OWL Semantics

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Discussion

OWL semantics defines meaning through OWL ontology constructs, axioms, class expressions, property expressions, individuals, assertions, and formally defined inference rules.

OWL, the Web Ontology Language, provides an ontology language for the Semantic Web. OWL semantics gives formal meaning to OWL expressions, enabling software tools and reasoners to interpret OWL ontologies consistently.

OWL semantics differs from Ontological Semantics. Ontological semantics concerns the domain commitments expressed by an ontology. OWL semantics concerns the formal interpretation of OWL content.

OWL semantics also differs from semantics as a whole. OWL expresses selected ontology content using a formal ontology language. Semantics includes additional forms of meaning expressed through terminology, vocabularies, schemas, reports, type systems, rules, policies, lifecycle models, implementation artefacts, and conformance tests.

OWL semantic content includes:

- Classes
- Object properties
- Data properties
- Individuals
- Axioms
- Class expressions
- Property restrictions
- Equivalence assertions
- Disjointness assertions
- Subclass relationships
- Domain and range assertions
- Cardinality restrictions
- Individual assertions
- Consistency conditions
- Inference commitments
- Reasoner-derived classifications

A governed architecture preserves traceability from OWL semantics to the ontology, conceptual model, vocabulary, rule set, schema, report, or other semantic source that establishes the intended domain meaning.

Definition

meaning defined through OWL ontology constructs, axioms, assertions, class expressions, property expressions, and formally specified inference rules

Source

DIDO Solutions usage is informed by W3C Web Ontology Language (OWL), OWL semantics, ontology engineering practice, semantic modelling practice, and model-driven architecture principles.

Note

OWL semantics does not define all semantics. OWL semantics defines the formal interpretation of OWL expressions. Domain meaning remains governed by the conceptual model, ontology commitments, vocabulary, definitions, rules, policies, reports, schemas, and other authoritative semantic sources.

OWL reasoning derives consequences from OWL axioms under OWL semantics. OWL reasoning does not replace business judgment, policy interpretation, conformance testing, or implementation validation.

Example

An FX OWL ontology expresses selected ontology content using OWL classes, properties, and axioms.

OWL content	**OWL semantic meaning**
`FXTrade` declared as a class	individuals classified as `FXTrade` belong to the class of FX trades
`ConfirmedFXTrade` subclass of `FXTrade`	every confirmed FX trade is also an FX trade
`hasCounterparty` declared as an object property	the property relates one resource to another resource
`hasSettlementDate` declared as a data property	the property relates a trade to a data value representing a settlement date
`ConfirmedFXTrade` disjoint with `RejectedFXTrade`	no individual belongs to both classes at the same time under the ontology
`FXTrade` restricted to exactly two counterparties	an individual trade conforms to this OWL constraint only when it has two counterparty relationships

OWL semantics supports formal processing of these expressions. For example, when `Trade-123` is asserted as a `ConfirmedFXTrade`, an OWL reasoner also classifies `Trade-123` as an `FXTrade` because `ConfirmedFXTrade` is a subclass of `FXTrade`.

This inference expresses OWL semantics. The business meaning of confirmation still comes from the

FX conceptual model, lifecycle rules, validation rules, and governance context.