
- gist:goesToAgent
 - gist:goesToAgent **Range** gist:Organization **or** gist:Person
- gist:governs
 - gist:governs **Domain** gist:Intention **or** gist:Organization **or** gist:Person **or** gist:Template
 - gist:governs **Range** gist:Category **or** gist:Content **or** gist:GeoRegion **or** gist:IntellectualProperty **or** gist:Intention **or** gist:Organization **or** gist:Person **or** gist:Template
- gist:Group
 - gist:Group **EquivalentTo** gist:Collection **and** (gist:hasMember **some** gist:Person)

Persons and Organizations (in Protege)

gist:Person — <https://ontologies.semanticarts.com/gist/Person>

Annotations Usage

Show: this disjoints named sub/superclasses

Found 47 uses of gist:Person

- gist:hasBiologicalParent
 - gist:hasBiologicalParent gist:rangeIncludes gist:Person
- gist:hasCommunicationAddress
 - gist:hasCommunicationAddress **Domain** gist:Organization **or** gist:Person
- gist:hasParty
 - gist:hasParty **Range** gist:Organization **or** gist:Person
- gist:ID
 - gist:ID **EquivalentTo** gist:Content **and** (gist:isAllocatedBy **some** (gist:IntellectualProperty **or** gist:Organization **or** gist:Person)) **and** (gist:uniqueText **some** xsd:string)
- gist:isAllocatedBy
 - gist:isAllocatedBy **Range** gist:IntellectualProperty **or** gist:Organization **or** gist:Person
- gist:isRecognizedBy
 - gist:isRecognizedBy **Range** gist:Organization **or** gist:Person
- gist:Message
 - gist:Message **EquivalentTo** gist:ContentExpression **and** (gist:comesFromAgent **some** (gist:Organization **or** gist:Person)) **and** (gist:goesToAgent **some** (gist:Organization **or** gist:Person))
- gist:Obligation
 - gist:Obligation **EquivalentTo** gist:Commitment **and** (gist:hasGiver **some** (gist:Organization **or** gist:Person)) **and** (gist:hasRecipient **some** (gist:Organization **or** gist:Person))
- gist:Offer
 - gist:Offer **EquivalentTo** gist:ContingentObligation **and** (gist:hasDirectPart **some** gist:CatalogItem) **and** (gist:hasGiver **some** (gist:Organization **or** gist:Person)) **and** (gist:hasMagnitude **some** gist:Monetary) **and** (gist:hasPlannedEnd **some** gist:TimeInstant) **and** (gist:hasStart **some** gist:TimeInstant)
- gist:owns
 - gist:owns **Domain** gist:Organization **or** gist:Person

Organizations

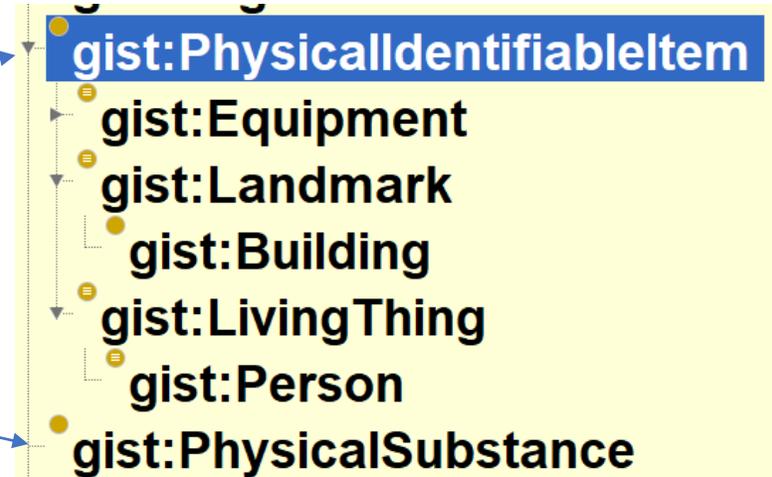
- Very general: “A generic organization that can be formal or informal, legal or non-legal. It can have members, or not.”
- Examples: Corporations, NGOs, clubs, committees, or departments.
- **Government Organizations: huge variety**
- CountryGovernment governs a GeoRegion with political boundaries
- You define the organizations that you need.

