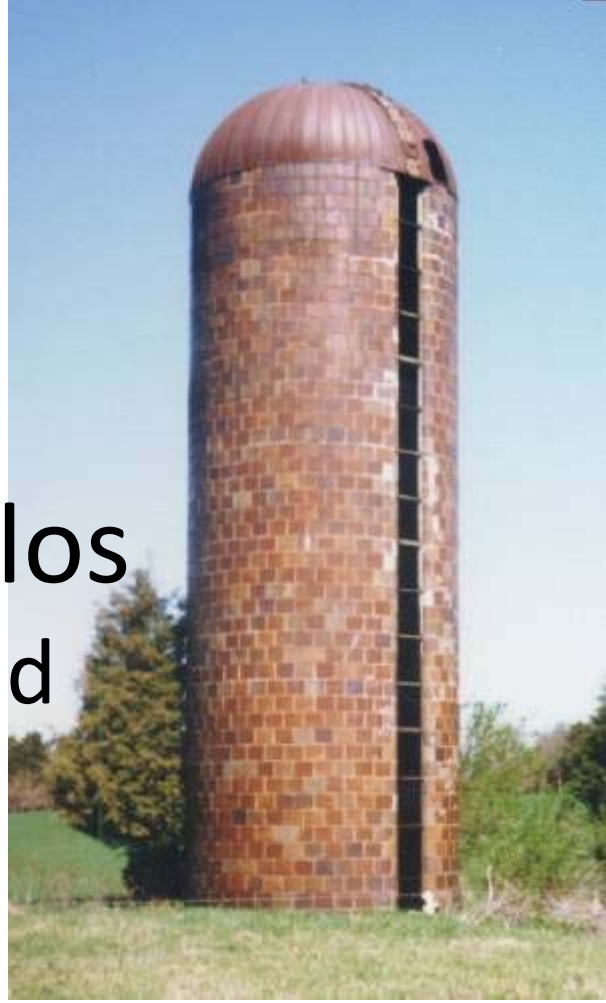
# Ontologies and Silos

## A view from the field

Chris Welty

IBM Research



Ferrario et al. http://www.loa-cnr.it/Papers/focom12.pdf p.10

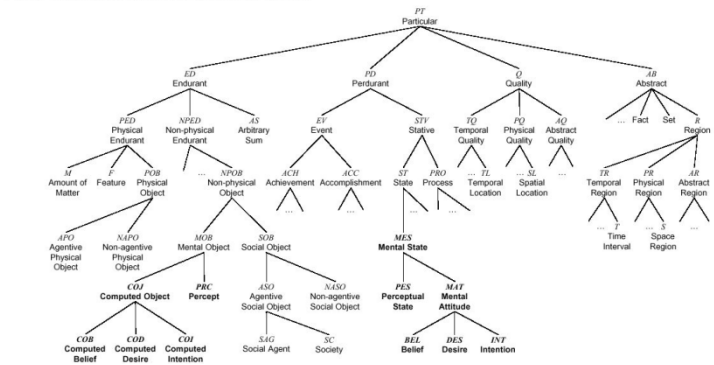



**Figure 1**

Taxonomy integrating DOLCE and COM basic categories

# Semantic Web Standards News

- RDF (pre WG)
  - Looking at adding *named graphs*
- SPARQL (WD)
  - Adding update, aggregates
  - Fixing inference profiles
- OWL (Rec)
  - Punning, relation composition
- RIF (PR)
  - Exchange of rules for RDF data

# Ontology is *not*…

- A technology
- A kind of logic (description, modal, context, …)
- A standard
- OWL
- The semantic web
- A taxonomy
- Reasoning
- An efficient algorithm

# Ontology is…

- A *shared view* of the *kinds of entities* that exist in the world, and how they are related
  - Independent of how this is communicated and specified
- The result of disciplined analysis to capture *objective reality*
- to information systems design what Software Architecture is to software design
- *Supported by* certain technologies (with which it is often confused)

# Software Architecture

- Driven by two principle factors:
  - The increasing *size* of software systems raised the principle concern of software engineers "beyond the algorithms and data structures of the computation"
  - The increasing cost of long-term *maintenance* of software systems focused awareness on "design for change"
- These factors derived from analysis of the software life-cycle
  - Design should account for the principle *long-term costs* of the system ("change is inevitable")
  - What is the information systems life-cycle?

