



Semantic Web

Tutorial 0. Intro

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Organization

Format:

- ◆ Video lectures
- ◆ In-presence tutorials (two time slots)
- ◆ Assignments
- ◆ OLAT resource: <https://olat.vcrp.de/auth/RepositoryEntry/3699836239/CourseNode/105516779687951>

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Assignments/Tutorials

Assignments:

- ◆ One assignment per week (9 assignments in total)
- ◆ Assignments are solved at home in groups of 1-3 students. Please list all the participants of your team on each solution sheet.
- ◆ Solved assignments are to be submitted via OLAT
- ◆ 50 % credits in exercise sheets are necessary in order to attend the exam and to pass the course

Solutions:

Solutions to assignments are presented during tutorials and published on OLAT as PDF.

**Use the forum in OLAT to discuss the assignments
and ask questions!**

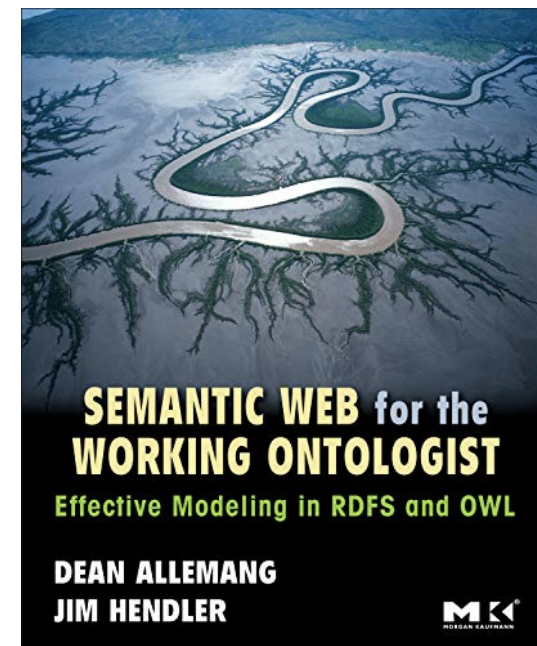
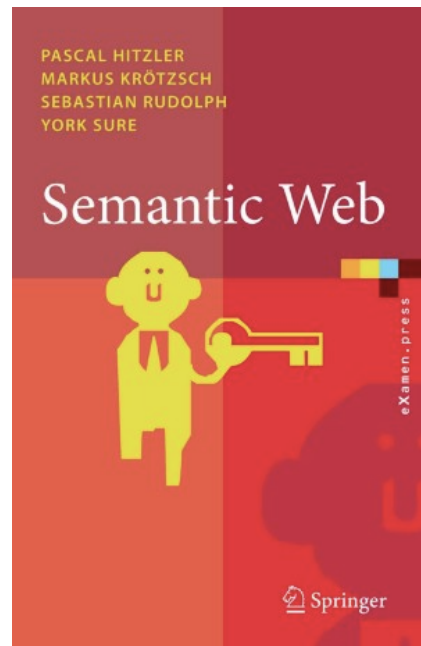
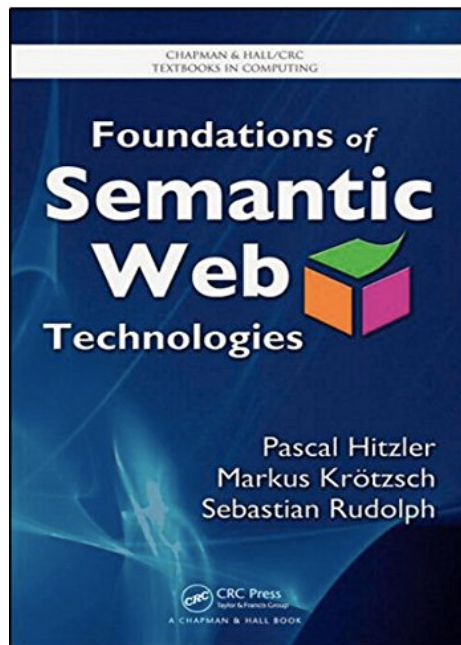
Plagiarism

- ◆ Submitted solutions to exercise sheets are part of the examination process
- ◆ Solutions have to be prepared independently within the student group and must contain only the group's own work
- ◆ You are allowed to discuss exercise sheets and potential solutions with other students, but it is explicitly forbidden to copy solutions and code of others
- ◆ Internet research is allowed but solutions must be phrased in one own's words and code has to be developed by yourself
- ◆ Also small changes of text and code (such as renaming of variables) still counts as a plagiarism.
- ◆ Plagiarism is a severe academic misconduct and will be punished correspondingly
- ◆ In case of plagiarism the whole student group will be expelled from the course and the exam (you lose one year);
- ◆ severe cases of plagiarism may be criminally prosecuted
- ◆ If two student groups have (partially) identical solutions, both groups will be punished as outlined above (so do not share your solutions with others)