From IMF



Physicality

- Has mass & takes up space
- Things you can count .vs.
'Stuff' (e.g sand, water)
- Persons
- PhysicalSubstance:
 - NOT: the type of substance, e.g. insulin.
 - BUT: an actual amount of some substance
e.g. what's in the syringe in your hand



Building

- A physical thing
- Also a place
- Has an address



Person

- A human being that may or may not still be alive.
- Flesh and blood: has mass & takes up space
- No fictional characters
- Has a biological parent that is also a Person

Places

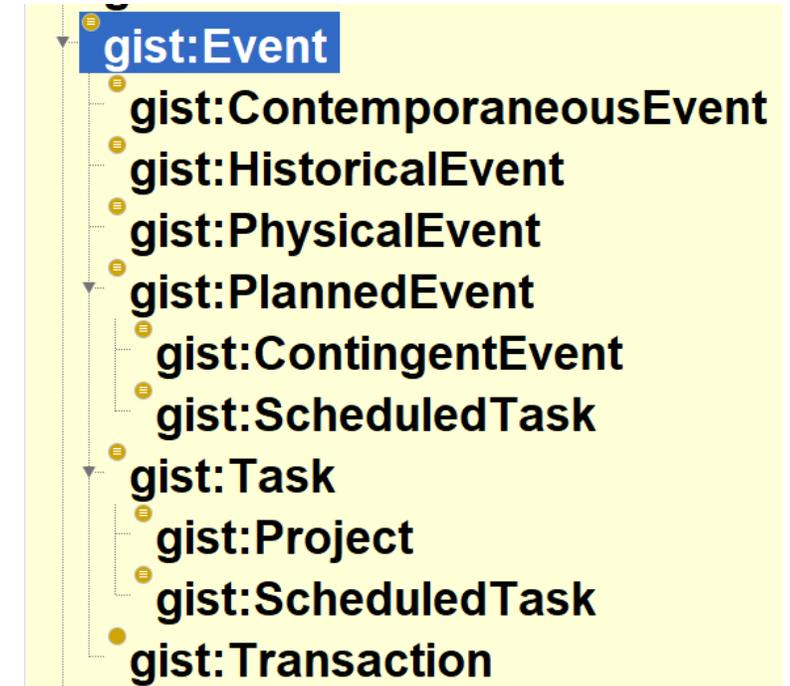
- Most often used: GeoRegion
 - natural or political boundaries.
- A CountryGovernment governs a GeoRegion ambiguously called a 'Country'
- Schema.org uses the term "Administrative Area" for regions with political boundaries such as country, county, city
- Note: TimeZone is really a region



Also a
PhysicalIdentifiableItem

Events

- Planned event
 - contingent event (insurance)
 - scheduled task (project planning)
- Historical event (records)
- Task (planned or completed)
- Project: a task with subtasks
- Transaction: affects an accumulator



Commitment

- A kind of Intention
- Agreement: e.g. LoanContract

Description: gist:Agreement

Equivalent To 

- **gist:Commitment**
and (gist:hasParty **some**
(gist:Organization or gist:Person))
and (gist:hasDirectPart **min 2** gist:Obligation)

- Obligation to fund the loan
- Obligation to make loan payments
- Account : Agreement with a Balance



Lets talk about Offers

Offer

- Something is on offer
- Offered by some party
- There is an amount of money
- The offer is valid for a certain time

