# „Confined“ Linked Data for physical-cyber-social-data?

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# I should not be talking about the work that I do…

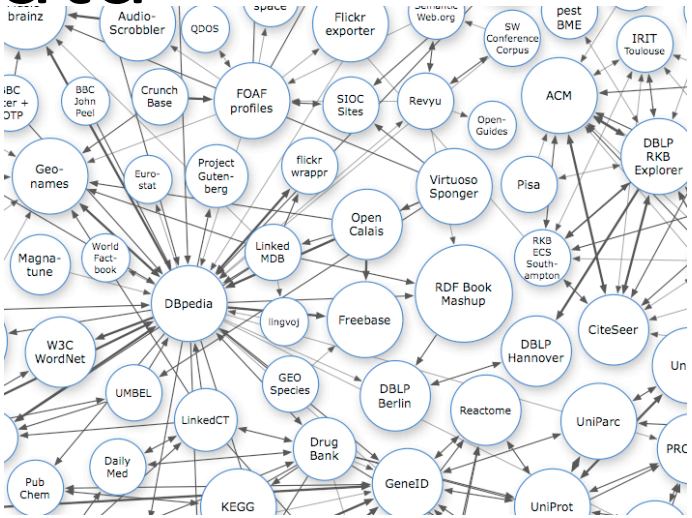

*www.wordle.net*

# So I talk about what I don‘t know...

## What is physical-cyber-social-data?

- Linked Open Data?
- Social Data?
- Physical data (sensing data)?

# Linked Open Data




- High hopes!
  - → pushed by W3C as **the** standard format for sharing and re-using **public** data: W3C GLD, W3C LDP WGs
  - → strong standards to query and integrate that data (RDF, SPARQL, OWL)

→ powered by Open Data Movement

Recent efforts to get dynamics into the equation:

→ W3C RSP WG: RDF Stream Processing

# Social Data

- Some exporters into RDF, but
- ... is still in silos

- ... BTW, the idea of „Open Social“ seems to be partially on the decline...
  - FOAF did not really pick up as a decentral way to define social networks
  - OpenId providers like MyOpenID closing their services

# Physical Data

- Personal sensing Data
  - On our mobiles: in silos, cf. previous slide
  - More silos: e.g. SmartMeter data, Car Data, etc.

  ... in fact all this data is implicitly **linked**...
    - by **user identities**,
    - by **location**,
    - by **temporal co-occurrence**.

  .. But
  - neither of these contextual parts of information is natively a part of RDF,
  - **Plus:** Little incentive for the current data owners to **share** that data and/or provide open interfaces

- → We need to define the use cases for open interchange!

# Challenges, as I see them

- Use Cases:
  - Aggregating this data has huge potential, but:
    - Who (apart from NSA) can benefit from integrating this data?
    - Energy, Sustainability use cases: monitor localized energy consumption, personal, per building, etc.
    - Personal healthcare

- How to bring data owners (us) back into the equation?

- How can **standards** support that?
  - Standards for sharing and integrating – done: RDF
  - Standards for querying data –SPARQL – done?
    - SPARQL needs to be **extended** to cope with highly dynamic data **RSP?**
    - SPARQL needs to be **restricted** to scale to dynamic use cases
  - Standard(s +) mechanisms for tracking data provenance – done**?**
    - **PROV** is a good start, but is it too academic? Ie. is it running into the same issues as FOAF?
  - Standard(s +) mechanisms for protecting data
    - Various extensions for adding Access rights to SPARQL, but I haven‘t yet seen any maturing to a standard
    - Encryption
  - Standard(s +) mechanisms for trading data
    - Advertising and declaring **pricing models**, automated charging
    - Ability to **revoke** access rights