Recommendations

- ◆ Listen to the video lectures
- ◆ You do not have to understand everything at once, but you have to deal with the topic thoroughly
- ◆ Listen to the lectures multiple times
- ◆ Read and work with the PDF slides
- ◆ understand the concepts; only memorising formulas is not sufficient
- ◆ Practise by yourself
- ◆ The assignment sheets are the perfect preparation for the exam
- ◆ Do not ignore the importance of self learning

Recommended Reading



Add-Ons to the Intro

- ◆ Semantic Web (recap)
- ◆ Linked Data Concept
- ◆ DBpedia
- ◆ URI, URL, URN

Semantic Web

“The Semantic Web is a webby way to link data”. Dave Beckett

Goal: make **information** machine-readable and machine-understandable.

Technical outline of semantic Web:

- ◆ **XML** >>> representation language for RDF, provides a surface syntax, ensures well-formedness, improves information exchange
- ◆ **RDF** >>> data model, provides Level_1 vocabulary, improves data integration from multiple sources

Subject - Predicate - Object

- ◆ **OWL** >>> provides Level_2 vocabulary, semantics and inference
- ◆ **RDFS** >>> mechanism to describe properties and classes of RDF resources and the relation between them
- ◆ **SPARQL** >>> query language for RDF
- ◆ **URI** >>> provides naming system for web resources

Linked Data

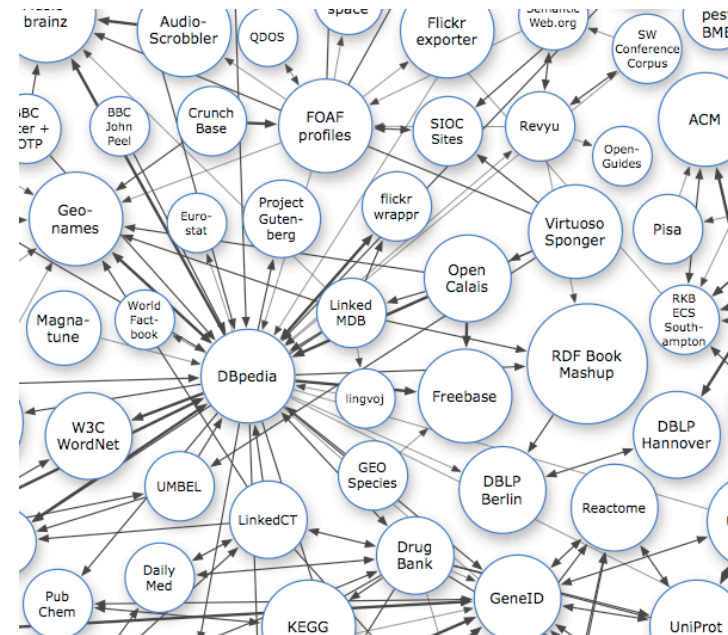
is a set of design techniques and best practices that allows to structure, express, publish and connect data stored in different locations in a way so it becomes machine-readable and machine-understandable.

If data can be used and distributed freely and by anyone >>> **Open Data**

If Open Data is linked >>> **Linked Open Data:**

- ◆ integrates different data sources and formats
- ◆ extends existing data models
- ◆ facilitates **inference** of new knowledge
- ◆ motivates organisations to follow semantic web context

>>> brings semantic technology innovation!



Cloud diagram by Richard Cyganiak and Anja Jentzsch

Linked Data

How well is your data integrated into the Web?

5* deployment schema for Linked Data (Tim Berners-Lee, 2010):

- *data should be available on the Web
- **data should be structured
- ***non-proprietary formats should be used
- ****URIs should be used to identify things
- *****data should be linked to other data to build a context



Picture by <https://www.w3.org>

Traditional Web

- information resources
- links between documents
- data is unstructured
- semantics is implicit
- for human perception

