



Semantic Web



Semantic Web

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What is Semantic Web?

- Allows information to be processed automatically by tools as well as manually.
- Can infer potential relationships among pieces of data.
- Extends principles of the World Wide Web from documents to data through the development of a common framework.
- Allows data to be shared and reused across application, enterprise, and community boundaries.



Semantic Web

Developing Semantic Web using the 5 Rules of Software Development:

- Solves complex technical solutions once thought unsolvable.
- Maximizes product shelf life.
- Reduces product cost.

5 Rules of Software Development

1. W3C specifications ahead of JSR specifications.
2. JSR ahead of defacto standards.
3. Defacto standards ahead of custom development.
4. Compositional patterns to create software systems.
5. Use design patterns when creating custom code.

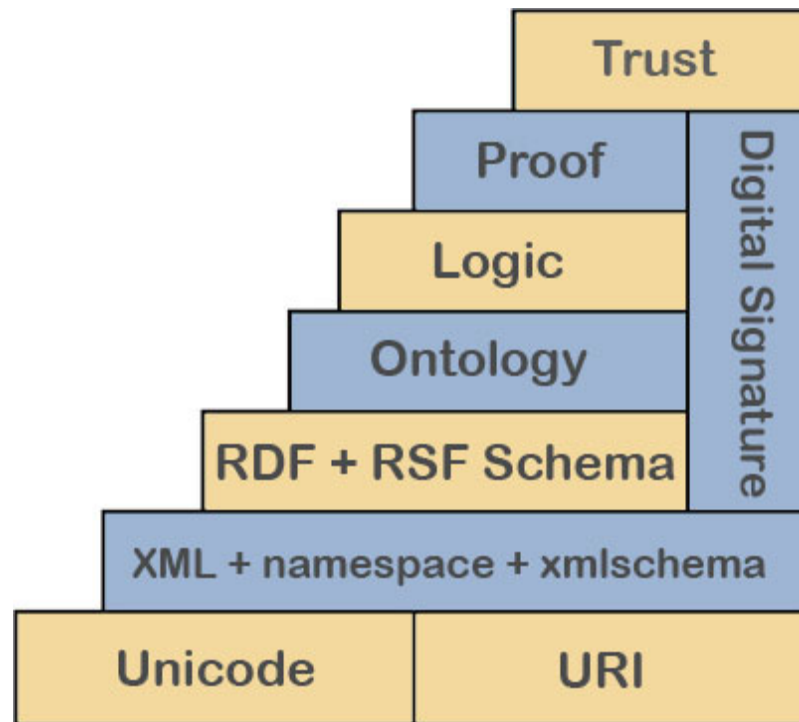


Semantic Web

- Specification Oriented Approach
- EJB3, JAAS, SSL, W3C Workflow XPD L 2.0
- RDF, OWL
- Variable Ontologies
- Namespaces
- XML
- RDF
- RDFS
- OWL

Semantic Web

Semantic Web Layers

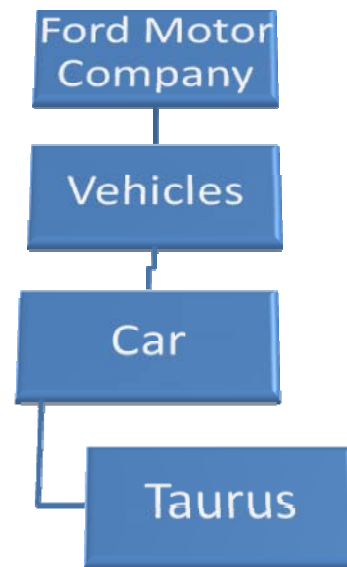


Variable Ontologies

- Provides for interchangeable format systems to exchange data removing the possibilities for rewrites when information changes.
- Flexible storage so schema doesn't have to change as problems become more complex.
- Next generation of visualization through browsers.
- Ability to add analytical data through reasoning.

