#iks

Emergent Solutions

Danny Ayers
@danja

Semantic Web
Interest Group

#swig
irc.freenode.net

Changing Reality

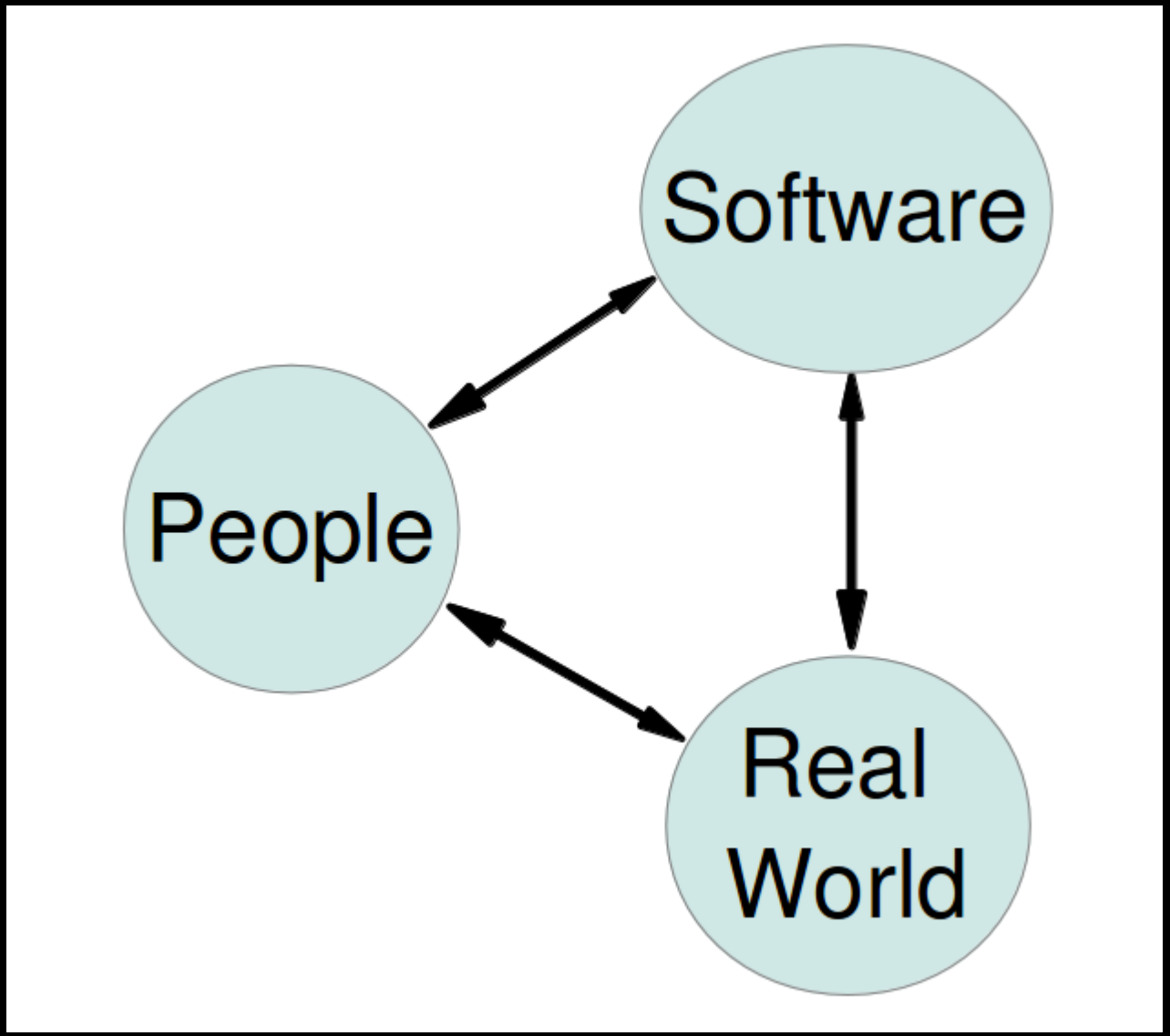
"emergence is the way complex systems and patterns arise out of a multiplicity of relatively simple interactions"

Contents

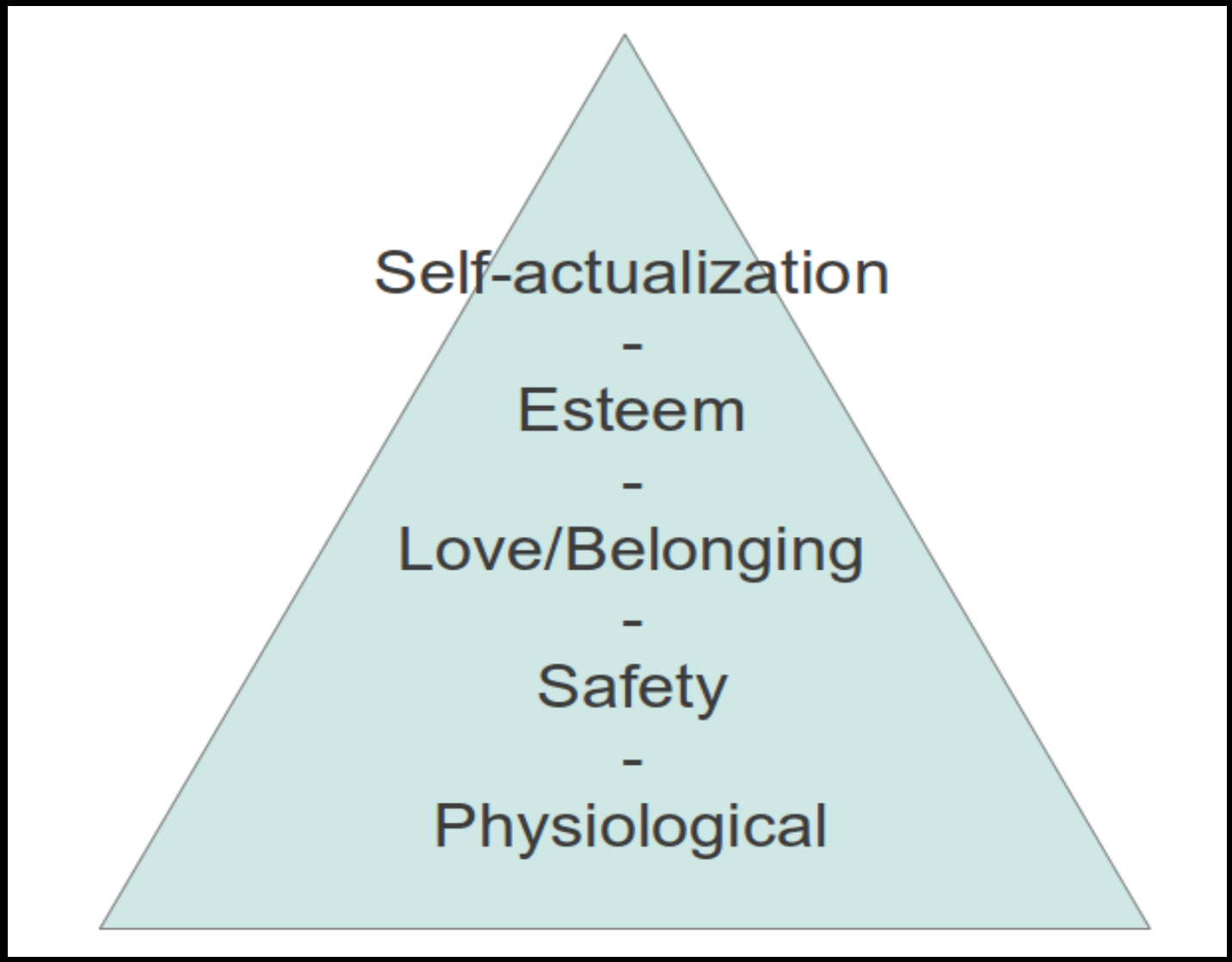
- A Little History
- Core Semantic Web notions
- Emerging Systems
- (Interesting Initiatives)

