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OÉ Gaillimh
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FreebaseViz: Interactive Exploration of Freebase Schema Using Query-driven Visualisation

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Outline

- What is Visualisation?, and why it is important?
- Related Challenges in the Context of Big Data
- Dataset of Interest: Freebase
- Architecture of FreebaseViz Tool
- Live Demo and Visualisation Scenarios
- Conclusions

Introduction

What is Visualisation?

- The transformation of the symbolic into the geometric (McCormick et al., 1987).

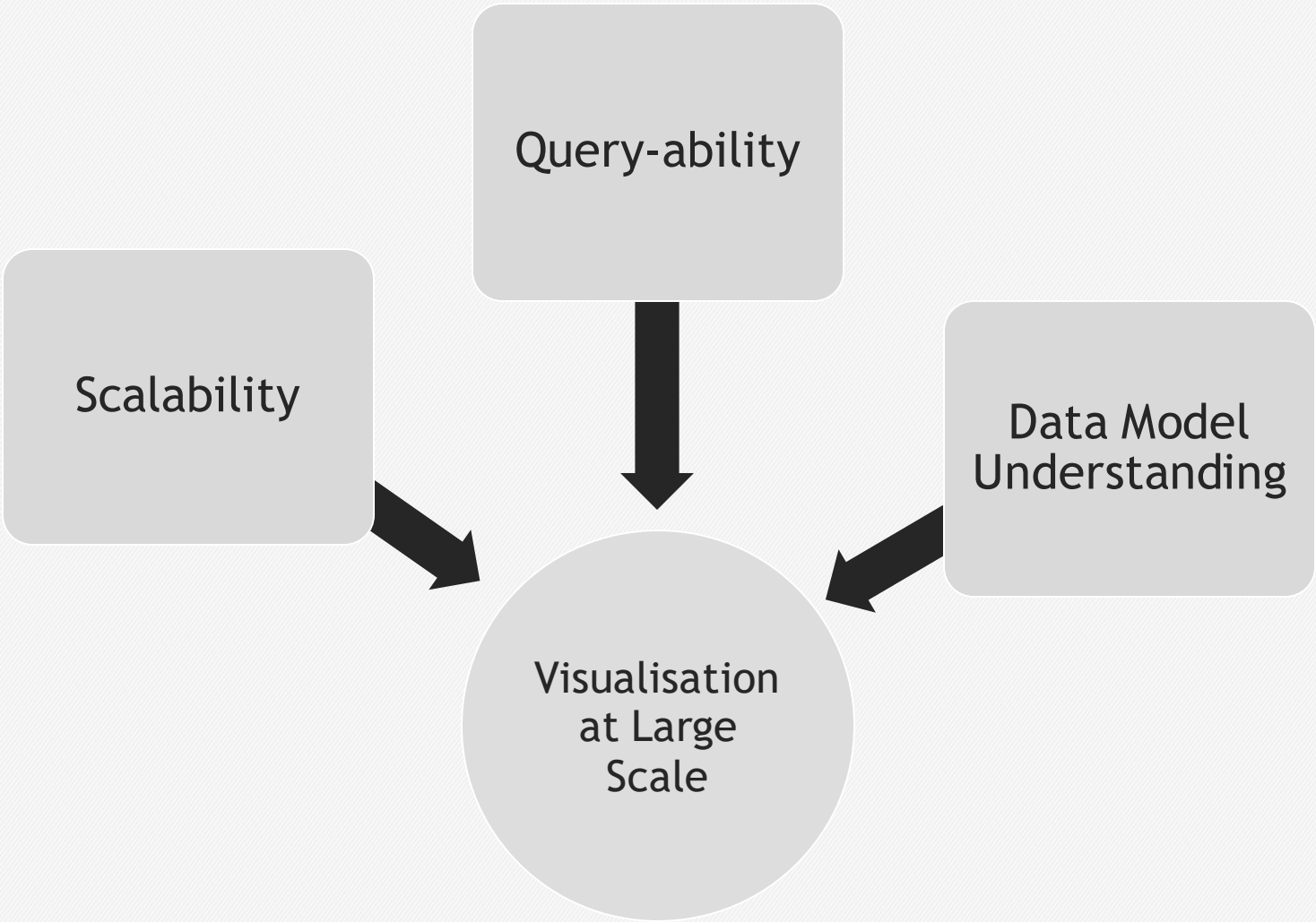
- The use of computer-generated, interactive, visual representations of data to amplify cognition (S. K. Card et al., 1999).