# So, do we need...

## Linked Dynamic ~~„Closed“~~ Data?

## „Confined “

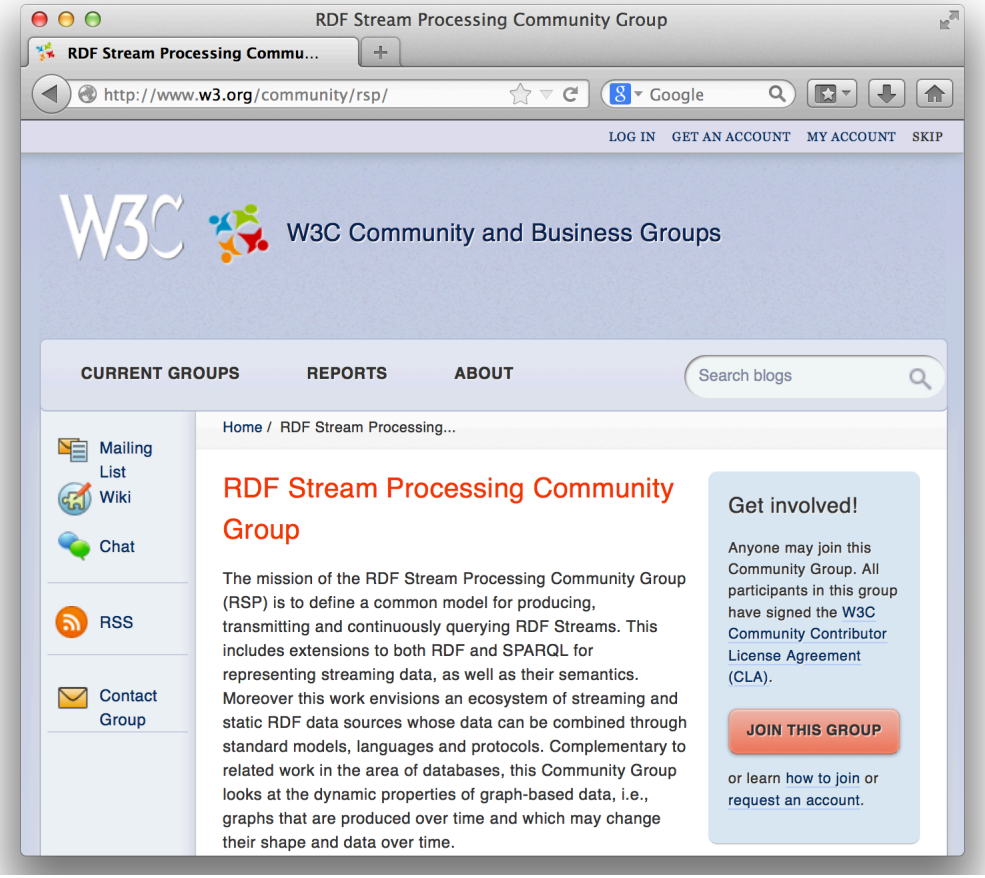
- Linked Data & Mechanisms to deal with Dynamicity & Evolution.
- Linked Data & Provenance, Trust, Privancy & Policies.
- Linked Data & more (and less) than OWL and SPARQL.
- Linked Data & trading/pricing models

# Some starting points

- Not exhaustive, of course...

