TDT44 - Semantic Web

OWL

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  - Terms and Language Constructs
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Introduction
OWL: Web Ontology Language

- Most popular ontology language
- More complex and richer relationships than RDF Schema
- Much stronger reasoning ability
- Two versions: OWL 1 and OWL 2
  - OWL 1 is a subset of OWL 2

\[ \text{OWL} = \text{RDF Schema} + \text{new constructs for better expressiveness} \]
A Brief History

- 1990s: SHOE, OIL, DAML → DAML+OIL
- 2001: Revision of DAML+OIL → OWL (1)
- 2004: OWL 1 formal W3C recommendation
- 2005: Suggestions for incremental revisions (OWL 1.1)
- 2008: OWL 1.1 → OWL 2
- 2009: OWL 2 W3C standard
OWL 1: Terms and Language Constructs
OWL 1: Classes

- Localizing global properties
  - Value constraints: allValuesFrom, someValuesFrom, hasValue
  - Cardinality constraints: cardinality, minCardinality, maxCardinality

- Set operators
  - intersectionOf, unionOf, complementOf

- Enumeration
  - oneOf

- Equivalent
  - equivalentClass

- Disjoint
  - disjointWith
OWL 1: Properties

- **ObjectProperty vs DatatypeProperty**
- **Property characteristics**
  - SymmetricProperty
  - TransitiveProperty
  - FunctionalProperty and InverseFunctionalProperty
  - inverseOf
OWL 2: Terms and Language Constructs
OWL 2: Common Patterns

- Disjointedness
  - AllDisjointClasses,
  - disjointUnionOf

- Negative assertions
  - Negative(Object|Datatype)PropertyAssertion
  - sourceIndividual
  - assertionProperty
  - target(Individual|Value)
OWL 2: Improved Expressiveness for Properties

- Property cardinality restrictions
  - qualifiedCardinality
- Reflexive, irreflexive, asymmetric
  - ReflexiveProperty, IrreflexiveProperty, AsymmetricProperty
- Disjoint properties
  - propertyDisjointWith, AllDisjointProperty
- Property chains
  - propertyChainAxiom
OWL 2: Other Features

- Datatypes
  - More built in
  - Creating/extending datatypes
- Entity Declarations
  - Helps OWL tools
  - Optional
- Imports and Versioning
OWL 2: Language Profiles
OWL 2: Language Profiles

- OWL 2 Full vs. OWL 2 DL
- OWL 2 profiles
  - OWL 2 EL
  - OWL 2 QL
  - OWL 2 RL
Summary
Summary

- OWL extends on the idea behind RDF Schemas, allowing for more expressiveness, and thus stronger reasoning abilities
- OWL 1 does this by
  - Add restrictions to subclasses, such as ways of localizing global properties
  - Add characteristics to properties
- OWL 2 expands on this by
  - Adding constructs to simplify some common patterns
  - Adding improved expressiveness for properties
  - Defining 3 language profiles for different use cases
Thanks!