Lets talk about
CatalogItems

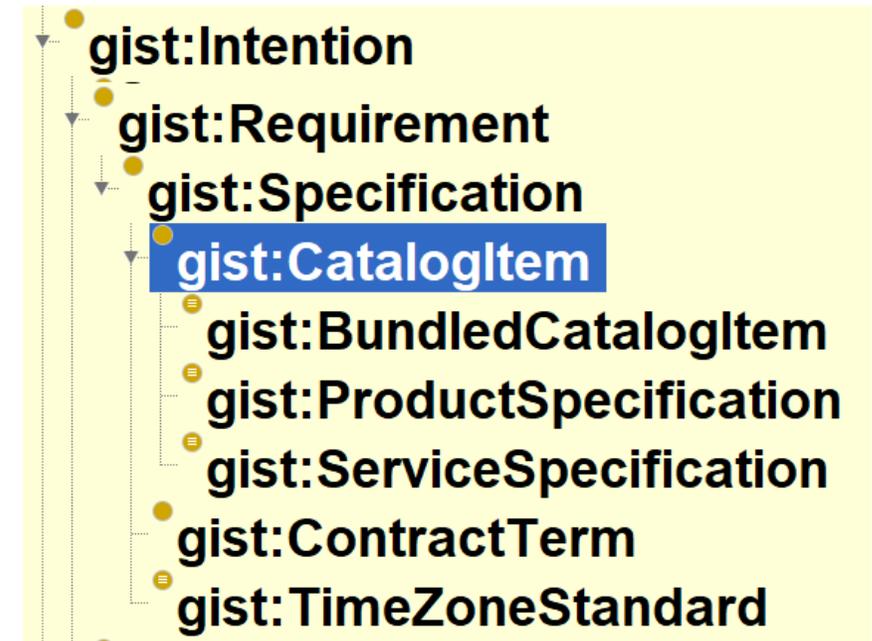
Description: gist:Offer

Equivalent To 

- **gist:ContingentObligation**
and (gist:hasDirectPart **some** gist:CatalogItem)
and (gist:hasGiver **some**
(gist:Organization **or** gist:Person))
and (gist:hasMagnitude **some** gist:Monetary)
and (gist:hasPlannedEnd **some** gist:TimeInstant)
and (gist:hasStart **some** gist:TimeInstant)

Catalog Item

- An unambiguous specification of something that can be offered for sale.
- What you would find in a catalog. You can order it.
 - iPhone SE 2020 Red 128G memory
- versus... a ProductCategory
 - iPhone 13, Tesla Model S
 - You cannot order a category.



Intention

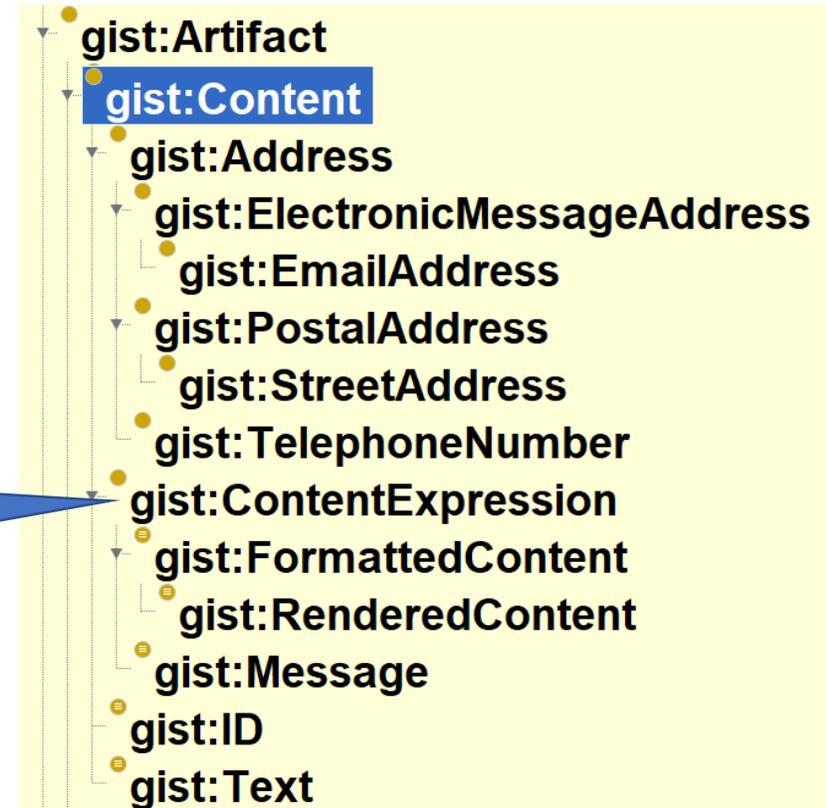
- Abstract class for characterizing how things should or should not be.
- Permission (e.g hospital license)
- Not often used:
 - Function
 - Goal
 - Requirement (except subclasses)
 - Restriction (not an OWL restriction)



