

Databázové systémy

Dáta v grafe – dáta na webe

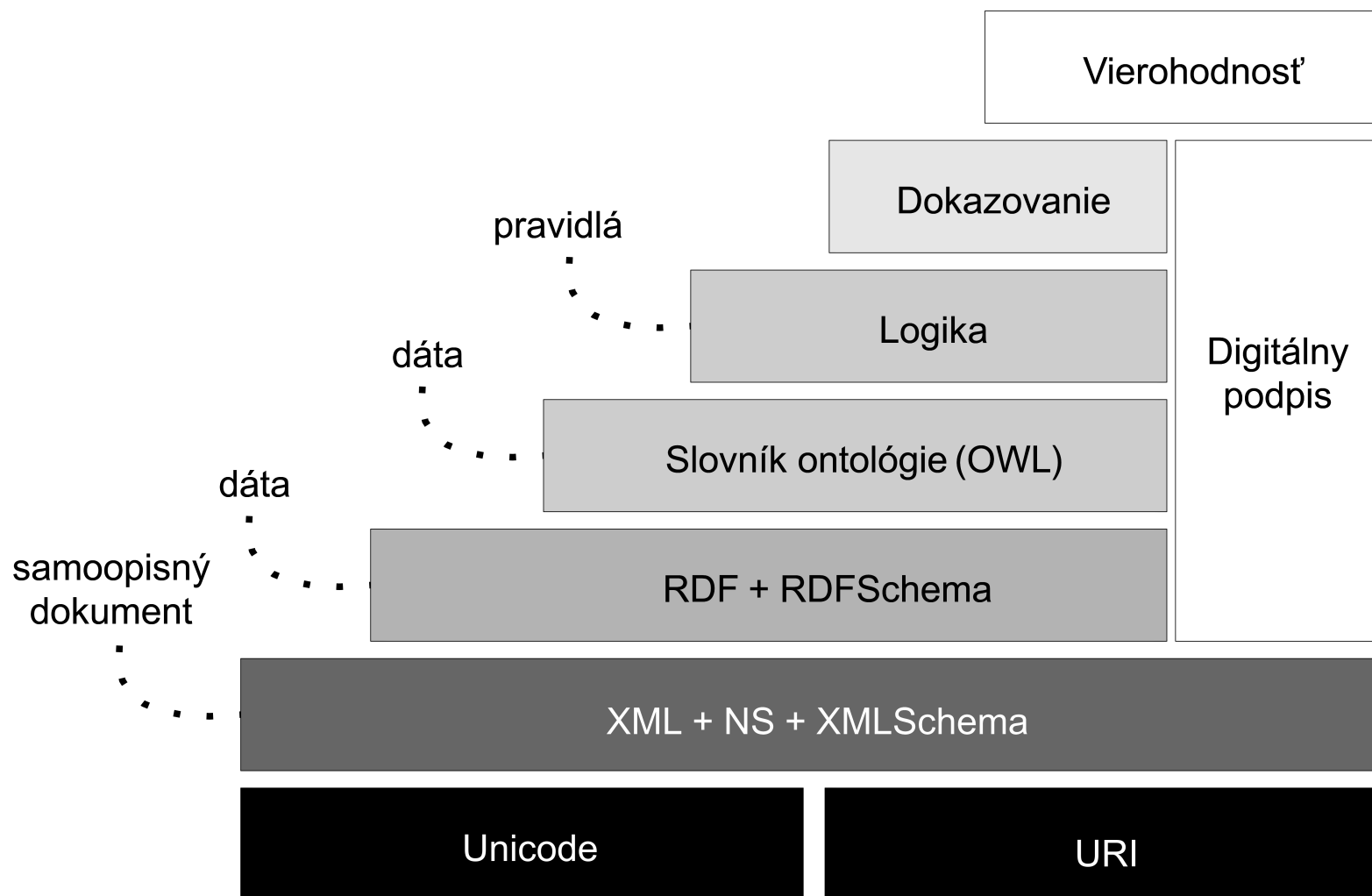
Vyhľadávanie na webe

- Chceme nájsť informáciu, ale hádame kľúčové slová, ktoré sa snád' vyskytujú na stránke s informáciou
- Väčšinou dostaneme milióny výsledkov
 - Drvivá väčšina z nich je zbytočná
- Ak je naše kľúčové slovo homonymom pre niečo frekventované, budeme často neúspešní
 - Monitor – LCD/CRT
 - Monitor – sledovanie

Čo potrebujeme?