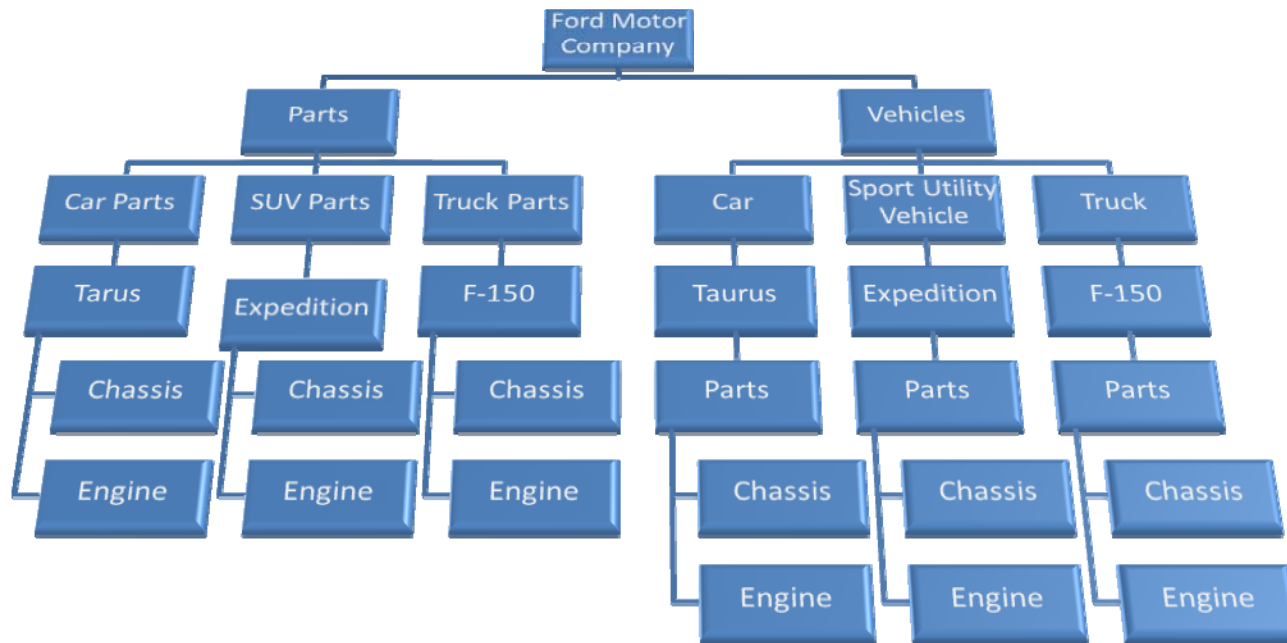
Variable Ontologies – Ford Taurus Hierarchy

Example: The hierarchy of the Ford Taurus



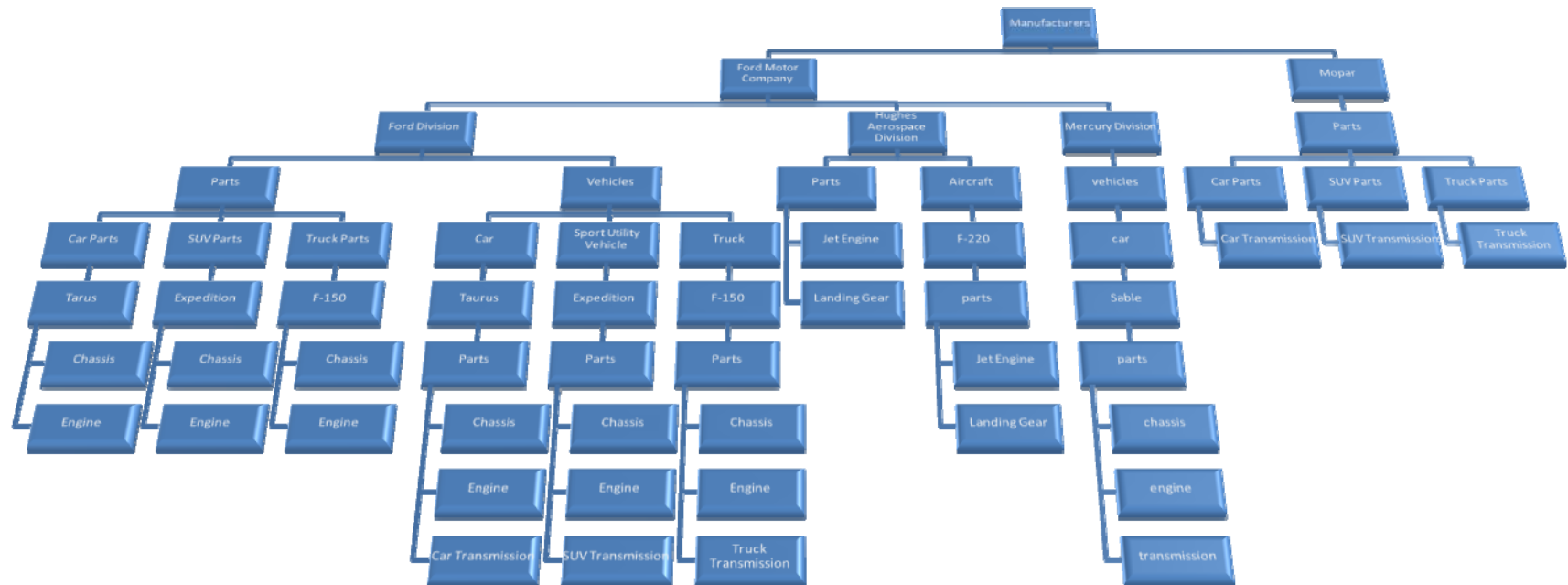
Variable Ontologies – XML Diagram

Expanding the Ford Motor Company ontology will lead to a more formalized data structure and with implied relationships between different pieces of data. For instance Ford produces more than one type of vehicle, and they also make parts for the vehicles they manufacture. Look at what happens when the F-150 Truck and Expedition Sport Utility Vehicle and some vehicle parts like a chassis and engine for each are added.