AI Prehistory

Neats vs. Scruffies


Software
People
Real
World

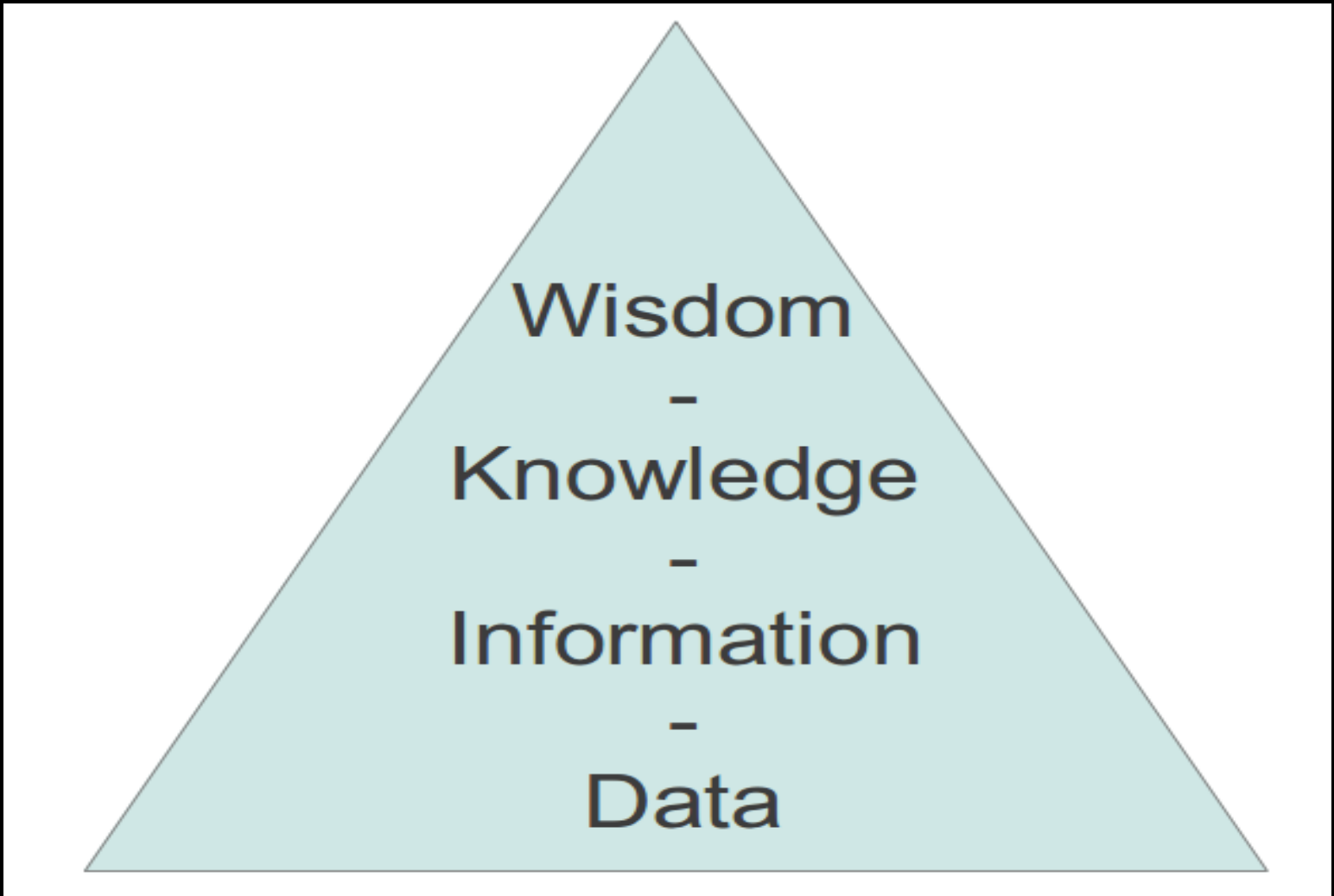
People



Hierarchy of Needs

Abraham Maslow 1943

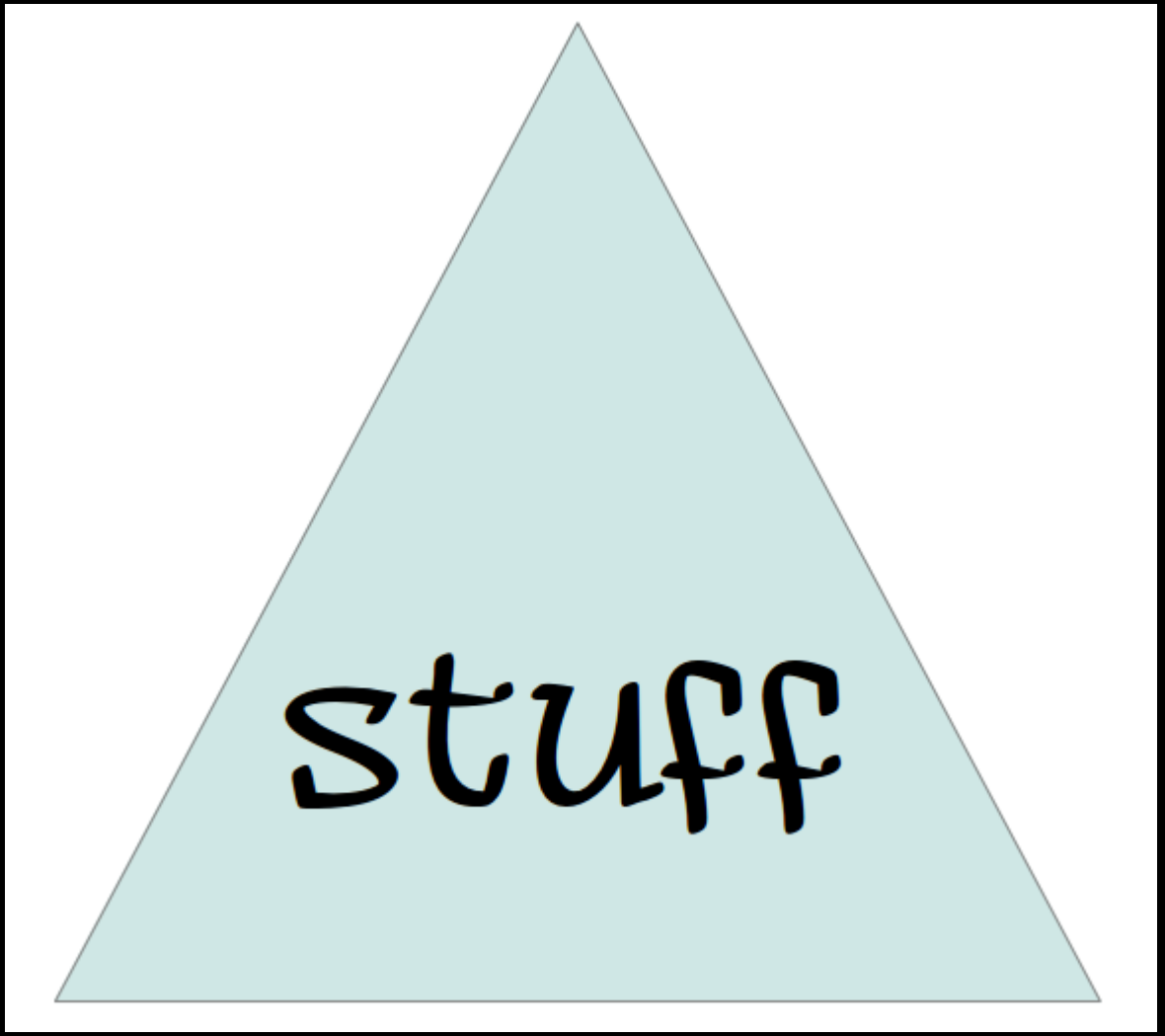
Software



Knowledge Hierarchy

David Skyrme 1999

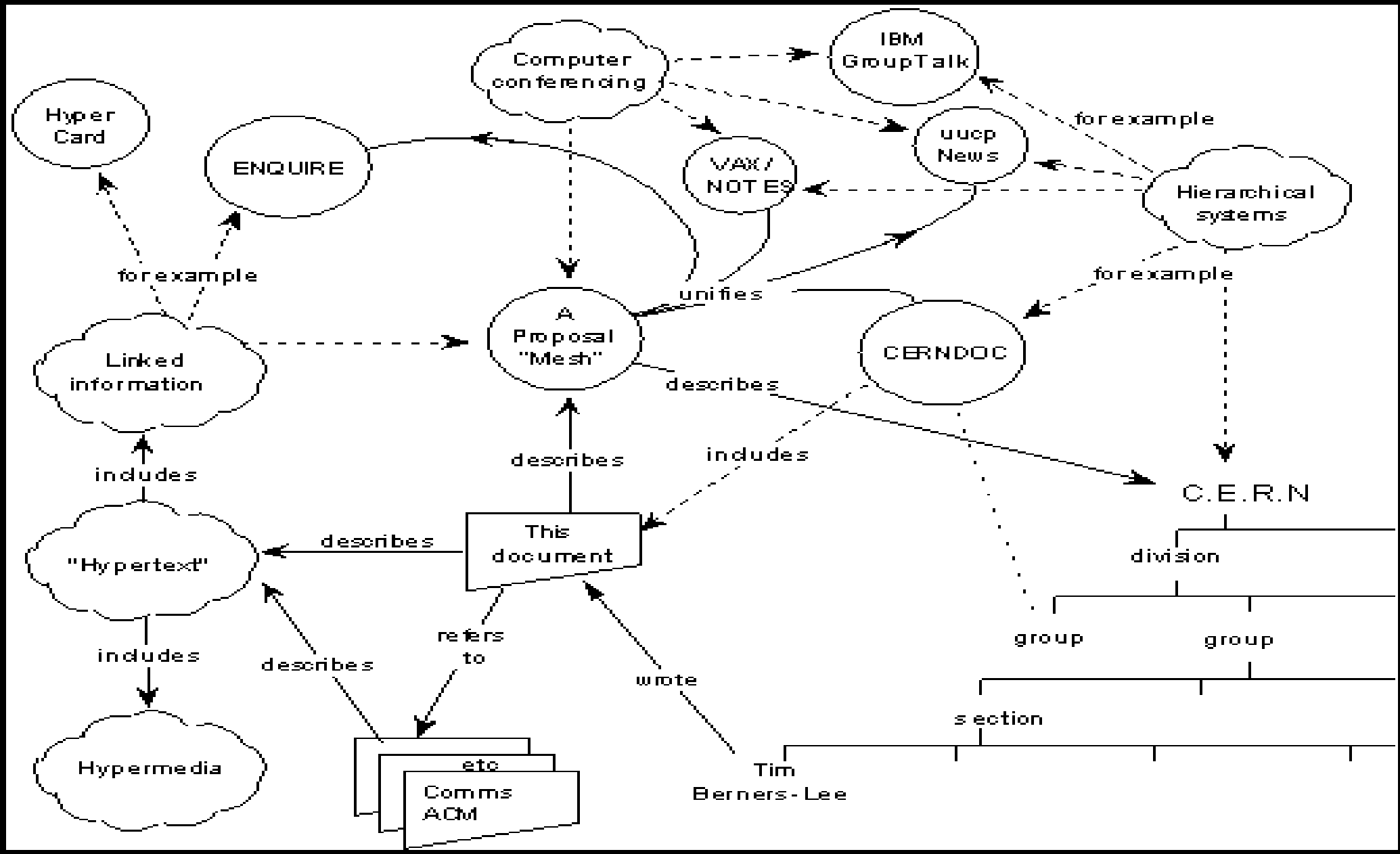
Real World



Hierarchy of Stuff

Danny Ayers 2012

Knowledge Representation



CERN Proposal

Tim Berners-Lee 1989

Library of Babel

– Borges

The Documents

Search

Document Metadata

early example :
Platform for Internet Content Selection

Semantic Web Technologies

- RDF as data language/model
- RDF/OWL etc.
- SPARQL
- Linked Data
- Doc metadata NG

"It's all about the docs"

"No, it's all about the things"

FOAF

“machine-readable homepage”

"Look, putting angle brackets around things is not a technology, by itself. I'd rather make progress by having computers understand what humans write, than by forcing humans to write in ways computers can understand."