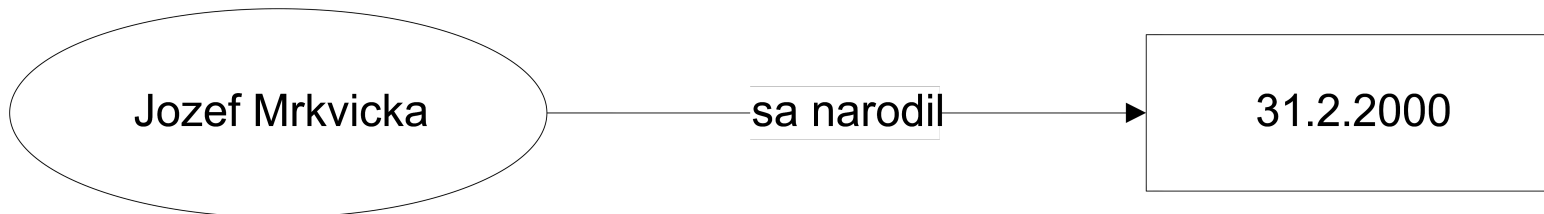
- Zadať vyhľadávaču to, čo chceme vedieť,
 - nie kľúčové slová
- Web je sieťou dokumentov určených pre ľudí
 - HTML a jeho značky definujú vizualizáciu
- Mať web ako sieť informácií, ktorým rozumie človek a ktoré zároveň dokáže spracovať stroj
 - Web so sémantikou

