RDF-Star

Or: The Path to RDF 1.2

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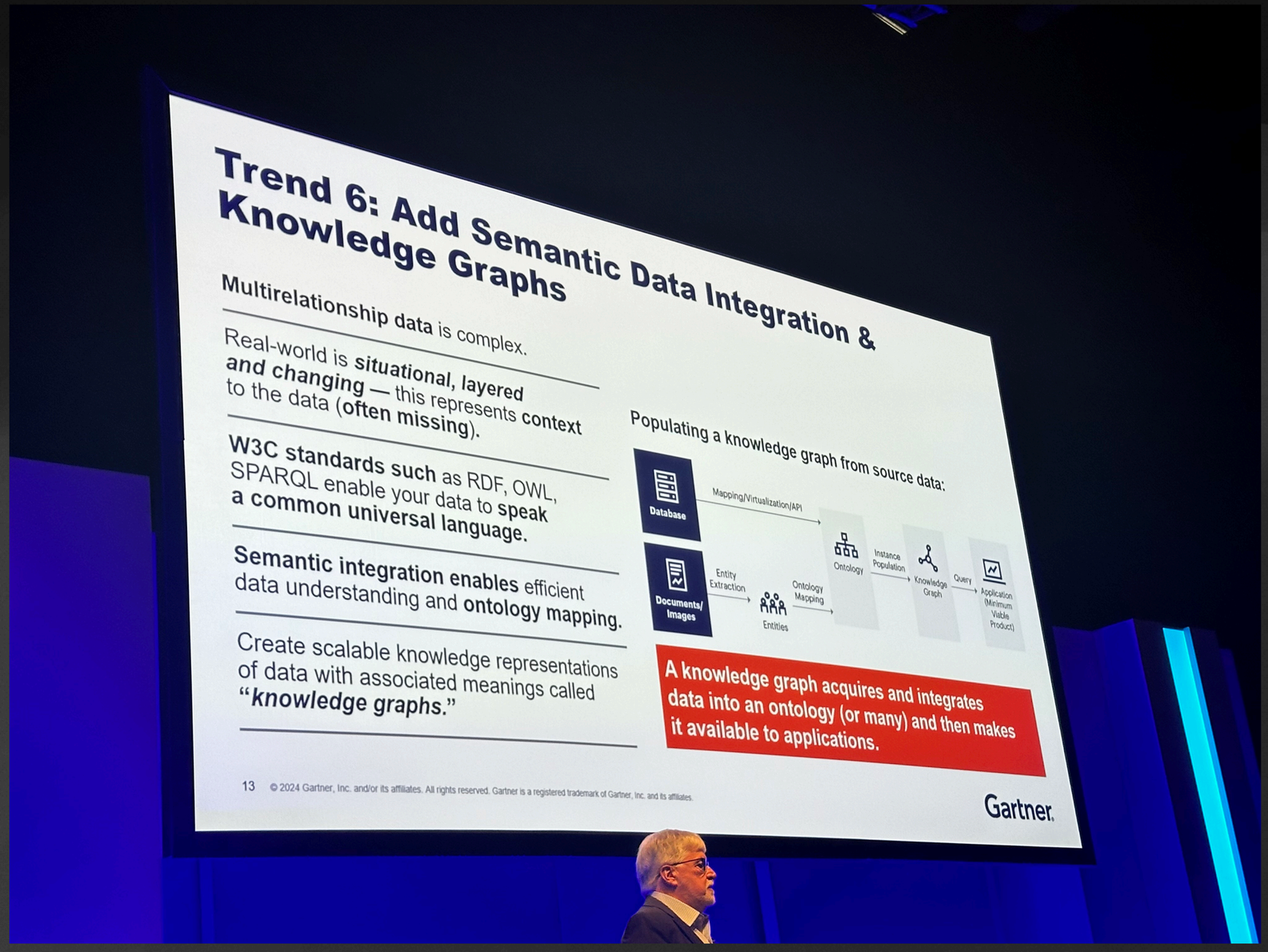
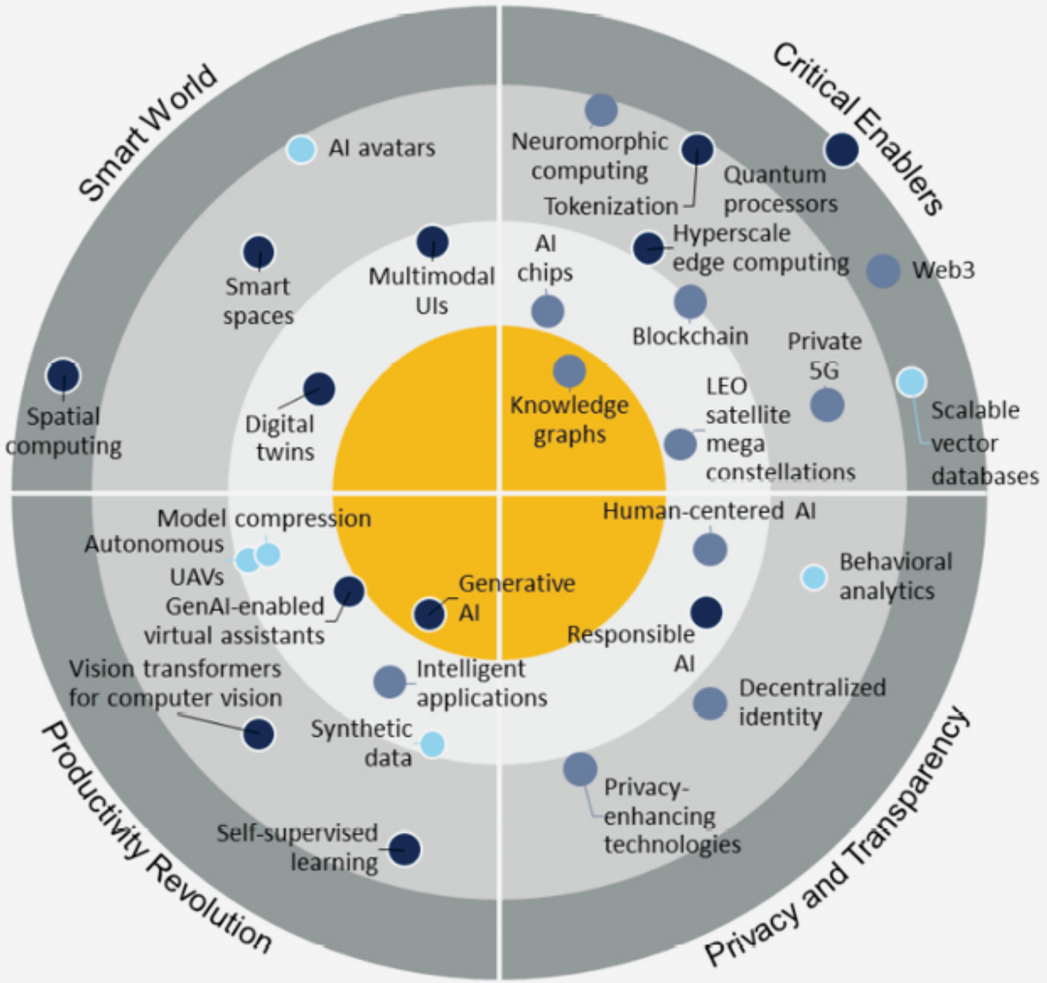
Brief history of RDF

