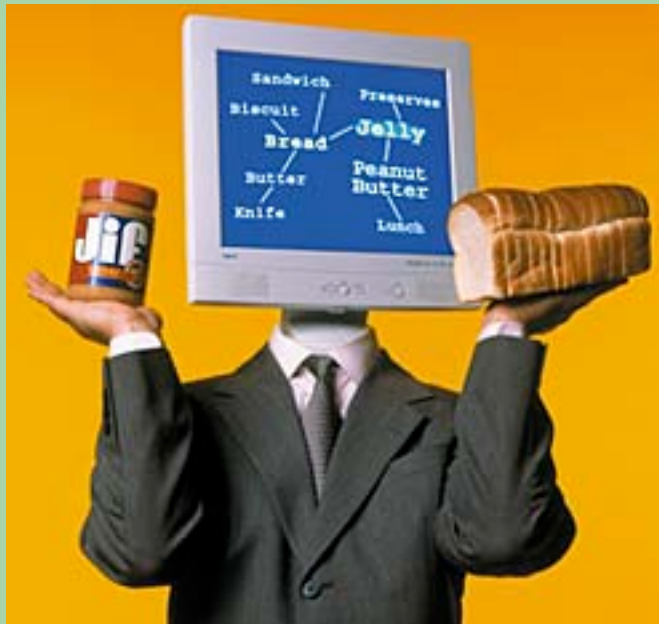


10 Practical Reasons why you need an Ontology



Michael C. Daconta

Chief Architect

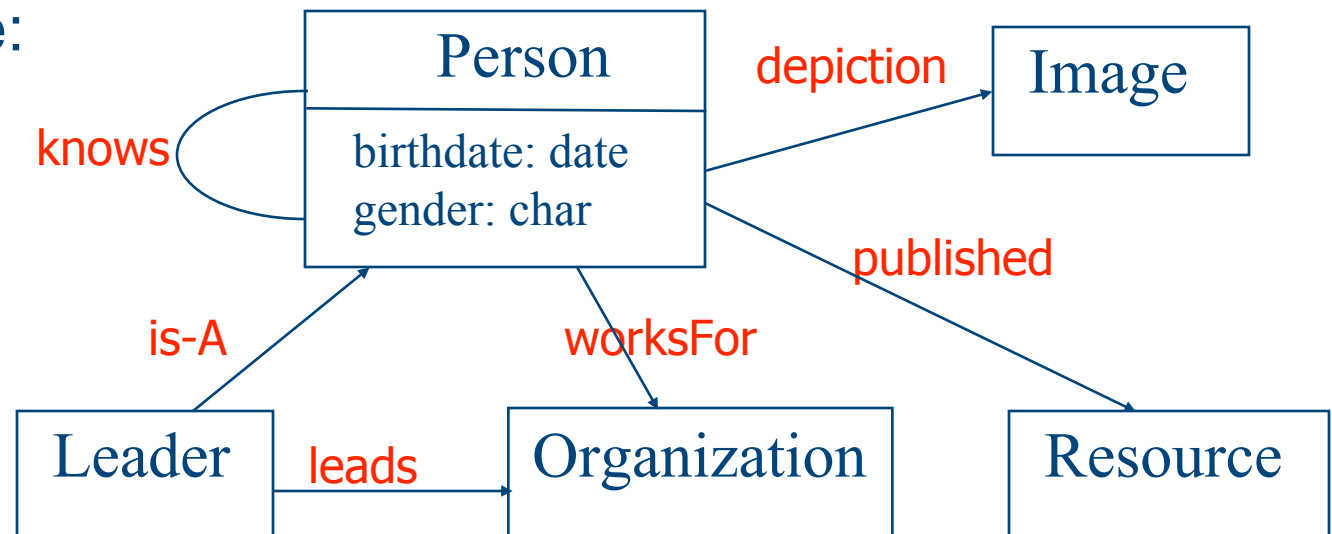
Virtual Knowledge Base

Outline

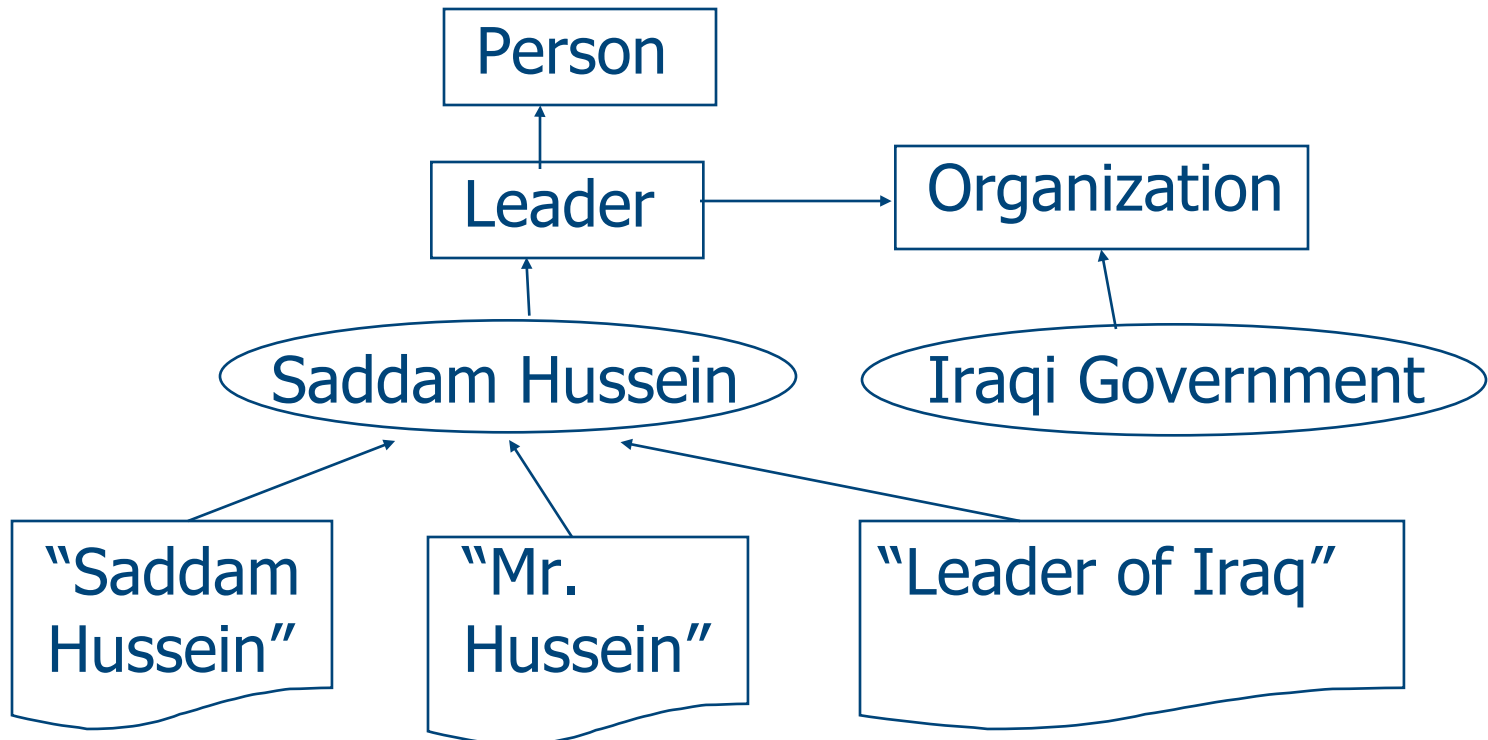
- What is an Ontology?
- 10 Practical Reasons
 - Ontologies unambiguously define things.
 - Associations bridge stove-piped domains.
 - Ontologies can expand/narrow search terms.
 - Ontologies enable “Activity-based” search.
 - Ontologies can validate taxonomy membership.
 - Ontologies can be distributed and aggregated.
 - Ontologies map to dbms, OOP and UML modeling.
 - Ontologies + Rules = Inference.
 - Ontology concepts are mature.
- Conclusion

What is an Ontology?

- Useless Definition:
 - “A specification of a conceptualization”
- Practical Definition:
 - An object model or entity-relationship model
- Example:

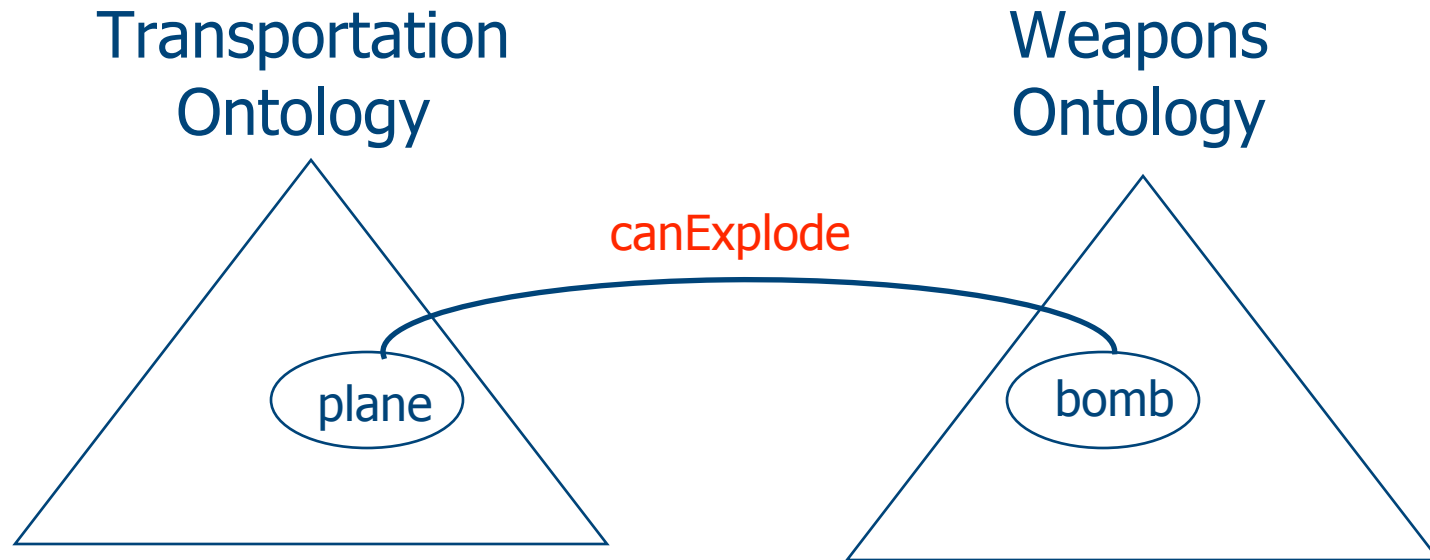


Reason #1: Ontologies unambiguously define things.



- 3 separate syntaxes → same “thing”
- Essential for Authoritative search.

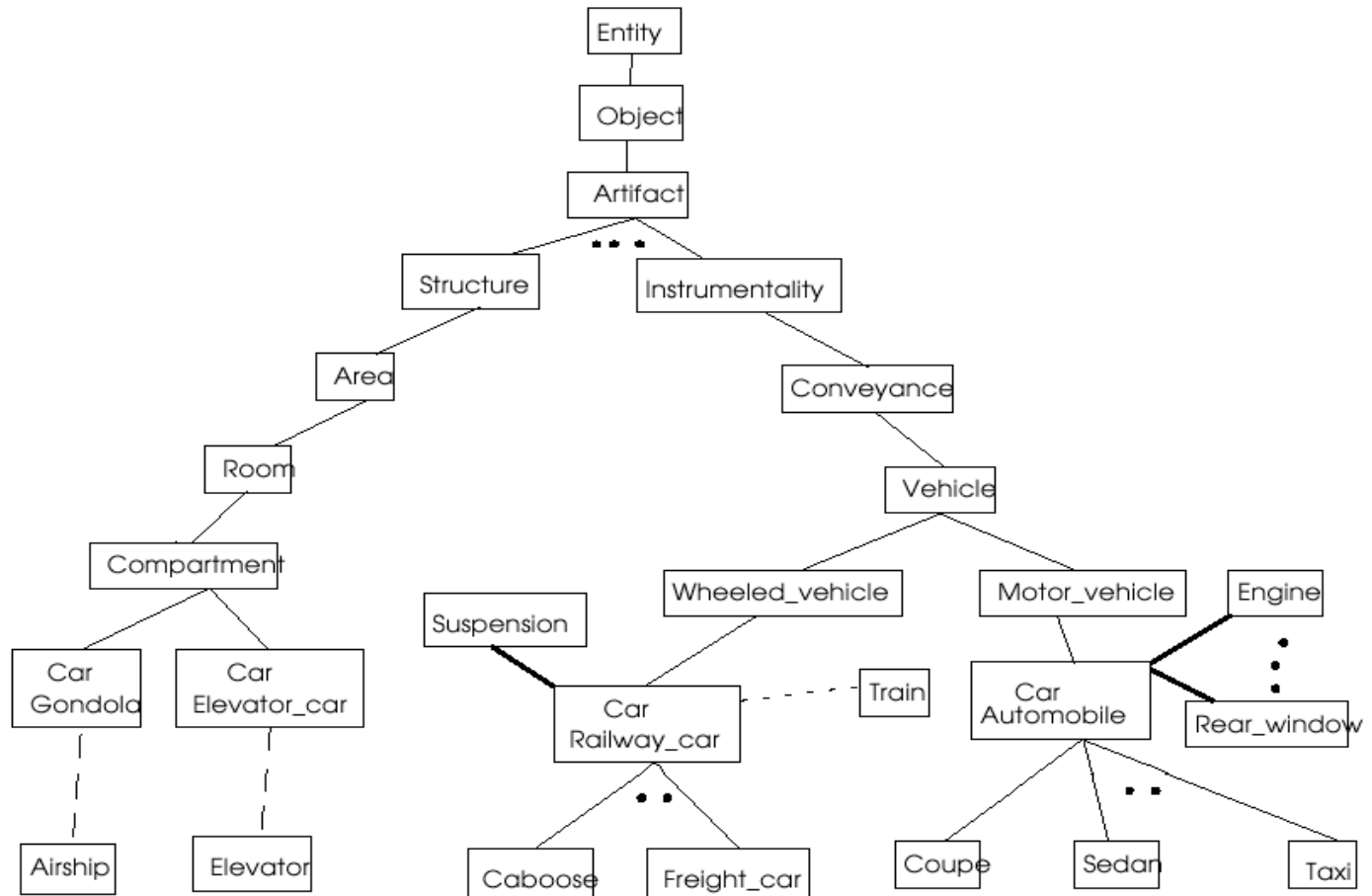
Reason #2: Associations bridge stove-piped domains



















- Essential for Asymmetric Search
- “Search by association” is the “killer-app” for robust ontologies.