Vrstvy webu so sémantikou

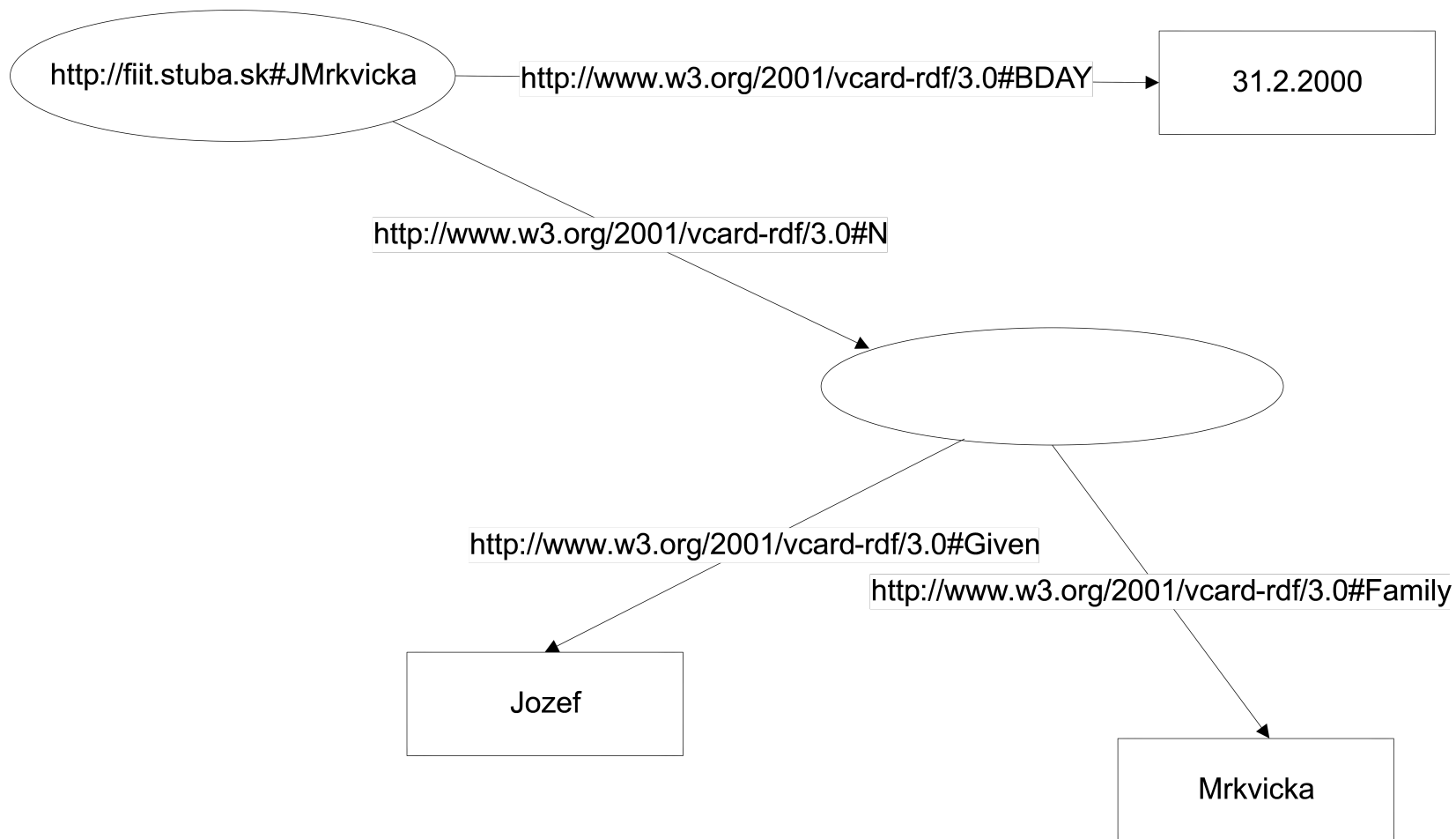


Resource Description Framework RDF

- Zápis tvrzení o zdrojoch pomocou trojíc
 - subjekt – predikát – objekt
- Príklad
 - Subjekt: Jozef Mrkvička
 - Predikát: sa narodil
 - Objekt: 31.2.2000



Príklad zápisu v RDF



Odvodzovanie

Príklad:

+ Peter má mamu Evu

+ Jozef má mamu Evu

+ Jozef má syna Ferka

X mama Y ak
X rodič Y
žena X

X súrodenec Y ak
Z rodič X
Z rodič Y

X stará mama Y ak

Môžem sa pýtať aj na to,
čo som systému explicitne nepovedal!!

Peter je Ferkov strýko

Eva je Ferkova stará mama



X je strýko Y ak
Y syn Z
X súrodenec Z

SPARQL

- Dopytovací jazyk pre semantický web
 - Pre dáta uložené v RDF
- Dopyt do viacerých datasetov v jednom dopyte
- Pekný tutoriál
 - <http://www.cambridgesemantics.com/semantic-university/sparql-by-example>

SPARQL

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

```
SELECT ?name ?email
```

```
WHERE {
```

```
    ?person a foaf:Person.
```

```
    ?person foaf:name ?name.
```

```
    ?person foaf:mbox ?email.
```

```
}
```

Napr. DBPedia

```
SELECT ?vztah, ?objekt
```

```
WHERE {
```

```
{ <http://dbpedia.org/resource/Slovakia> ?vztah  
  ?objekt }
```

```
}
```

- <http://dbpedia.org/sparql>

Iný príklad z DBPedia

PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

PREFIX type: <http://dbpedia.org/class/yago/>

PREFIX prop: <http://dbpedia.org/property/>

SELECT ?country_name ?population

WHERE {

 ?country a type:LandlockedCountries ;