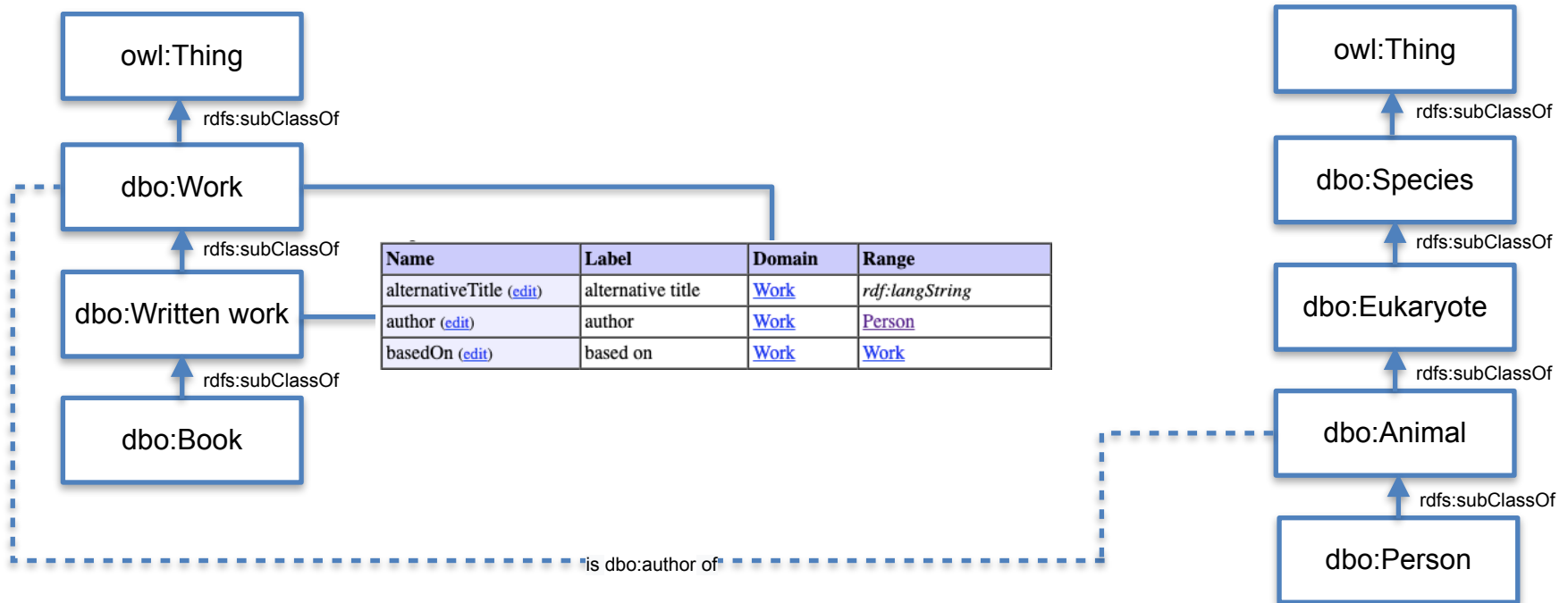


Semantic Web

- real-world objects
- links between things
- data is structured
- semantics is explicit
- understandable by humans and machines

DBpedia

DBpedia is a semantic representation of Wikipedia.



About: [Charles Dickens](#)

An Entity of Type: [animal](#), from Named Graph: <http://dbpedia.org/ontology/animal>

About: [author](#)

An Entity of Type: [ObjectProperty](#)

About: [Oliver Twist](#)

An Entity of Type: [work](#), from Named Graph: <http://dbpedia.org/ontology/work>

Getting familiar: <http://mappings.dbpedia.org/server/ontology/classes/>

DBpedia

For those who are curious:

DBpedia VS Wikidata:

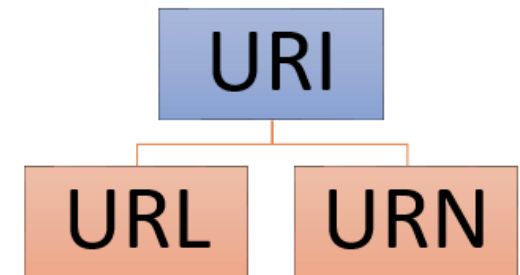
D. Abián, F. Guerra, J. Martínez-Romanos, Raquel Trillo-Lado. (2018). Wikidata and DBpedia: A Comparative Study

DBpedia:

Jens Lehmann, , Robert Isele, Max Jakob, Anja Jentzsch, Dimitris Kontokostas, Pablo N. Mendes, Sebastian Hellmann, Mohamed Morsey, Patrick van Kleef Soren Auer, Christian Bizer. (2012). DBpedia – A Large-scale, Multilingual Knowledge Base Extracted from Wikipedia

URI, URL, URN

- ◆ **URI identifies** a resource.
- ◆ Possible ways to identify a resource: **location, name:**
 - ◆ Location: **URL** points out **where** the identified resource is located and **how** to fetch it
 - >>> http:// myspace.com
 how? where?
 - ◆ Name: **URN** points out **what** the name of the resource is
 - >>> urn:myname



ldap://[2000:db8::7]/c=GB?objectClass=one	URL
mailto:myname@example.com	URL
telnet://172.0.4.16:80/	URL
ftp://username@ftp.example.com:21	URL
URN:ISSN:1234-5678	URN
tel:+1-456-123-7890	?

Picture: <https://www.guru99.com/url-vs-uri-difference.html>

Questions?

References

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