# Some Starting Points 1/4

- Linked Data & Mechanisms to deal with Dynamicity & Evolution.
- W3C RSP



# Some Starting Points 1/4

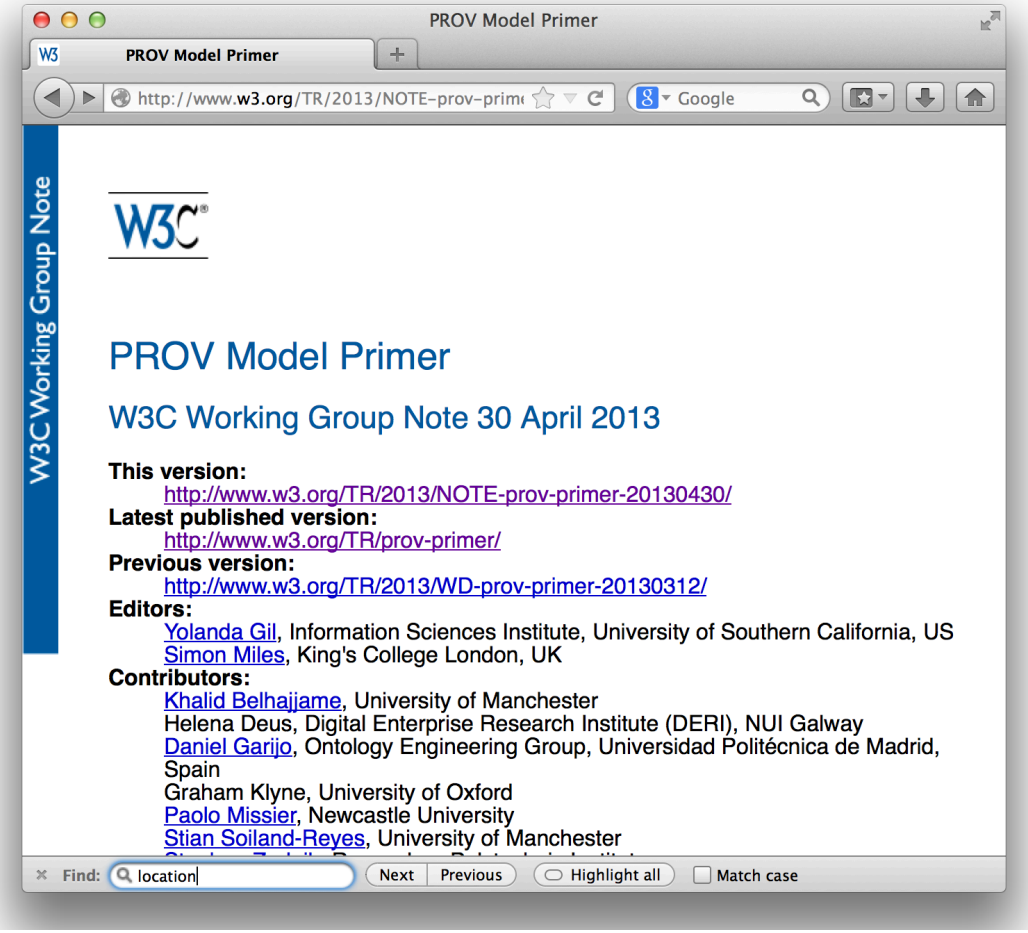
- Linked Data & Provenance, Trust, Privancy & Policies.

- W3C PROV:

  + modeling prov and

  also temporal context

  - location?



