INFO/CS 4302
Web Information Systems

FT 2012
Week 8: Global Data Networks Intro

- Bernhard Haslhofer -
Plan for today...

• Discussion of HW6 (RESTful Web Services)

• Project Proposal Q & A

• Global Data Networks & Linked Data

• Questions, Housekeeping, ...
DISCUSSION OF HW6
HW6: RESTful Webservice (Due: 10/18 11:59pm)

Create a RESTful Webservice for retrieval and manipulation of actor and movie data. It should use the movie/actor dataset and implement the following use cases:

- UC1: Retrieve a list of all actors
- UC2: Retrieve a list of all movies
- UC3: Retrieve a specific actor
- UC4: Retrieve a specific movie
- UC5: Create a new movie
- UC6: Delete a movie
- UC7: Update a movie
- UC8: Retrieve a list of all actors playing in a certain movie
- UC9: Search (full-text) over actors and movies

Think about a mapping of the "things of interest" (movies, actors) and design URI templates before you implement your Webservice. For instance: /actors/{:id} -> identifies a specific actor.

The Webservice must serve XML and JSON data representations for all resources and also for search results. Distinguish between these representations by assigning separate URIs, e.g., /actors/1234.json identifies the JSON representation of a certain actor, whereas /actors/1234.xml identifies the XML representation.

Your Webservice should also implement the principle of "connectedness", meaning that returned resource representations should include links to other related resources.

For implementing your Webservice you can re-use existing code from your previous lectures. For getting started you can use our Python code skeleton, which uses
PROJECT PROPOSAL Q & A
Project and Proposal Guidelines

The project result should be a web information system that exposes information on the Web in human- and machine-readable form. We don't want to restrain your creativity by imposing too many rules. However, to make sure that your project is related to this course, we ask you to consider the following project guidelines:

- Your project idea must be novel and convincing. You cannot hand in some existing solutions from the Web or something you coded for other courses.
- The result of your project must be a Web application.
- This application must use at least one publicly available dataset from the Web. Here are some pointers to possible data sets.
- The application must clean, process, organize, and structure the data as needed.
- The application must have a Web-based user interface that generates some added value from the data for a web user (by combining data, by providing some interaction with the data (e.g. searches), by visualization of data, etc.).
- The application must provide a RESTful API to the underlying structured dataset.
- The application must either expose a Linked Data interface or provide structured data markup for its Web pages.

Your project proposal document should answer the following questions:

- Which use case/problem are you addressing with your project?
- Which datasets do you take as input? How do you transform them into a usable structure?
- What is your planned solution and how is it different from existing solutions?
- What is the estimated effort for this project (what tasks are involved, how much time do you expect to work on them) and how do you distribute work in your group?
A good proposal...

• Clearly describes the use case and the added value for the user

• Convinces us that the use case can be implemented with the given dataset(s)

• Shows that the group thought about technical aspects (architecture, data storage/processing)
Next Steps

• **SUN Oct 14th 11:59pm**: proposal submission

• **SUN Oct 21st**: acceptance notification
  – accept: continue working
  – reject: come and talk with us about minor/major revisions (office hours)
GLOBAL DATA NETWORKS & LINKED DATA
Some context...

http://www.youtube.com/watch?v=5Cb3ik6zP2I
Why Linked Data?
Why Linked Data?
Why Linked Data?
Web Architecture
Web Architecture

• A set of simple standards
  – Uniform global addressing (URI)
  – Uniform document encoding (HTML)
  – Uniform transportation (HTTP)
• Hyperlinks connecting documents
• Works pretty well for accessing and exchanging documents
But sometimes we need to access the underlying *structured data*.
Web Services and Web APIs

Web Services and Web APIs

• Each Web API has a proprietary interface
• Datasources must be known in advance
• Information entities (papers, authors, subjects, etc.) are often not linked
Social Networking Sites as Walled Gardens by David Simonds
Linked Data Vision

- Publish and link **structured data on the Web**
- Create a single **globally connected data space** based on the Web Architecture
Web of Linked Data

• A set of simple standards
  – Uniform global addressing (URI)
  – Uniform data model (RDF)
  – Uniform transportation (HTTP)
• RDF links connecting entities
• Forms a global data space and facilitates accessing and exchanging data
Shining ist ein Horrorfilm des Regisseurs Stanley Kubrick nach Stephen Kings gleichnamigem Roman, in dem sich in der Einsamkeit eines abgelegenen Berghotels ein schreckliches Familiendrama zuträgt.