Reason #3: Ontologies can expand/ narrow search terms

Wordnet
Extract
For
Concept
"car"







Wordnet Relations

<u>Relation</u>		<u>Example</u>	
Allow trigger links	Clinton		Whitewater
Allow synonym links	bike		bicycle
Allow generalization links	tree		acacia
Allow specialization links	shoe		footwear
Allow comprises links	Turkey		Istanbul
Allow part-of links	CPU		computer
Allow antonym links	opaque		clear
Allow rhyme links	Reno		casino
Allow sounds-like links	candle		cancel
Allow anagram links	Geraldine		realigned
Allow occupation links	Leonardo da Vinci		painter
Allow nationality links	Martin Luther		German
Allow birth year links	Orville Wright		1871
Allow death year links	Gilda Radner		1989
Allow biographical trigger links	Jesse Louis Jackson		rainbow
Allow <i>also known as</i> links	John Ono Lennon		John Lennon

Narrowing Search

The screenshot shows the Flashline website's 'Advanced Product Search' interface. The top navigation bar includes the Flashline logo and the tagline 'TRANSFORMING SOFTWARE DEVELOPMENT'. Below this is a menu with links for Home, Flashline CMEE, Marketplace, Services, Resources, News / Events, and About Flashline. The 'Marketplace' section is active, displaying a search box with the text 'indexing' and a 'Go' button. To the left, there are links for 'Components Only' and 'Advanced Component Search', along with a list of product categories like 'Java Products', '.NET / COM Products', 'BetaBeans', 'New Products', and 'Vendor List'. Below that are links for 'Shopping Cart', 'Your Account', 'File Archive', 'Corporate Accounts', 'Help', and 'Contact Us'. The main search area is titled 'Advanced Product Search' and contains several filters: 'General Search' (with the input 'indexing'), 'Product Name', 'Vendor Name', 'Framework / Platform' (set to 'Java'), 'Technology' (set to 'EJB'), 'Category' (set to 'Information Management'), and 'Subcategory' (set to 'Content Management'). A 'Search Now' button is located at the bottom of the search filters.

FLASHLINE  TRANSFORMING SOFTWARE DEVELOPMENT   

[Home](#) [Flashline CMEE](#) [Marketplace](#) [Services](#) [Resources](#) [News / Events](#) [About Flashline](#)

Marketplace

Search

Components Only
[Advanced Component Search](#)

- [Java Products](#)
- [.NET / COM Products](#)
- [BetaBeans](#)
- [New Products](#)
- [Vendor List](#)

- [Shopping Cart](#)
- [Your Account](#)
- [File Archive](#)
- [Corporate Accounts](#)
- [Help](#)
- [Contact Us](#)

Advanced Product Search

General Search

Search product name or description.

Product Name

Enter any part of the Product's name.

Vendor Name

Enter any part of the Vendor's name.

Framework / Platform

Select a platform for the product you want to find.

Technology

Select a Technology for the product you want to find.
You must select a Platform first.

Category

Select a Category for the product you want to find.
You must select a Platform first.

Subcategory

Select a Subcategory for the product you want to find.
You must select a Platform and a Category first.

Semantic Search Example (TAP)



[Search Tips](#)

Tim Berners Lee

Search

Semantics by TAP

Search WWW Search w3.org

Searched pages from **w3.org** for **Tim Berners Lee** . Results **1 - 10** of about **7,450**. Search took **0.16** seconds.

Tim Berners-Lee

Tim Berners-Lee. Weaving the Web by **Tim Berners-Lee** with Mark Fischetti, (Harper San Francisco; Hardback: ISBN:0062515861, Abridged ...

Description: Includes biographies, information about his book, as well as questions and answers about his contribution...

Category: [Computers](#) > [Internet](#) > [History](#) > [People](#) > [Berners-Lee, Tim](#)
www.w3.org/People/Berners-Lee/ - 11k - [Cached](#) - [Similar pages](#)

People of the W3C

... Baron, Caroline: Administrative Support **Berners-Lee, Tim**: Management Booth, David:

Architecture Bos, Bert: Document Formats Bournez, Carine: Architecture Boyera ...
www.w3.org/People/ - 17k - 9 Sep 2002 - [Cached](#) - [Similar pages](#)

Who's Who at the World Wide Web Consortium

... Management. **Tim Berners-Lee**, Director. ... Amy van der Hiel. Amy van der Hiel is the

assistant to **Tim Berners-Lee** and works as part of the administrative team. ...
www.w3.org/People/all - 100k - [Cached](#) - [Similar pages](#)

People who have contributed to the World Wide Web project

... (more). **Tim Berners-Lee**. Please see W3C People, a list of people involved with the World Wide Web Consortium. Thomas R Bruce. Formerly ...

www.w3.org/People.html - 14k - [Cached](#) - [Similar pages](#)

Frequently asked questions by the Press - Tim BL



[Tim Berners-Lee](#)

timbl@w3.org

Tim invented the World Wide Web in late 1990 while working at CERN, the European Particle Physics Laboratory in Geneva, Switzerland. He wrote the first WWW client

... ..

