Usability & Scalability of Knowledge Graphs

Dave Raggett, W3C/ERCIM
Knowledge graphs combine models (i.e. ontologies) and the data they describe.

Large knowledge graphs can become awkward to browse, query and update.

With graphical views, there is a confusing amount of detail when you zoom out, and a lack of context when you zoom in.

A picture isn’t always worth a thousand words!

How can we improve the usability of large knowledge graphs?
Potential Ideas and Challenges

- Some ideas of interest include:
  - Higher level representations and higher level query languages based upon common design patterns,
  - the means to generate dynamic views for contexts of interest,
  - and the means to structure large knowledge graphs in terms of overlapping smaller contextualised graphs

- A related challenge is that different communities (e.g. enterprise business units and departments) will often have different mindsets, vocabularies and requirements

- What about the need for versioning?
How can we allow for this diversity whilst ensuring effective management of shared enterprise wide models, master data, and associated core vocabularies?

How can we build on what people are already familiar with, e.g. “knowledge sheets” as an evolutionary step up from today’s spreadsheets, along with live access to distributed knowledge graphs?

What about using natural language?
What about Reasoning?

- Knowledge is about reasoning with information, i.e. structured labelled data
- But today’s implementations embed application logic within the application code
- This makes it costly to update – getting in the way of agility
- How can we make it easier to reason with knowledge graphs?
- Moreover, how can we reason with imperfect knowledge subject to uncertainty, incompleteness and inconsistencies?
- Traditional logic can’t cope, and statistical inference may be impractical, as it is difficult to compile the required statistics
- We need to switch to cognitive databases that mimic the cortex
Evolution in action

Relational Databases (Enterprise S/W)

SQL

Graph Databases (Semantic Web)

SPARQL

Cognitive Databases (Human-like AI)

Natural Language & Cooperative Problem Solving
Thank you!