



FORUM OF YOUNG GEOINFORMATICIANS 2014

8th YEAR OF PhD STUDENT SCIENTIFIC CONFERENCE

Brainstorming 05-06.06.2014

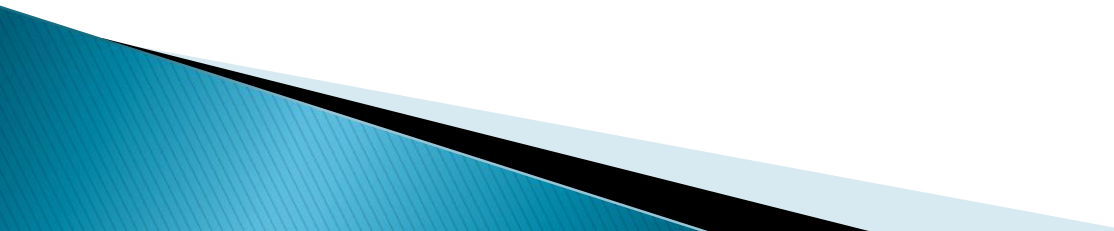


**TECHNICAL UNIVERSITY
IN ZVOLEN**

Spatial data infrastructures and linked open geo data

Martin Tuchyňa & Tomáš Kliment

Content

- ▶ Overview
 - ▶ Spatial data infrastructures
 - ▶ Linked open geo data
 - ▶ Towards the future...
- 

Overview

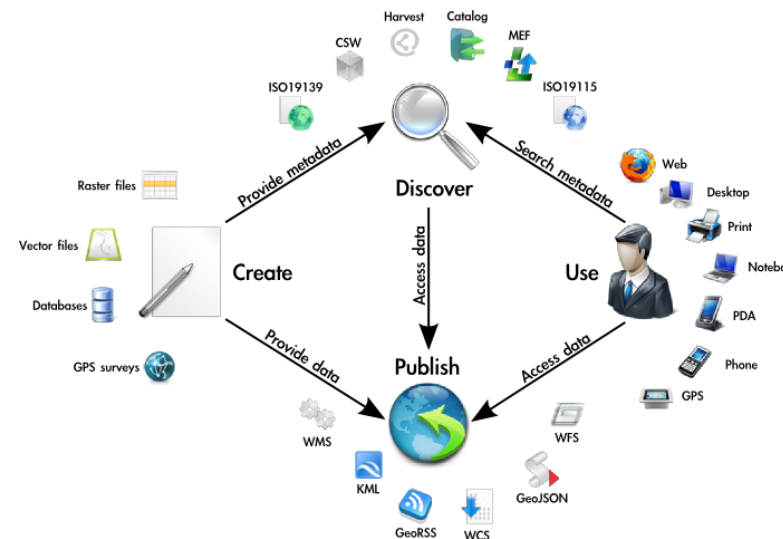
► Why?

- To share the views about current trends influencing creation, sharing and utilisation of geospatial resources
- To trigger ideas and discussion how to benefit from these paradigm and what challenges can occur
- Invite you for the brainstorming:

“Current trends, activities and issues in the field of Geoinformatics – from global, through the European to the national level”

Spatial Data Infrastructures

- ▶ Paradigm recently driven by
 - Legal driven initiative
 - standardisation initiatives
- ▶ Main building blocks (INSPIRE)
 - Metadata
 - Spatial data
 - Network services
 - Data sharing
 - Monitoring reporting
- ▶ Roadmap
 - Still on the beginning

