Determining the Impact of Eric Clapton on Music Using RDF Graphs

Selected Challenges of Semantics Across and Within Datasets

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Balisage
The Markup Conference

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Pre-History: 1972

2011 – Triples (RDF, NT, etc.)

Subject	Predicate	Object
Eric Clapton	Played with →	John Mayall
Eric Clapton	Played with →	Cream
Eric Clapton	Has Alternate Names →	"Clapton, Eric Patrick; Slowhand"@en
Eric Clapton	Played with →	Derek and the Dominos

Lofty Goal: Measuring a Musician's Impact

- Who has had the greatest "impact" on rock (or blues) music?
  - Conceptual vs. Technical
  - Empirical, repeatable procedure
  - Verifiable
    - In theory – Can we trust results?
    - In practice – Need to check (direct knowledge and other authoritative sources)
    - Compare to musician's own recollections
  - Case study: *"Selected Challenges of Semantics Across and Within Datasets"*

Measuring a Musician's Impact – cont.

- A la "Six Degrees of Kevin Bacon":
  - Which rock artist's extended graph has the most other artists in 2 degrees? 3? 4?
  - How many musicians are within 1 or 2 degrees of Eric Clapton?
  - Difficult to verify.
- Easy to think of two dozen interesting questions.
- Very hard to align to specific RDF properties (in selected datastores with certainty).

Problem Statements

- Which recording artist has directly played with the most musicians? (no genre)
  - Define "played with": group, album, live performance, same show?
- Which recording artist was most active during a particular *decade*?
  - But how to define active? recordings ? concerts?
- Among all artists of a particular *genre*, who has played with the most other musicians?
  - But how to define genre (multiple similar terms)?

Problem Statements – cont.

- Impoverished data
  - Can we use our own knowledge of Eric Clapton to clarify some of the semantics behind some of the RDF data we encounter?

Data Sources - Wikipedia Infoboxes

Eric Clapton

Clapton on stage, Munich, Germany on 5 June 2010

Background information

Birth name	Eric Patrick Clapton
Also known as	Slowhand
Born	30 March 1945 (age 66) Ripley, Surrey, England
Genres	Rock, blues-rock, blues, psychedelic rock, hard rock
Occupations	Musician, songwriter, producer, artist
Instruments	Vocals, guitar
Years active	1962–present
Labels	Warner Bros., Reprise, Polydor, RSO, Atco, Apple, Deram[1]
Associated acts	The Yardbirds, John Mayall & the Bluesbreakers, Powerhouse, Cream, Free Creek, The Dirty Mac, Blind Faith, J.J. Cale, The Plastic Ono Band, Delaney, Bonnie & Friends, Derek and the Dominos
Website	Official website

Notable instruments

See: Guitars section

Source: Wikipedia. "Eric Clapton -- Wikipedia, The Free Encyclopedia". 2011.

Contents [hide]

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Wikipedia Infobox Markup

```
{{Use British English|date=August 2010}}{{Use dmy dates|date=October 2010}}
{{Infobox musical artist <!-- See Wikipedia:WikiProject_Musicians -->
| Name                = Eric Clapton
| Img                 = Eric Clapton in concert.jpg
| Alias               = Slowhand
| Img_capt            = Clapton on stage, Munich, Germany on 5 June 2010
| Img_size            = 250
| Landscape           = Yes
| Background          = solo_singer
| Birth_name          = Eric Patrick Clapton
| Born                = {{Birth date and age|1945|3|30|df=y}}<br />[[Ripley, Surrey]], England
| Instrument          = [[Singing|Vocals]], [[guitar]]
| Genre               = [[Rock music|Rock]], [[blues rock]], [[psychedelic rock]], [[blues]], [[hard rock]], [[acid rock]]
| Occupation          = [[Musician]], [[songwriter]], [[Record producer|producer]], [[artist]]
| Years_active        = 1962-present
| Label               = [[Warner Bros. Records|Warner Bros.]], [[Reprise Records|Reprise]], [[Polydor Records|Polydor]], [[RSO
Records|RSO]], [[Atco Records|Atco]], [[Apple Records|Apple]], [[Deram]]<ref>{{cite web
| title               = Rock & Roll Library - Eric Clapton's Releases
| work                = List
| publisher           = Rock & Roll Library
| url                 = http://www.rocklibrary.com/Library/qs/releases.aspx?id=de20a9f0-1c31-4632-a807-336d3a4c537b
| accessdate          = 25 August 2008}}</ref>
| Associated_acts     = <!-- see: [[Template:Infobox_musical_artist#Associated_acts]]--> [[The Yardbirds]], [[John Mayall & the
Bluesbreakers]], [[Eric Clapton's Powerhouse|Powerhouse]], [[Cream (band)|Cream]], [[Free Creek (band)|Free Creek]], [[The Dirty
Mac]], [[Blind Faith]], [[J.J. Cale]], [[The Plastic Ono Band]], [[Delaney, Bonnie & Friends]], [[Derek and the Dominos]], [[The
Beatles]], [[Phil Collins]], [[The Rolling Stones]], [[Luciano Pavarotti]], [[The Band]], [[Freddie King]], [[B.B. King]]
| URL                 = [http://www.ericclapton.com/ Official website]
| Notable_instruments = See: [[#Guitars|Guitars section]]<br />[[Blackie (guitar)|"Blackie": Fender Stratocaster]]<br
/>[[Brownie (guitar)|"Brownie": Fender Stratocaster]]<br />[[Gibson SG]]<br />[[Gibson ES-335]]<br />[[Gibson Les Paul]]
}}
```

Source: Wikipedia. "Eric Clapton -- Wikipedia, The Free Encyclopedia". 2011.

