

KNOWLEDGE GRAPH COMPLETION

PART 4: FUTURE CHALLENGES

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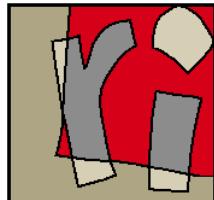
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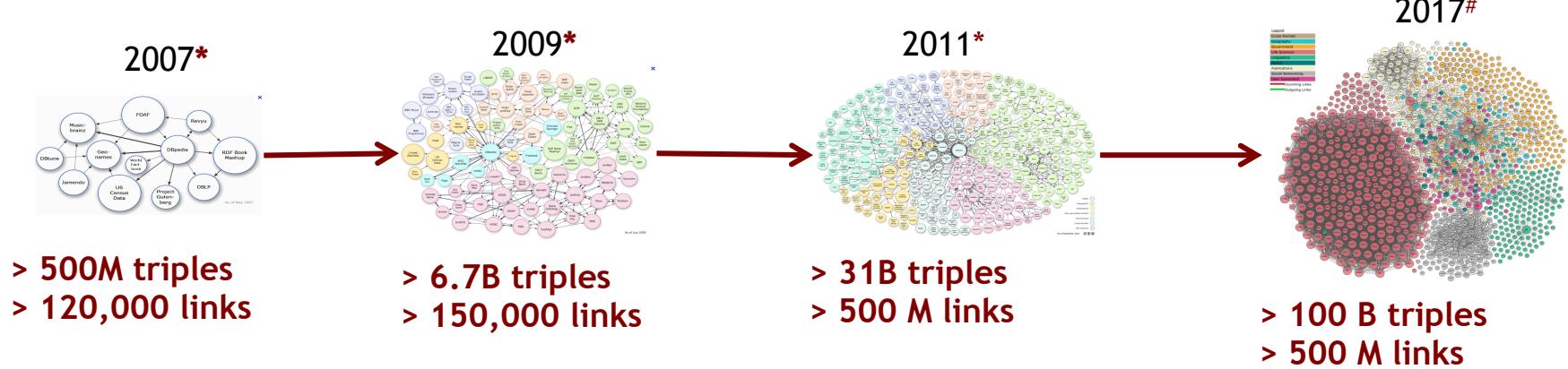
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FUTURE CHALLENGES

▪ Data evolution

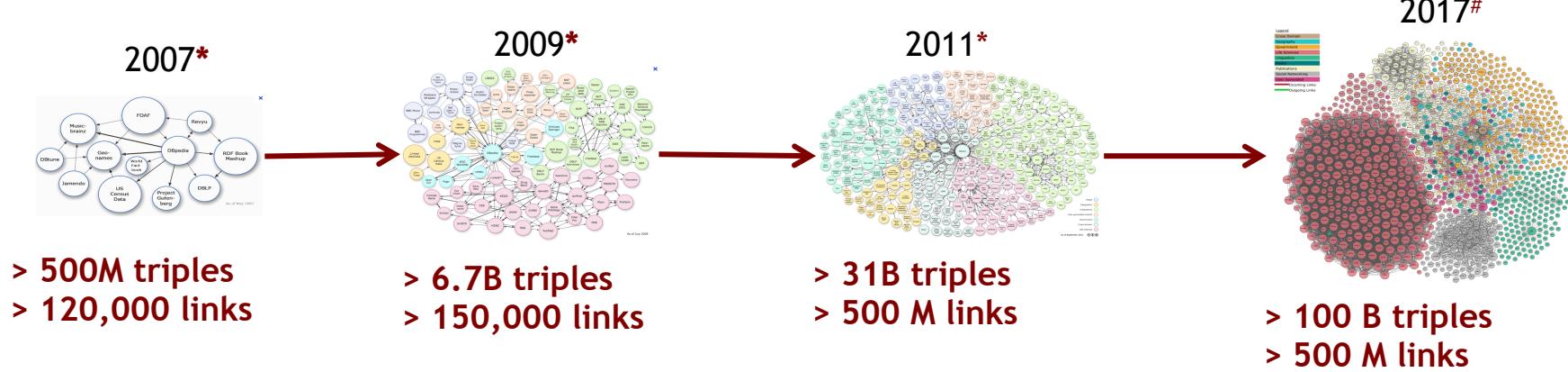


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FUTURE CHALLENGES

■ Data evolution



- **Link update:** addition and deletion of links
- **Ontology axiom evolution inference**