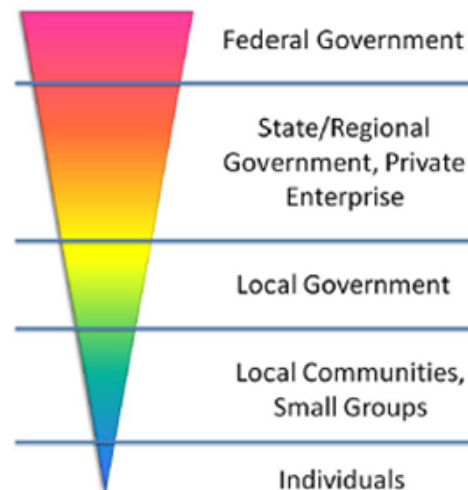


Spatial Data Infrastructures

► Stakeholders involvement

• Stakeholders:

- High involvement
 - Governmental sector
- Semi involvement
 - Academic, Private sector
- Limited involvement
 - Regional and local authorities, NGOs



Source: sdi4apps

Spatial Data Infrastructures



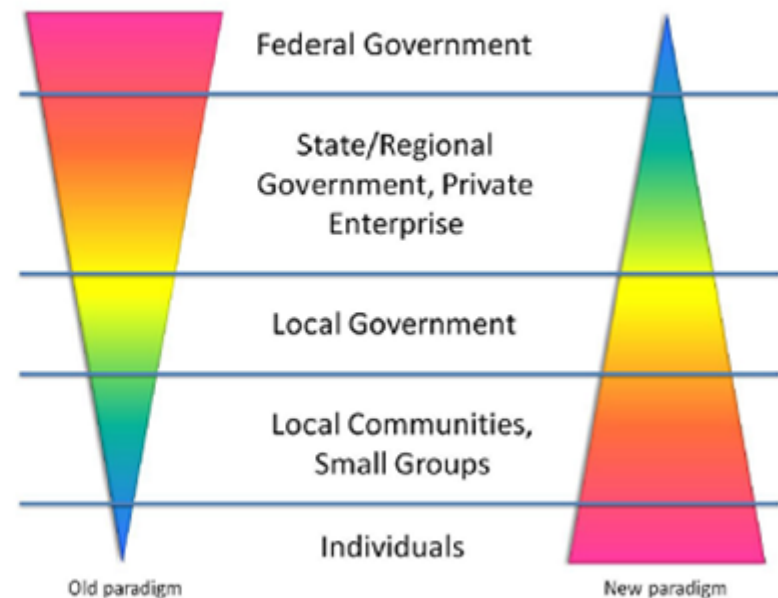
I Have No Customers!

Spatial Data Infrastructures

- ▶ Stakeholders involvement

- Questions on table:

- Users
- Demands
- Use cases
- X sectoral, X border
- Added value
- Link 2 world outside



Source: sdi4apps

Linked Open Geo Data

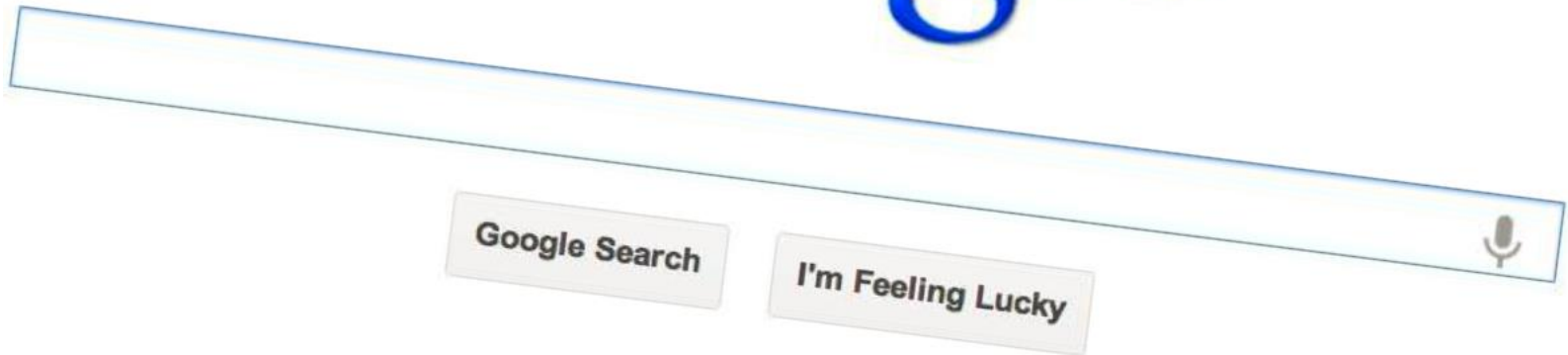
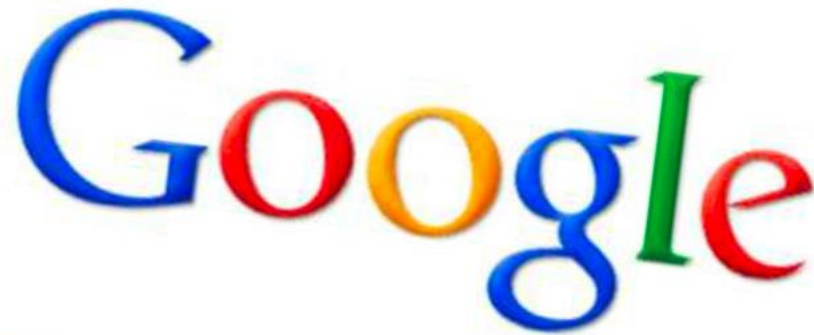
How can we find information
in the Web?