DBpedia NT Excerpt – Clapton Infobox

EC = <http://dbpedia.org/resource/Eric_Clapton>

Total Clapton triples: 5,064.   <u>Source</u>: infobox_properties_en.nt: 160 EC's

EC <http://dbpedia.org/property/name> "Eric Clapton"@en .
EC <http://dbpedia.org/property/id> "618b6900-0618-4f1e-b835-bccb17f84294"@en .
EC <http://dbpedia.org/property/wikiPageUsesTemplate> <http://dbpedia.org/resource/Template:Persondata> .
EC <http://dbpedia.org/property/placeOfBirth> "Ripley, Surrey, England"@en .
EC <http://dbpedia.org/property/dateOfBirth> "1945"^^<http://www.w3.org/2001/XMLSchema#int> .
EC <http://dbpedia.org/property/shortDescription> "Grammy Award winning English guitarist, singer and composer"@en .
EC <http://dbpedia.org/property/alternativeNames> "Clapton, Eric Patrick; Slowhand"@en .
EC <http://dbpedia.org/property/name> "Clapton, Eric"@en .
EC <http://dbpedia.org/property/wikiPageUsesTemplate> <http://dbpedia.org/resource/Template:Template_group> .
EC <http://dbpedia.org/property/title> "Associated bands"@en .
EC <http://dbpedia.org/property/associatedActs> "The Yardbirds, John Mayall & the Bluesbreakers, Powerhouse, Cream, Free Creek, Dire Straits, George Harrison, The Dirty Mac, Blind Faith, Freddie King, Phil Collins, J.J. Cale, The Plastic Ono Band, Delaney, Bonnie & Friends, Derek and the Dominos, T.D.F., Jeff Beck, Paul McCartney, Steve Winwood, B.B. King, The Beatles, The Band"@en .
EC <http://dbpedia.org/property/label> "Warner Bros., Reprise, Polydor, RSO, Atco, Apple, Deram"@en .
EC <http://dbpedia.org/property/yearsActive> "1962\u2013present"@en .
EC <http://dbpedia.org/property/occupation> "Musician, singer-songwriter, artist"@en .
EC <http://dbpedia.org/property/genre> "Rock, blues-rock, psychedelic rock, hard rock"@en .
EC <http://dbpedia.org/property/wikiPageUsesTemplate> <http://dbpedia.org/resource/Template:Musicbrainz_artist> .
EC <http://dbpedia.org/property/wikiPageUsesTemplate> <http://dbpedia.org/resource/Template:Listen> .
EC <http://dbpedia.org/property/format> "Ogg"@en .
EC <http://dbpedia.org/property/description> "27.0"^^<http://dbpedia.org/datatype/second> .
EC <http://dbpedia.org/property/title> "\"Layla\""@en .
EC <http://dbpedia.org/property/filename> "Layla sample 1.ogg"@en .
EC <http://dbpedia.org/property/wikiPageUsesTemplate> <http://dbpedia.org/resource/Template:Infobox_musical_artist> .
EC <http://dbpedia.org/property/notableInstruments> <http://dbpedia.org/resource/Gibson_ES-335> .
EC <http://dbpedia.org/property/notableInstruments> "See: Guitars section"@en .
EC <http://dbpedia.org/property/url> "Official website"@en .

Data Source - DBpedia

About: Eric Clapton

An Entity of Type : musical artist, from Named Graph : http://dbpedia.org, within Data Space : dbpedia.org

Eric Patrick Clapton, CBE (born 30 March 1945) is an English blues-rock guitarist and singer-songwriter. Clapton is the only person who has been inducted into the Rock and Roll Hall of Fame three times; as a solo performer, as well as a member of rock bands the Yardbirds and Cream. Throughout his career, Clapton has been viewed by critics and fans alike as one of the most important and influential guitarists of all time, Clapton was ranked fourth in Rolling Stone

Property	Value
dbpedia-owl:abstract	▪ Eric Patrick Clapton, CBE ist ein englischer Blues- und Rock-Gitarrist und -Sänger. Er ist mehrfacher Grammygewinner und dreifaches Mitglied der „Rock and Roll Hall of Fame". Clapton prägte die Entwicklung des Bluesrocks seit den 1960er Jahren wesentlich mit und gilt als einer der bedeutendsten Gitarristen. Auf der Liste der 100 Greatest Guitarists of All Time der amerikanischen Musikzeitschrift Rolling Stone findet sich Clapton auf Rang 4. ▪ Eric Patrick Clapton, CBE (born 30 March 1945) is an English blues-rock guitarist and singer-songwriter. Clapton is the only
dbpedia-owl:alias	▪ Slowhand
dbpedia-owl:associatedBand	▪ dbpedia:The_Yardbirds ▪ dbpedia:Jeff_Beck ▪ dbpedia:B.B._King ▪ dbpedia:Eric_Clapton's_Powerhouse ▪ dbpedia:The_Dirty_Mac ▪ dbpedia:George_Harrison ▪ dbpedia:The_Beatles ▪ dbpedia:Cream_(band) ▪ dbpedia:The_Band ▪ dbpedia:John_Mayall_&_the_Bluesbreakers ▪ dbpedia:Phil_Collins ▪ dbpedia:Paul_McCartney ▪ dbpedia:Freddie_King ▪ dbpedia:Dire_Straits ▪ dbpedia:Blind_Faith ▪ dbpedia:Steve_Winwood ▪ dbpedia:Derek_and_the_Dominos ▪ dbpedia:Free_Creek_(band) ▪ dbpedia:The_Plastic_Ono_Band ▪ dbpedia:Delaney,_Bonnie_&_Friends ▪ dbpedia:J.J._Cale ▪ dbpedia:X-sample
dbpedia-owl:associatedMusicalArtist	▪ dbpedia:The_Yardbirds ▪ dbpedia:Jeff_Beck ▪ dbpedia:B.B._King ▪ dbpedia:Eric_Clapton's_Powerhouse ▪ dbpedia:The_Dirty_Mac ▪ dbpedia:George_Harrison

Source:
http://dbpedia.org/resource/
Eric_Clapton [redirects[

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Data Source: MusicBrainz

- MBID is a 36 character Universally Unique Identifier permanently assigned to each MusicBrainz database entity, such as:
    - Artists
    - Release Groups, Releases
    - Disc IDs
    - Recordings [tracks]
    - Labels
    - Works
    - Relationships [links]
- Eric Clapton's MBID and Artist page:
    - 618b6900-0618-4f1e-b835-bccb17f84294
    - http://musicbrainz.org/artist/618b6900-0618-4f1e-b835-bccb17f84294

MusicBrainz – *Previous* Clapton page

Previous Source: http://musicbrainz.org/artist/618b6900-0618-4f1e-b835-bccb17f84294.html. This 3/21/11 view is no longer possible, AFAIK.