– Sergey Brin (Google)

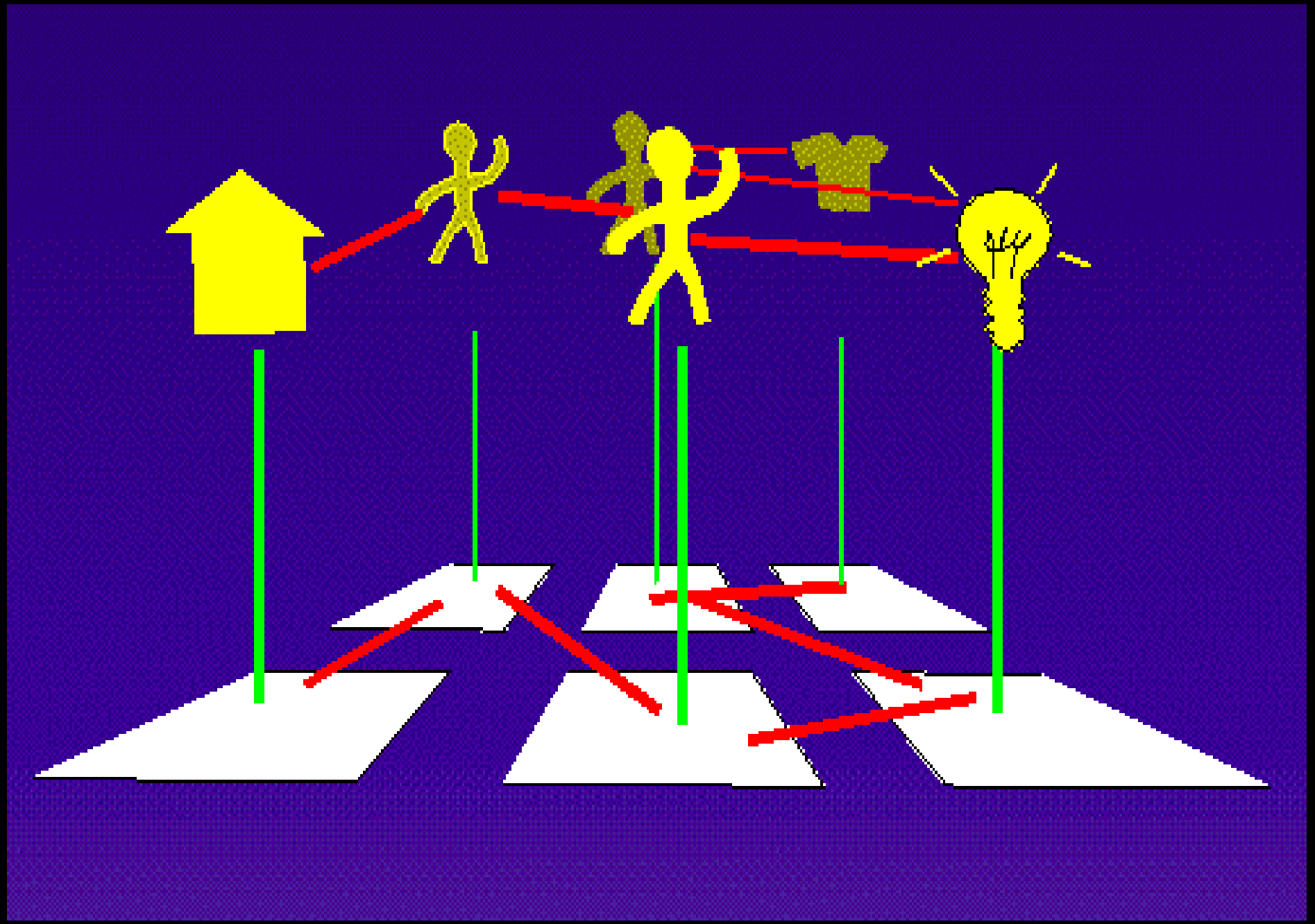
"Ok, maybe the docs are important after all"

Time for Synthesis

Semantic Web Core Concepts

All models are wrong,
but some are useful.

– E.P Box



Resource Description Framework

(RDF)

Language : Vocabulary, Grammar and Syntax

Grammar

~

Data Model

Triples

subject property object

"my dog's name is Basil, he is a Hovawart"

(Basil) name “Basil”
(Basil) type Hovawart

Open World Assumption

true/unknown

Vocabularies/Ontologies

Hovawart

subClassOf

Dog

Vocab Specification

- language spec, e.g. HTML, Atom
- registries, e.g. IANA
- distributed - Web based