4



Linked Open Geo Data current solution:

5



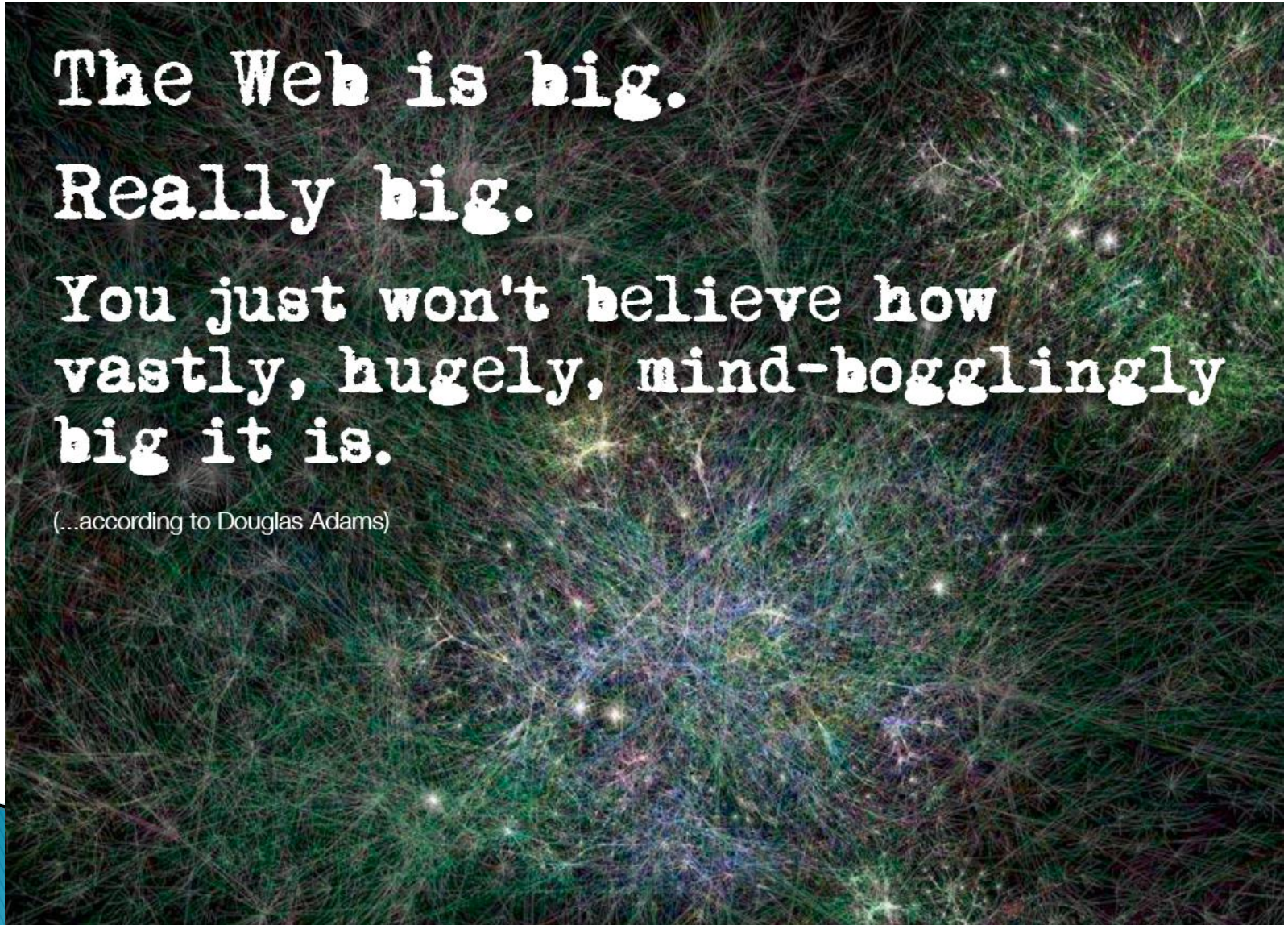
Linked Open Geo Data

The Web is big.

Really big.

You just won't believe how
vastly, hugely, mind-bogglingly
big it is.

(...according to Douglas Adams)



Linked Open Geo Data

The Web is really big...

- ca. 25×10^9 indexed documents in search engines
(TNL Blog: Google has 24 billion items index, considers MSN search nearest competitor, September 2005)
- Web Crawler: $> 10^{12}$ (1 trillion) documents
(The Official Google Blog: We knew the Web was Big....., Juli 25, 2008
<http://googleblog.blogspot.de/2008/07/we-knew-web-was-big.html>)
- Google Search Index Caffeine comprises ca. 100 Million Gigabytes i.e. 10^{17} Byte
(SMX Video: Google's Matt Cutts On Caffeine Launch, June 9, 2010,