MusicBrainz – Clapton "Artist" page Now

Source: http://musicbrainz.org/artist/618b6900-0618-4f1e-b835-bccb17f84294

Permanent link.   Last updated: 2011-05-19 20:35 UTC

MusicBrainz – WS result 461 Ocean Blvd.

Previous Source: http://musicbrainz.org/mm-2.1/album/1301e027-b038-4017-9b4c-7655bff78f6b

Permanent Release Link now: [release, not album] http://musicbrainz.org/release/1301e027-b038-4017-9b4c-7655bff78f6b

```xml
<rdf:RDF>
  <mq:Result>
    <mq:status>OK</mq:status>
    <mm:albumList>
      <rdf:Bag>
        <rdf:li rdf:resource="http://musicbrainz.org/mm-2.1/album/1301e027-b038-4017-9b4c-7655bff78f6b"/>
      </rdf:Bag>
    </mm:albumList>
  </mq:Result>
  <mm:Album rdf:about="http://musicbrainz.org/mm-2.1/album/1301e027-b038-4017-9b4c-7655bff78f6b">
    <dc:title>461 Ocean Boulevard</dc:title>
    <dc:creator rdf:resource="http://musicbrainz.org/mm-2.1/artist/618b6900-0618-4f1e-b835-bccb17f84294"/>
    <mm:cdindexidList>
      <rdf:Bag>
        <rdf:li rdf:resource="http://musicbrainz.org/mm-2.1/cdindex/y72NfVvPOq352_SUXFjSzcgljM0-"/>
        <rdf:li rdf:resource="http://musicbrainz.org/mm-2.1/cdindex/mym7chOZfDoF8RJ1m7ST6JnSO8A-"/>
        <rdf:li rdf:resource="http://musicbrainz.org/mm-2.1/cdindex/ZLPCG1qHanPJRPUVTQOLgneukQ-"/>
        <rdf:li rdf:resource="http://musicbrainz.org/mm-2.1/cdindex/evjs.Kx8e_lPJtopLpFHiZ27YgU-"/>
      </rdf:Bag>
    </mm:cdindexidList>
    <mm:releaseType rdf:resource="http://musicbrainz.org/mm/mm-2.1#TypeAlbum"/>
    <mm:releaseStatus rdf:resource="http://musicbrainz.org/mm/mm-2.1#StatusOfficial"/>
    <mm:releaseDateList></mm:releaseDateList>
    <az:Asin>B000001F3N</az:Asin>
  </mm:Album>
</rdf:RDF>
```

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MusicBrainz – WS 2 for 461 Ocean Blvd.

```xml
- <metadata>
  - <release id="1301e027-b038-4017-9b4c-7655bff78f6b">
      <title>461 Ocean Boulevard</title>
      <status>Official</status>
      <quality>normal</quality>
    + <text-representation></text-representation>
    - <artist-credit>
      - <name-credit>
        - <artist id="618b6900-0618-4f1e-b835-bccb17f84294">
            <name>Eric Clapton</name>
            <sort-name>Clapton, Eric</sort-name>
          </artist>
        </name-credit>
      </artist-credit>
      <date>1974</date>
      <country>US</country>
      <asin>B000001F3N</asin>
    + <label-info-list count="1"></label-info-list>
    - <medium-list count="1">
      - <medium>
          <position>1</position>
          <format>Vinyl</format>
          <disc-list count="0"/>
        - <track-list count="10" offset="0">
          - <track>
              <position>1</position>
              <length>293200</length>
            - <recording id="10aae51f-f253-42c4-8af8-5673da1c98e6">
                <title>Motherless Children</title>
                <length>293200</length>
```

Source as of 7/24/11:
http://musicbrainz.org/ws/2**/release**/1301e027-b038-4017-9b4c-7655bff78f6b?inc=artist-credits+labels+discids+recordings

Freebase Triples – Tab Separated Values

```
1   musical_group.tsv:
2       Blind Faith     /m/0197vy /m/01wvwr8,/m/01tfhrr,/m/01tfhry,/m/01tfhrk
3       Derek and the Dominos     /m/01jjpl4 /m/0bd3rky,/m/0bd3y2g,/m/01tj3yf,/m/01w3ths,/m/01t73cp
4       Cream     /m/0d_yq /m/03brncc,/m/0dq6698,/m/0kpxvh,/m/01tly45,/m/0dzrptm,/m/0kpxvz
5
6   group_membership.tsv: [search for "Derek and the Dominos"]
7       Line 15951:       /m/01tj3yf  Duane Allman    Derek and the Dominos
8       Line 41400:       /m/0bd3y2g  Bob Whitlock    Derek and the Dominos
9       Line 52281:       /m/0bd3rky  Carl Radle  Derek and the Dominos
10      Line 52759:       /m/01t73cp  Eric Clapton    Derek and the Dominos
11      Line 75436:       /m/01w3ths  Jim Gordon  Derek and the Dominos
12      ======================
13  group_member.tsv:    [search for each of the 5 unique IDs above;
14              matches are to part of the comma-separated string]
15      Line 4388: Duane Allman /m/01qyy3    /m/040qwdk,/m/043f3g9,/m/043f3g4,/m/01tj3ym,/m/01tj3yf,
16      Line 8987: Bob Whitlock /m/03h_kgb   /m/0bd3y2g,/m/0bd4wpy        Keyboard instrument
17      Line 12298: Carl Radle   /m/03h_1b6   /m/0bd36f0,/m/0bd3rky        Bass guitar
18      Line 95599: Eric Clapton     /m/02qwg
        /m/01wyq91,/m/01x2v1x,/m/043ds06,/m/01tjv90,/m/03brncc,/m/04d37n4,/m/01v977y,/m/045z2rs,/m/
        01t7ctr,/m/04d37mg,/m/04d37mz,/m/043dr_x,/m/04d37n9,/m/040jgbb,/m/04d37mn,/m/01wjb4p,/m/08c
        ds01,/m/043dr_r        Slide guitar,Guitar,Fender Stratocaster
19      Line 20786: Jim Gordon  /m/0409zb    /m/01w3tj4,/m/01w3thz,/m/01w3ths,/m/0bd3nvq        Percuss
```