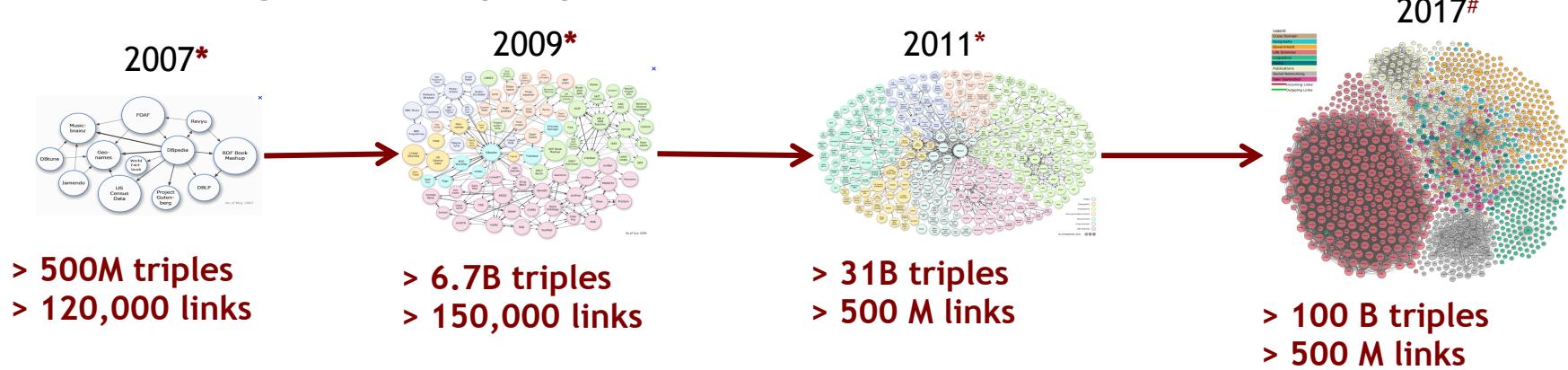
ex: Added instances “Louvre Lens” and “Louvre Abu Dhabi”, the property :MuseumLocation is it still functional?

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FUTURE CHALLENGES

▪ Knowledge Graph (KG) Evolution



- **Link update**: addition and deletion of links
 - **Ontology axiom evolution inference**
 - ex: Added instances “Louvre Lens” and “Louvre Abu Dhabi”, the `:MuseumLocation` is it still functional?
 - **Data** and **link quality** assessment: completeness, accuracy, ...
 - How to guarantee **incrementality** of the methods working on evolving KGs?

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FUTURE CHALLENGES

- **Knowledge Graph (KG) Evolution**
- **Need of some time**

marriedTo (Madonna, GuyRitchie) [22Dec2000, Dec2008]

capitalOf (Berlin, Germany) [1990, now]

capitalOf (Bonn, Germany) [1949, 1989]

Examples from G. Weikum

- **Time representation in KGs:** which predicates? Which semantics?
- **Temporal reasoning on KGs:** time-aware data linking, knowledge discovery, query answering, ...

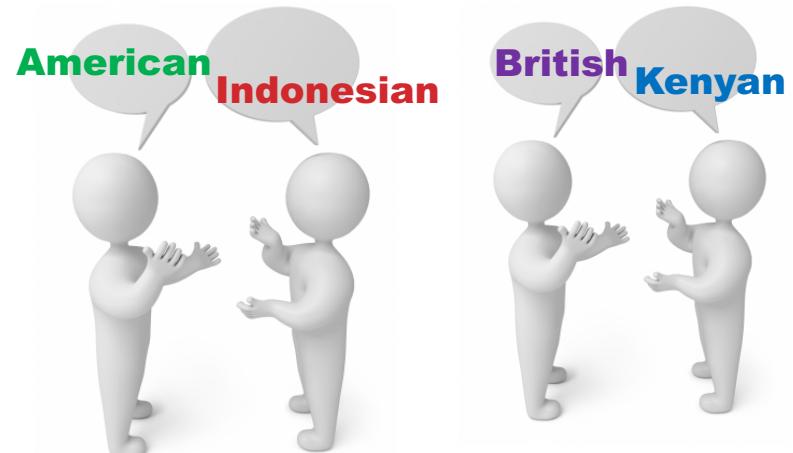
FUTURE CHALLENGES

- Knowledge Graph (KG) Evolution
- Need of some time
- Data veracity → what is the truth?

Barack Obama citizenship conspiracy theories

From Wikipedia, the free encyclopedia

During Barack Obama's campaign for president in 2008, throughout his presidency, and afterwards, a number of conspiracy theories falsely asserted Obama was ineligible to be President of the United States



- Truth discovery when the sources are inter-dependent (copy detection)
- Multi-truth: multi-valued properties. Ex. Double citizenship for B. Obama.
- Truth discovery while considering *against* and *for* arguments.

FUTURE CHALLENGES

- **Knowledge Graph (KG) Evolution**
- **Need of some time**
- **Data veracity → what is the truth?**
- **Need of some explanations for the processes/reasoning**
 - How to **represent** and **keep track** of the processes used for KGs construction and completion?
 - Which pattern used for the extraction of the "bornIn" relation?
 - Which axiom/similarity function led to that :sameAs link?
 - ...

FUTURE CHALLENGES

- **Knowledge Graph (KG) Evolution**
- **Need of some time**
- **Data veracity → what is the truth?**
- **Need of some explanations for the processes/reasoning**
- **Knowledge graph completion with:**
 - Distinctness relations (`owl:differentFrom`) for KG consistency checking and for better reasoning capabilities
 - Ontology axioms (keys, functionality, ...) with multi-source validity

KNOWLEDGE GRAPH COMPLETION

THANKS!

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MATERIAL: www.iri.fr/~sais/KGC