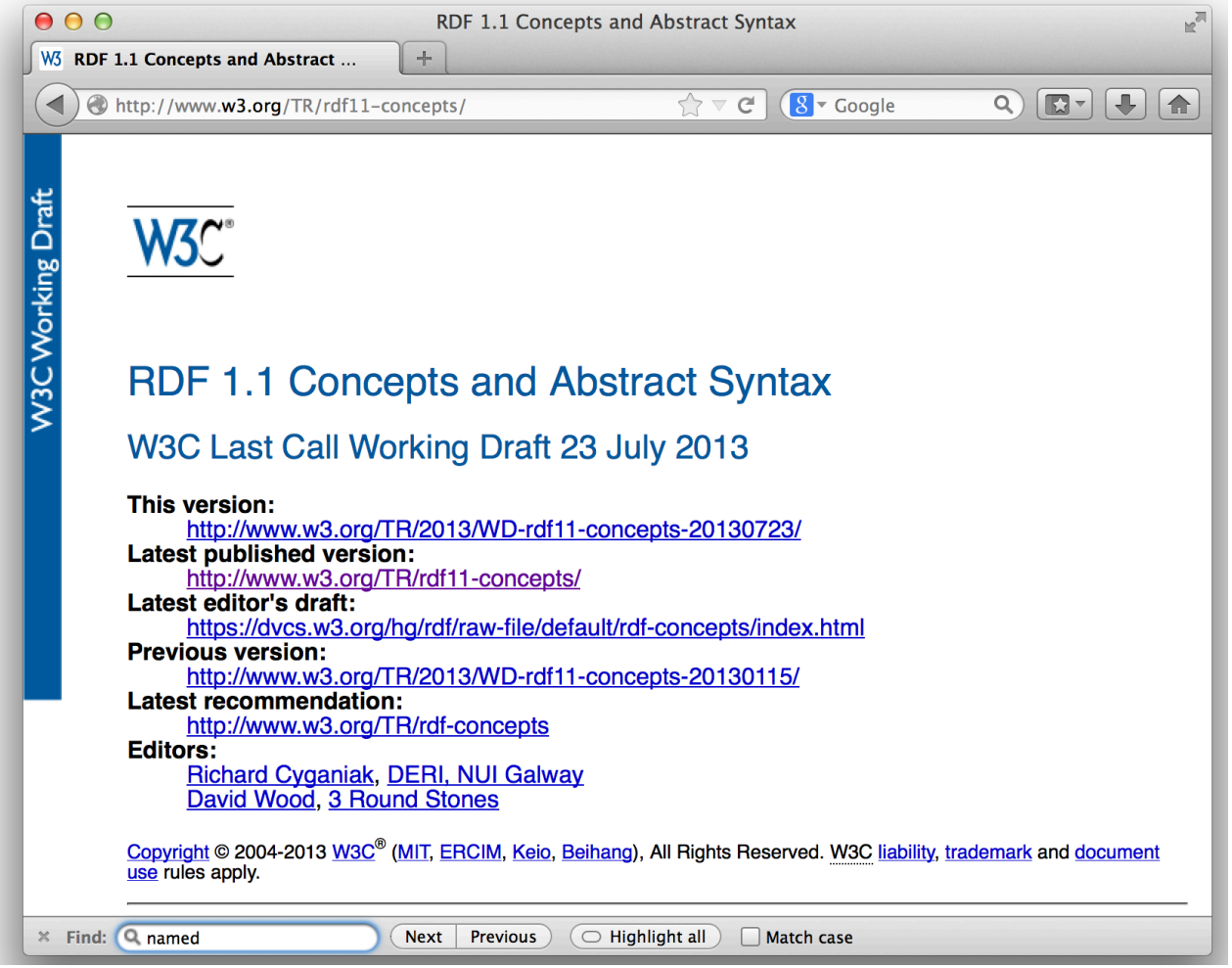
# Some Starting Points 1/4

- Linked Data & Provenance, Trust, Privancy & Policies.

- W3C RDF 1.1

+ named graphs

- how to use them?
- E.g. how to attach prov/context to datastreams?