Freebase – RDF

```
−<rdf:RDF>
  −<fb:base.popstra.canoodled rdf:about="http://rdf.freebase.com/ns/m.0652sw0">
      <fb:base.popstra.canoodled.participant rdf:resource="http://rdf.freebase.com/ns/en.alicia_witt"/>
    −<fb:base.popstra.canoodled.participant>
      +<fb:award.award_winner rdf:about="http://rdf.freebase.com/ns/en.eric_clapton"></fb:award.award_winner>
      </fb:base.popstra.canoodled.participant>
    −<fb:base.popstra.sww_base.source>
        http://www.whosdatedwho.com/celebrities/people/dating/alicia-witt.htm
      </fb:base.popstra.sww_base.source>
      <fb:base.popstra.canoodled.date>1998-01-01T00:00:00.000Z</fb:base.popstra.canoodled.date>
    </fb:base.popstra.canoodled>
  −<fb:common.webpage rdf:about="http://rdf.freebase.com/ns/m.01t4f28">
      <fb:type.object.name xml:lang="en">http://www.discogs.com/artist/Eric+Clapton</fb:type.object.name>
      <fb:common.webpage.resource rdf:resource="http://rdf.freebase.com
      /ns/uri.http$003A$002F$002Fwww$002Ediscogs$002Ecom$002Fartist$002FEric$002BClapton"/>
      <fb:common.webpage.category rdf:resource="http://rdf.freebase.com/ns/en.topic_webpage"/>
      <fb:common.webpage.topic rdf:resource="http://rdf.freebase.com/ns/en.eric_clapton"/>
      <fb:common.webpage.uri>http://www.discogs.com/artist/Eric+Clapton</fb:common.webpage.uri>
    </fb:common.webpage>
  −<fb:base.popstra.support rdf:about="http://rdf.freebase.com/ns/m.064cvh7">
      <fb:base.popstra.support.supporter rdf:resource="http://rdf.freebase.com/ns/en.eric_clapton"/>
      <fb:base.popstra.support.supported_organization rdf:resource="http://rdf.freebase.com/ns/m.0646426"/>
    −<fb:base.popstra.sww_base.source>
        http://www.looktothestars.org/celebrity/618-eric-clapton
      </fb:base.popstra.sww_base.source>
      <rdf:type rdf:resource="http://rdf.freebase.com/ns/base.popstra.sww_base"/>
    </fb:base.popstra.support>
  −<fb:base.popstra.canoodled rdf:about="http://rdf.freebase.com/ns/m.0652sjy">
      <fb:base.popstra.canoodled.participant rdf:resource="http://rdf.freebase.com/ns/en.eric_clapton"/>
```

Methodology: Development Environment

- Ubuntu Linux

- OpenLink Virtuoso Universal Server
  - RDF datastore and query engine/SPARQL endpoint

- Drupal 6.18
  - testing and sharing queries

Methodology: RDF Visualization

- HTML form with JQuery and AJAX, POST

- Convert XML query results to Graphviz input format DOT language.

- Output SVG

Drupal Query Interface

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Drupal Query Interface: Result

www.vocabutek.com

| DBPedia queries | DBP Awards | KENS | DEB | Bacon | Aaron |

kensall

- Visualize a query
- AJAX test
- Color Picker Example
- Financial Search
- Import external RDF vocabulary
- My account
- SPARQL query
- Search
- ▶ Create content
- clapton svg
- ▶ Administer
- Log out

Home

see Eric Clapton properties and values

| View | Edit | Export | Devel |

Submitted by rreck on Sat, 2011-02-19 15:21

properties	values
http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.w3.org/2002/07/owl#Thing
http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://dbpedia.org/ontology/Artist
http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://dbpedia.org/ontology/MusicalArtist
http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://dbpedia.org/ontology/Person
http://purl.org/dc/terms/subject	http://dbpedia.org/resource/Category:Commanders_of_the_Order_of_the_British_Empire
http://purl.org/dc/terms/subject	http://dbpedia.org/resource/Category:1990s_singers
http://purl.org/dc/terms/subject	http://dbpedia.org/resource/Category:People_self-identifying_as_alcoholics
http://purl.org/dc/terms/subject	http://dbpedia.org/resource/Category:2010s_singers
http://purl.org/dc/terms/subject	http://dbpedia.org/resource/Category:Electric_blues_musicians

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Drupal Query Interface: Menus