<http://searchengineland.com/smx-video-googles-matt-cutts-on-caffeine-launch-43933>)
- DeepWeb (Darkweb) estimated to be about 550 times bigger than Surface Web

Linked Open Geo Data

From the World Wide Web to the Web of Data



- The **Web of Data** is an upgrade of the Web of Documents
- The Web as a huge decentralised database (knowledge base) of
- machine-accessible data

„The web of human-readable document is being merged with a web of machine understandable data. The potential of the mixture of humans and machines working together and communication through the web could be immense.“

Tim Berners-Lee, The World Wide Web: A very short personal history, May 1998

Linked Open Geo Data

Meaning



sender

receiver

Experience

Concept

symbolizes

refers to

Symbol

stands for

Object

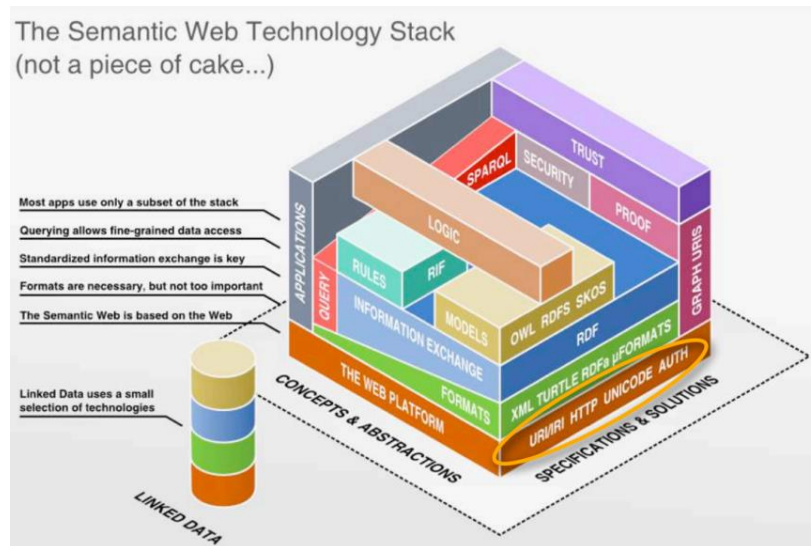
"Jaguar"