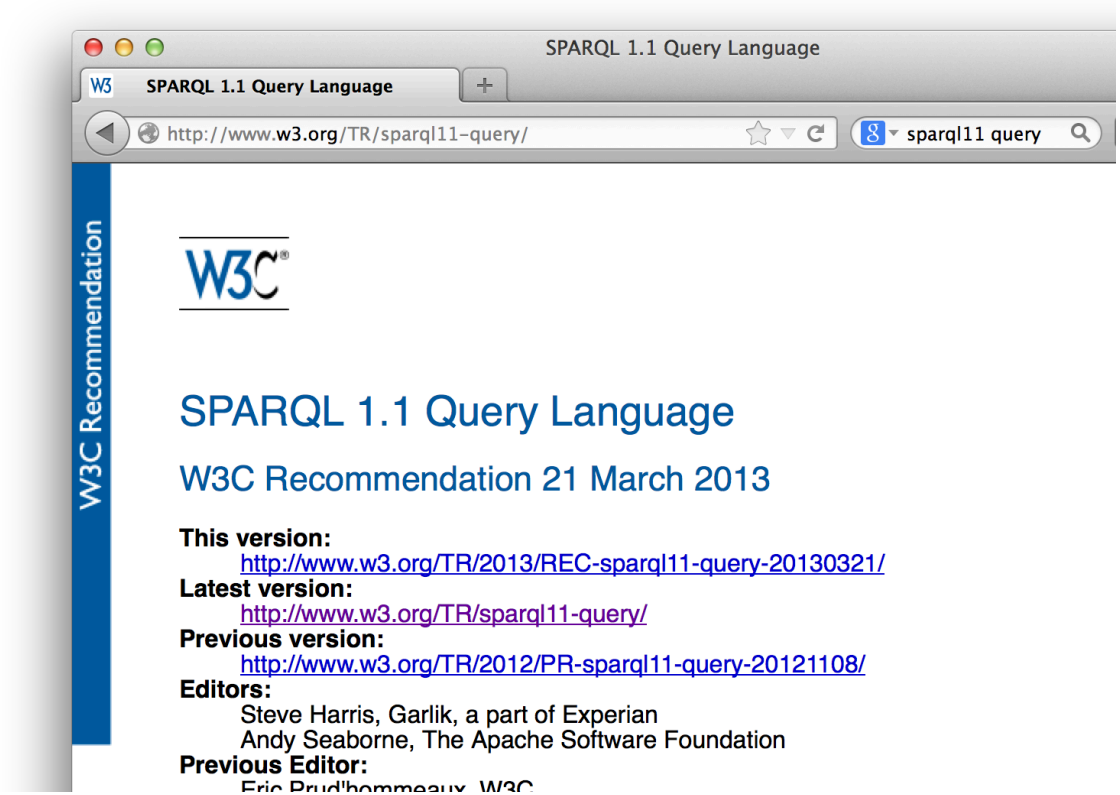


# Some Starting Points 1/4

- Linked Data & Mechanisms to deal with Dynamicity & Evolution.
- Linked Data & Provenance, Trust, Privancy & Policies.

- W3C SPARQL 1.1

+ querying named graphs
+ update/dynamics
+ federated queries
+ service descriptions
- Language fragments that scale to PCS use cases



# Our own attempts...

- Linked Data & Provenance, Trust, Privancy & Policies.

+ SPARQL on „annotated RDFS“

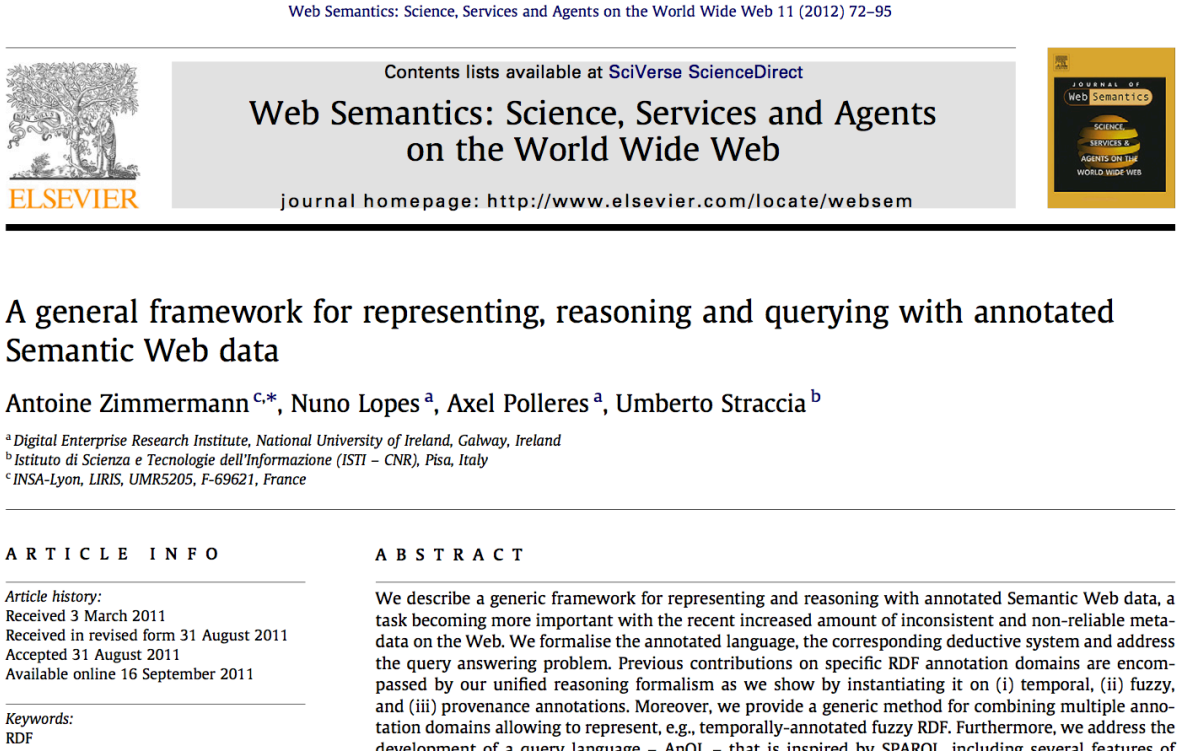
query RDF data

along with time,

provenance,

also access rights,

modeled



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A general framework for representing, reasoning and querying with annotated Semantic Web data

