Use cases: collection management

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with contributions from
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Collection management area

- Large data/text/image/multimedia/website sets with a common theme/context/focus
Classes as instances of other classes

Aircraft-type
no-of-engines: integer >0
propulsion: \{propeller, jet\}

Fokker-50
instance of Aircraft-type
no-of-engines = 2
propulsion = jet

Aircraft
no-of-seats: positive integer
owner: Airline

Fokker-50
subclass of Aircraft
no-of-seats: 40-50

PH-851
instance of Fokker-50
no-of-seats = 45
owner = KLM
Some remarks about classes as instances

- Common modeling issue
  - Martin: all classes are instances, some instances are not classes (introduces notion of “power class”)
  - Cf. Protégé-2000 modeling tool

- Representing Fokker-50 as a subclass of Aircraft-type does not solve the problem
  - Instances of Fokker-50 are not instances of Aircraft-type
  - Fixing class-instance border leads to constant revisions of ontology (cf. HPKB paper by Valente et al.)

- RDF and DAML+OIL allow it (?!), but semantics are problematic
Constraints (use cases 2, 3, 4)

- Examples:
  - wing-spar.length < wing.length
  - furniture.style = Late-Georgian <-> furniture.culture = British AND furniture.date-created = 1760-1811

- Can be expressed in DAML+OIL solution
  - Late Georgian things are an intersection of British things and 1760-1811 things

- But:
  - Syntax is awful (debatable whether this is an issue)
  - Language idioms required for usage in practice
Default knowledge (1, 2, 4)

- **Examples:**
  - living things don't fly
  - Late Georgian chests of drawers are typically made of mahogany wood

- **Essential for semantic search in collection**

- **Solution:** distinguish between definition and query semantics?!
Part-whole relation (use cases 2, 3, 4)

- Examples:
  - a wing spar is part of a wing assembly
  - chests of drawers have feet with their own style

- Most items in collections have some internal structure
Relation typing

- Example:
  - property P represents a time relation
- Possible in RDF
  - Define TimeProperty as subclass of Property
  - rdf:type P TimeProperty
- Is this desirable for OWL?
  - E.g. in a layered approach
  - Mechanism can also be used to define part-whole relation
Other requirements

- Synonyms / lexical term -> concept (1, 5)
- Provenance (1, 5)
  - Typical examples: distinguishing annotations by experts and non-experts, authorship of hyperlinks.
- Version management (1)
  - Ability to extend/revise ontology.
- Query support (1)
  - Ability to reason with falsehood, e.g. "whales as fish".
- Support for content standards (1, 3)
  - General thesauri (WordNet, TGN) as well as domain-specific thesauri (AAT, ICONCLASS) are often used to standardize annotations.
Using existing hierarchies from thesauri

<color>
  <chromatic color>
    pink
    vivid pink
    strong pink
  <intermediate pink>
    purplish pink
    brilliant purplish pink
    yellowish pink
  <neutral color>