# Information System Life-Cycle

- Change (aka schema drift)
  - Fixed-schema information systems will need to change, imposing a significant long-term maintenance cost
- Integration/interoperation
  - There is no “one ring” to rule them all
  - Integration is inevitable
- Design for change, design for interoperability

# Lost!

tree

albero

Flim furmbletum blug vremtorum

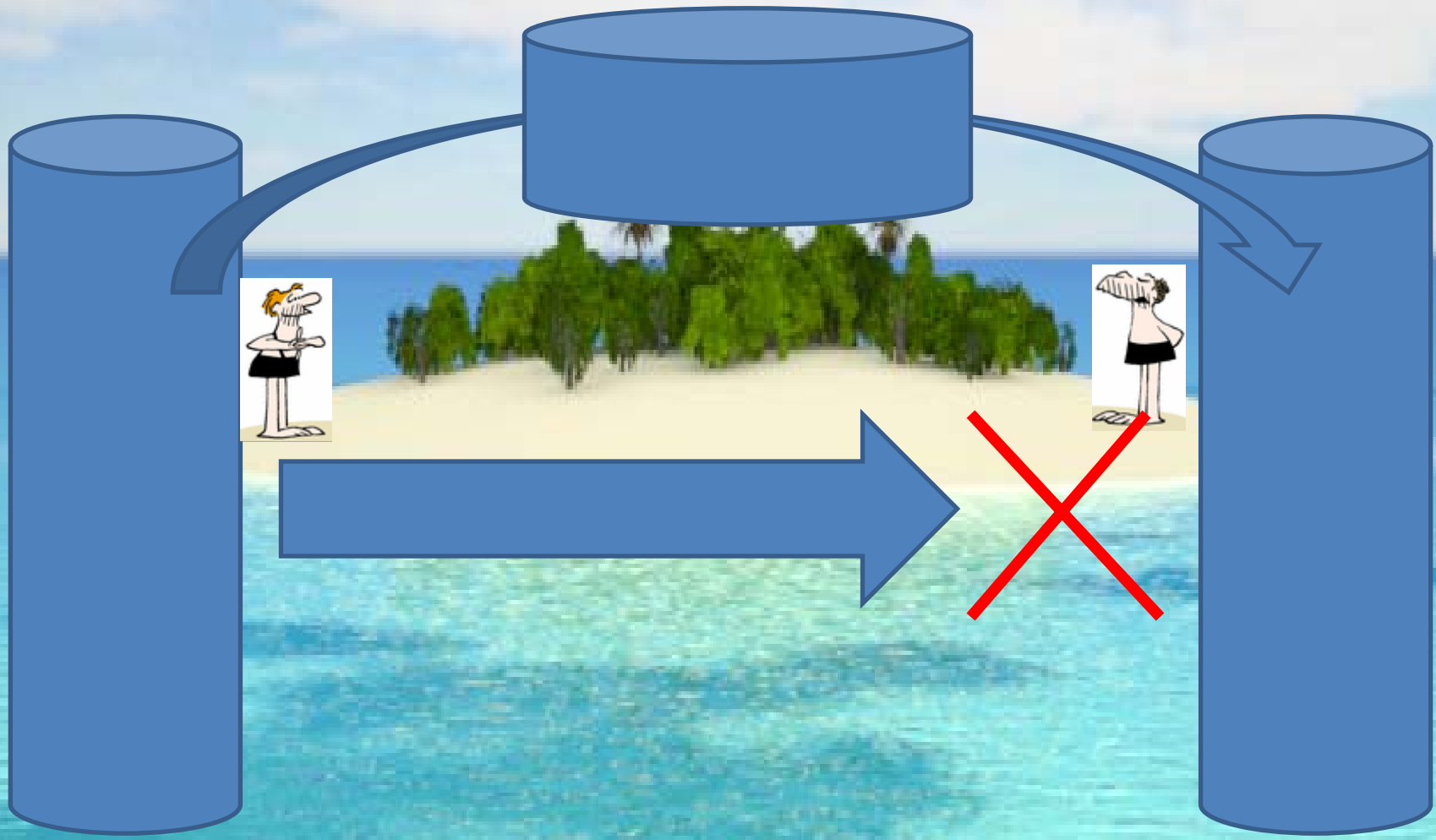
sand

Mrmphlphhht sabbia

water

aqua

# Integrate!

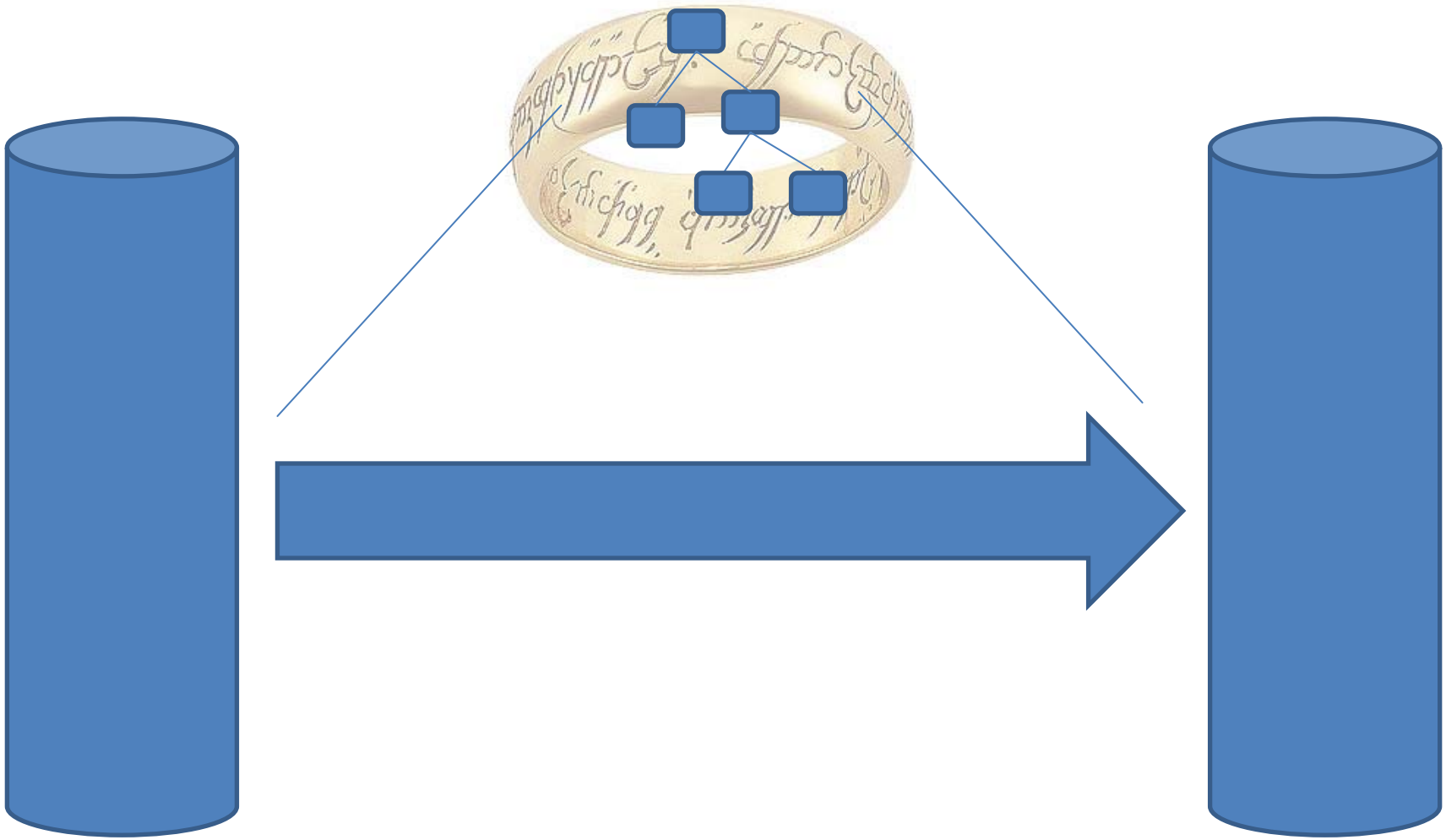