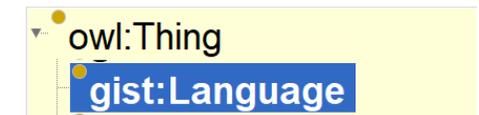
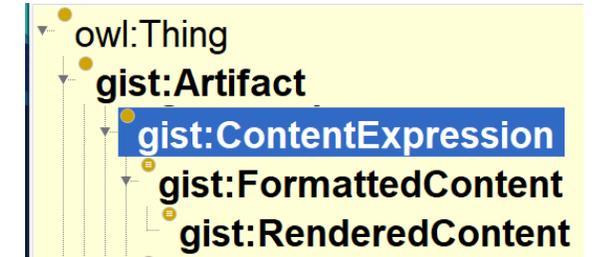
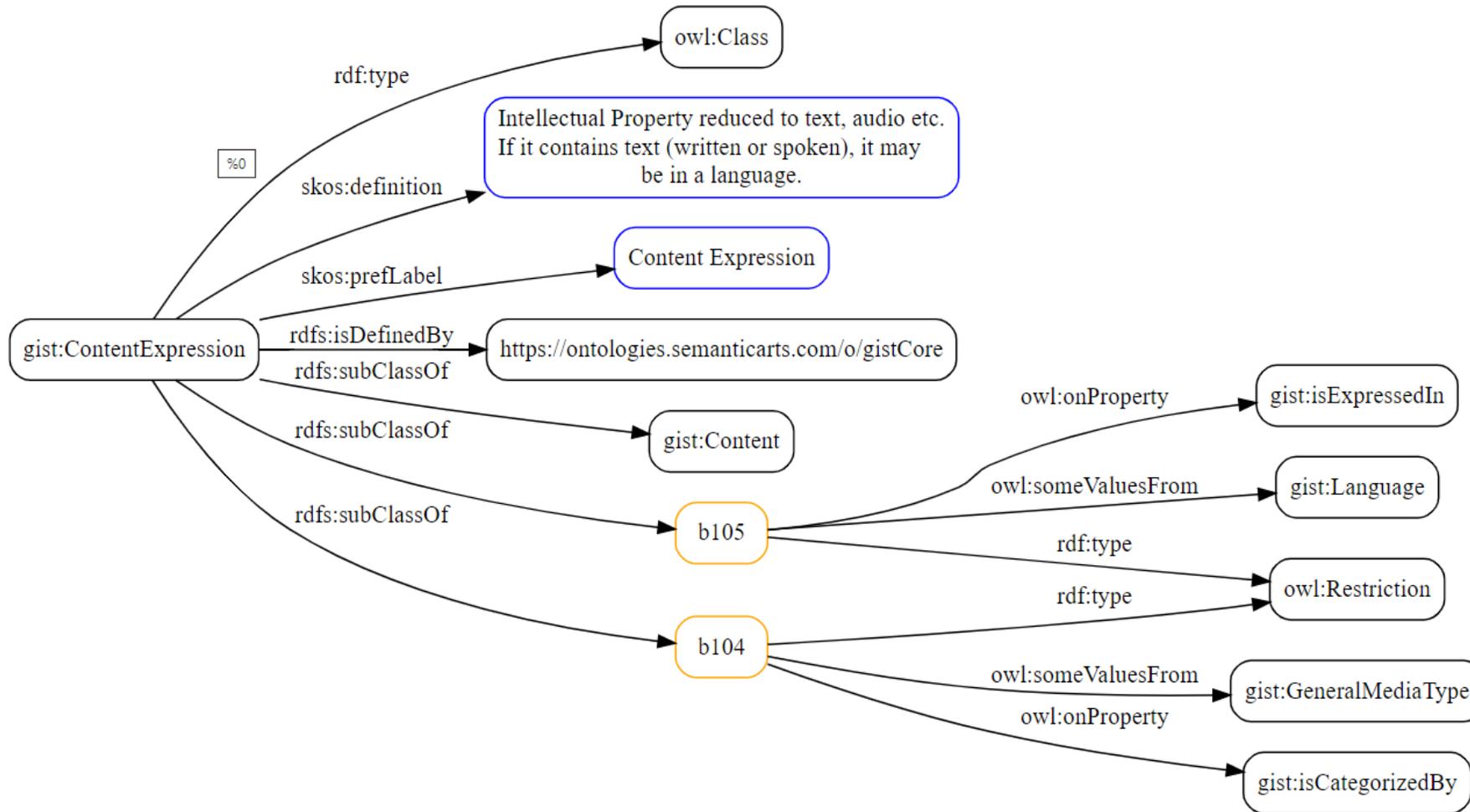
Content

- Documents
- Expressed in a Language
- Multi-media
- Addresses
- Messages
- Identifiers
- Text

Lets talk about
ContentExpressonsi



Content Expressions



gist:ID

- The key thing to remember is: the ID is not the same as the thing identified
 - You are not your Driver's License number

The screenshot displays an ontology editor interface. On the left, a class hierarchy is shown with 'owl:Thing' at the root, followed by 'gist:Artifact', 'gist:Building', 'gist:Component', 'gist:Content', 'gist:Address', 'gist:ContentExpression', 'gist:ID', and 'gist:Text'. The 'gist:ID' class is highlighted. On the right, the 'Annotations' tab is active, showing a list of annotations for 'gist:ID':

- skos:prefLabel** [type: xsd:string]: ID
- skos:definition** [type: xsd:string]: Content that is used to uniquely identify something or someone.
- rdfs:isDefinedBy**: <https://ontologies.semanticarts.com/o/gistCore>
- skos:example** [type: xsd:string]: SSN for a person; serial number for a product; employee ID.
- skos:scopeNote** [type: xsd:string]: This is used in conjunction with gist:identifiedBy