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ABSTRACT

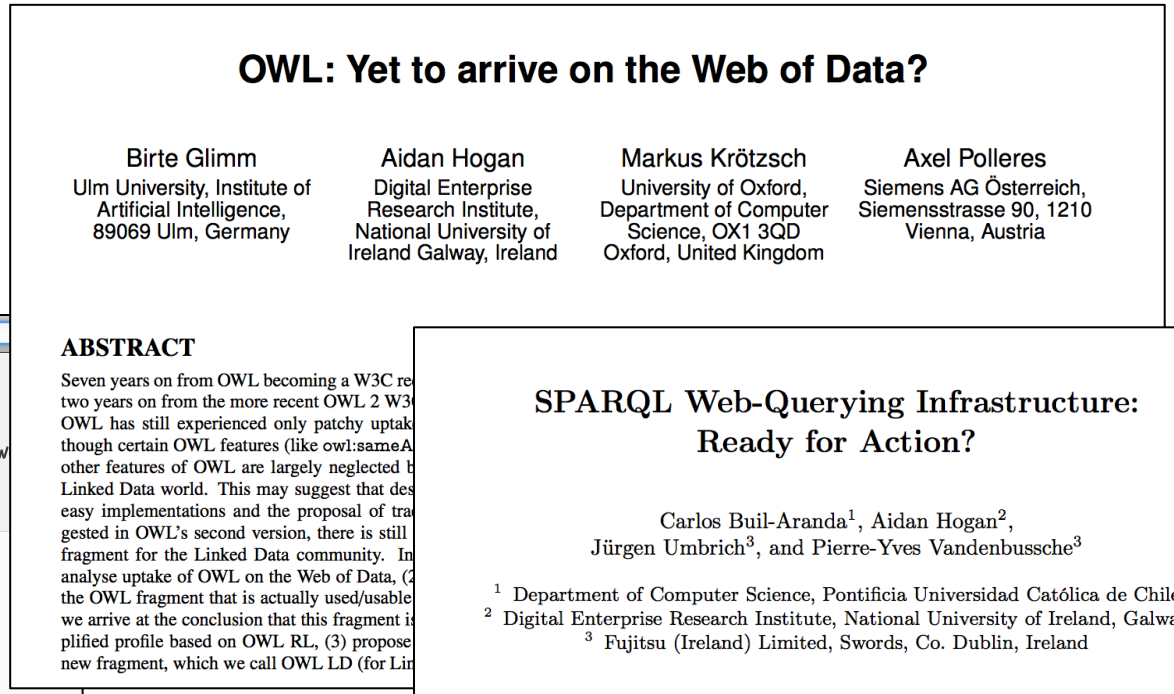
We describe a generic framework for representing and reasoning with annotated Semantic Web data, a task becoming more important with the recent increased amount of inconsistent and non-reliable metadata on the Web. We formalise the annotated language, the corresponding deductive system and address the query answering problem. Previous contributions on specific RDF annotation domains are encompassed by our unified reasoning formalism as we show by instantiating it on (i) temporal, (ii) fuzzy, and (iii) provenance annotations. Moreover, we provide a generic method for combining multiple annotation domains allowing to represent, e.g., temporally-annotated fuzzy RDF. Furthermore, we address the development of a query language – AnQL – that is inspired by SPARQL, including several features of

# Are our technologies+standards fit for PCS?

- Linked Data & more **and less** than OWL and SPARQL.

