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LOGIC, RULES, AND INFERENCE

OVERVIEW

The architecture of the Semantic Web is comprised of a series of layers that form a hierarchy of content and logic. The ontology layer defines knowledge about content, concepts, and relationships. Currently, the RDF Schema (RDFS) is recognized as an ontology language that provides classes, properties, subclass relationships, range, and domain. However, RDFS has no localized range and domain constraints, no cardinality constraints, no provision for negation, and no transitive, inverse, or symmetrical properties. As a result, RDFS is unable to provide sufficient expressive power for machine processing on the Semantic Web. To expand the expressive capabilities of RDFS, three versions of the Web Ontology Language (OWL) have been developed: OWL Full is the union of OWL syntax and RDF, but it is undecidable, and therefore cannot provide complete reasoning support. The OWL Descriptive Logic (DL) is a sublanguage of OWL Full that has efficient reasoning support, but is not fully compatible with RDF. Web Ontology Language Lite is an “easier-to-implement” subset of OWL DL. Both RDF and OWL DL are specializations of predicate logic (also known as first-order logic (FOL)) that are used for Web knowledge representation. They provide a syntax that promotes their use on the Web in the form of tags, where