Pragmatics

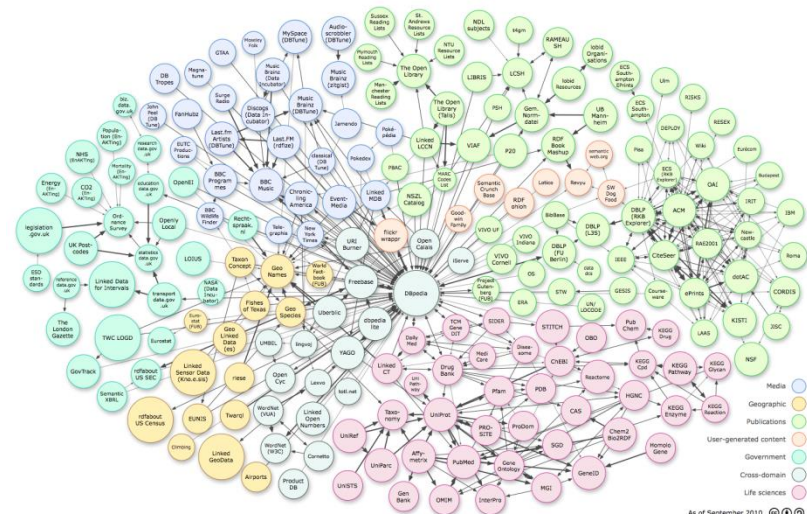
Linked Open Geo Data

- ▶ Paradigm recently driven by
 - Development of the Internet
 - Need to process huge amount of data
- ▶ Main building blocks



Linked Open Geo Data principles

- ▶ Linking of heterogeneous resources in the web
- ▶ RDF, URI
- ▶ re-emphasizes Semantic Web principles by RDF data model



Linked Open Geo Data principles

► Implementations

- Storage
- Transformation
- Publishing
- Visualisations (eg.<http://linkedgeo.org>)

Edit Lukaskirche

Name	Lukaskirche
Description	
Image	
Source_ref	
amenity	place_of_worship [-]
religion	christian [-]
denomination	lutheran [-]
created_by	xybot [-]

[+]

Search: [Login >>](#)

[Show updates in this area >>](#)

Properties

- [+] [highway](#) (15)
- [+] [religion](#) (3)
- [+] [amenity](#) (31)
- [+] [denomination](#) (3)
- [+] [historic](#) (1)
- [+] [railway](#) (2)
- [+] [leisure](#) (5)
- [+] [man_made](#) (1)
- [+] [shop](#) (4)
- [+] [sport](#) (1)
- [+] [cuisine](#) (1)

Instances

1. **Lukaskirche**
amenity: place_of_worship
religion: christian
denomination: lutheran
2. **Club 11**
amenity: nightclub
3. amenity: recycling
4. amenity: parking
5. amenity: parking
6. amenity: parking
7. amenity: recycling
8. **Lukas-Apotheke**
amenity: pharmacy
9. amenity: school
10. amenity: parking
11. **Johanneskirche**
denomination: christian_community
religion: christian
amenity:

0.0658550262451

This faceted Linked Geo Data browser was developed by [AKSW research group](#).