Graphviz Query Entry

Graphviz Visualization Result
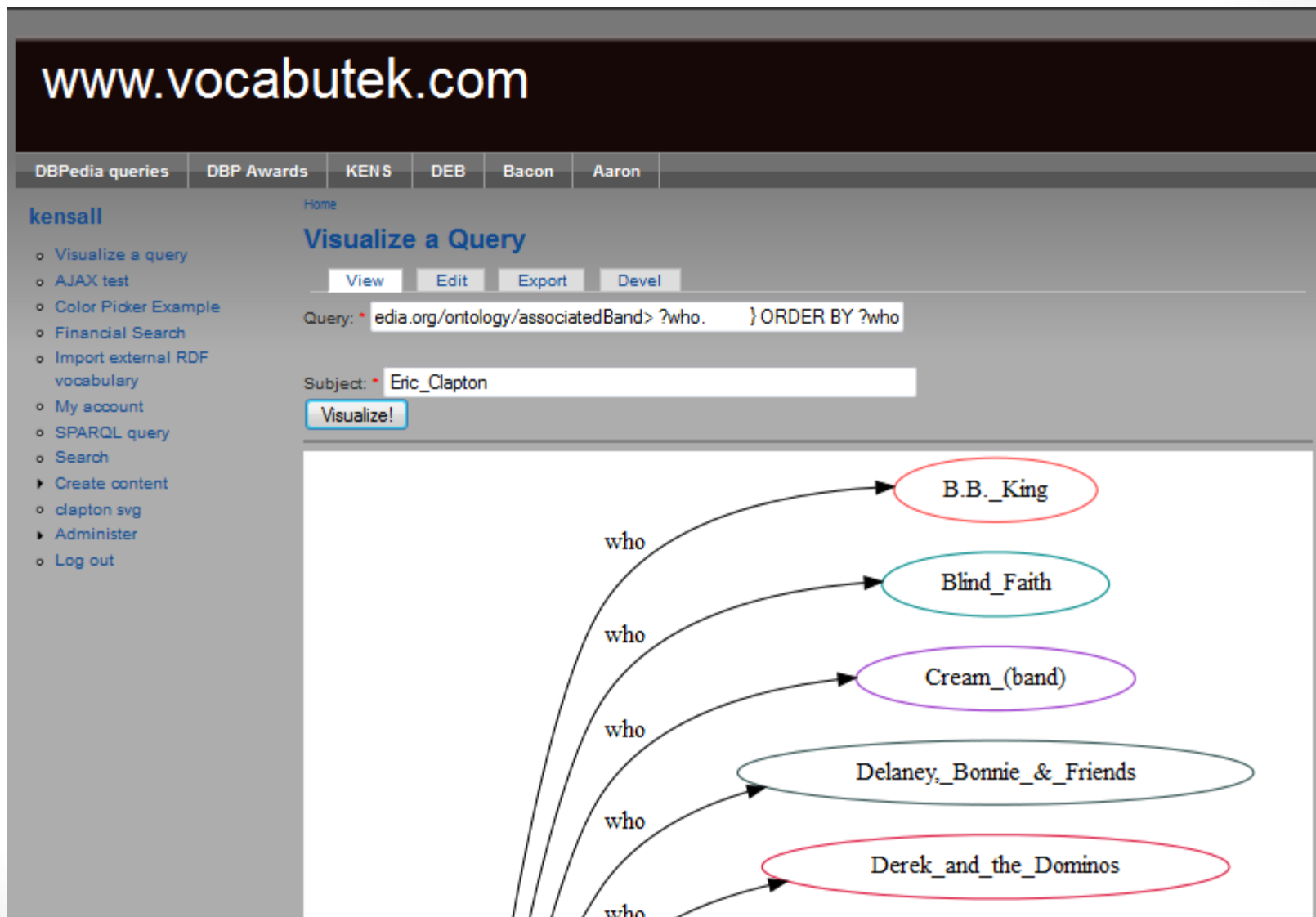
Challenges and Results: 23 Predicates

Predicates for Which Clapton is the (only) Object

http://dbpedia.org/ontology/artist
http://dbpedia.org/ontology/associatedBand
http://dbpedia.org/ontology/associatedMusicalArtist
http://dbpedia.org/ontology/composer
http://dbpedia.org/ontology/musicComposer
http://dbpedia.org/ontology/musicalArtist
http://dbpedia.org/ontology/musicalBand
http://dbpedia.org/ontology/partner
http://dbpedia.org/ontology/producer
http://dbpedia.org/ontology/spouse
http://dbpedia.org/ontology/starring
http://dbpedia.org/ontology/wikiPageDisambiguates
http://dbpedia.org/ontology/writer
http://dbpedia.org/property/associatedActs
http://dbpedia.org/property/before
http://dbpedia.org/property/currentMembers
http://dbpedia.org/property/music
http://dbpedia.org/property/pastMembers
http://dbpedia.org/property/producer
http://dbpedia.org/property/spouse
http://dbpedia.org/property/starring
http://dbpedia.org/property/writer
http://www.w3.org/2002/07/owl#sameAs