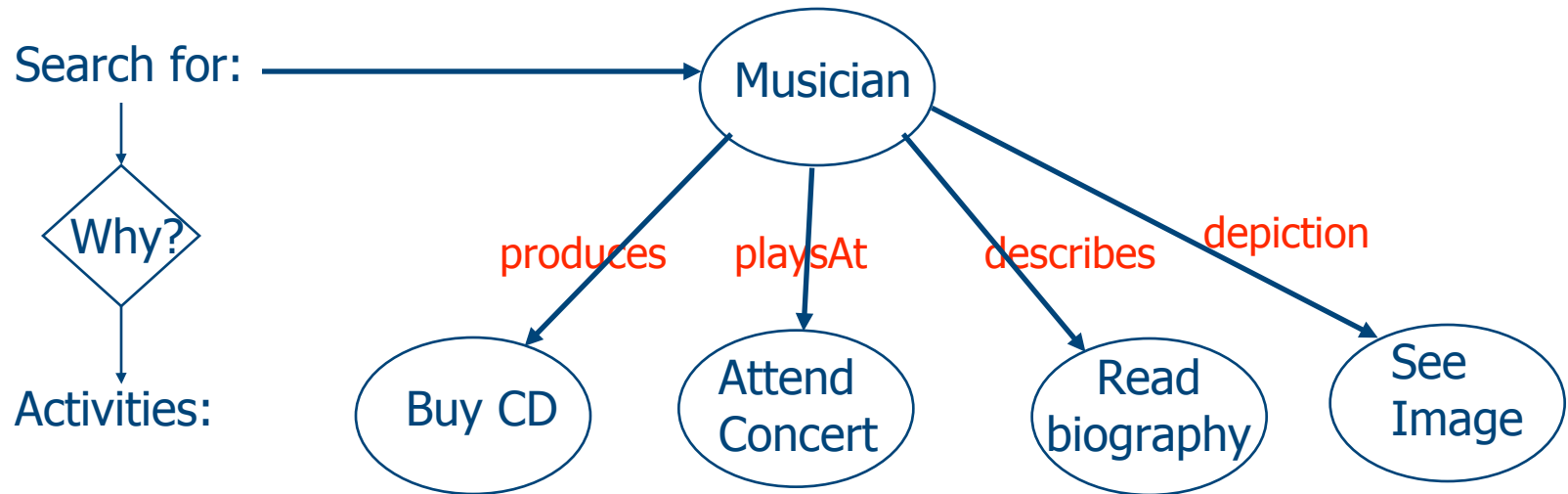
Related Activities:

[W3C Semantic Web Activity](#)

Related Recommendations:

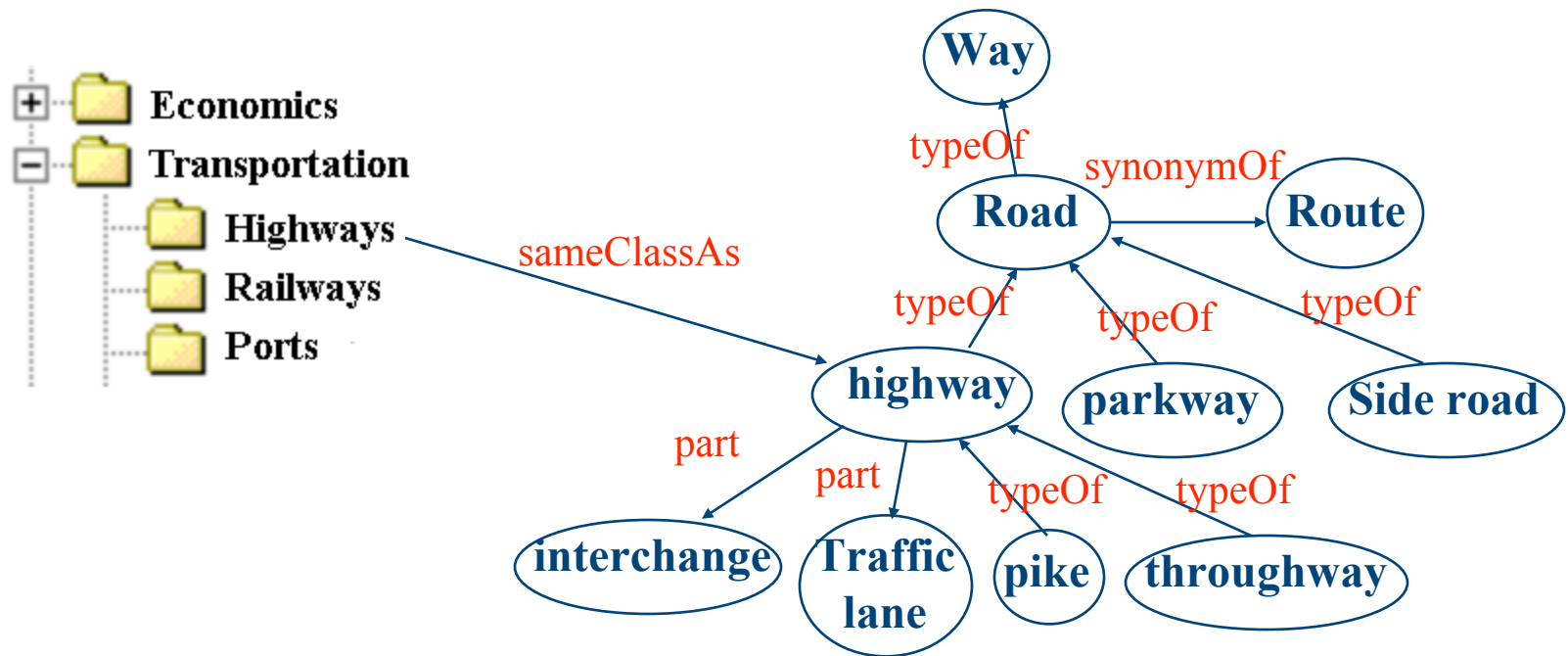
[Resource Description Framework \(RDF\) Model and Syntax Specification](#), 22 February 1999 .
Ralph Swick, Ora Lassila

