Synthesis I

Kenneth Baclawski
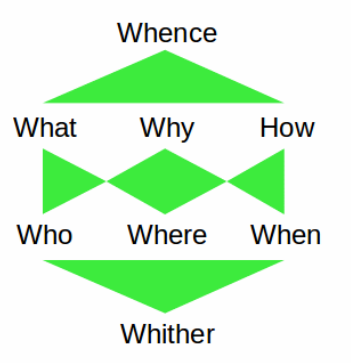**Janet Singer**
Ram D. Sriram
Gary Berg-Cross
Ravi Sharma
Todd Schneider

1 April 2020

Outline

- Theme

- Tracks

- Synthesis: What

**Ontology Summit 2020: Knowledge Graphs**
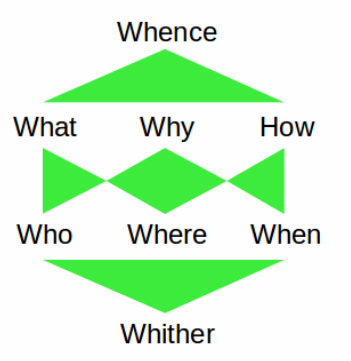
Theme

- ## Whence

  - The historical perspective

  - Knowledge as open, loose, fuzzy, emergent

  - Analogies and metaphors

- ## Who, Where, When

 - Use case specifics for individual enterprises and industries
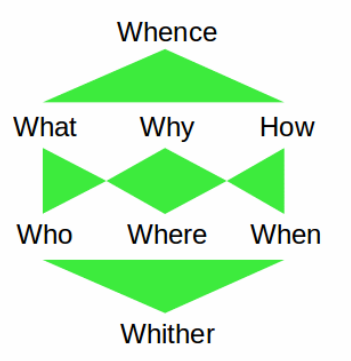
Theme

- Why

  - General big picture of KGs, as opposed to use cases

  - The full cycle realization from data to business results

  - Evaluation and management of quality and efficiency

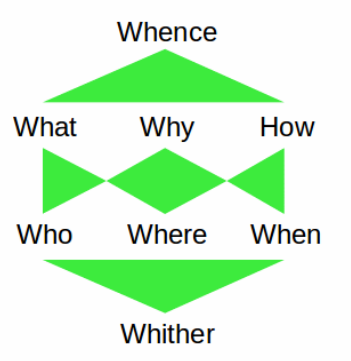**Ontology Summit 2020: Knowledge Graphs**
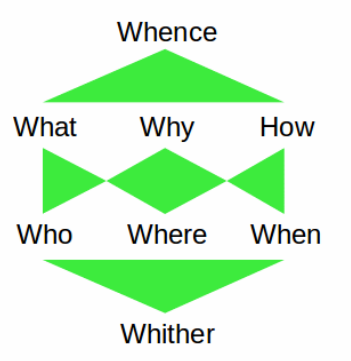
Theme

- ## How

  - Vendors are developing technologies based on graph-based methods.

  - A wide-spread graph-based culture is emerging, including conferences and training.

  - The culture includes aspects such as `data thinking' and `ontological thinking'.

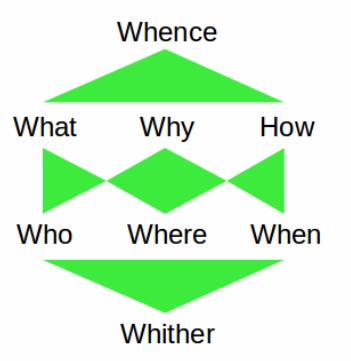 - Promotion of dialog to promote mutual understanding

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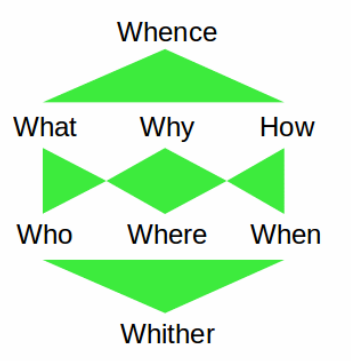
Theme

- Whither
  - Emerging standards
  - Research challenges
  - Speculation about future directions

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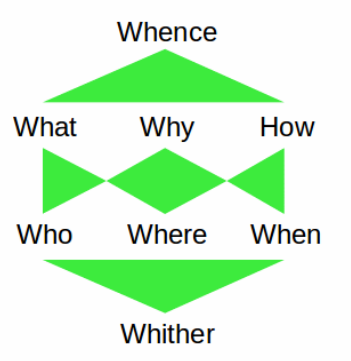
Tracks

- Whence
  - Chaitanya Baru
  - John Sowa
- Why
  - Jans Aasman
  - Matthew West
  - Ernest Davis
    06 May

- How
  - Anirudh Prabhu
  - Paco Nathan
  - Sargur Srihari
  - Spencer Breiner
  - Krzysztof Janowicz
    29 April
  - More TBA

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Tracks

- Use Cases
    - Binil Starly 08 April
    - Michael Uschold 15 April
    - Sean Gordon 22 April
    - More TBA
- Whither
    - Vinay K. Chaudhri 20 May
    - More TBA

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Synthesis: Progress

- Summary of some suggestions for the definition of "knowledge graph"
    - Gary Berg-Cross
    - Todd Schneider
    - Ravi Sharma
- Other discussions are ongoing

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Synthesis: What

- What is a knowledge graph?