- October 1997: First public “working draft”
- February 1999: RDF “Model and Syntax”
- February 2004: RDF “Model and Syntax” revised (“RDF 1.0”)
- January 2008: SPARQL 1.0
- March 2013: SPARQL 1.1
- February 2014: RDF 1.1
- December 2021: RDF Star CG Report (W3C Community Group)

Look mum, we are mainstream!



Impact Radar for 2024



Range
- 6 to 8 Years
- 3 to 6 Years
- 1 to 3 Years
- Now (0 to 1 Years)

Mass
- Low
- Medium
- High
- Very High

Source: Gartner

Gartner®

History: Statements about Statements

Up until now done by “modeling” RDF statements in RDF

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Reification: cumbersome, misunderstood, unpopular

- one of the most persistent criticisms of RDF, particularly when comparing to Labeled Property Graphs (LPGs)

Over the years, many ideas and proposals on how to “fix” this

- most notably, “Reification Done Right” by Hartig & Thompson in 2014
- RDR eventually parlayed into “RDF-Star”, first a W3C Community Group, now a Working Group

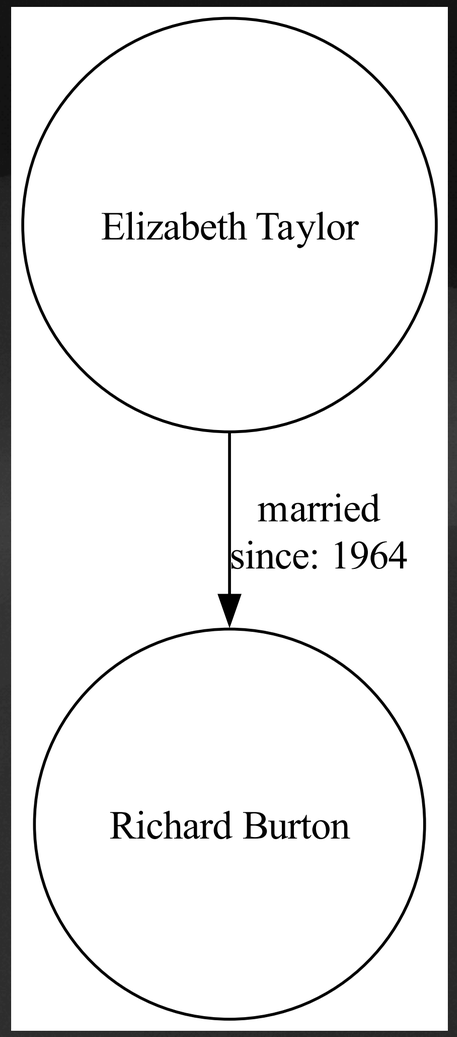
Property Graphs

Labeled Property Graphs - LPGs

```
CREATE (elizabeth:Person )
CREATE (richard:Person )
CREATE (elizabeth)-[:MARRIED {since: 1964}]->(Richard)
```

```
Person: label
Direct relationship: MARRIED
Property: since: 1964
```

Property Graphs



Classical RDF Reification

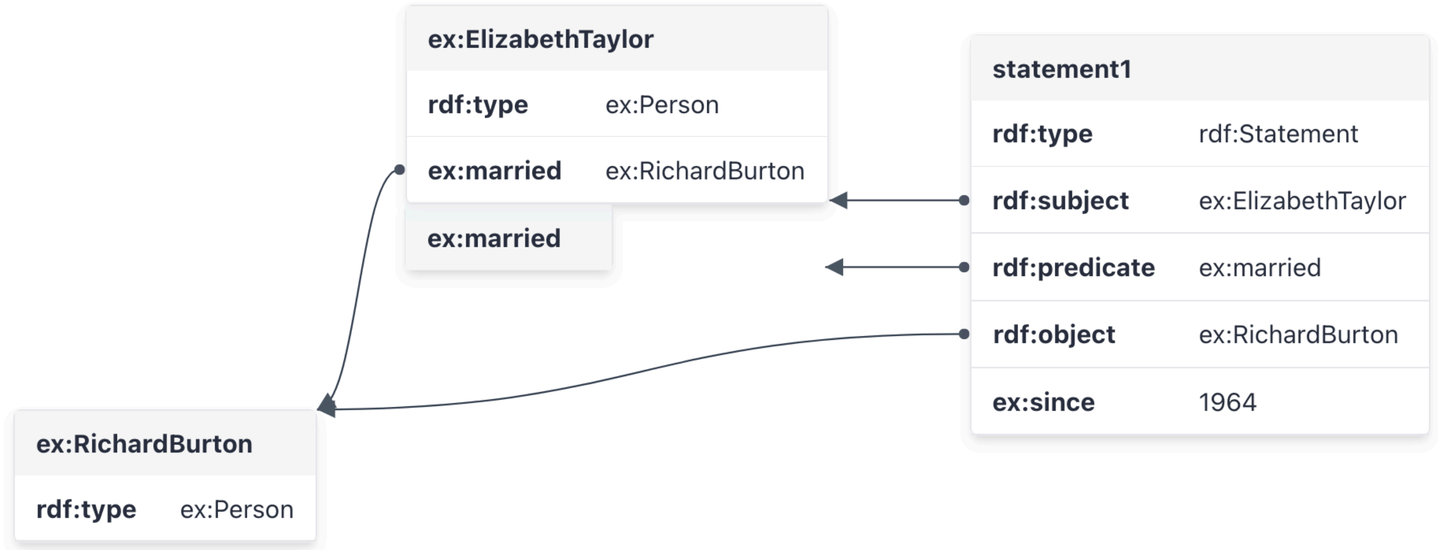
Taylor RDF | Taylor Reification | +

Sketch / zazuko

RDF editor text/turtle

```
1  @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-
2  @prefix ex: <http://example.org/> .
3
4  ex:ElizabethTaylor a ex:Person ;
5      ex:married ex:RichardBurton .
6
7  ex:RichardBurton a ex:Person .
8
9  _:statement1 a rdf:Statement ;
10     rdf:subject ex:ElizabethTaylor ;
11     rdf:predicate ex:married ;
12     rdf:object ex:RichardBurton ;
13     ex:since "1964" .
```