13.73790 51.03104

Linked Open Geo Data principles

- Standards
 - General linked open data (RDF,RDFa)
 - Modeling languages (RDFS,OWL)
 - Notation&serialisation (RDF/XML, N-Triples, RDFa, notation3, Turtle, TriG,JSON-LD, GEOJSON-LD ...)
 - Metadata linked open standards (DC,OWL,VoiD...)
- Schemas, vocabularies
 - Location (GRDF,GeoRSS,GeoSparql,NeoGeo..)
 - Domain ones (AgroVOC,GEMET,GeoSpecies)
- GeoLOD datasets
 - dbPedia,FAO,OS,Geonames,LinkedGeoData,Getty...

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Linked Open Geo Data principles

- Technology
 - Storage ([RDF triple stores](#)) with GeoSPARQL:
 - Virtuoso, OWLIM, Parliament , uSeekM, Strabon
 - Connectors & ETL [tools](#) (Sparqlify, TripleGeo)
 - Browsing, visualisation
 - Mappify, Jassa, Facete ([more info](#))
 - Interlinking ([GeoLift, LIMES](#))
- Examples
 - Data preparation – transformation for Linked Data ([GeoKnow Unister report](#))

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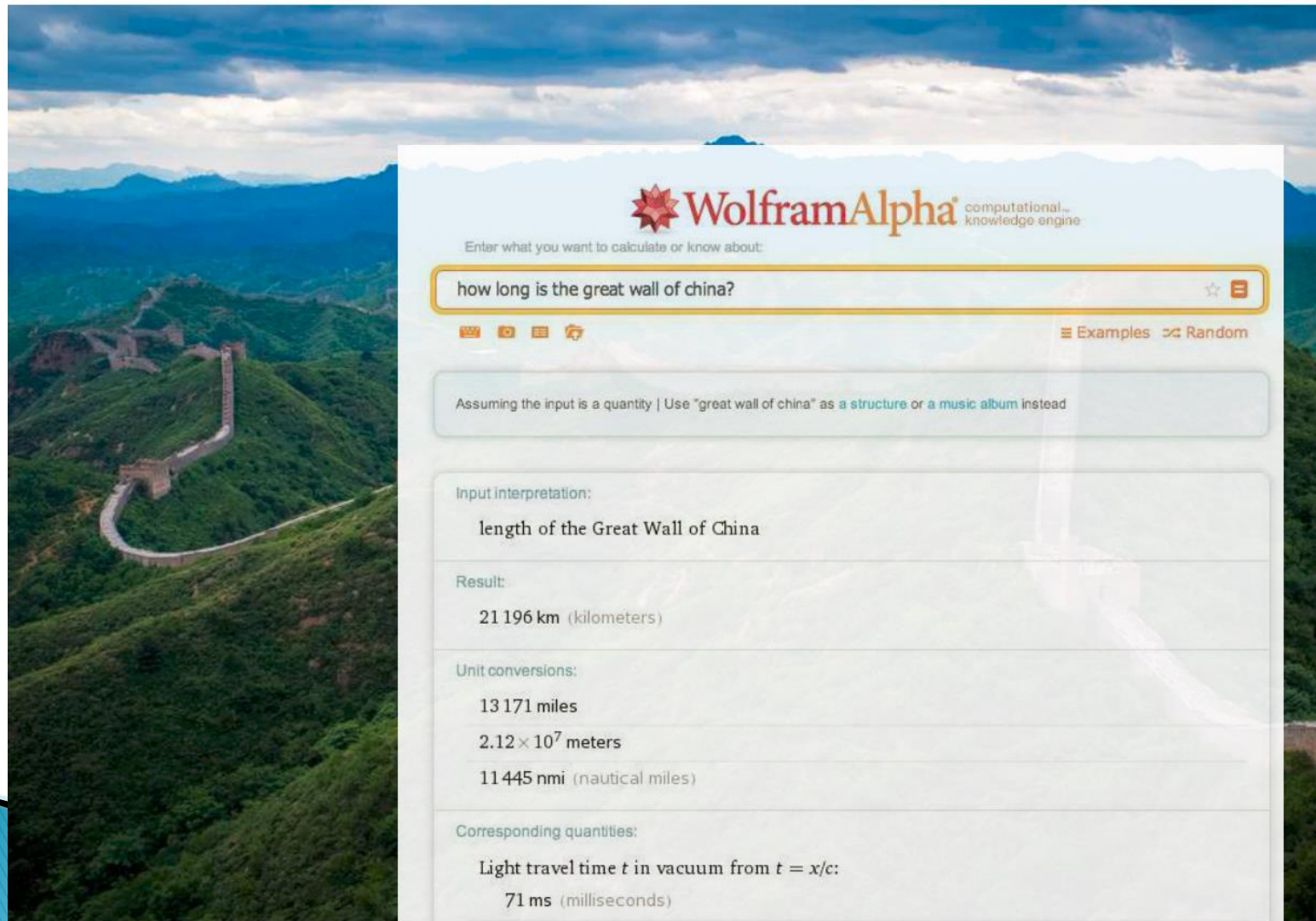
Linked Open Geo Data principles