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<th>Property</th>
<th>Value</th>
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<tr>
<td>dbpedia-owl:Work/runtime</td>
<td>146.0</td>
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<tr>
<td>dbpedia-owl:abstract</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Shining ist ein Horrorfilm des Regisseurs Stanley Kubrick nach Stephen Kings gleichnamigem Roman, in dem sich in der Einsamkeit eines abgelegenen Berghotels ein schreckliches Familiendrama zuträgt.</td>
</tr>
<tr>
<td></td>
<td>- El resplandor es el título de un largometraje dirigido por Stanley Kubrick en 1980 basado en la exitosa novela de terror de Stephen King del mismo nombre. Su título original en inglés es The Shining.</td>
</tr>
<tr>
<td></td>
<td>- The Shining is a 1980 psychological horror film directed by Stanley Kubrick, based on Stephen King's novel of the same name. Director Stanley Kubrick co-wrote the screenplay with novelist Diane Johnson. The film stars Jack Nicholson as tormented writer Jack Torrance, Shelley Duvall as his wife Wendy, and Danny Lloyd as their son, Danny. Unlike most Stanley Kubrick films which saw a slow graduated release building on word-of-mouth reputation, The Shining was released in a manner more like a mass-market film, opening at first in just two cities on Memorial Day, and then a month later seeing a nationwide release (including to drive-ins) after extensive television advertising. Nonetheless, initial response to the film was mixed and at first it performed moderately at the box office. The subsequent European release was almost half an hour shorter. Later critical assessment of the film has been more favorable and it is now viewed as a classic of the horror genre by critics such as Roger Ebert and other directors like Martin Scorsese. Its iconic and surreal imagery is now deeply embedded throughout popular culture. The film tells the story of a writer, Jack Torrance (Jack Nicholson), who accepts the job of the winter caretaker at a hotel that always gets snowed in during the winter. Jack's son shares psychic abilities with the hotel's chef who calls it &quot;shining&quot;. They can see things in the future or past, such as the ghosts of murdered people in the hotel. As the hotel becomes snowbound, Jack Torrance becomes influenced by the ghosts in the haunted hotel, descending into madness and trying to murder his wife and son. The novel's author Stephen King had very conflicted feelings about the film which have oscillated over time. A TV mini-series adaptation of the novel broadcast in 1997 saw King more actively involved.</td>
</tr>
</tbody>
</table>
What is Linked Data?

• A method to build a Web of Data
• Architectural style, set of standards
What is Linked Data?

• A set of four principles
  – use URIs as names for things
  – use HTTP URIs so that people can look up those names
  – when someone looks up a URI, provide useful information, using the standards (RDF, SPARQL)
  – include links to other URIs, so that they can discover more things
Linking Open Data Project

- **Open Data**: a philosophy, practice, or policy that data are freely available to everyone without restrictions from copyright, patents, a.s.o.
- **Linked Data**: method / best practices for exposing, sharing, and connecting data using URIs and RDF
- **Linking Open Data**: a W3C community project with the goal to extend the Web with a data commons by publishing various open data sets as RDF on the Web and by setting links between data items from different sources
As of September 2008
Green Day
Biography

Green Day is an American rock trio formed in 1987. The band has consisted of Billie Joe Armstrong (vocals, guitar), Mike Dirnt (bass guitar, vocals), and Tré Cool (drums, percussion) for the majority of its existence.

Green Day was originally part of the punk rock scene at 924 Gilman Street in Berkeley, California. Its early releases for independent record label Lookout! Records earned them a grassroots fanbase, some of whom felt alienated when the band signed to a major label. Nevertheless, its major label debut Dookie (1994) became a breakout success and eventually sold over 10 million copies in the U.S. and 15 million worldwide. As a result, Green Day was widely credited, alongside fellow California punk bands The Offspring and Rancid, with reviving mainstream interest in and popularizing punk rock in the United States. Green Day's three follow-up albums, Insomniac, Nimrod and Warning did not achieve the massive success of Dookie, but they were still successful, reaching double platinum, double platinum, and gold status respectively. Green Day's 2004 rock opera American Idiot reignited the band's popularity with a younger generation, selling five million copies in the U.S. The band's eighth studio album, 21st Century Breakdown, will be released on May 15, 2009.

Green Day has sold over 65 million records worldwide, with 22 million of them being sold in the United States. They have won three Grammy Awards: Best Alternative Album for Dookie, Best Rock Album for American Idiot, and Record of the Year for "Boulevard of Broken Dreams".

Read more at Wikipedia...
data.nytimes.com

For the last 150 years, The New York Times has maintained one of the most authoritative news vocabularies ever developed. In 2009, we began to publish this vocabulary as linked open data.

The Data

As of 13 January 2010, The New York Times has published approximately 10,000 subject headings as linked open data under a CC BY license. We provide both RDF documents and a human-friendly HTML versions. The table below gives a breakdown of the various tag types and mapping strategies on data.nytimes.com.

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<th>Automatically Mapped Tags</th>
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<td>Descriptors</td>
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</tr>
</tbody>
</table>

|               |                      |                           | 10,467  |

Browse individual data records:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

SKOS Files

Download all of the data records as SKOS Files.

