

Linked Data/Applications

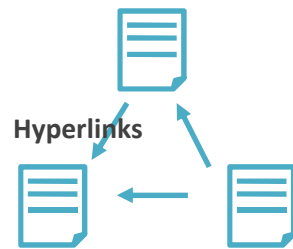
Semantic Web Technologies 1

WS2013/2014

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The Web: Evolution

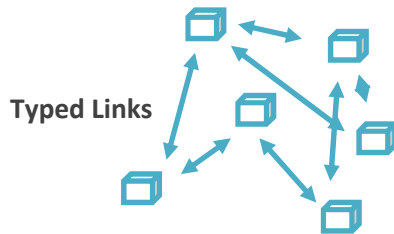
- Web of Documents



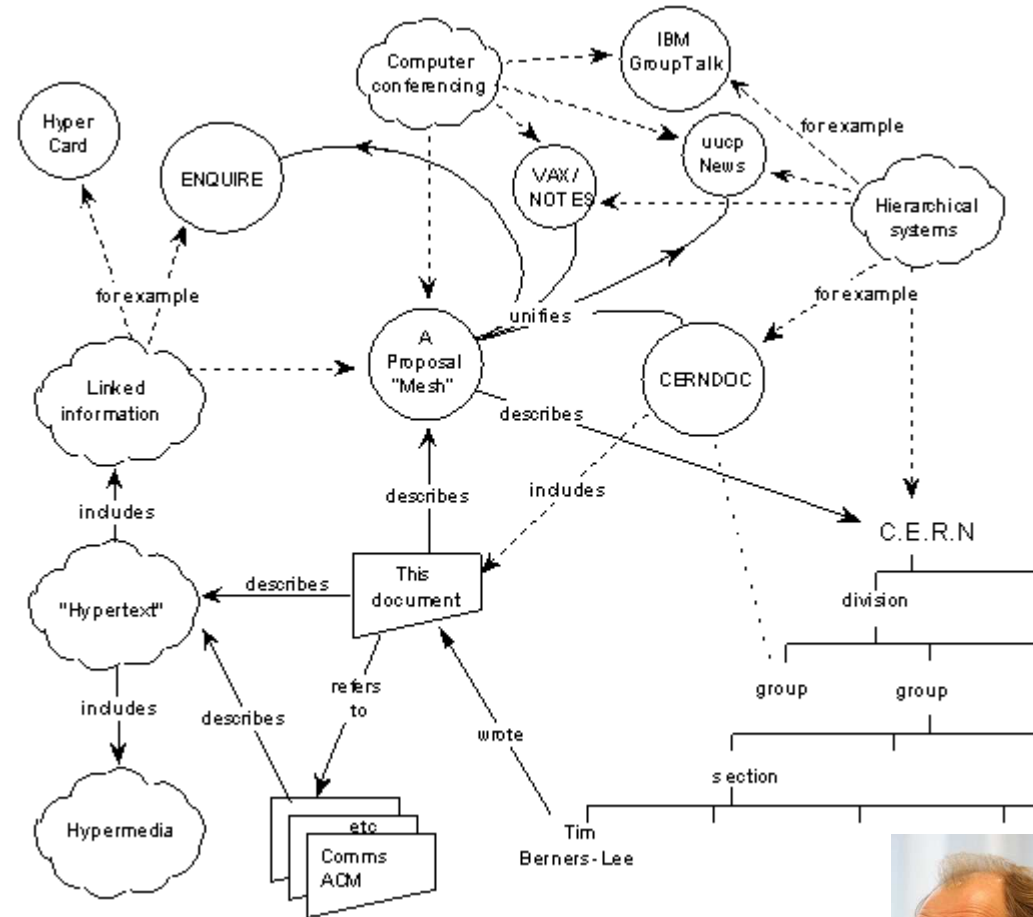
"Documents"



- Web of Data



"Things"



The Vision behind both:
Information Management – A Proposal
 By Tim Berners-Lee, 1989



Current W3C View on Semantic Web

Linked Data ■

The Semantic Web is a Web of data — of dates and titles and part numbers and chemical properties and any other data one might conceive of. RDF provides the foundation for publishing and linking your data. Various technologies allow you to embed data in documents (RDFa, GRDDL) or expose what you have in SQL databases, or make it available as RDF files.

