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## What Is the Semantic Web

[1, 2]

### History of the Semantic Web

**{ [1]**

* Web was “invented” by Tim Berners-Lee (amongst others), a physicist working at CERN
* TBL’s original vision of the Web was much more ambitious than the reality of the existing (syntactic) Web:

“... a goal of the Web was that, if the interaction between person and hypertext could be so intuitive that the **machine-readable** information space gave an accurate representation of the state of people's thoughts, interactions, and work patterns, then **machine analysis** could become a very powerful management tool, seeing patterns in our work and facilitating our working together through the typical problems which beset the management of large organizations.”

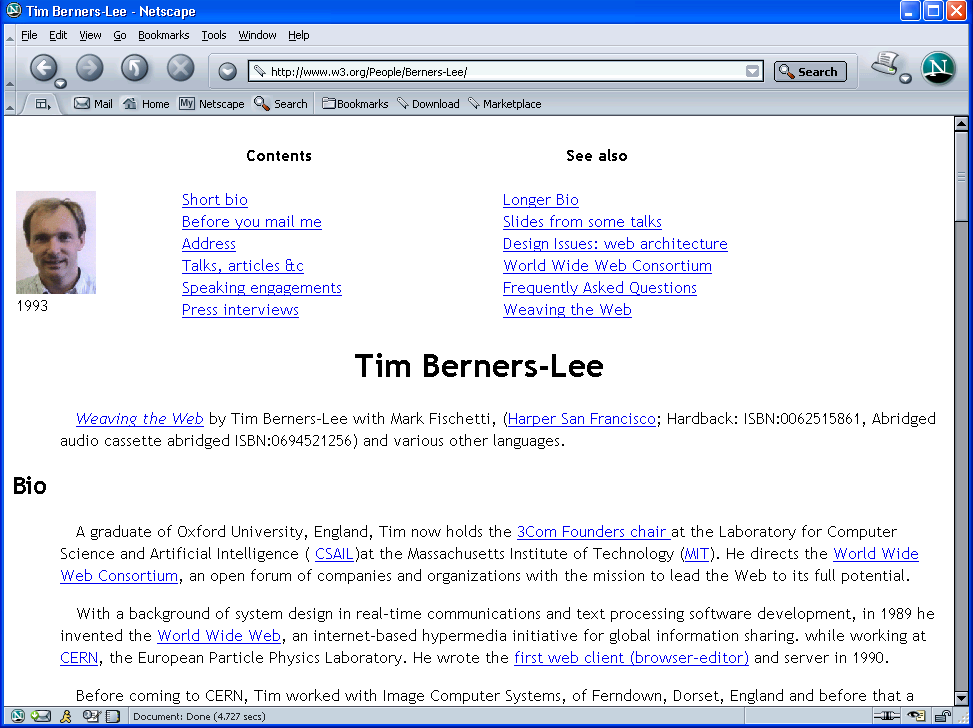
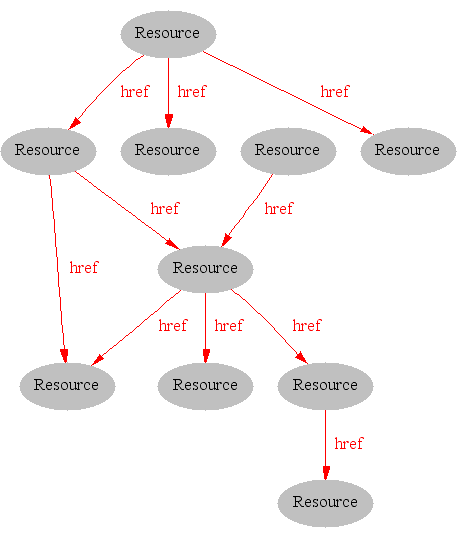


* TBL (and others) have since been working towards realising this vision, which has become known as the Semantic Web
* E.g., article in May 2001 issue of Scientific American…

**}**

**{ [1,2]**

**Where we are Today: the *Syntactic* Web:**



**}**

**{ [1]**

**The Syntactic Web is…**

**A place where computers do the presentation (easy) and people do the linking and interpreting (hard).**

* + **A hypermedia, a digital library**
    - **A library of documents called (web pages) interconnected by a hypermedia of links**
  + **A database, an application platform**
    - **A common portal to applications accessible through web pages, and presenting their results as web pages**
  + **A platform for multimedia**
    - **BBC Radio 4 anywhere in the world! Terminator 3 trailers!**
  + **A naming scheme**
    - **Unique identity for those documents**

