Web of Linked Data

Gathered by :

Arbi Baghoomian

Date : 01/28/2013

Semantic Web

Ontology Concept

Linked Data

Google Knowledge Graph

References

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Semantic Web

information

Semantic Web

The current Web is made up of many Web documents

Machines cannot make any intelligent decisions about these documents

Semantic Web

Machines have no idea about the meaning of the document
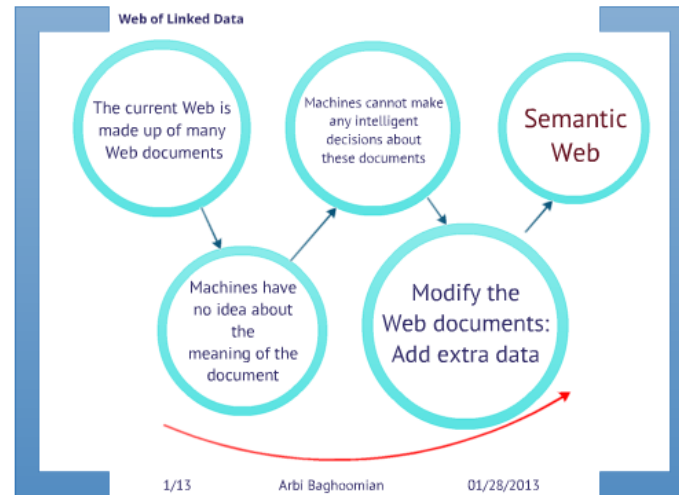
Modify the Web documents: Add extra data

Semantic Web

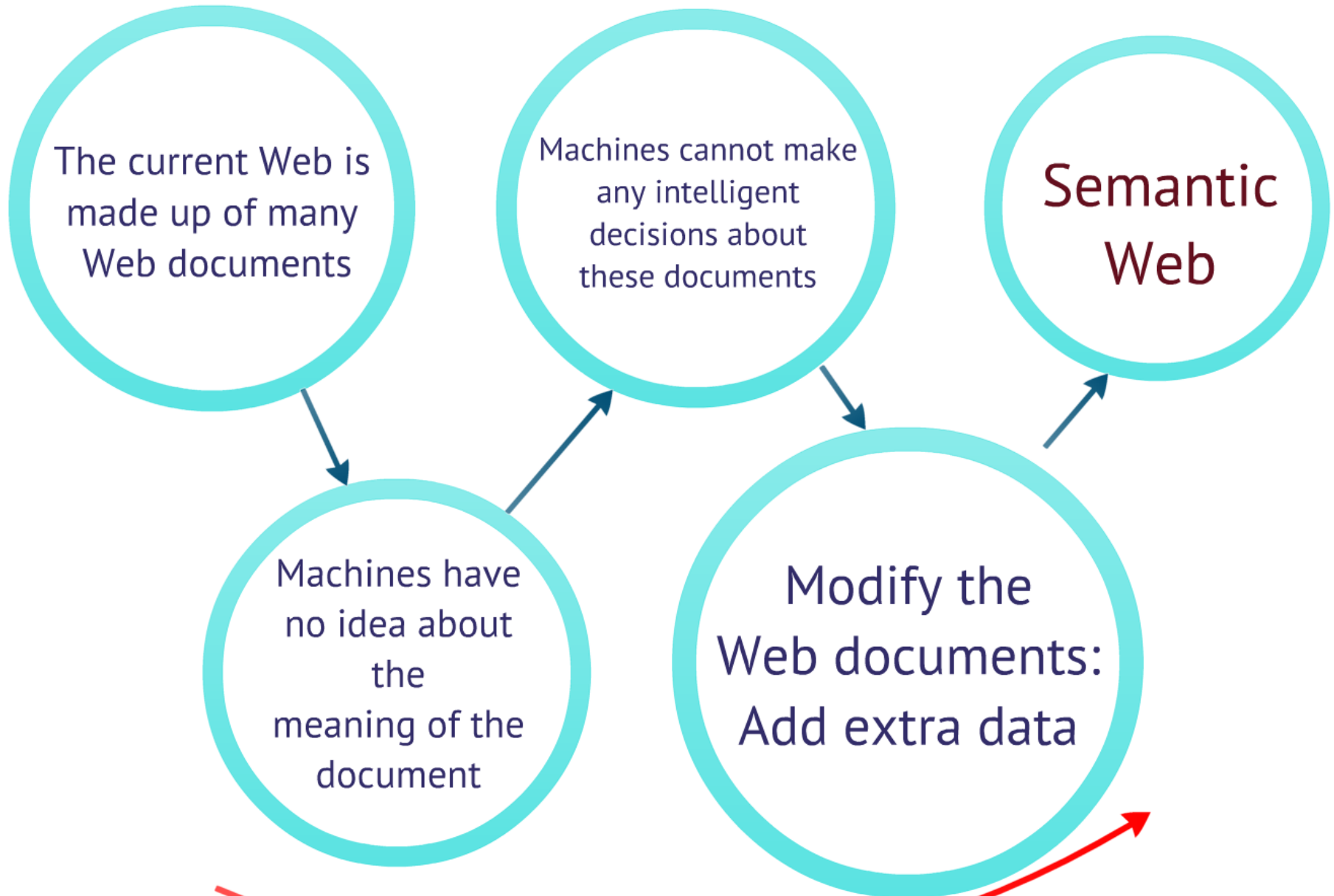### The Semantic Web is an extension of the current Web :