- People
GeoNames Ontology

The Semantic Web

The *Semantic Web* is a project that intends to add computer-processable meaning (semantics) to the World Wide Web.

In Feb 2004, the World Wide Web Consortium released the Resource Description Framework (RDF) and the *OWL Web Ontology Language* (OWL) as W3C Recommendations. RDF is used to represent information and to exchange knowledge in the Web. OWL is used to publish and share sets of terms called ontologies, supporting advanced Web search, software agents and knowledge management.

The GeoNames Ontology

The GeoNames Ontology makes it possible to add geospatial semantic information to the World Wide Web. All over 6.2 million geonames toponyms now have a unique URL with a corresponding RDF web service. Other services describe the relation between toponyms.

The Ontology for GeoNames is available in OWL: [http://www.geonames.org/ontology/ontology_v2.2.1.rdf](http://www.geonames.org/ontology/ontology_v2.2.1.rdf)

GeoNames is using 303 (See Other) redirection to distinguish the Concept (thing as is) from the Document about it.

For the town *Embrun* in France we have these two URIs:

[1] [http://sws.geonames.org/3020251/](http://sws.geonames.org/3020251/)

[2] [http://sws.geonames.org/3020251/about.rdf](http://sws.geonames.org/3020251/about.rdf)

The first URI [1] stands for the town in France. You use this URI if you want to refer to the town. The second URI [2] is the document with the information geonames has about *Embrun*. The geonames web server is configured to redirect requests for [1] to [2]. The redirection tells Semantic Web Agents that *Embrun* is not residing on the geonames server but that geonames has information about it instead. See our blog posting about "Concept vs. Document" for more information.

An example of RDF description of a geonames "Feature" document, as obtained through the RDF Webservice at URI [http://sws.geonames.org/3020251/about.rdf](http://sws.geonames.org/3020251/about.rdf)

```xml
<rdf:RDF
  xmlns:cc="http://creativecommons.org/ns#"`
```
An entity graph of people, places and things, built by a community that loves open data.
Authorities and Vocabularies

About
The Library of Congress Authorities and Vocabularies service enables both humans and machines to programmatically access authority data at the Library of Congress via URIs.

Read more >
<table>
<thead>
<tr>
<th>Name (click for metadata and to rate Dataset/Tools)</th>
<th>Agency/Sub-Agency</th>
<th>Category</th>
<th>RDF</th>
<th>Number of RDF Triples</th>
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Welcome to data.nature.com – the NPG Linked Data Platform

The NPG Linked Data Platform provides access to datasets from NPG published as linked data and made available through SPARQL services. Two different interfaces are provided, a form interface for interactive queries and a service endpoint for remote queries:

/query - form interface (non-streaming)
/sparql - service endpoint (streaming)

Full documentation, demos and data snapshots for downloading are available on the nature.com developers portal.

Triple count: 288,329,379 (288.3 million)

Note that a live updating process is actively adding in triples to the datasets as new articles are published.

What is Available?

NPG is making available a number of datasets for public access as linked data. These datasets include data about articles published by NPG as well as the NPG product and subject ontologies. All datasets are registered on the Data Hub.

The datasets can be queried with SPARQL and snapshots are also available for downloading.

Questions?

Data Organization

The datasets are organized by graphs with one graph maintained per object type. A directory graph maintains descriptions for each of the individual graphs with class and property counts, and vocabularies used. Note that an NPG vocabulary has been used for object type properties as well as for certain data type properties:

npg: http://ns.nature.com/terms/
What is Schema.org?

This site provides a collection of schemas, i.e., html tags, that webmasters can use to markup their pages in ways recognized by major search providers. Search engines including Bing, Google and Yahoo! rely on this markup to improve the display of search results, making it easier for people to find the right web pages.

Many sites are generated from structured data, which is often stored in databases. When this data is formatted into HTML, it becomes very difficult to recover the original structured data. Many applications, especially search engines, can benefit greatly from direct access to this structured data. On–page markup enables search engines to understand the information on web pages and provide richer search results in order to make it easier for users to find relevant information on the web. Markup can also enable new tools and applications that make use of the structure.

A shared markup vocabulary makes easier for webmasters to decide on a markup schema and get the maximum benefit for their efforts. So, in the spirit of sitemaps.org, Bing, Google and Yahoo! have come together to provide a shared collection of schemas that webmasters can use.

We invite you to get started!
Recommended Readings

• Linked Data Web Site: http://linkeddata.org
• Linked Data / Semantic Web Introduction: http://www.linkeddatatools.com/semantic-web-basics
• Tim Berners-Lee. Linked Data Design Issues: http://www.w3.org/DesignIssues/LinkedData.html