From Document Retrieval to Fact Retrieval



Linked Open Geo Data principles

From Document Retrieval to Fact Retrieval



The image shows the WolframAlpha search engine interface. The background is a scenic view of the Great Wall of China stretching across lush green mountains under a bright blue sky with scattered white clouds. The WolframAlpha logo, featuring a red four-pointed star, is positioned at the top center of the interface. Below the logo, the text "computational knowledge engine" is visible. A search bar contains the query "how long is the great wall of china?". Below the search bar, there are icons for various input methods (text, image, voice, etc.) and links for "Examples" and "Random". A note below the search bar states: "Assuming the input is a quantity | Use 'great wall of china' as a [structure](#) or a [music album](#) instead". The results are organized into sections: "Input interpretation:" showing "length of the Great Wall of China"; "Result:" showing "21 196 km (kilometers)"; "Unit conversions:" showing "13 171 miles", "2.12 x 10⁷ meters", and "11 445 nmi (nautical miles)"; and "Corresponding quantities:" showing "Light travel time t in vacuum from $t = x/c$:" and "71 ms (milliseconds)".

WolframAlpha computational knowledge engine

Enter what you want to calculate or know about:

how long is the great wall of china?

Assuming the input is a quantity | Use "great wall of china" as a [structure](#) or a [music album](#) instead

Input interpretation:

length of the Great Wall of China

Result:

21 196 km (kilometers)

Unit conversions:

13 171 miles

2.12×10^7 meters

11 445 nmi (nautical miles)

Corresponding quantities:

Light travel time t in vacuum from $t = x/c$:

71 ms (milliseconds)

Towards the future

- ▶ Join the Brainstorming to shape the future ;o)

Thursday 5.6.2014 (16:40 – 18:00)

1. Brainstorming FYG 2013 main [outcomes](#) (What we managed and what no?...)
2. Thematic identified topics:
 - a. Support of INSPIRE implementation ([INSPIRE MIG](#)) – Martin Tuchyňa
 - b. INSPIRE conformity testing and validation (Organisation of the process (EU (MIG WG MIWP-5)), tools, certification authorities) – Tomáš Kliment

Friday 6.6.2014 (09:00 – 12:00)

- c. OpenLinked ([Geo](#)) Data and related projects ([SmartOpenData](#), [SDI4Apps](#)) – Martin Tuchyňa, Tomáš Kliment
 - d. Data and services sharing ([TPVSS](#)) – Martin Tuchyňa
 - e. Needs and potential of shared knowledge and experience within the wider geo-community space ([Experience from Balkan countries](#), Challenges for Cental Europe Countries) – Vlado Cetl, Martin Tuchyňa
 3. Conclusions
 4. AOB