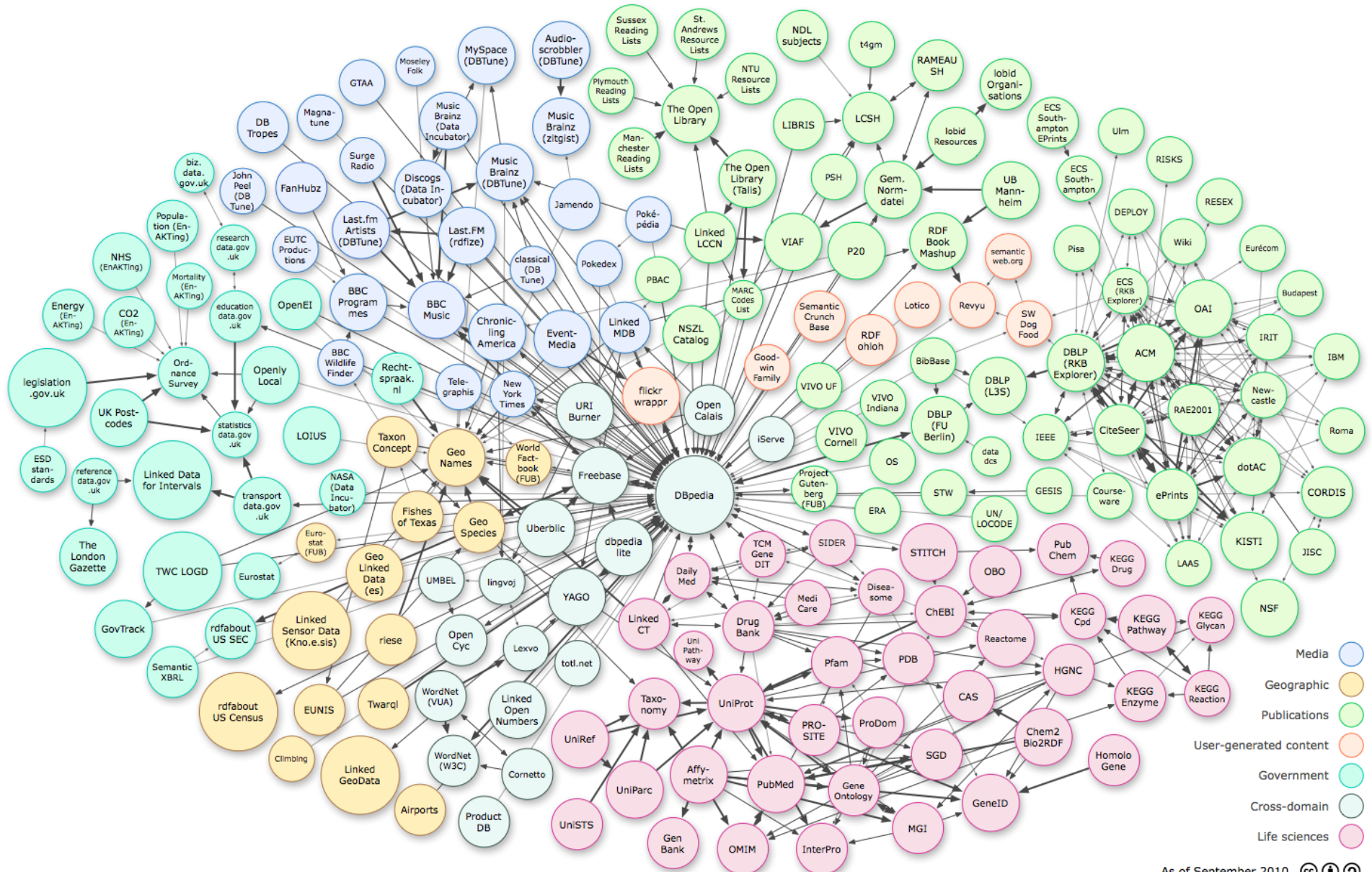
 rdfs:label ?country_name ;

 prop:populationEstimate ?population .

 FILTER (?population > 15000000) .

}

LinkedData



V praxi...

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Tim Berners-Lee - Wikipedia, the free encyclopedia

en.wikipedia.org/wiki/Tim_Berners-Lee ▼

Tim Berners-Lee at the Home Office, London, on 11 March 2010. In June 2009 then British Prime Minister Gordon Brown announced Berners-Lee would work ...

[Conway Berners-Lee](#) - [Enquire](#) - [Ferranti Mark 1](#) - [Mary Lee Woods](#)

Tim Berners-Lee - World Wide Web Consortium

www.w3.org/People/Berners-Lee/ ▼

A graduate of Oxford University, **Tim Berners-Lee** invented the World Wide Web, an internet-based hypermedia initiative for global information sharing while at ...