- There is no black magic!


http://www.youtube.com/watch?v=K8_IucR0l7Q



**OWL: Yet to arrive on the Web of Data?**

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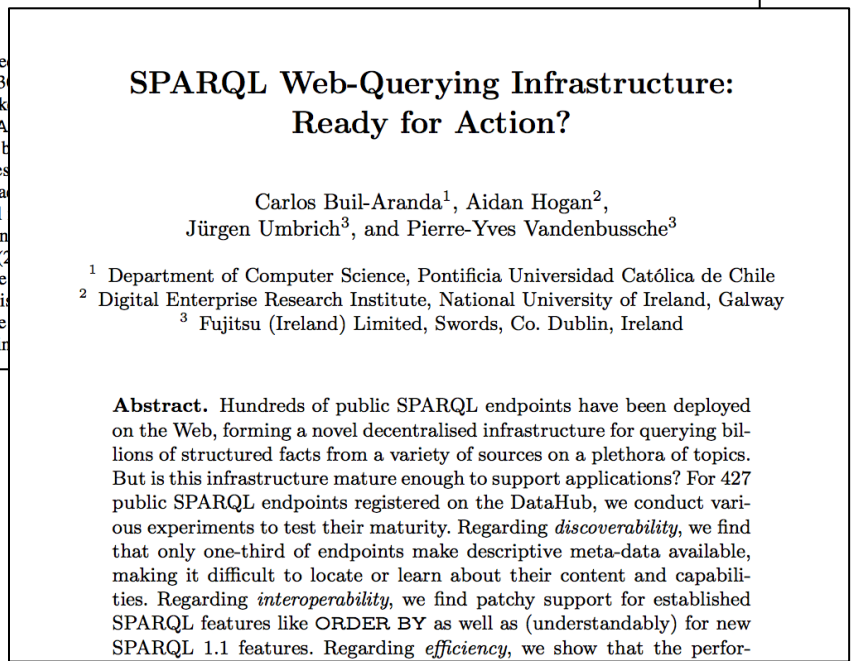
**ABSTRACT**

Seven years on from OWL becoming a W3C re
two years on from the more recent OWL 2 W3
OWL has still experienced only patchy uptak
though certain OWL features (like owl:sameA
other features of OWL are largely neglected b
Linked Data world. This may suggest that des
easy implementations and the proposal of trac
gested in OWL's second version, there is still
fragment for the Linked Data community. In
analyse uptake of OWL on the Web of Data, (2
the OWL fragment that is actually used/usable
we arrive at the conclusion that this fragment is
plified profile based on OWL RL, (3) propose
new fragment, which we call OWL LD (for Lin