Challenges and Results: 44 Predicates

Predicates for Which Clapton is (all or part of) the Object

http://dbpedia.org/ontology/abstract

http://dbpedia.org/ontology/alias

http://dbpedia.org/property/after

http://dbpedia.org/property/album

http://dbpedia.org/property/alias

http://dbpedia.org/property/allWriting

http://dbpedia.org/property/altArtist

http://dbpedia.org/property/artist

http://dbpedia.org/property/associatedActs

http://dbpedia.org/property/aux

http://dbpedia.org/property/before

http://dbpedia.org/property/caption

http://dbpedia.org/property/chronology

http://dbpedia.org/property/composer

http://dbpedia.org/property/cover

http://dbpedia.org/property/description

http://dbpedia.org/property/extra

http://dbpedia.org/property/founders

http://dbpedia.org/property/fromAlbum

http://dbpedia.org/property/img

http://dbpedia.org/property/imgCapt

http://dbpedia.org/property/label

http://dbpedia.org/property/lastAlbum

http://dbpedia.org/property/lyrics

http://dbpedia.org/property/music

http://dbpedia.org/property/musicalguests

http://dbpedia.org/property/name

http://dbpedia.org/property/namedAfter

http://dbpedia.org/property/nextAlbum

http://dbpedia.org/property/note

http://dbpedia.org/property/notes

http://dbpedia.org/property/partner

http://dbpedia.org/property/pastMembers

http://dbpedia.org/property/producer

http://dbpedia.org/property/recordedBy

http://dbpedia.org/property/shortDescription

http://dbpedia.org/property/starring

http://dbpedia.org/property/text

http://dbpedia.org/property/thisAlbum

http://dbpedia.org/property/title

http://dbpedia.org/property/writer

http://purl.org/dc/elements/1.1/title

http://www.w3.org/2000/01/rdf-schema#label

http://xmlns.com/foaf/0.1/name

Challenges and Results: 30 Properties

Clapton's Properties in Combined Datastore (DBpedia and MusicBrainz)

http://dbpedia.org/ontology/artist

http://dbpedia.org/ontology/associatedBand

http://dbpedia.org/ontology/associatedMusicalArtist

http://dbpedia.org/ontology/composer

http://dbpedia.org/ontology/musicComposer

http://dbpedia.org/ontology/musicalArtist

http://dbpedia.org/ontology/musicalBand

http://dbpedia.org/ontology/partner

http://dbpedia.org/ontology/producer

http://dbpedia.org/ontology/spouse

http://dbpedia.org/ontology/starring

http://dbpedia.org/ontology/wikiPageDisambiguates

http://dbpedia.org/ontology/writer

http://dbpedia.org/property/associatedActs

http://dbpedia.org/property/before

http://dbpedia.org/property/currentMembers

http://dbpedia.org/property/music

http://dbpedia.org/property/pastMembers

http://dbpedia.org/property/producer

http://dbpedia.org/property/spouse

http://dbpedia.org/property/starring

http://dbpedia.org/property/writer

http://musicbrainz.org/ar/ar-1.0#composer

http://musicbrainz.org/ar/ar-1.0#instrument

http://musicbrainz.org/ar/ar-1.0#performer

http://musicbrainz.org/ar/ar-1.0#producer

http://musicbrainz.org/ar/ar-1.0#toArtist

http://musicbrainz.org/ar/ar-1.0#vocal

http://purl.org/dc/elements/1.1/creator

http://www.w3.org/2002/07/owl#sameAs

Challenges and Results: Associations

- How to determine who played with an artist? Which properties apply?
  - http://dbpedia.org/property/associatedActs
  - http://dbpedia.org/ontology/associatedBand
  - http://dbpedia.org/ontology/associatedMusicalArtist
  - ~~http://dbpedia.org/property/starring~~
  - ~~http://dbpedia.org/property/musicalguests~~

Results: property/associatedActs

- Wikipedia:
  - "The Yardbirds, John Mayall & the Bluesbreakers, Powerhouse, Cream, Free Creek, The Dirty Mac, Blind Faith, J.J. Cale, The Plastic Ono Band, Delaney, Bonnie & Friends, Derek and the Dominos".

- SPARQL Query:
  - "The Yardbirds, John Mayall & the Bluesbreakers, Powerhouse, Cream, Free Creek, Dire Straits, George Harrison, The Dirty Mac, Blind Faith, Freddie King, Phil Collins, J.J. Cale, The Plastic Ono Band, Delaney, Bonnie & Friends, Derek and the Dominos, T.D.F., Jeff Beck, Paul McCartney, Steve Winwood, B.B. King, The Beatles, The Band"@en

Results: Association Ontology Mapping

- Further investigation pointed to DBpedia Infobox Mappings:

  - ontology mapping for the Infobox for Musical Artists.

- Infobox template property Associated_acts maps to two ontology properties

  - http://dbpedia.org/ontology/associatedBand

  - http://dbpedia.org/ontology/associatedMusical Artist

Results: ontology/associatedBand, associatedMusicalArtist

But what about Steve Winwood and T.D.F from slide #29?

http://dbpedia.org/resource/B.B._King
http://dbpedia.org/resource/Blind_Faith
http://dbpedia.org/resource/Cream_%28band%29
http://dbpedia.org/resource/Delaney,_Bonnie_&_Friends
http://dbpedia.org/resource/Derek_and_the_Dominos
http://dbpedia.org/resource/Dire_Straits
http://dbpedia.org/resource/Eric_Clapton%27s_Powerhouse
http://dbpedia.org/resource/Freddie_King
http://dbpedia.org/resource/Free_Creek_%28band%29
http://dbpedia.org/resource/George_Harrison
http://dbpedia.org/resource/J.J._Cale

http://dbpedia.org/resource/Jeff_Beck
http://dbpedia.org/resource/John_Mayall_&_the_Bluesbreakers
http://dbpedia.org/resource/Paul_McCartney
http://dbpedia.org/resource/Phil_Collins
http://dbpedia.org/resource/Steve_Winwood
http://dbpedia.org/resource/The_Band
http://dbpedia.org/resource/The_Beatles
http://dbpedia.org/resource/The_Dirty_Mac
http://dbpedia.org/resource/The_Plastic_Ono_Band
http://dbpedia.org/resource/The_Yardbirds

http://dbpedia.org/resource/X-sample

Challenges and Results: Birthdays

DEFINE input:same-as "yes"

select ?musician ?DBPdate ?MBdate {

   ?s <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://dbpedia.org/ontology/MusicalArtist>.

?s <http://dbpedia.org/ontology/birthDate> ?DBPdate .

?s <http://musicbrainz.org/mm/mm-2.1#beginDate> ?MBdate.

?s <http://www.w3.org/2000/01/rdf-schema#label> ?musician.