Longer Bio for Tim Berners-Lee - World Wide Web Consortium

www.w3.org/People/Berners-Lee/Longer.html ▼

Tim Berners-Lee graduated from the Queen's College at Oxford University, England, 1976. Whilst there he built his first computer with a soldering iron, TTL gates ...

Tim Berners-Lee (timberners_lee) on Twitter

https://twitter.com/timberners_lee ▼

The latest from **Tim Berners-Lee** (@timberners_lee). Director of the World Wide Web Consortium (W3C) w3.org, the place to agree on web standards. Founded ...

Tim Berners-Lee: The next web | Talk Video | TED - TED.com



Tim Berners-Lee

Computer Scientist

Sir Timothy John "Tim" Berners-Lee, OM, KBE, FRS, FREng, FRSA, DFBCS, also known as "TimBL", is a British computer scientist, best known as the inventor of the World Wide Web. [Wikipedia](#)

Born: June 8, 1955 (age 58), [London, United Kingdom](#)

Nationality: British

Books: [Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web by its Inventor](#)

Parents: [Mary Lee Woods](#), [Conway Berners-Lee](#)

Awards: MacArthur Fellowship, Marconi Prize, Charles Stark Draper Prize, Mountbatten Medal, President's Medal

Education: [The Queen's College, Oxford](#) (1973–1976), [Emanuel School](#)

Tap into the power of Google's Knowledge Graph with Freebase data

Freebase is a free, knowledge graph with millions of people, places, and things.


Follow Freebase on:



Select an item from the list:

Francis Ford Coppola	Film director
Francis Ford	Film director
Jeremy Clarkson	Film director
Phillip Ford	Film director

```
ns:m.012rkqx ns:type.object.type
ns:m.012rkqx ns:type.object.name
ns:m.012rkqx ns:type.object.type
ns:m.012rkqx ns:type.object.key
ns:m.012rkqx ns:type.object.type
ns:m.012rkqx key:authority.musicbr
ns:m.012rkqx key:authority.musicbr
```



Abraham Lincoln

/m/0gzh

Date of birth: 1809-02-12

Date of death: 1865-04-15

Place of birth: Hodgenville

President number: 16

Vice president: Andrew Johnson,

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Niečo praktickejšie?

Black Books (TV Series 2000–2004) - IMDb

www.imdb.com/title/tt0262150/ ▼

★★★★★ Rating: 8.7/10 - 27,671 votes

Bernard **Black** runs his own bookshop even though he doesn't much like people who buy **books** and hates having customers. Next door to Bernard's shop is the ...

[Episodes](#) - [Full Cast & Crew](#) - [Trivia](#) - [Awards](#)

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- Microdata embedované vo vašej stránke
- slovník zo schema.org (spolupráca Google, Bing, Yahoo, Yandex)
- Open Graph Protocol od Facebooku
- Twitter card data

Microdata + schema.org slovník

```
<div itemscope itemtype ="http://schema.org/Movie">
  <h1 itemprop="name">Avatar</h1>
  <div itemprop="director" itemscope
itemtype="http://schema.org/Person">
    Director: <span itemprop="name">James Cameron</span>
(born <span itemprop="birthDate">August 16, 1954</span>
  </div>
  <span itemprop="genre">Science fiction</span>
  <a href=" ../movies/avatar-theatrical-trailer.html"
itemprop="trailer">Trailer</a>
</div>
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```

Čo všetko sa takto dá uverejniť

- ▶ Product
- ▶ Place
- ▶ Person
- ▶ Organization
- ▶ MedicalEntity
- ▶ Intangible (nehmotné – napr. ponuka, objednávka, služba, hodnotenie...)
- ▶ Event
- ▶ CreativeWork (článok, film, fotka, hudba, ...)
- ▶ Akcia

Zhrnutie

- Vyššia vrstva abstrakcie nad dátami
 - Zdieľané slovníky, odvodzovanie
- Graf ako základná štruktúra webu so sémantikou (LinkedData)
 - RDF, RDFS(S), OWL
- SPARQL a SPARQL endpoints
- Microdata