

Graph Semantics

[Go up to Terms and Definitions](#)

Discussion

Graph semantics defines meaning through nodes, edges, identifiers, graph statements, graph patterns, graph vocabularies, and graph constraints.

A graph represents information by connecting things through relationships. In semantic graph work, the meaning comes from the governed identifiers, relationship names, vocabulary definitions, constraints, and traceability that give the graph structure its intended interpretation.

[RDF](#) provides a graph-based framework for representing information. An [RDF graph](#) contains [RDF triples](#). Each RDF triple expresses one subject-predicate-object statement.

Graph semantics differs from graph structure. Graph structure identifies connected nodes and relationships. Graph semantics explains what those nodes and relationships mean within a defined domain.

Graph semantics also differs from [ontology](#) and [OWL](#). An ontology captures selected semantic commitments for a domain. OWL provides an [ontology language](#) for the Semantic Web. A graph expresses semantic content when the graph preserves traceability to governed vocabulary, conceptual meaning, ontology content, rules, schemas, or other authoritative semantic sources.

Graph semantic content includes:

- Nodes
- Edges
- RDF triples
- Subject identifiers
- Predicate identifiers
- Object identifiers
- Graph patterns
- Relationship names
- Controlled vocabularies
- Named graphs
- Graph constraints
- Graph queries
- Inferred relationships
- Provenance relationships
- Traceability to domain meaning

A governed architecture preserves [traceability](#) from graph semantics to the [conceptual model](#), vocabulary, ontology, schema, rule set, or other semantic source that establishes the intended meaning.

Definition

meaning defined through graph statements, graph relationships, graph patterns, identifiers, and constraints within a defined graph representation context

Source

DIDO Solutions usage, informed by RDF, graph data modeling, semantic graph practice, ontology practice, and semantic traceability practice.

Note

Graph semantics is not equivalent to graph structure. Graph structure connects nodes and relationships. Graph semantics establishes the meaning of those nodes and relationships through governed identifiers, vocabularies, ontologies, schemas, rules, constraints, and domain models.

Example

An FX graph represents information about Trade - 123 using RDF triples.

Subject	Predicate	Object	Semantic interpretation
Trade - 123	hasCounterparty	LEI - 5493001KJTIIGC8Y1R12	the trade involves the identified legal entity as a counterparty
Trade - 123	hasCurrencyPair	EUR/USD	the trade exchanges euros and US dollars
Trade - 123	hasNotionalAmount	1000000	the trade has a defined notional amount
Trade - 123	hasTradeDate	2026 - 07 - 07	the trade occurs on the stated trade date
Trade - 123	hasSettlementDate	2026 - 07 - 09	the trade settles on the stated settlement date
Trade - 123	hasLifecycleState	Confirmed	the trade has reached the confirmed lifecycle state
Trade - 123	wasValidatedBy	Validator - Structural - 01	the trade has validation evidence from the structural validator

The graph structure connects Trade - 123 to counterparties, dates, amounts, lifecycle state, and validation evidence. The graph semantics comes from the governed meanings of hasCounterparty, hasCurrencyPair, hasNotionalAmount, hasTradeDate, hasSettlementDate, hasLifecycleState, and wasValidatedBy.

The same graph structure has different semantics when the predicates come from a different vocabulary or lack traceability to defined domain meaning. For example, a predicate named hasDate

does not distinguish trade date, settlement date, effective date, or termination date. Graph semantics requires governed relationship names or additional constraints that preserve those distinctions.

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