  - It depends on the point of view

- Theory

- Purpose

- Requirements

- Implementation

- Practice

- Others?

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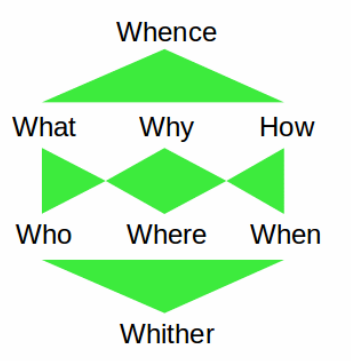
Synthesis: What

- Model of a portion of a domain

- Graph-based, flexible formal data/knowledge representation

- Easily map to other data formats using generic tools, and pipelines for updates

  - It allows more fidelity of the representation of a domain via relations (the relations are the key),

  - The additional fidelity of representation (via relations) allows more more useful and actionable distinctions.

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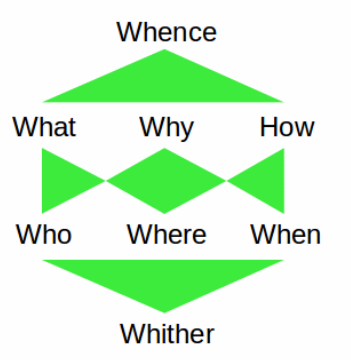
Synthesis: What

- Consider the label 'Knowledge Graph' and the two terms used to distinguish it. 'Knowledge' and 'Graph'.

- First consider the notion of 'Graph'. This is a well defined entity in Mathematics. In fact, there's a entire field devoted to it, 'Graph Theory'.

  - Comment by Ken Baclawski: This is not entirely accurate. There are many kinds of graph in the field of graph theory. It's at least as diverse as the many definitions of knowledge graph. If we want to appeal to Mathematics for the theoretical meaning of graph in this context, we will need to give a theoretical definition and treatment. I have developed such a treatment.

  - Other comments?

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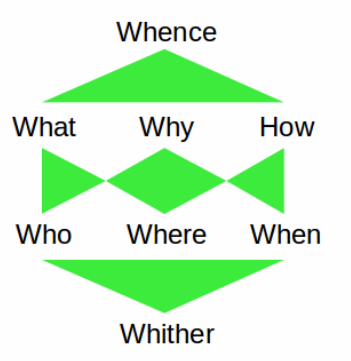
Synthesis: What

- Second considered the qualifier in the label, 'Knowledge'.

- This is a less well defined notion. Among the common (English) definitions that can be found are the following: facts, information, and skills acquired by a person through experience or education; the theoretical or practical understanding of a subject what is known in a particular field or in total; facts and information Since we don't want to confuse the discussion too early, let's leave out epistemological considerations for the moment. And focus on the bits about "information" and "in a particular domain".

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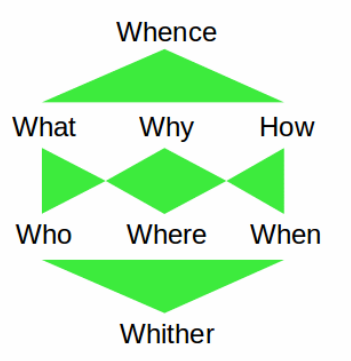
Synthesis: What

- A Graph Database is one that uses graph structures for semantic queries with nodes, edges, and properties to represent and store data. The graph model explicitly lays out the dependencies between nodes of data, the relational model and other NoSQL database models link the data by implicit connections. A graph database is a database designed to treat the relationships between data as equally important to the data itself.

- A Property Graph is a key/value-based, directed, multi-relational graph that is a collection of interlinked descriptions of entities. The descriptions have a structure that allows both people and computers to process them and the entity descriptions contribute to one another, forming a network, where each entity represents part of the description of the entities, related to it.

- Knowledge Graphs combine characteristics of several data management paradigms. The Knowledge Graph can be seen as a specific type of database, because it can be queried via structured queries. A graph, because it can be analyzed as any other network data structure and knowledge base, because the data in it bears formal semantics, which can be used to interpret the data and infer new facts.

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