Inference ■

Near the top of the Semantic Web stack one finds inference — reasoning over data through rules. W3C work on rules, primarily through RIF and OWL, is focused on translating between rule languages and exchanging rules among different systems.

Vocabularies ■

At times it may be important or valuable to organize data. Using OWL (to build vocabularies, or “ontologies”) and SKOS (for designing knowledge organization systems) it is possible to enrich data with additional meaning, which allows more people (and more machines) to do more with the data.

Vertical Applications ■

W3C is working with different industries — for example in Health Care and Life Sciences, eGovernment, and Energy — to improve collaboration, research and development, and innovation adoption through Semantic Web technology. For instance, by aiding decision-making in clinical research, Semantic Web technologies will bridge many forms of biological and medical information across institutions.

Query ■

Query languages go hand-in-hand with databases. If the Semantic Web is viewed as a global database, then it is easy to understand why one would need a query language for that data. SPARQL is the query language for the Semantic Web.

<http://www.w3.org/standards/semanticweb/>

Related Standards

- RDFa: embedding RDF triples into HTML, XHTML and XML documents
- GRDDL: Gleaning Resource Descriptions from Dialects of Languages; providing XSLT (XML Stylesheet Transformation) files to extract RDF triples from XML documents
- SKOS: Simple Knowledge Organization System:
skos:Concepts that are linked via skos:narrower or skos:broader
- RIF: Rules Interchange Format; an exchange format for rules to allow transfer of rules from one rule engine to another

Linked Data Principles...

...according to TimBL:

1. Use URIs as names for things.
2. Use HTTP URIs so that users 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 users can discover more things.

1. Use URIs as Names for Things

- Use a unique identifier to denote things
- URIs are defined in RFC 2396
- Hegel, Georg Wilhelm Friedrich
 - http://dbpedia.org/resource/Georg_Wilhelm_Friedrich_Hegel
 - <http://viaf.org/viaf/89774942/>
 - ...
- Hegel, Georg Wilhelm Friedrich: *Gesammelte Werke / Vorlesungen über die Logik*
 - <urn:isbn:978-3-7873-1964-0>



2. Use HTTP URIs

- Enables “lookup” of URIs
- Via Hypertext Transfer Protocol (HTTP)
 - Piggy-backs on hierarchical Domain Name System to guarantee uniqueness of identifiers
- Use of established HTTP infrastructure
- Connects logical level (thing) with physical level (source)

3. Provide useful information upon looking up a URI

- Immediate description: triples where the URI is the subject.
- Backlinks: triples where the URI is the object.
- Related descriptions: information of interest in typical usage scenarios.
- Metadata: information as author and licensing information.
- Syntax: RDF descriptions as RDF/XML and human-readable formats.

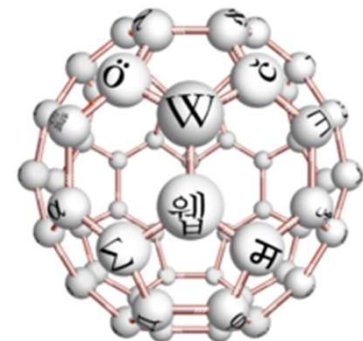
Source: *How to Publish Linked Data on The Web* - Chris Bizer, Richard Cyganiak, Tom Heath.

4. Include links to other URIs

- Instance level
 - direct reuse
 - owl:sameAs
- Schema level
 - direct reuse of class/property
 - rdfs:subClassOf/rdfs:subPropertyOf
 - owl:equivalentClass/owl:equivalentProperty




Semantic MediaWiki

- Semantic MediaWiki extends MediaWiki markup with metadata that can be exported to RDF
- The extension consists of i) typed links
 - MediaWiki: ... Karlsruhe is located in [[Germany]] ...
 - Semantic MediaWiki: ... Karlsruhe is located in [[has location::Germany]] ...
- and ii) annotations
 - MediaWiki: ... Karlsruhe has 280.000 inhabitants ...
 - Semantic MediaWiki: ... Karlsruhe has [[inhabitants:=280000]] ...



Types of SMW Usage

- Survey from semantic-mediawiki.org, Jan 2013

Response	Number	Percentage	Graph
Public online community (public read and write)	33	43.4%	
Wiki-based website (public read, restricted write)	44	57.9%	
Organisational or intranet wiki (restricted read and write)	50	65.8%	
Personal wiki (private use only)	16	21.1%	