Reason #4: Ontologies enable “Activity-based” Search.



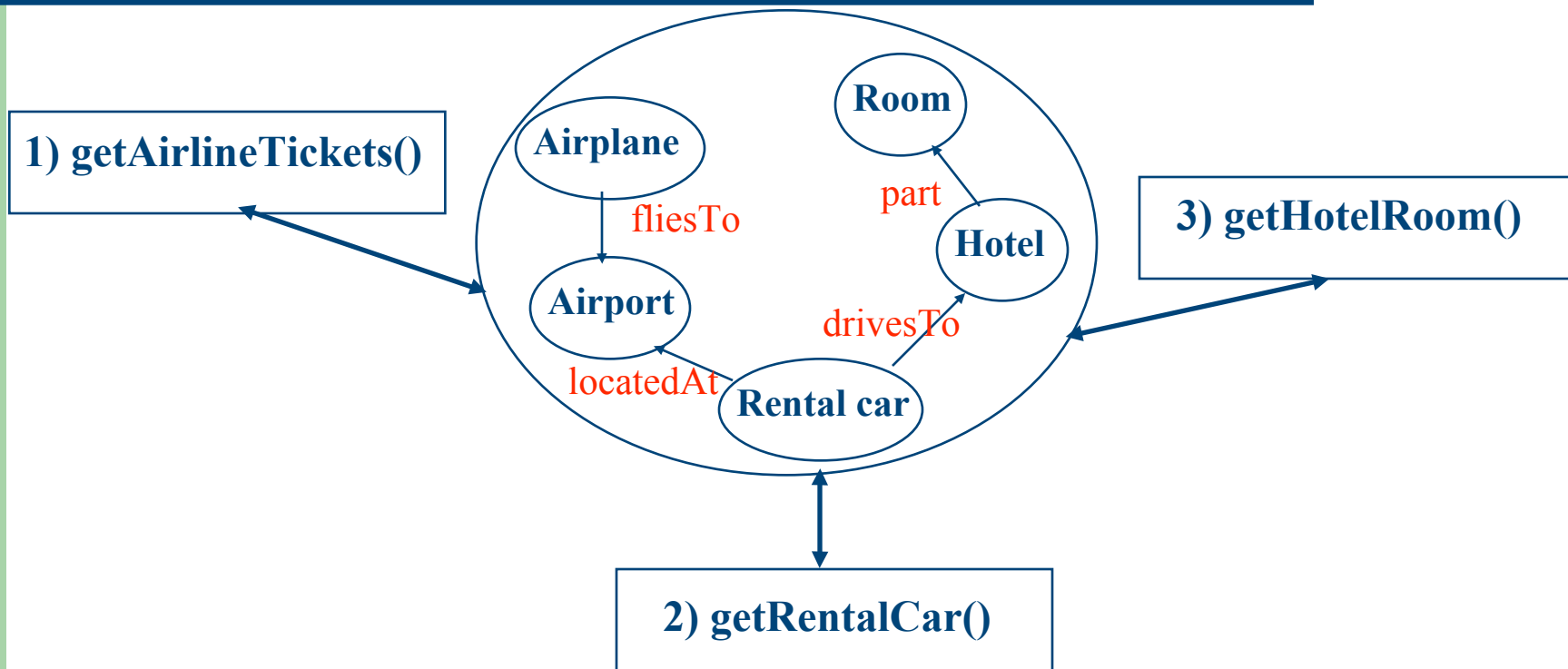
- Demos of Activity based search at <http://tap.stanford.edu>