• Better enabling computers and people to work in cooperation.

• Information is given well-defined meaning.

Web of data that can be processed directly and indirectly by machines.

-- Tim Berners-Lee, James Hendler, Ora Lassila

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Ontology Concept

Ontology Concept

Existing problems in searching results :

1 **Agents misunderstanding over Datas.**

2 **Uncertainty results.**

3 **The large number of irrelevant results.**

4 **Reduce the use of the reusability feature.**

Ontology Concept (Cont.)

The idea of having data on the Web defined and linked in a way that it can be used by machines not just for display purposes, but for :

1 Automation

2 Integration

3 Reuse

- W3C Semantic Web Activity

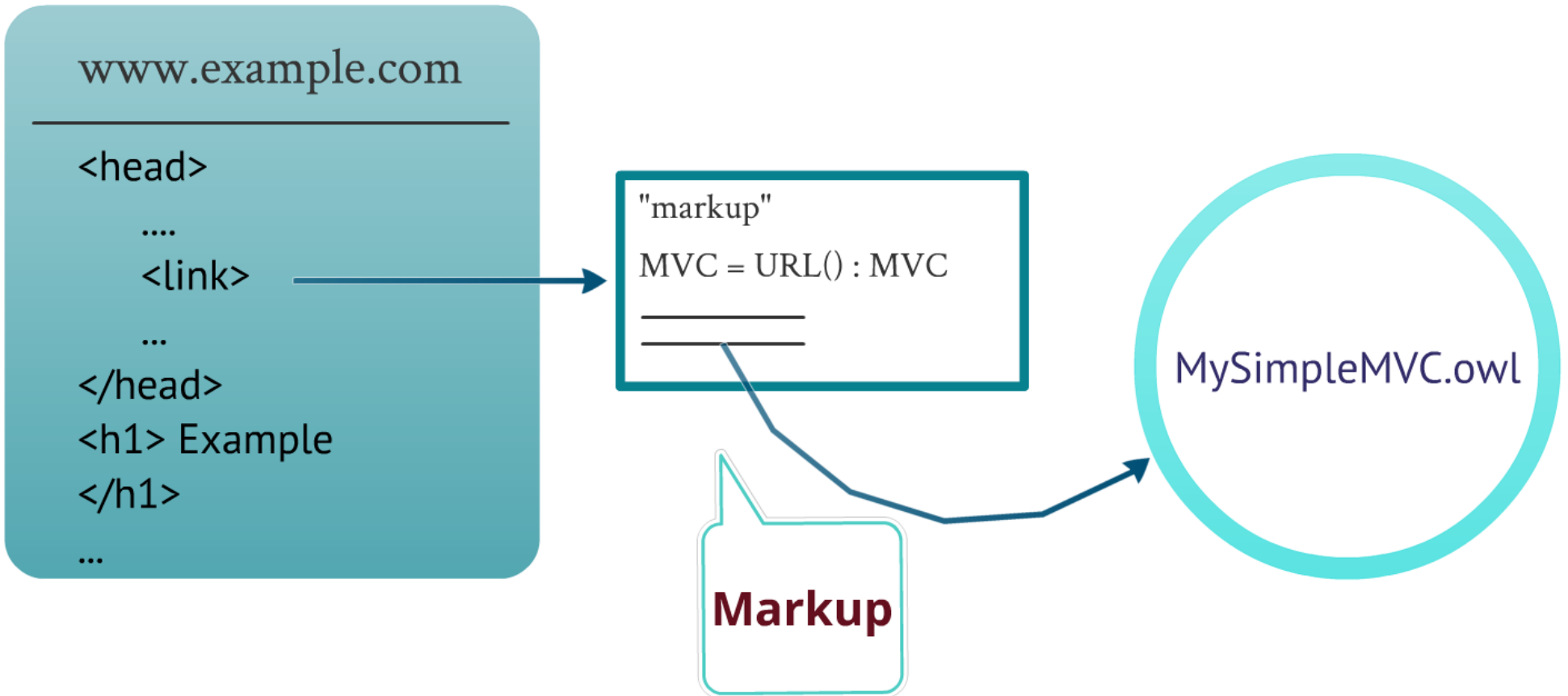## In computer science and information science :

An ontology formally represents knowledge as a set of concepts within a domain, and the relationships among those concepts.

Ontology Concept (Cont.)

For this purpose we should make the agents intelligent .

But how to make agents Intelligent ?

www.example.com
_____

```
<head>
    ....
        <link>
        ...
</head>
<h1> Example
</h1>
...
```

"markup"

$MVC = URL() : MVC$
_____

Markup

MySimpleMVC.owl

Ontology Concept (Cont.)

Three types of Knowledge representation :

💡 **RDF : Resource Description Framework**

💡 **RDFS : RDF Schema**

💡 **OWL : Web Ontology Language**

Why do we use OWL for Knowledge Representation ?

· **OWL gives you a much larger vocabulary to play with.**

· **OWL allows you to easily express the relationships between different ontologies using a standard annotation framework.**

&

OWL = RDF Schema + new constructs for better expressiveness

Ontology Concept (Cont.)

Ontology Benefits :

1 It provides a common and shared understanding/definition about certain key concepts in the domain

2 It offers the terms one can use when creating RDF documents in the domain

3 It provides a way to reuse domain knowledge

4 It makes the domain assumptions explicit

5 It provides a way to encode knowledge and semantics such that the machine can understand

6 It makes automatic large-scale machine processing become possible

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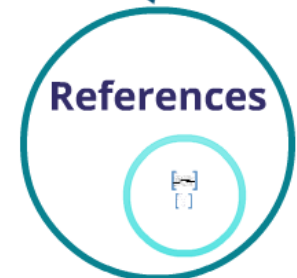
Linked
Data

Open
Linked Data

What is Linked Data?

The concept of Linked Data was originally proposed by Tim Berners-Lee in his 2006 Web architecture note.

Linked Data refers to data published on the Web in such a way that it is **Machine Readable.**

1 It is linked to other external datasets.

2 It can in turn be linked to from external datasets.

What is Linked Data? (Cont.)