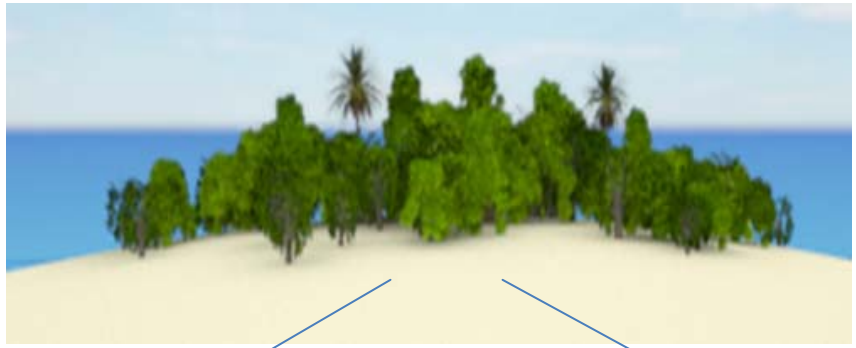
# Ontology

- Human communication is ultimately grounded in the world around us

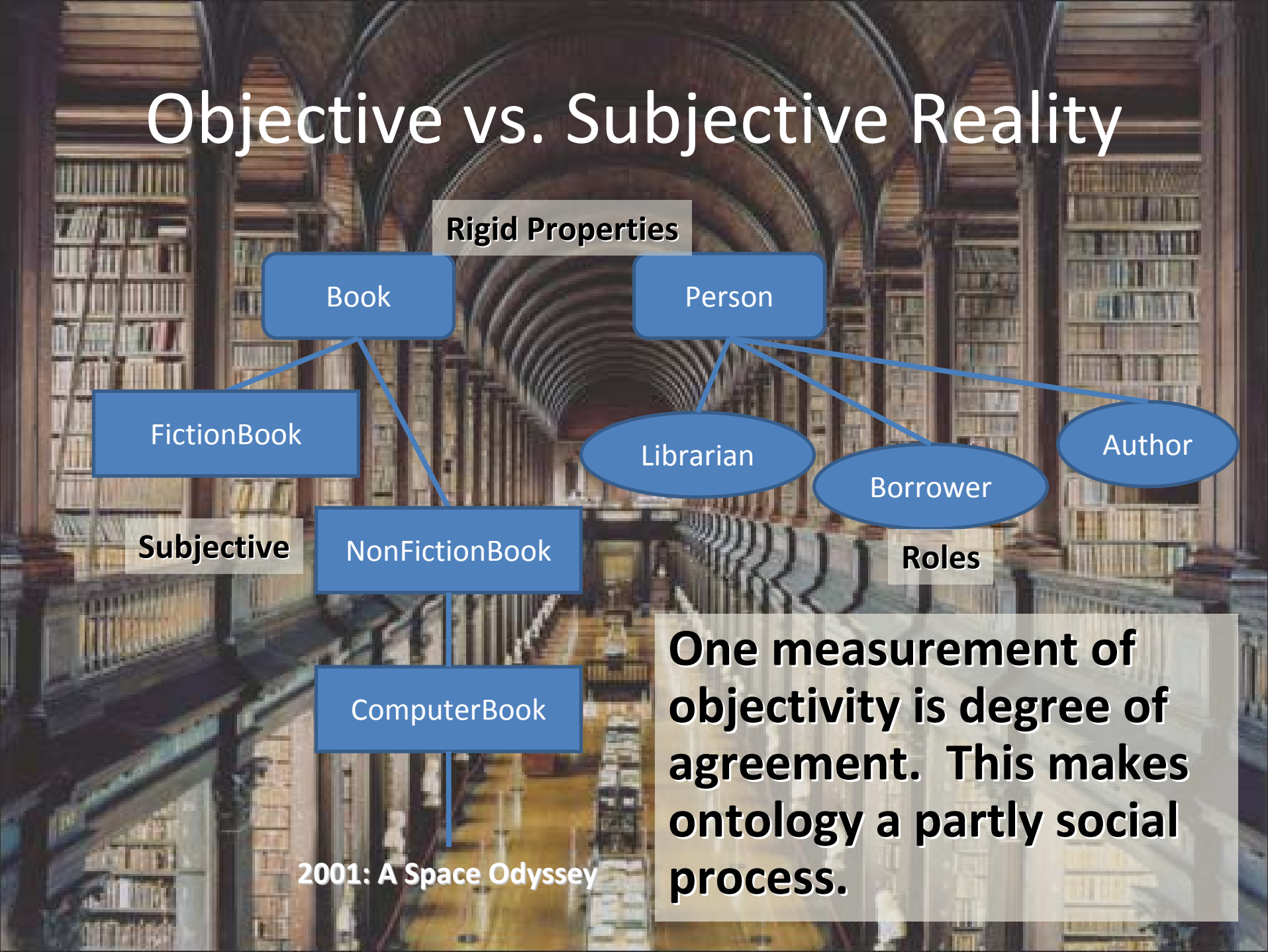
- Information systems design should be likewise grounded