Representation



The “RDF Way”

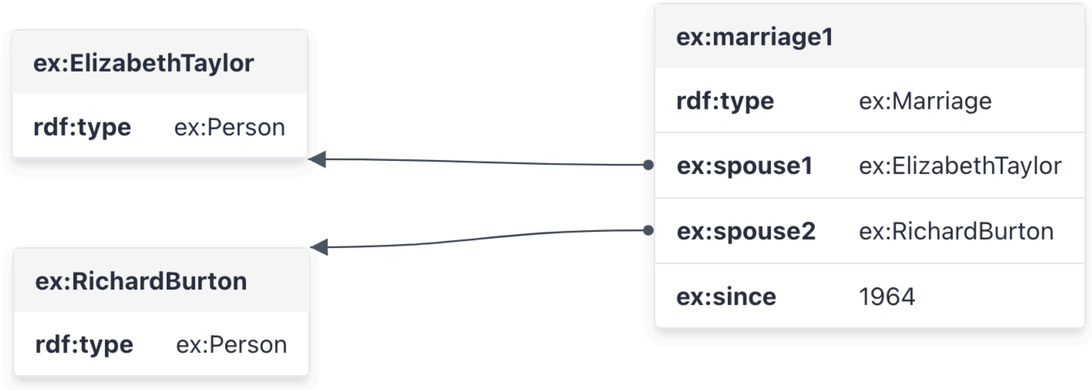
Taylor RDF | Taylor Reification | +

Sketch / zazuko

RDF editor text/turtle

```
1  @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-
2  @prefix ex: <http://example.org/> .
3
4  ex:ElizabethTaylor a ex:Person .
5
6  ex:RichardBurton a ex:Person .
7
8  ex:marriage1 a ex:Marriage ;
9      ex:spouse1 ex:ElizabethTaylor ;
10     ex:spouse2 ex:RichardBurton ;
11     ex:since "1964" .
12
13
```

Representation



RDF Star Use Cases

- Provenance
- Qualifying Statements
  - “Präzisierung”
- “Marginalia”
  - “Randbemerkungen”
- Modalities (beliefs, etc.)
  - Representing different beliefs about a statement
  - Earth is flat vs earth is a sphere
- Also: Bringing RDF closer to LPGs

RDF Star Issues

Triples in an RDF graph are unique (remember: set semantics)

```
:ElizabethTaylor :married :RichardBurton
```

  - we want to qualify this with a year
  - but... Taylor married Burton twice (1964 and 1975)
- Breaking existing RDF (1.1) semantics is highly undesirable
- Introducing new semantics can have consequences for OWL
- Relationship between statements and named graphs?
  - is a statement a singleton named graph?

RDF Star Syntax Proposal

Occurrence syntax: **<< :id | :s :p :o >> :pp :oo**

Annotation syntax: **:s :p :o {| :pp :oo |}**

“Triple term” syntax (only for internal use): **<<(:s :p :o)>>**

Concrete syntax	Resulting triples	Notes
<< :id | :s :p :o >> :pp :oo .	**:id rdf:reifies <<(:s :p :o)>> .** **:id :pp :oo .**	**:s :p :o** not asserted
<< _:b | :s :p :o >> :pp :oo .	**_:b rdf:reifies <<(:s :p :o)>> .** **_:b :pp :oo .**	**_:b** is a new blank node
:s :p :o {| :pp :oo |} .	**:s :p :o .** **_:b rdf:reifies <<(:s :p :o)>> .** **_:b :pp :oo .**	also **{| :id | :pp :oo |}**

RDF Star Syntax Proposal

Everything can and might change until the WG concludes!

- https://github.com/w3c/rdf-star-wg/wiki/RDF%E2%80%90star-examples-of-profiles#rdf-star-examples-draft-20240531

Explanation

- Asserted triple
  - Core fact: The triple exists stated that way in the data
- Occurrence (Not asserted triple)
  - statements about the statement itself
  - i.e. when it was asserted or by whom
- Annotation
  - annotate a triple with additional information
  - qualifying the relationship with further details
  - context, temporal aspects, provenance, or other qualifiers

Outlook

- RDF 1.2 in 2025
- Moving to a “living standard”
- New, non-breaking features could be added without formal Working Group

Thank you

- I’m Adrian Gschwend
- Find me on LinkedIn