Relaxation of constraints

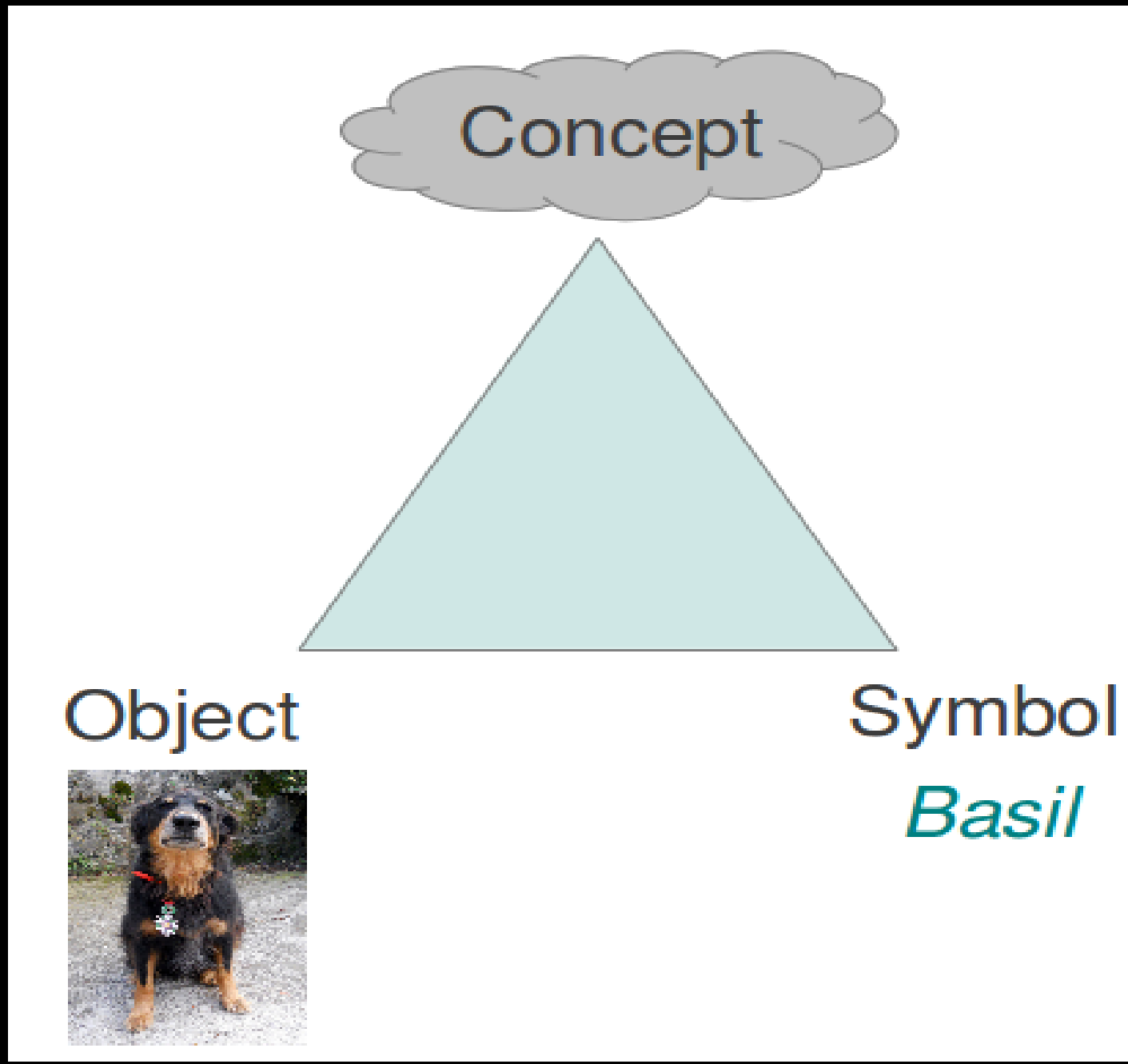
schema.org

quasi-centralized

Syntaxes

- NTriples (raw)
- Turtle (human-friendly)
- RDF/XML (RDF/XML)
- GRDDL (any XML and ...)
- RDFa (HTML)
- JSON-LD (JSON)
- *Microformats (HTML)*
- *Microdata (HTML5)*

The Web



Meaning Triangle

Anything can be identified with a URI

Everything important
should be identified
with a URI

Ideally a

http: URI

which supports

interactions

http://dannyayers.com/pets/Basil

(Basil) name “Basil”
(Basil) type Hovawart

<http://dannyayers.com/pets/Basil>
<http://xmlns.com/foaf/0.1/name> “Basil”
.

<http://dannyayers.com/pets/Basil>
<http://www.w3.org/1999/02/22-rdf-syntax-ns#type>
<http://dbpedia.org/resource/Hovawart>
.

```
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-
ns#type> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
@prefix db: <http://dbpedia.org/resource/> .
@prefix da: <http://dannyayers.com/pets/> .
```

```
da:Basil foaf:name "Basil" ;
                 a db:Hovawart .

db:Hovawart rdfs:subClassOf db:Dog .
```

Follow your nose

Named Graphs

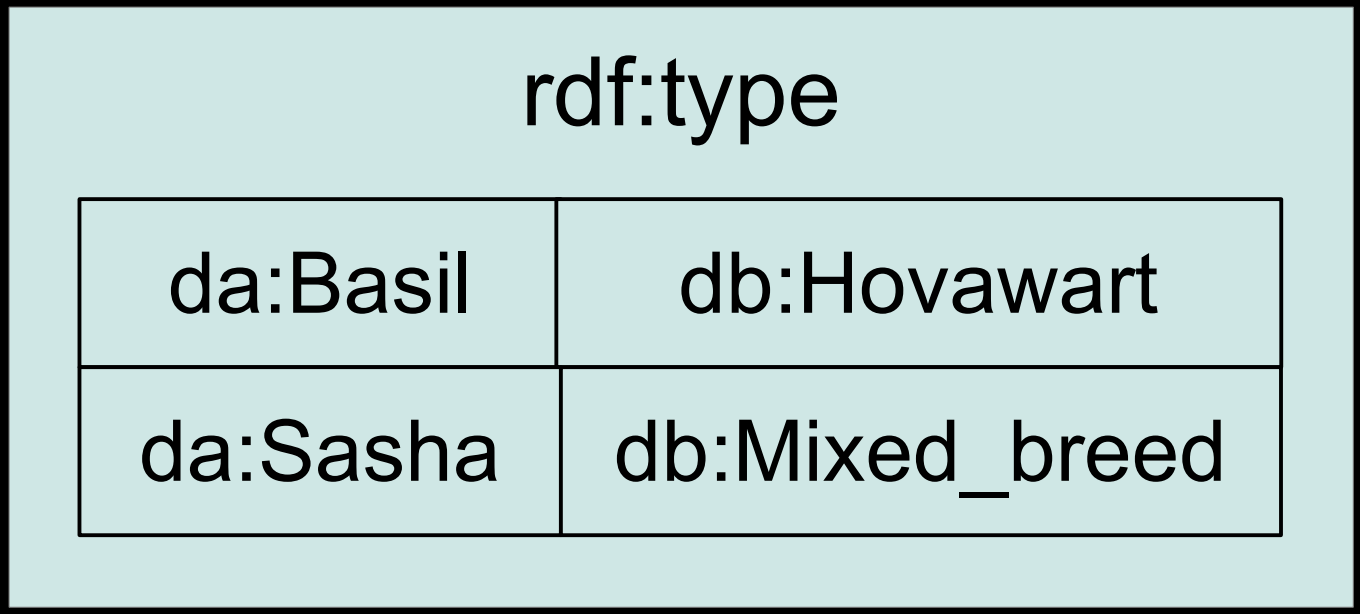
http://dannyayers.com/pets/Basil

```
...

da:Basil foaf:name "Basil" ;
                 a db:Hovawart .


db:Hovawart rdfs:subClassOf db:Dog .
```

Links are Data


rdf:type
da:Basil
db:Hovawart
da:Sasha
db:Mixed_breed

SPARQL

```
prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-
ns#type>
prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>
prefix foaf: <http://xmlns.com/foaf/0.1/>
prefix db: <http://dbpedia.org/resource/>
prefix da: <http://dannyayers.com/pets/>

SELECT ?x ?name WHERE {
    ?x foaf:name ?name ;
                 a db:Hovawart .
}
```