# *An* ontology vs. ontology





# Objective vs. Subjective Reality

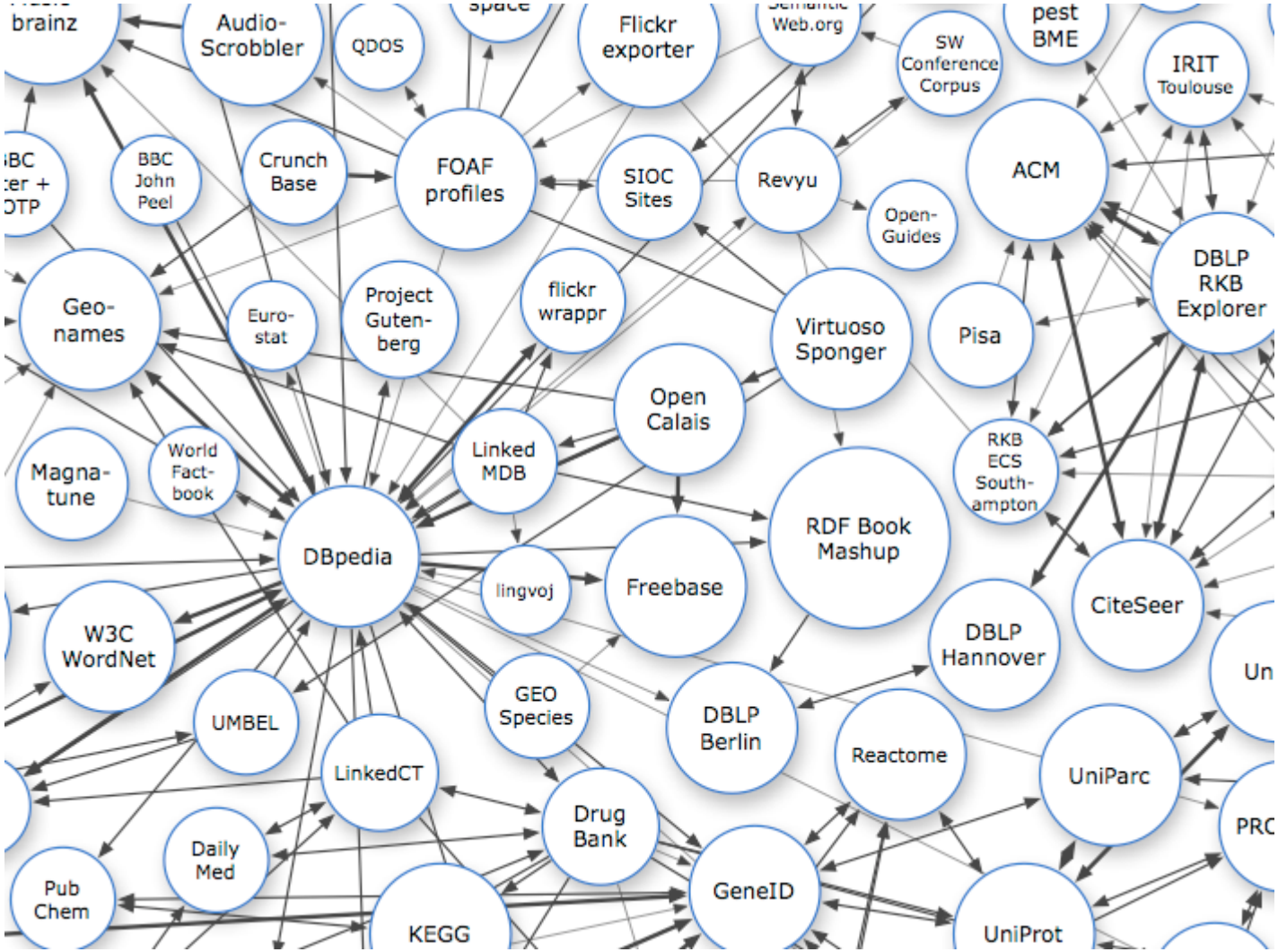



**One measurement of objectivity is degree of agreement. This makes ontology a partly social process.**

Objective Reality
Rigid Properties
Book
Person
Librarian
Borrower
Author
Roles
2001: A Space Odyssey

# Conclusions

- Ontology is not a technology
- Design for interoperability
- Ontologies should be founded on an objective view of reality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Audio-
Scrobbler
QDOS
Flickr
exporter
Web.org
SW
Conference
Corpus
pest
BME
IRIT
Toulouse
BBC
John
Peel
Crunch
Base
FOAF
profiles
SIOC
Sites
Revyu
ACM
Open-
Guides
DBLP
RKB
Explorer
Geo-
names
Euro-
stat
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Virtuoso
Sponger
Pisa
Open
Calais
Linked
MDB
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Fact-
book
Magna-
tune
RKB
ECS
South-
ampton
RDF Book
Mashup
DBpedia
lingvoj
Freebase
CiteSeer
W3C
WordNet
DBLP
Hannover
UMBEL
GEO
Species
DBLP
Berlin
Reactome
UniParc
LinkedCT
Drug
Bank
Daily
Med
Pub
Chem
KEGG
GeneID
UniProt

# Objective vs. Subjective Reality

- Ontologies can help reduce silos

  …but bad ontologies make the problem worse
- Ontology is *not* a technology, but what technologies support ontology?

# Semantic Web

- is *not*…
  - A technology
  - An organization
  - Ontology
  - OWL, RDF, …
- Is …
  - An idea: linking data
  - Providing identifiers for entities, relations
  - Supported by technologies like http, RDF, OWL, and RIF

# Linking with Web Ids (URIs)

# Semantic Web Standards

- RDF
- SPARQL