The Semantic Web is a Web of Data :

Dates, titles, part numbers, chemical properties & any others ...

The collection of Semantic Web technologies (RDF, OWL, SKOS, SPARQL, etc.) :

Provides an environment where application can query that data, draw inferences using vocabularies, etc.

It is important to have the huge amount of data on the Web available in a standard format, reachable and manageable by Semantic Web tools.

So, to make the Web of Data in reality we use Linked Data.

What is Linked Data? (Cont.)

What is the relationship between Linked Data
&
Semantic Web?

A web of data that can be processed directly and indirectly by machines.

-- by Tim Berners-Lee

While the Semantic Web, or Web of Data, is the goal or the end result of this process.

Linked Data provides the means to reach that goal.

Linked Data is the Semantic Web done right.

What is Linked Data? (Cont.)

The four rules :

1 Use URIs as names for things.

2 Use HTTP URIs so that people can look up those names.

3 When someone looks up a URI, provide useful information, using the standards (RDF*, SPARQL)

4 Include links to other URIs. so that they can discover more things.

```xml
<rdf:RDF>
<foaf:PersonalProfileDocument rdf:about="">
<rdfs:label>Advogato FOAF profile for Tim Berners-Lee</rdfs:label>
<foaf:maker rdf:resource="#me"/>
<foaf:primaryTopic rdf:resource="#me"/>
</foaf:PersonalProfileDocument>
<rdf:Description rdf:about="http://www.w3.org/People/Berners-
Lee/card#i">
<owl:sameAs rdf:resource="#me"/>
</rdf:Description>
<foaf:Person rdf:about="#me">
<foaf:name>Tim Berners-Lee</foaf:name>
<foaf:nick>timbl</foaf:nick>
<foaf:homepage rdf:resource="http://www.w3.org/People/Berners-Lee/"/>
<foaf:knows>
<foaf:Person
rdf:about="http://www.advogato.org/person/connolly/foaf.rdf#me">
<foaf:nick>connolly</foaf:nick>
<rdfs:seeAlso
rdf:resource="http://www.advogato.org/person/connolly/foaf.rdf"/>
</foaf:Person>
</foaf:knows>
</foaf:Person>
</rdf:RDF>
```
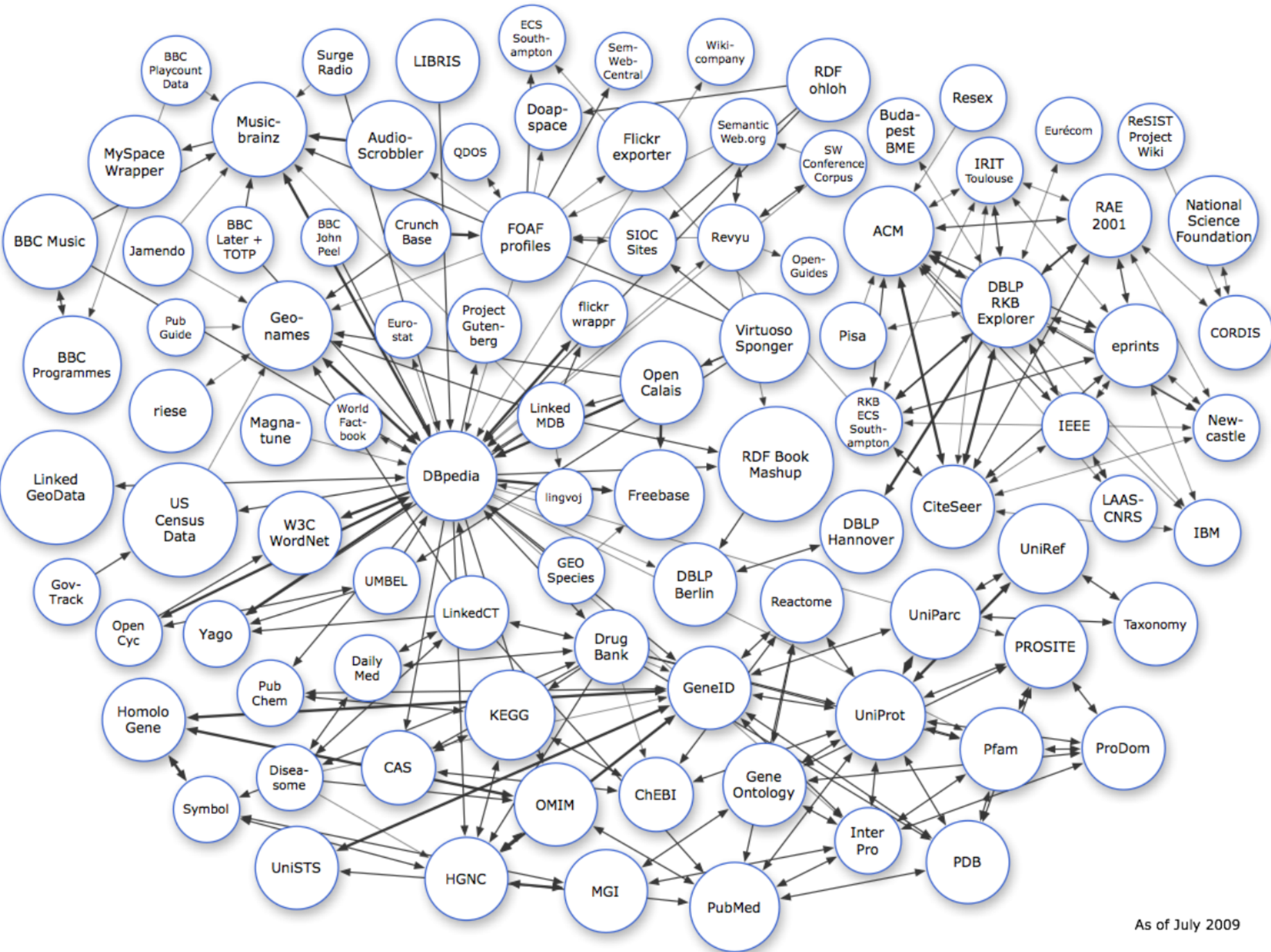
Open Linked Data