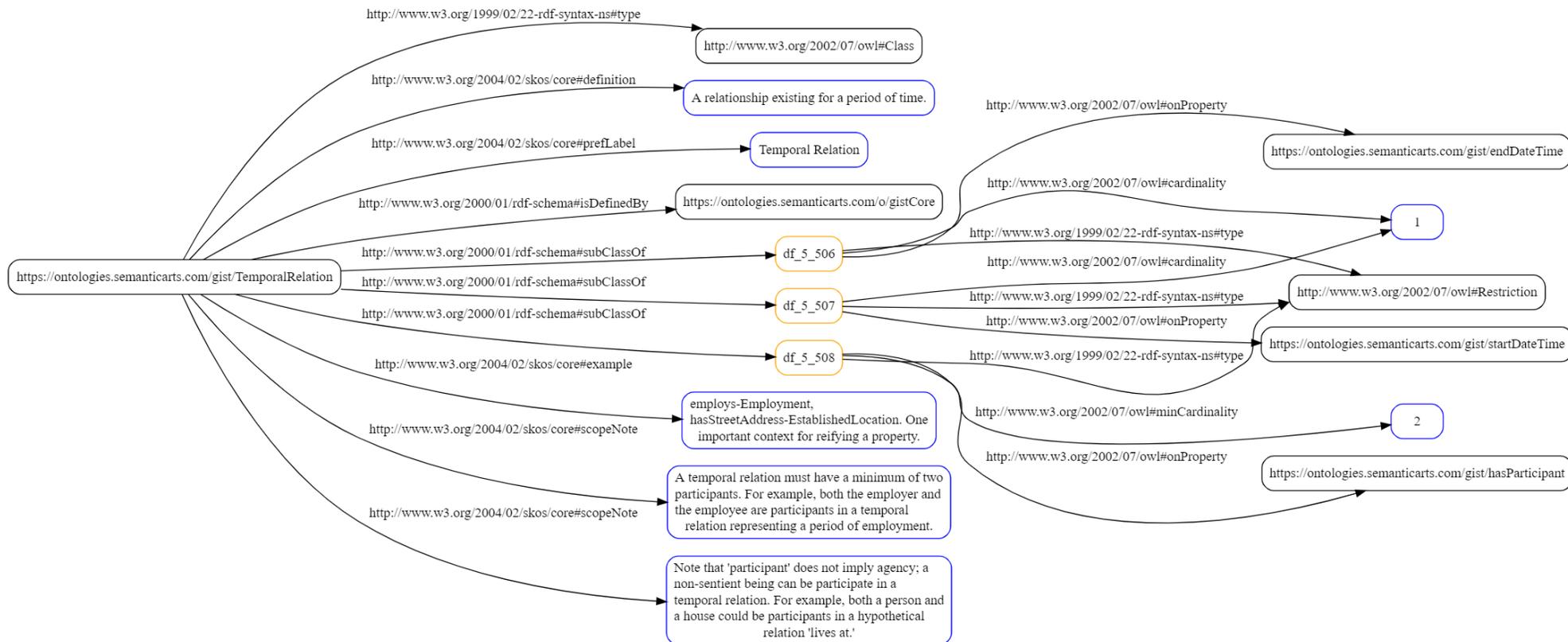
Below the class hierarchy, the 'Description: gist:ID' tab is active, showing the following logical definition:

Equivalent To +

- **gist:Content**
and (**gist:allocatedBy** some (gist:IntellectualProperty or gist:Organization or gist:Person))
and (**gist:uniqueText** some xsd:string)

A partial screenshot of the ontology editor showing a class hierarchy. The classes listed are: gist:Component, gist:Content, gist:Address, gist:ContentExpression, gist:ID (highlighted), gist:Text, gist:Equipment, and gist:IntellectualProperty.

Temporal Relation



“Digital twin” use case

- Legal compliance in an investment bank
- Needs to mirror the organisation
- Covers
 - the organisational structure
 - Lines of business
 - Data flows
 - etc

“Digital twin” use case

- Distribution network in power company
- Needs to mirror the transmission network
- Covers
 - the components
 - Lines connection
 - Voltages and other performance features
 - Connection between voltage levels – High -> Medium -> Low

'gist' is used in many business types

- open license – Creative Commons 3.0 Attribution ShareAlike
- <https://www.semanticarts.com/gist/>
- <https://github.com/semanticarts/gist>
- Ontology IRI: <https://w3id.org/semanticarts/ontology/gistCore>