**Why not get computers to do more of the hard work?**

**}**

**{ [1,2]**

**Hard Work using the *Syntactic* Web…**

* **Complex queries involving background knowledge**
  + **Find information about “animals that use sonar but are not either bats or dolphins”**
* **Locating information in data repositories**
  + **Travel enquiries**
  + **Prices of goods and services**
  + **Results of human genome experiments**
* **Finding and using “web services”**
  + **Visualise surface interactions between two proteins**
* **Delegating complex tasks to web “agents”**
  + **Book me a holiday next weekend somewhere warm, not too far away, and where they speak French or English**

**Almost impossible for machines and too hard for people without automation**

**}**

**{ [2]**

**Limitations of the Web today**



**Machine-to-human, not machine-to-machine**

**}**

sd

## What Is the Ontology

[2]

## The need for Ontology

search, taxonomies, knowledge maps vs ontology...

[4]

## RDF/S ve OWL Yapısı

[2]

{ Yöntem...

Ontolojideki property ve relation tipleri...

}

SWRL

Model vs. Data in ontology management

Ramifications of semantic web assumptions — open world and unique naming

## OWL Levels and Logic

[1]

{ OWL Dialects and Modelling Philosophy

OWL Full vs OWL DL

OWL Lite

Beyond OWL }

## Semantic Web Applications

[1] ... in the wild

[2]... anlamsal web uygulamaları

## Developing a Semantic Web Application with a Sample Ontology

Create Ontology, Query Ontology (by Protege & by Jena), Process Ontology Instances...

[1]: Ch4

{ RDF Parser,

RDF Store,

RDF Query (& Languages - SPARQL)

}

[2]: Bölüm 3.2

{

Protege’de ontolojinin oluşturulması

OWL’yi daha kolay yönetebilmek için yardımcı Java sınıflarının oluşturulması

Ontolojinin yönetilmesi ile ilgili servisler (sorgulama, yeni instance kaydı, vs...)

}

## Inferencing

[1]: Ch5 {

Asserted type vs Inferred Type

}

Inferencing vs Query

## Good and Bad Modelling Practices

[1]: Ch12

[3] ve google(ontology design patterns & best practices)

## Notes

**Necessary and Sufficient Conditions:**



To summarise: If class A is described using necessary conditions, then we can say that if an individual

is a member of class A it must satisfy the conditions. We cannot say that any (random) individual that

satisfies these conditions must be a member of class A. However, if class A is now defined using necessary and sufficient conditions, we can say that if an individual is a member of the class A it must satisfy the conditions and we can now say that if any (random) individual satisfies these conditions then it must be a member of class A. The conditions are not only necessary for membership of A but also sufficient to determine that something satisfying these conditions is a member of A.

How is this useful in practice? Suppose we have another class B, and we know that any individuals that are members of class B also satisfy the conditions that define class A. We can determine that class B is subsumed by class A — in other words, B is a subclass of A. Checking for class subsumption is a key task of a description logic reasoner and we will use the reasoner to automatically compute a classification hierarchy in this way.

A class that only has necessary conditions is known as a **Primitive Class**.

A class that has at least one set of necessary and sufficient conditions is known as a **Defined Class**.

Classes that only have necessary conditions are also known as ‘**partial’** classes. Classes that have at least one set of necessary and sufficient conditions are also known as ‘**complete**’ classes.

**To find some owl ontologies:**

<http://www.google.com/search?q=filetype:owl+owl>

Swoogle (<http://swoogle.umbc.edu/>)

Protege owl trunk: <http://smi-protege.stanford.edu/svn/owl/trunk/?rev=1171>

Protege Ontology Library: <http://protegewiki.stanford.edu/index.php/Protege_Ontology_Library>

introProtege.ppt dokumanı güzel...

ResultSet results; // already contains SPARQL result set

OutputStream oStream = new ByteArrayOutputStream();

ResultSetFormatter.outputAsXML( oStream, results );

// oStream contains results in SPARQL Query Results XML format

~~~~~~~~~

~~~~~~~~~

[1] [D:\My Documents\SemanticWebWorkshop\kaynak\Ian Horrocks - CS646\intro-2004.ppt](file:///D:\My%20Documents\SemanticWebWorkshop\kaynak\intro-2004.ppt)

[2] [D:\My Documents\SemanticWebWorkshop\kaynak\VaganTerziyan-SW Course\SW\_Tutorial\_2004\_Part\_1.ppt](file:///D:\My%20Documents\SemanticWebWorkshop\kaynak\VaganTerziyan-SW%20Course\SW_Tutorial_2004_Part_1.ppt)

[1]: Semantic Web for the Working Ontologist,2008

[2]: TEZ

[3]: <http://irfgc.irri.org/pantheon/index.php?option=com_content&task=view&id=425&Itemid=263>

[4]: The Semantic Web Real World Applications from Industry,2007