FILTER (str(?MBdate) != str (?DBPdate))

}

ORDER BY ?musician

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Results: Birthdays: > 1000 Discrepancies

```
        musician                DBPdate             MBdate
50 Cent                         1975-07-06          1976-07-06
Andy Partridge                  1953-11-11          1953-12-11
Astrud Gilberto                 1940-03-29          1940-03-30
Blind Willie Johnson            1897-01-22          1902-00-00          [5 year difference]
Blind Willie McTell             1898-05-05          1901-05-05          [3 year difference]
Carl Perkins                    1932-04-09          1928-08-16          [4 year difference]
Courtney Love                   1964-07-09          1990-00-00          [extremely different!]
David Lee Roth                  1954-10-10          1955-10-10
Eddie Van Halen                 1955-01-26          1956-01-26
Edgar Winter                    1947-12-28          1946-12-28
Five for Fighting               1965-01-07          1997-00-00          [extremely different!]
Frankie Valli                   1934-05-03          1937-05-03          [3 year difference]
George Harrison                 1943-02-25          1943-02-24
Jennifer Lopez                  1969-07-24          1970-07-24
```

Challenges: It's Still Rock 'n Roll to Me

- 2,887 musical genres
- 330 contain "rock" in their label
  - Aboriginal_rock to Zulu_rock
  - Concept of "rock and roll music" : 18 IRIs

Challenges: It's Still Rock 'n Roll to Me

SELECT DISTINCT (?genre)

    {

    ?album <http://dbpedia.org/ontology/genre> ?genre.

    ?album <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://dbpedia.org/ontology/Album>.

    FILTER regex (?genre, "[Rr]ock") .

    FILTER regex (?genre, "[Rr]oll") .

    }

ORDER BY ?genre

Results: It's Still Rock 'n Roll to Me

http://dbpedia.org/resource/British_Rock_and_Roll
http://dbpedia.org/resource/Real_Rock_and_Roll
http://dbpedia.org/resource/Rock%27n%27Roll
http://dbpedia.org/resource/Rock%27n%27roll
http://dbpedia.org/resource/Rock%27n_roll
http://dbpedia.org/resource/Rock_%27N%27_Roll
http://dbpedia.org/resource/Rock_%27n%27_Roll
http://dbpedia.org/resource/Rock_%27n%27_roll
http://dbpedia.org/resource/Rock_%27n_Roll
http://dbpedia.org/resource/Rock_&_Roll
http://dbpedia.org/resource/Rock_&_roll
http://dbpedia.org/resource/Rock_N%27_Roll
http://dbpedia.org/resource/Rock_and_Roll
http://dbpedia.org/resource/Rock_and_Roll_music
http://dbpedia.org/resource/Rock_and_roll
http://dbpedia.org/resource/Rock_n%27_Roll
http://dbpedia.org/resource/Rock_n_Roll
http://dbpedia.org/resource/Spanish_language_rock_and_roll

Advantages of Our Approach

- No execution timeout
- Higher limits
- Direct access to raw RDF at command line level
- Collaborative SPARQL development for saving queries in Drupal
- More precise SPARQL timing metrics
- Test harness for repeatedly running the same query
- Examination of error messages

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Disadvantages of Our Approach

- Static datastore of dynamic sources
- Limited knowledge of inner workings or planned changes

Limitations and Further Efforts

- Data Inconsistencies
  - Errors of omission - what if Eric Clapton were to enter his own data about himself?
  - Poor data curating – extraction process
  - Erroneous data - unsubstantiated facts
  - Unclear semantics – considerable ambiguity
- Need for further RDF visualization work
- Need to address more of the original problems

Future: Put the LOD Right on Me

- Linking Open Data
- Demos including DBpedia and MusicBrainz
- DBpedia Extended Datasets
  - for MusicBrainz and Freebase
- Music Ontology
  - especially MusicArtist, musicbrainz_guid and supporting_musician

Late Breaking Developments

- DBpedia Live announced July 9, 2011
- Learning SPARQL: Querying and Updating with SPARQL 1.1
  - very new book by Bob DuCharme (July 2011)
- Semantic Web for the Working Ontologist, **Second Edition**: Effective Modeling in RDFS and OWL
  - Dean Allemang, James Hendler (June 2011)

Recommendations

- Publish example SPARQL queries
  - Not just data and endpoints
- Provide detailed explanation of
  - IRI conventions
  - property semantics
- Include examples of intersecting graphs from other music-oriented sites

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Conclusions

- Significant challenges regarding consistency of data sources and interpretation of semantics for properties of musical artists.

  - Similar problems in other large community-entered datasets of relatively low quality.

- "Normalize" or decrease spurious diversity not intended as semantic distinction.

- "Impact" = weighted measurement of several variables (subjective):

  - Bands, songs, albums, years active

  - Frequency of airplay, number of covers, concerts, people who recognize their name, chart success

And One More Thing…

- "In an era of iTunes and Amazon, Spotify and Pandora, album sales don't tell you what they used to. With so many routes to our eardrums, **how do we measure the actual popularity of pop music?** It's something various companies are scrambling to figure out."

- **"Album sales as representative of the success of artists is a failing metric…"**

http://www.washingtonpost.com/lifestyle/style/whos-on-top-in-music-its-gotten-hard-to-say/2011/06/27/gIQAWF9gZI_story.html