Reason #5: Ontologies can validate taxonomy membership



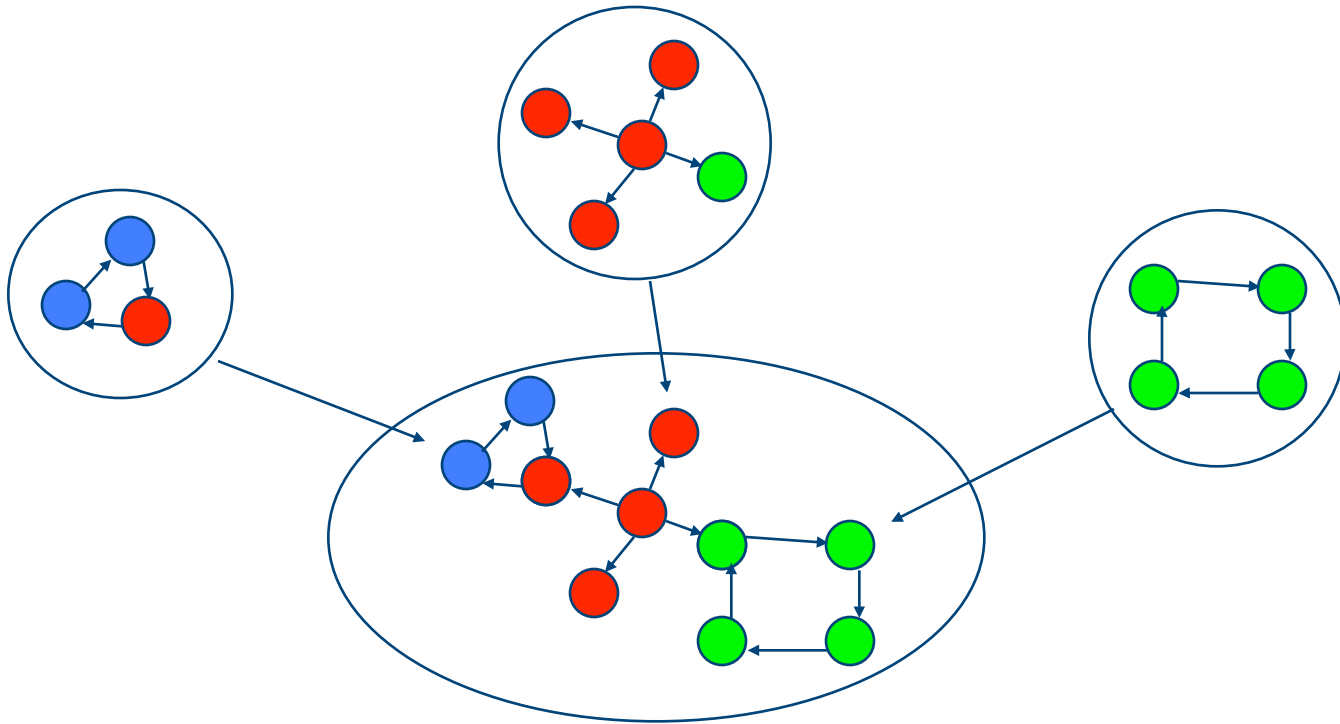
- Essential for authoritative machine categorization

Reason #6: Ontologies enable web-service orchestration.



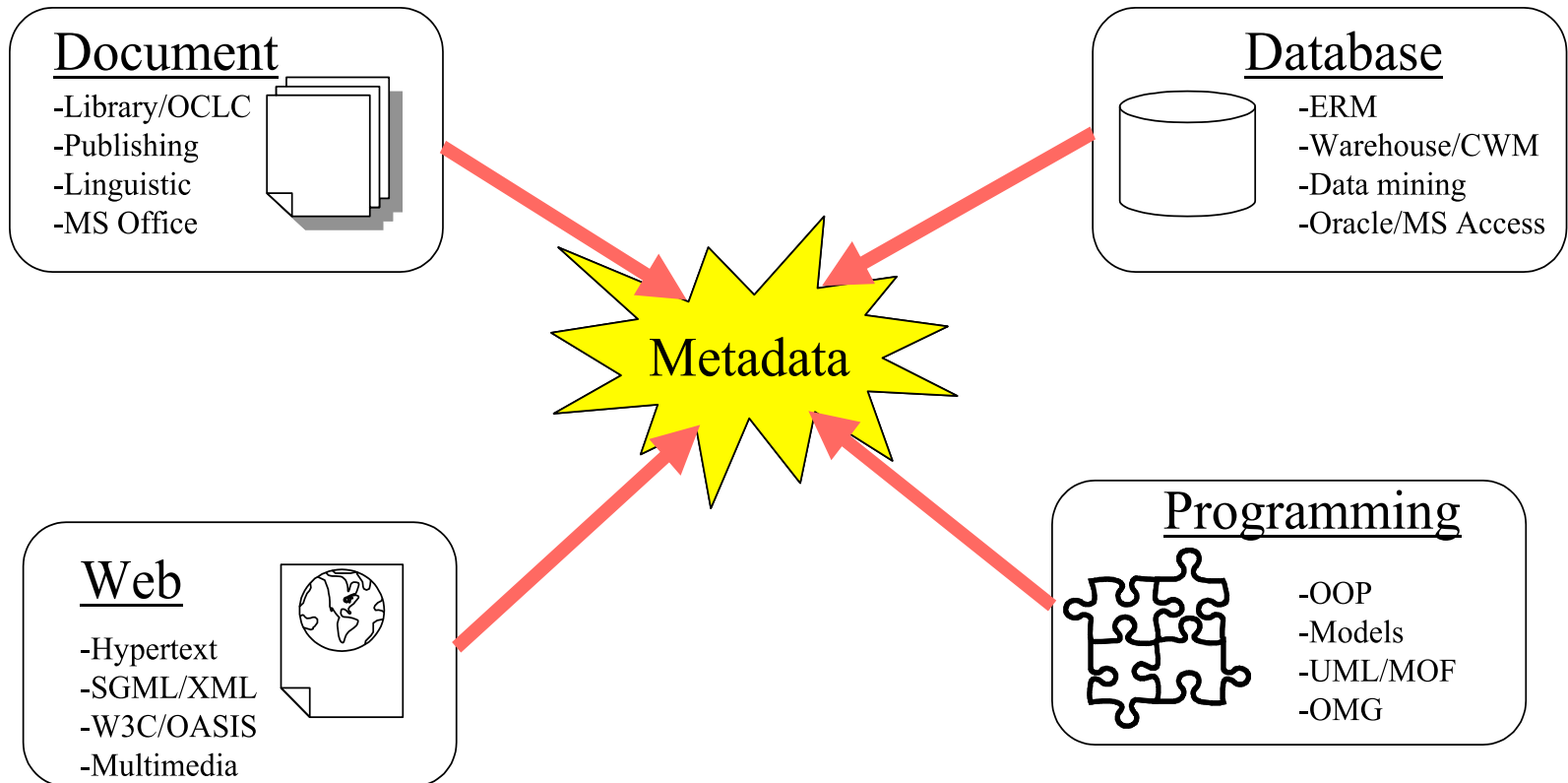
- Canonical Example: Trip reservations for airline, rental car and hotel need to be orchestrated.