Linked Data

Linked Open Data 5 Stars

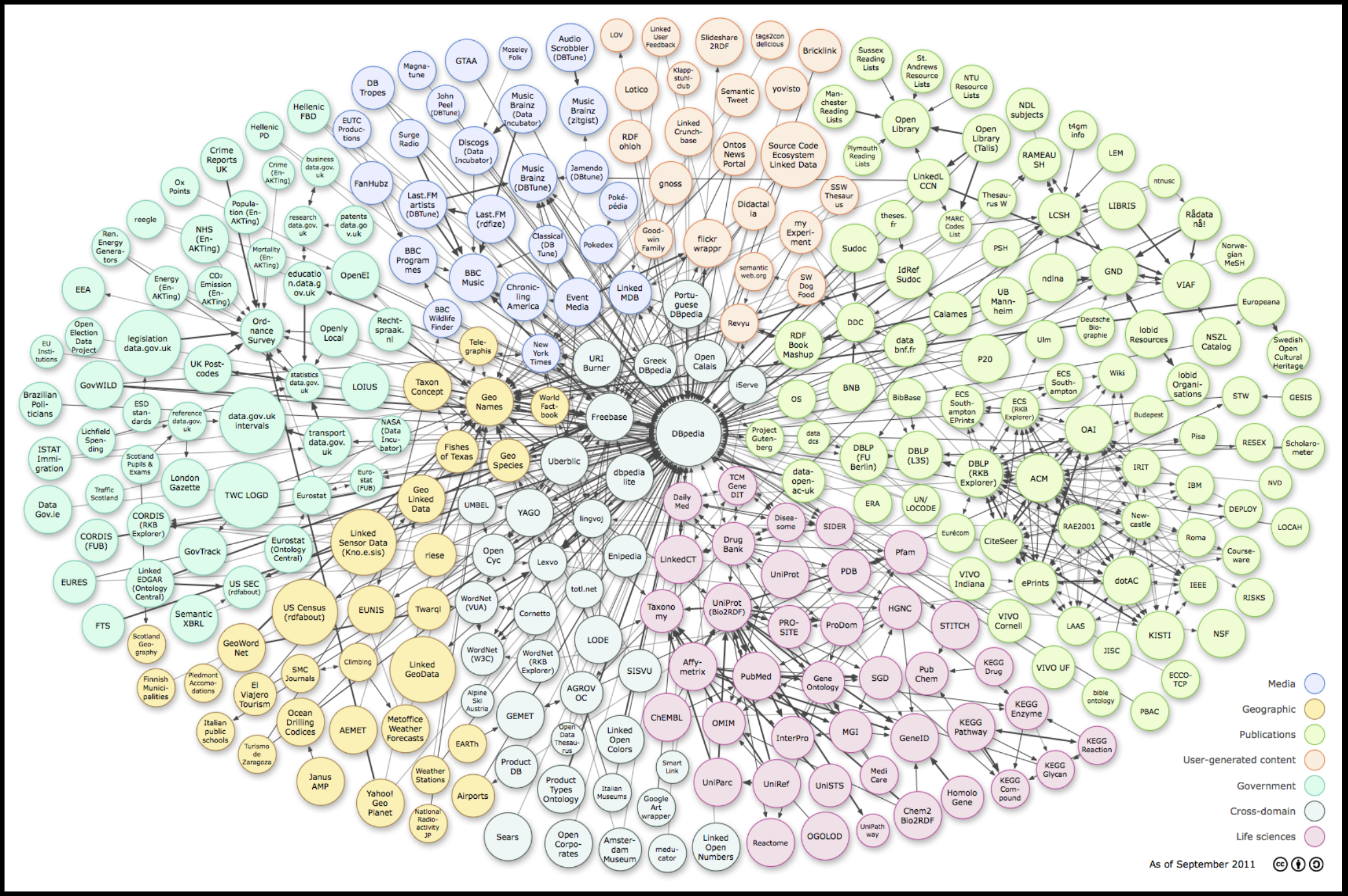
★ make your stuff available

★★ as structured data

★★★ use non-proprietary formats

★★★★ use URIs to identify things

★★★★★ link your data to other data



Linked Open Data Cloud

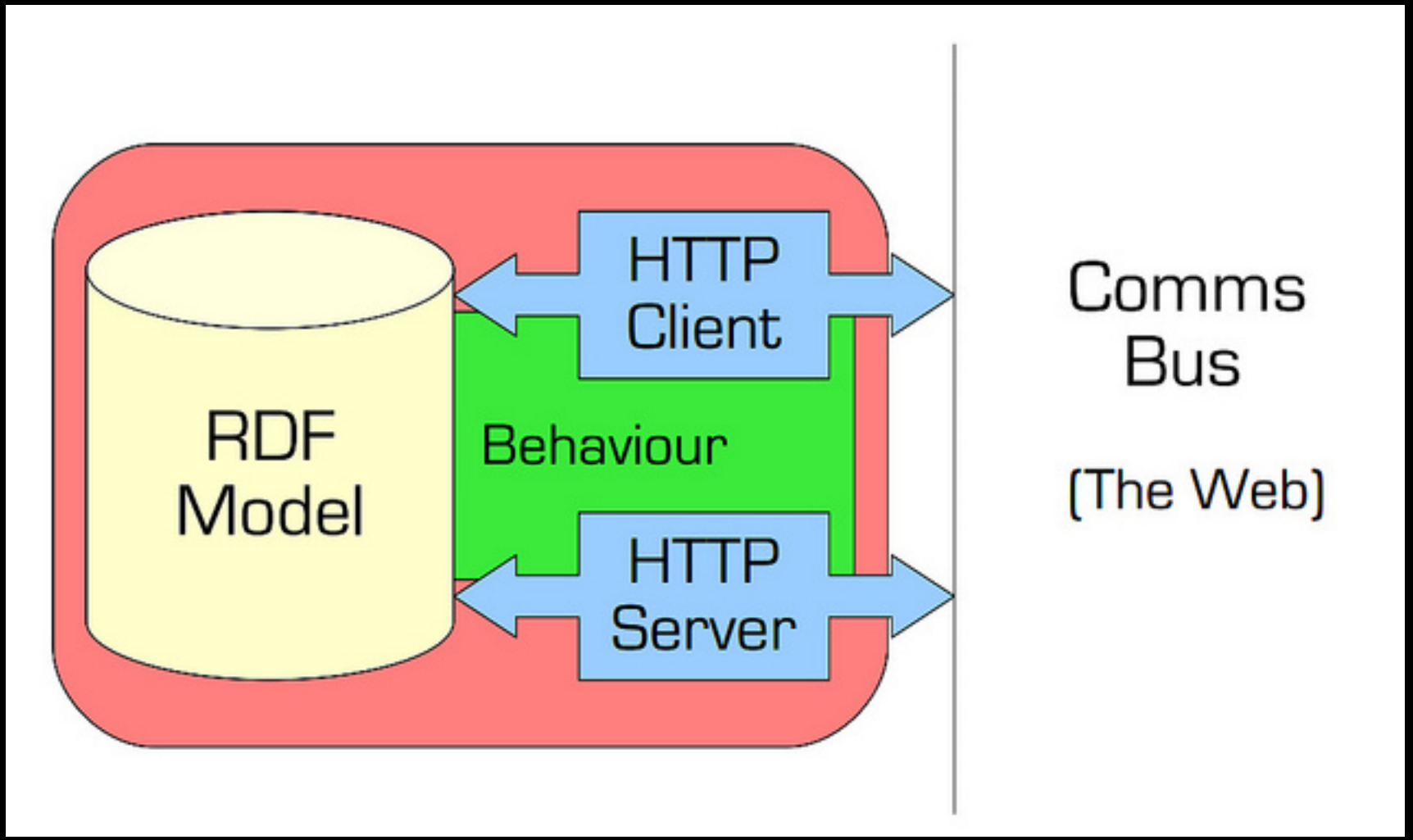
Other semantics

Serendipity


IX
X
XI
XII
I
II
III
IV
V
VI
VII
VIII


Aquarius

a language needs agents


RDF
Model
Behaviour
HTTP
Client
HTTP
Server
Comms
Bus
(The Web)