References

- [Auer and Lehmann 2007] Auer, Sören; Lehmann, Jens: What Have Innsbruck and Leipzig in Common? Extracting Semantics from Wiki Content. ISBN-13: 978-3-540-72666-1. Springer Verlag. © 2007. Lecture Notes in Computer Science, 2007, Volume 4519/2007, pp. 503-517, DOI: 10.1007/978-3-540-72667-8_36. http://www.springerlink.com/content/3131t21p634191n2/ and http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.71.1314&rep=rep1&type=pdf.
- [Auer et al 2007] Auer, Sören; Bizer, Christian; Kobilarov, Georgi; Lehmann, Jens; Cyganiak, Richard; Ives, Zachary: DBpedia: A Nucleus for a Web of Open Data. ISBN-13: 978-3-540-76297-3. Springer Verlag. © 2007. Lecture Notes in Computer Science, 2007, Volume 4825/2007, pp. 722-735, DOI: 10.1007/978-3-540-76298-0_52. http://www.springerlink.com/content/rm32474088w54378/ and http://www.informatik.uni-leipzig.de/~auer/publication/dbpedia.pdf.
- [Allemang and Hendler 2008] Allemang, Dean; Hendler, James A.: Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. ISBN-13: 978-0-12-373556-0. Elsevier Inc. © 2008. http://www.workingontologist.org/index.html
- [Bacon] Six Degrees of Kevin Bacon. [online]. [cited 08 Apr 2011]. http://en.wikipedia.org/wiki/Six_Degrees_of_Kevin_Bacon
- [Butcher 2010] Butcher, Matt et al. Drupal 7 Module Development. ISBN-10: 1849511160. First edition. Packt Publishing © 2010. [cited 08 Apr 2011]. http://www.amazon.com/Drupal-Module-Development-Matt-Butcher/dp/1849511160/
- [Clapton] Eric Clapton's Wikipedia page. [online]. [cited 08 Apr 2011]. http://en.wikipedia.org/wiki/Eric_clapton
- [Clapton FAQ] Eric Clapton Frequently Asked Questions, part of The Eric Clapton Fan Club Magazine. [online]. [cited 08 Apr 2011]. http://www.whereseric.com/eric-clapton-faq
- [DBpedia Dataset] The DBpedia Dataset. [online]. [cited 08 Apr 2011]. http://wiki.dbpedia.org/Datasets
- [DBpedia Ontology] The DBpedia Ontology. [online]. [cited 08 Apr 2011]. http://wiki.dbpedia.org/Ontology
- [DBpedia Release] DBpedia 3.6 released. [online]. [cited 08 Apr 2011]. http://blog.dbpedia.org/2011/01/17/dbpedia-36-released/.
- [Feigenbaum and Prud'hommeaux 2008] SPARQL By Example - A Tutorial. [online] [cited 08 Apr 2011]. Feigenbaum, Lee and Prud'hommeaux, Eric. Cambridge Semantics, 2008. Updated 2011-01-25. http://www.cambridgesemantics.com/2008/09/sparql-by-example/
- [Feigenbaum 2008] SPARQL by Example: The Cheat Sheet. [online] [cited 08 Apr 2011]. Feigenbaum, Lee. Cambridge Semantics, 2008. http://www.slideshare.net/LeeFeigenbaum/sparql-cheat-sheet
- [Frame 1983] Peter Frame's Rock Family Trees. [online and 3 books]. [cited 08 Apr 2011]. http://www.familyofrock.com/browse/details/trees.html
- [Freebase] Freebase home page. [online]. [cited 08 Apr 2011]. http://www.freebase.com/
- [Freebase Data Dumps] Freebase Data Dumps. [online]. [cited 08 Apr 2011]. http://wiki.freebase.com/wiki/Data_dumps/
- [Graphviz] Graphviz home page. [online]. [cited 08 Apr 2011]. http://www.graphviz.org/
- [MQL] Metaweb Query Language. [online]. [cited 08 Apr 2011]. http://wiki.freebase.com/wiki/MQL
- [MusicBrainz] MusicBrainz home page. [online]. [cited 08 Apr 2011]. http://musicbrainz.org/
- [Newman 2010] Newman, Mark. Networks - An Introduction. ISBN-10: 9780199206650. First edition. Oxford University Press, USA © 2010. [cited 08 Apr 2011]. http://www.amazon.com/Networks-Introduction-Mark-Newman/dp/0199206651/
- [OpenCyc for the Semantic Web] OpenCyc for the Semantic Web. [online]. [Cited 26 Jun 2011]. http://sw.opencyc.org/
- [Six Degrees] Six Degrees of Separation. [online]. [Cited 08 Apr 2011]. http://en.wikipedia.org/wiki/Six_degrees_of_separation
- [SPARQL 1.0] SPARQL Query Language for RDF. [online] [cited 08 Apr 2011]. W3C Recommendation 15 January 2008. W3C © 2006-2007 http://www.w3.org/TR/rdf-sparql-query/
- [Starr] Ringo Starr's Wikipedia page. [online] [cited 08 Apr 2011]. http://en.wikipedia.org/wiki/Ringo_Starr
- [Ringo Starr & His All-Starr Band] Ringo Starr & His All-Starr Band Wikipedia page. [online] [cited 08 Apr 2011]. http://en.wikipedia.org/wiki/Ringo_Starr_%26_His_All-Starr_Band
- [VanDyke and Westgate 2007] VanDyk, John K and Westgate, Matt Pro Drupal Development. ISBN-10: 1590597559. First edition. APress © 2007. [cited 08 Apr 2011]. http://www.amazon.com/Pro-Drupal-Development-John-VanDyk/dp/1590597559/
- [Virtuoso Universal Server] OpenLink Virtuoso Universal Server. [online]. [cited 08 Apr 2011]. http://virtuoso.openlinksw.com/
- [Virtuoso SPARQL Tutorial] Virtuoso SPARQL Tutorial, Part 2. [online]. [cited 08 Apr 2011]. http://virtuoso.openlinksw.com/presentations/SPARQL_Tutorials/SPARQL_Tutorials_Part_2/SPARQL_Tutorials_Part_2.html
- [Vocabutek Web Site] Ron Reck's demo site. [online] [cited 08 Apr 2011]. http://www.vocabutek.com/
- [Whitburn 2006] Whitburn, Joel. The Billboard Albums. ISBN-13 0-89820-166-7. Sixth edition. Record Research Inc. © 2006. [Data from 1956-2006; other editions are entitled Top Pop Albums.] https://www.recordresearch.com