Reason #7: Ontologies can be distributed and aggregated



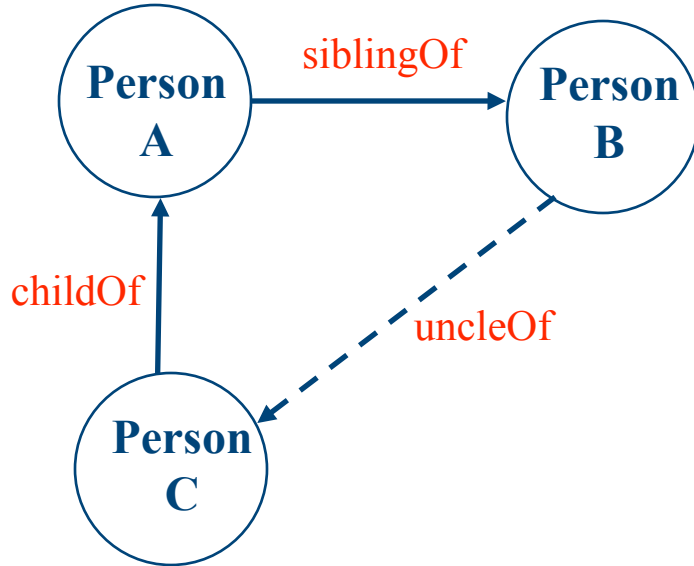
- Construction and maintenance can be distributed.

Reason #8: Ontologies map to DBMS, OOP and UML modeling



A convergence of 4 diverse “data communities”!

Reason #9: Ontologies + Rules = Inference



Rules

if (C.gender == “male” AND
C == childOf(A))
then C = sonOf(A);

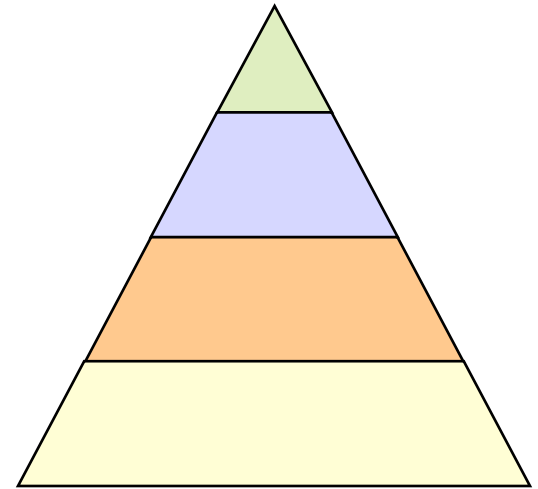
if (B.gender == “male” AND
B == siblingOf(A))
then B == brotherOf(A);

if (C == sonOf(A) AND
B == brotherOf(A))
then B = uncleOf(C);

- Two given relations and one inferred relation (uncleOf)

Reason #10: Ontology concepts are mature

- Used for Knowledge Representation starting in **1968** by M.R. Quillan.
- Used extensively in healthcare and other industries: GIS, FDA, biotechnology, finance, law.
- Large-scale ontologies in production: CYC [Lenat], WordNet, OntoBroker [Fensel], TAP, SUMO.
- W3C Ontology Web Language (**OWL**) is now a working draft (extends DAML+OIL).



Conclusion

- Knowledge Bases need an Ontology to unambiguously integrate data sources.
- We should leverage the work of the Semantic Web Community.
- Ontologies have proven themselves applicable to this task.
- Questions?