The most visible example of adoption and application of the Linked Data principles is Linking Open Data project.

The original and ongoing aim of the project is:

Bootstraping the Web of Data by :

- Identifying existing data sets that are available under open licenses.

- Converting these to RDF according to the Linked Data principles.

- Publishing them on the Web.

As of July 2009

Google Knowledge Graph

Google Knowledge Graph

The Knowledge Graph enhances Google Search in three main ways to start:

- Find the right thing

- Get the best summary

- Go deeper and broader

"New" Google Language	Established Semantic Web Vocabulary
Knowledge Graph	Linked Data Cloud
Relationships Between things	Linked Data
Connecting Things	Linked data
Ambiguous Language	Semantics
Graph	RDF
Things	URIs (Linked Data)

-- Google Just Hi-jacked the Semantic Web Vocabulary

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References

Semantic Web information Web agents page code language data program ontology agent system address pages new rules RDF service ontologies concepts Pete find XML use computer

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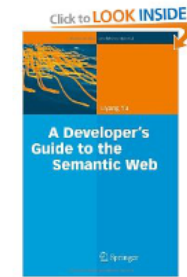[12] Tom Heath, Christian Bizer, Linked Data Evolving the Web into a Global Data Space,Morgan Claypool Publishers, 2011.
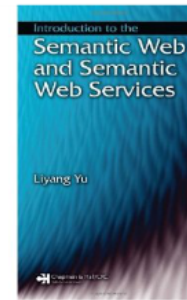
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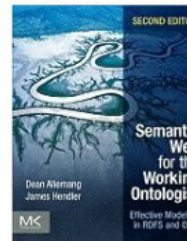
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