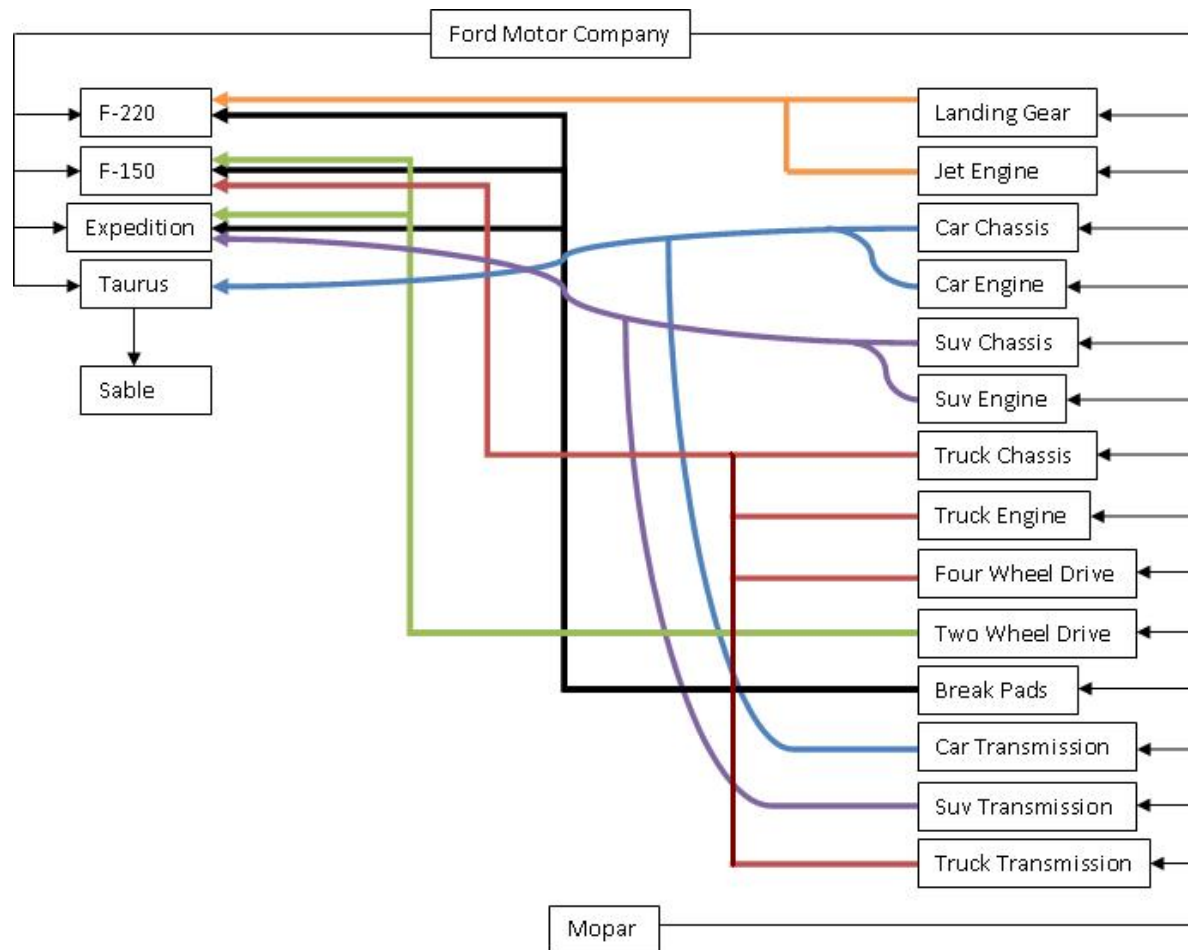
Variable Ontologies – XML Diagram

What happens when Ford Motor Company uses an outside parts manufacturer to supply a part for one of the vehicles it manufactures? What happens when Ford produces another vehicle under a different make and model like the Mercury Sable that is virtually identical to the Taurus? What happens when Ford Motor Company purchases Hughes Aerospace and begins producing aircraft and aircraft parts?



Variable Ontologies – RDF Diagram

The diagram below shows how the OWL has simplified the data representation cleaning up the duplication and establishing the relationships between the different data objects.



Solved Problems: RDF & RDFS

- ❖ Vocabulary oriented variable ontologies
- ❖ Solved problem space:
 - ❖ We can bring back 3,000 entries from 5 terabytes of data in 250 milliseconds.
 - ❖ We can materialize URI's in 20 milliseconds per URI.
 - ❖ As a result, we can bring back one page of data to scale.
 - ❖ Utilizes non-relational structure either partially or fully resulting in polynomial response times.