Representational State Transfer (REST)

REST Contraints:

Manipulation of resources through representations

REST Contraints:

Uniform Interface

REST Contraints:

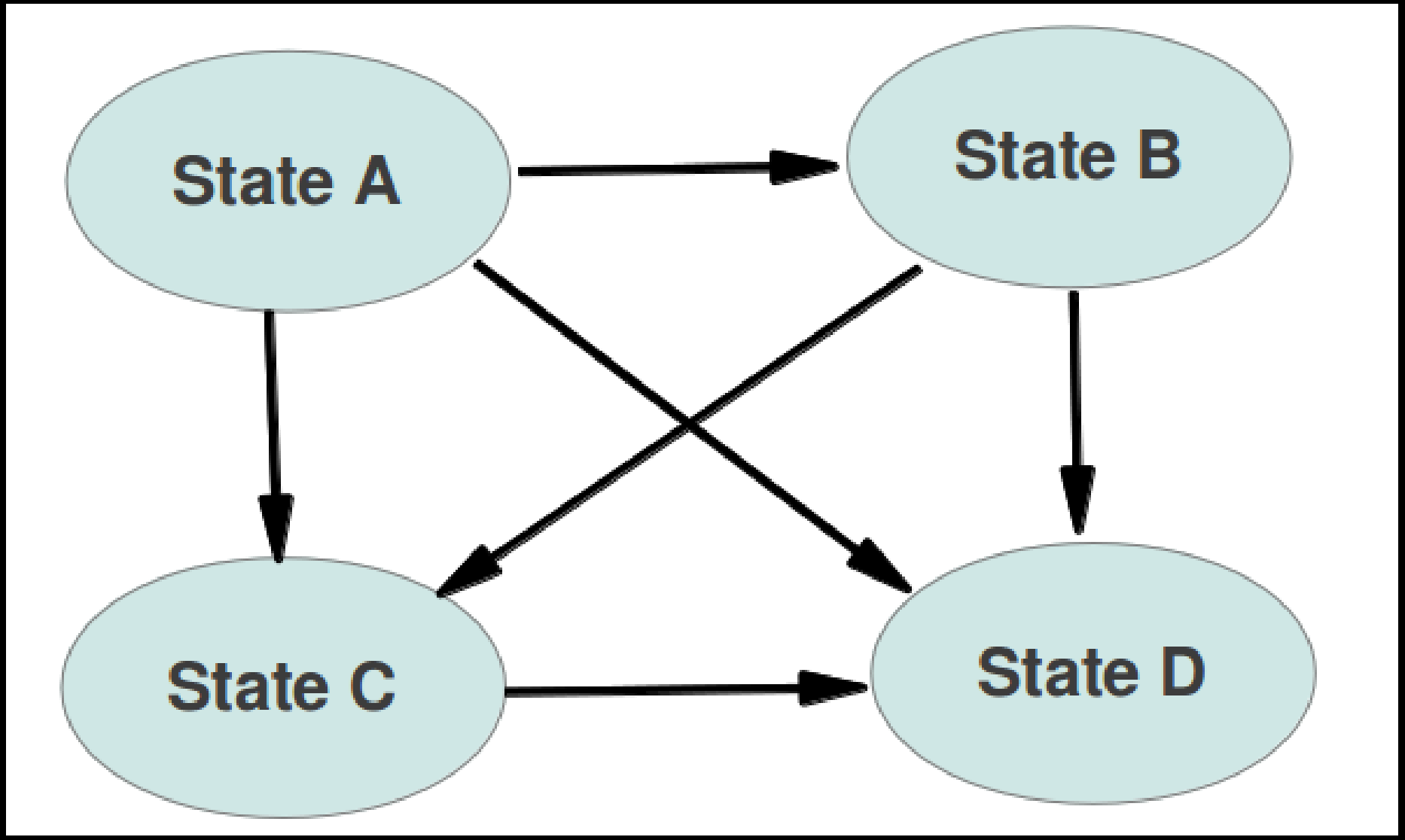
Self-descriptive messages

REST Contraints:

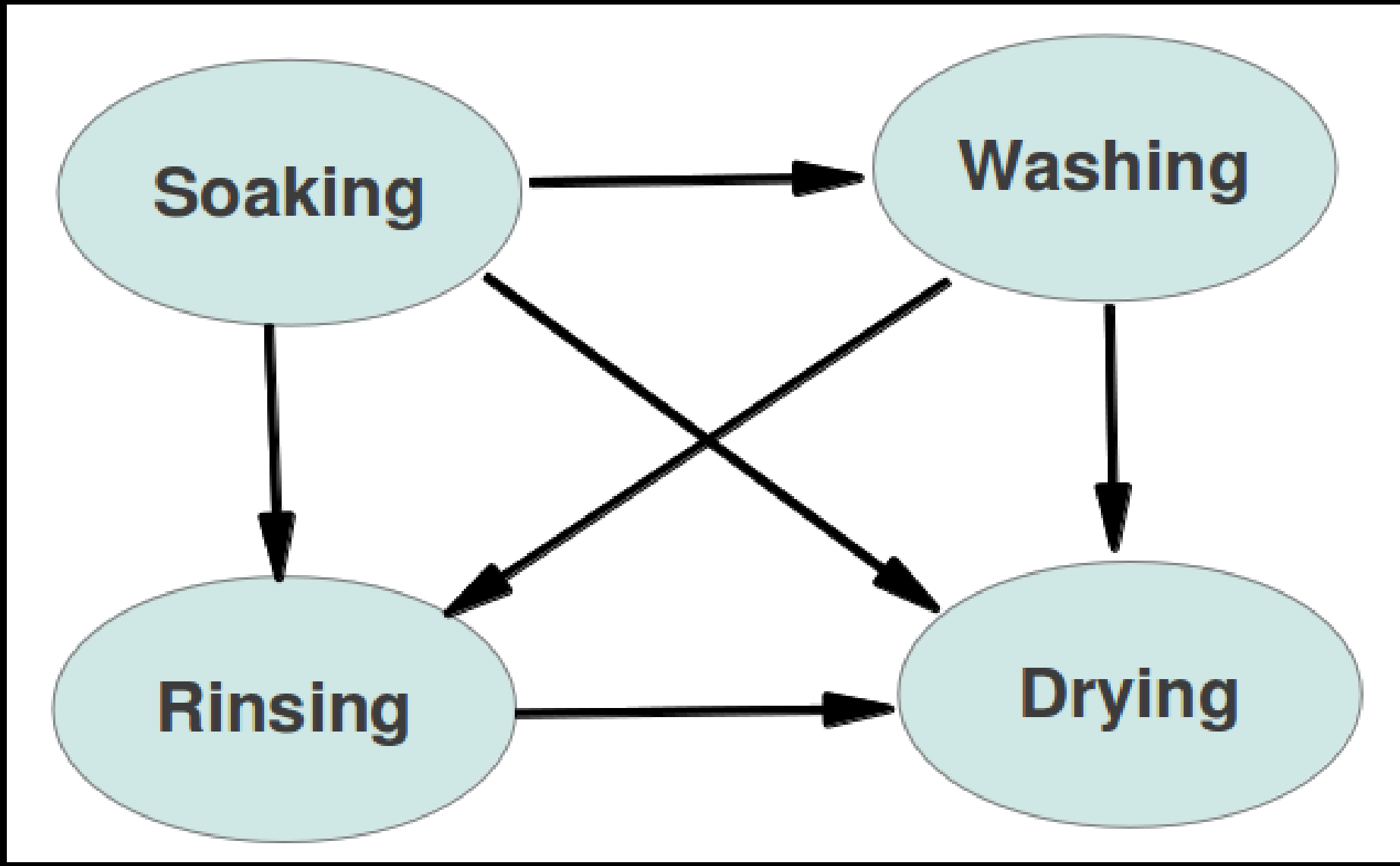
Identification of resources

REST Contraints:

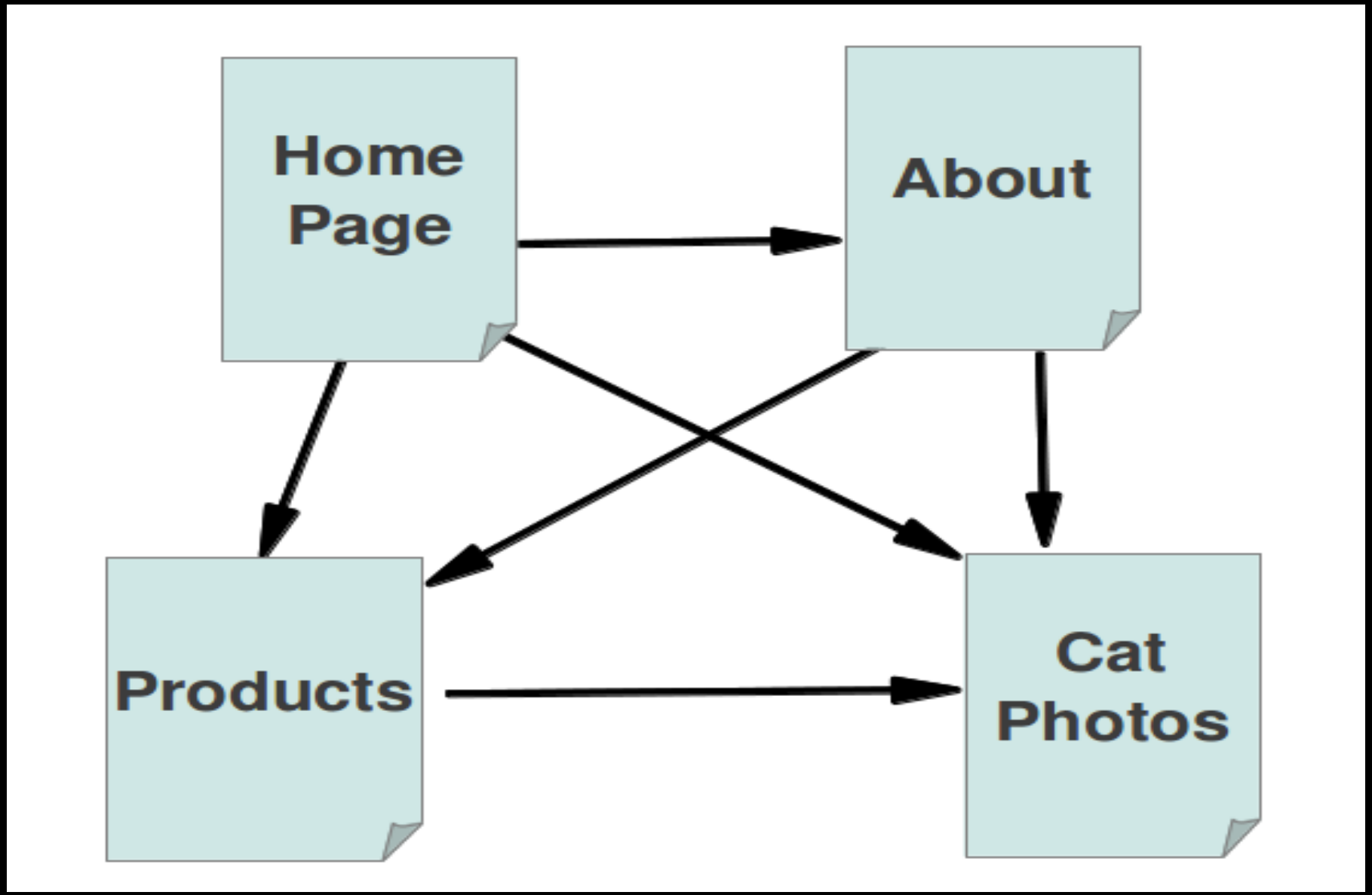
Hypermedia as the engine of application state



State Machine



Washing Machine



Web Machine

Hypermedia needs links

Tyranny of the Browser

Relaxation of constraints #2

- Rich Internet Applications
- "Apps" vs. hypermedia

Read/Write Web

Writing

- form-encoded
- WebDAV
- Ajax/JSON
- Atom Publishing Protocol
- SPARQL 1.1 Update

Affordances

- interaction model
- follow your nose

Separation of Concerns

- data model
- interaction model

Reducing friction

Open Source

The Big Intuition

A Semantic Web-friendly site or application costs no more to develop than a traditional site.

Value Add to Existing

- Short term : good for SEO
- Longer term : flexible, easy reuse

Blue Ocean Strategies

- no two companies offering the same product or service

- capturing new demand rather than competing for existing market-share

Innovation!

Interesting Initiatives see:

http://hyperdata.org/docs/salzburg/

Apache Clerezza

W3C Community & Business Groups

Read/Write Web

W3C Community & Business Groups

Federated Social Web

Linked Data Platform WG

Web Intents

Unhosted

Mozart