**SPARQL Web-Querying Infrastructure: Ready for Action?**

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[1] Department of Computer Science, Pontificia Universidad Católica de Chile
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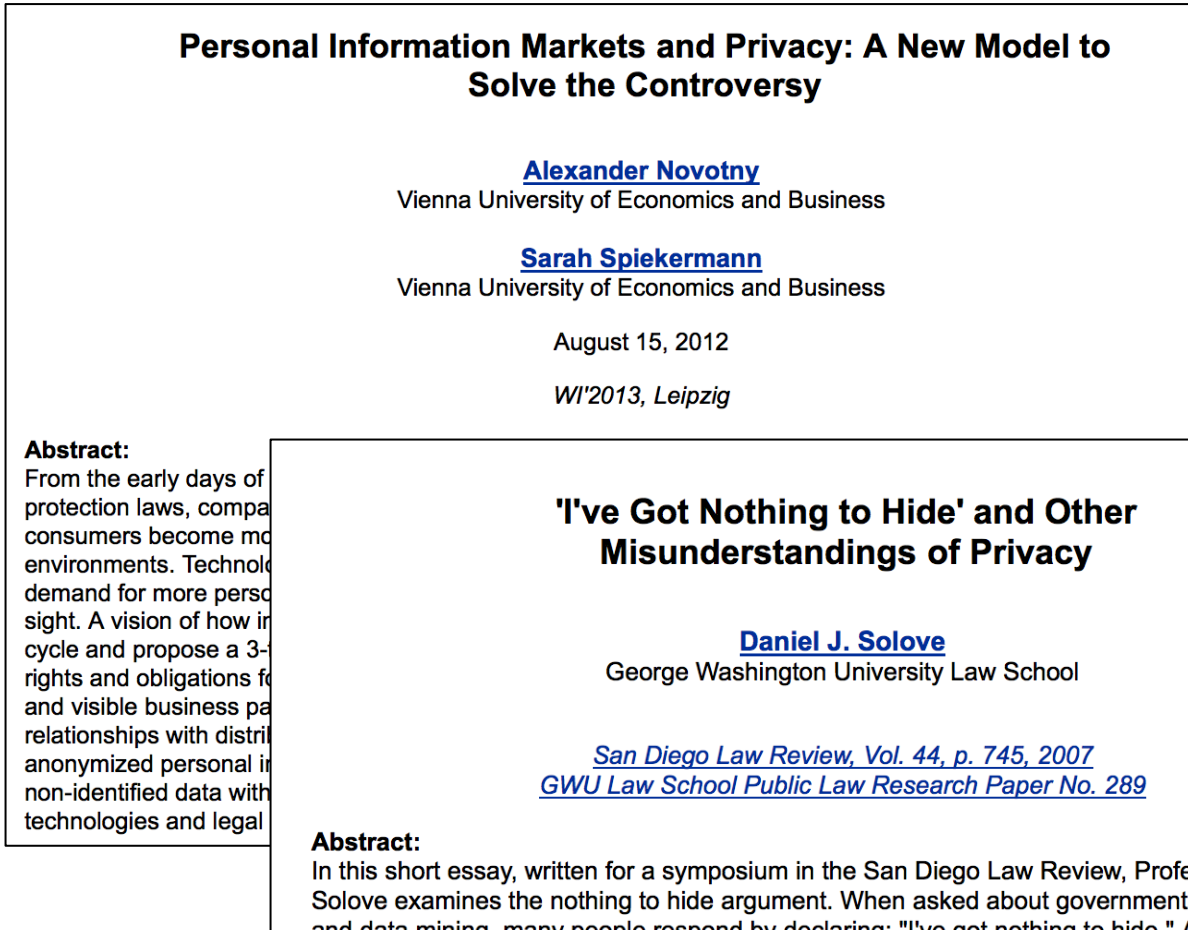
**Abstract.** Hundreds of public SPARQL endpoints have been deployed on the Web, forming a novel decentralised infrastructure for querying billions of structured facts from a variety of sources on a plethora of topics. But is this infrastructure mature enough to support applications? For 427 public SPARQL endpoints registered on the DataHub, we conduct various experiments to test their maturity. Regarding *discoverability*, we find that only one-third of endpoints make descriptive meta-data available, making it difficult to locate or learn about their content and capabilities. Regarding *interoperability*, we find patchy support for established SPARQL features like ORDER BY as well as (understandably) for new SPARQL 1.1 features. Regarding *efficiency*, we show that the perfor-

# Looking beyond our noses...

- Linked Data & Provenance, Trust, Privancy & Policies
- Linked Data & trading/pricing models
- How can standards support privacy?
- Legal frameworks need to interplay with those standard?
- How can we enforce privacy policies make them accountable?



**Personal Information Markets and Privacy: A New Model to Solve the Controversy**


Alexander Novotny
Vienna University of Economics and Business

Sarah Spiekermann
Vienna University of Economics and Business


August 15, 2012

*WI'2013, Leipzig*


**Abstract:**
From the early days of
protection laws, compa
consumers become mo
environments. Technol
demand for more perso
sight. A vision of how ir
cycle and propose a 3-
rights and obligations f
and visible business pa
relationships with distri
anonymized personal i
non-identified data with
technologies and legal


**'I've Got Nothing to Hide' and Other Misunderstandings of Privacy**


Daniel J. Solove
George Washington University Law School



*San Diego Law Review, Vol. 44, p. 745, 2007*
*GWU Law School Public Law Research Paper No. 289*



**Abstract:**
In this short essay, written for a symposium in the San Diego Law Review, Profe
Solove examines the nothing to hide argument. When asked about government
and data mining, many people respond by declaring: "I've got nothing to hide."

# So, do we need...

## **Linked Dynamic „Confined“ Data?**

- Linked Data & Mechanisms to deal with Dynamicity & Evolution.
- Linked Data & Provenance, Trust, Privancy & Policies.
- Linked Data & more (and less) than OWL and SPARQL.
- Linked Data & pricing models