Sources:
McCormick, Bruce Howard, Thomas A. DeFanti, and Maxine D. Brown. "Visualization in scientific computing." IEEE Computer Graphics and Applications 7, no. 10 (1987): 69-69.
S. K. Card, J. D. Mackinlay, et al. Readings in Information Visualization; Using Vision to think. Los Altos, CA, Morgan Kaufmann. 1999.

What is Different about Visualisation?

- The interpretation of visual formats happens immediately in a "pre-attentive" manner.
- Larger-bandwidth for perception rather than text-based means.
- The pictorial representation of data can help answer or discover questions.
- A particular significance in the era of **Big Data**.

Challenge: Visualisation of Large-Scale Data



Dataset of Interest: Freebase

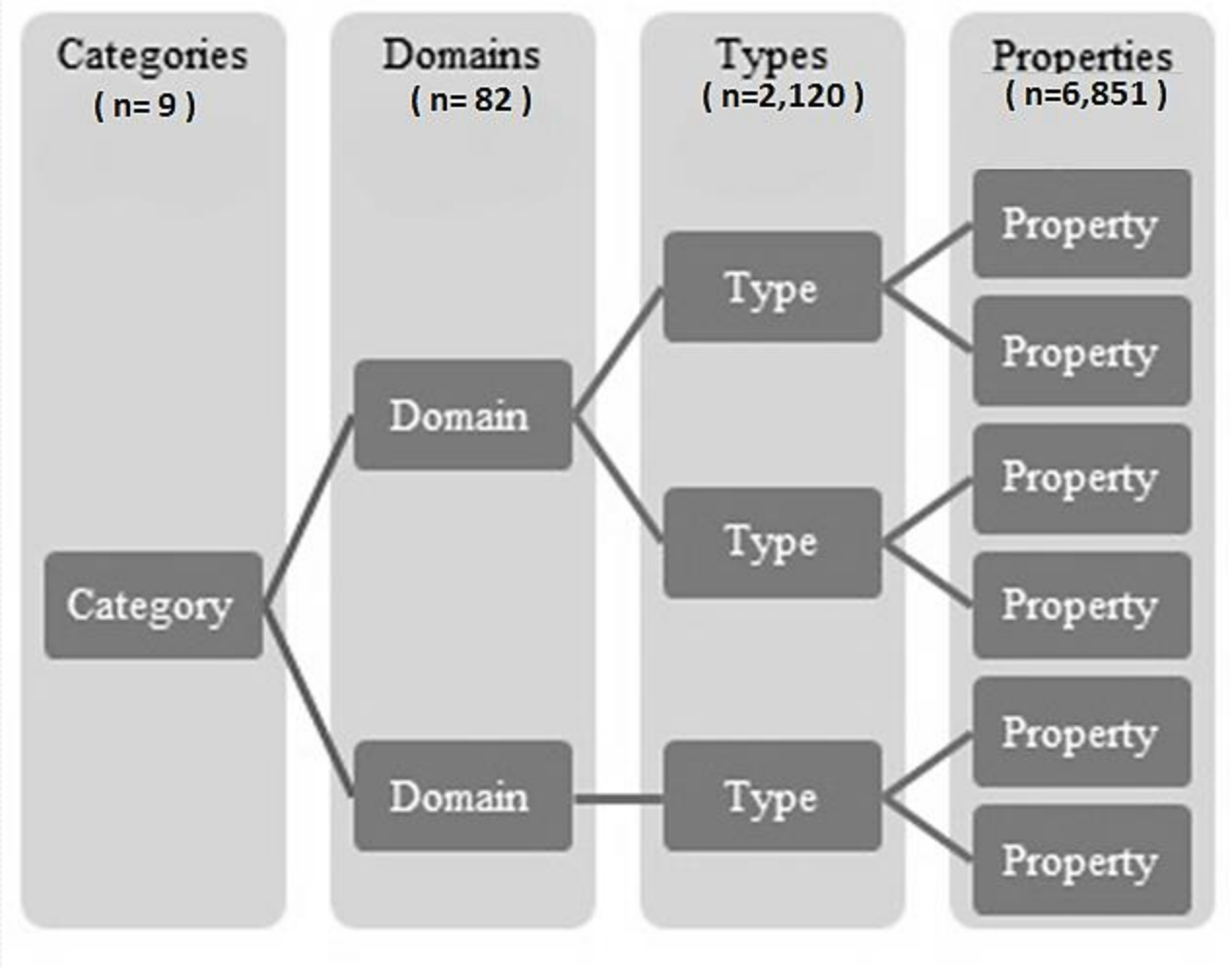
About Freebase

- Freebase: A huge structured entity database.
- Entities (Topics) about people, places, and things.
- ≈ 57 million Topics
- ≈ 650 Domains

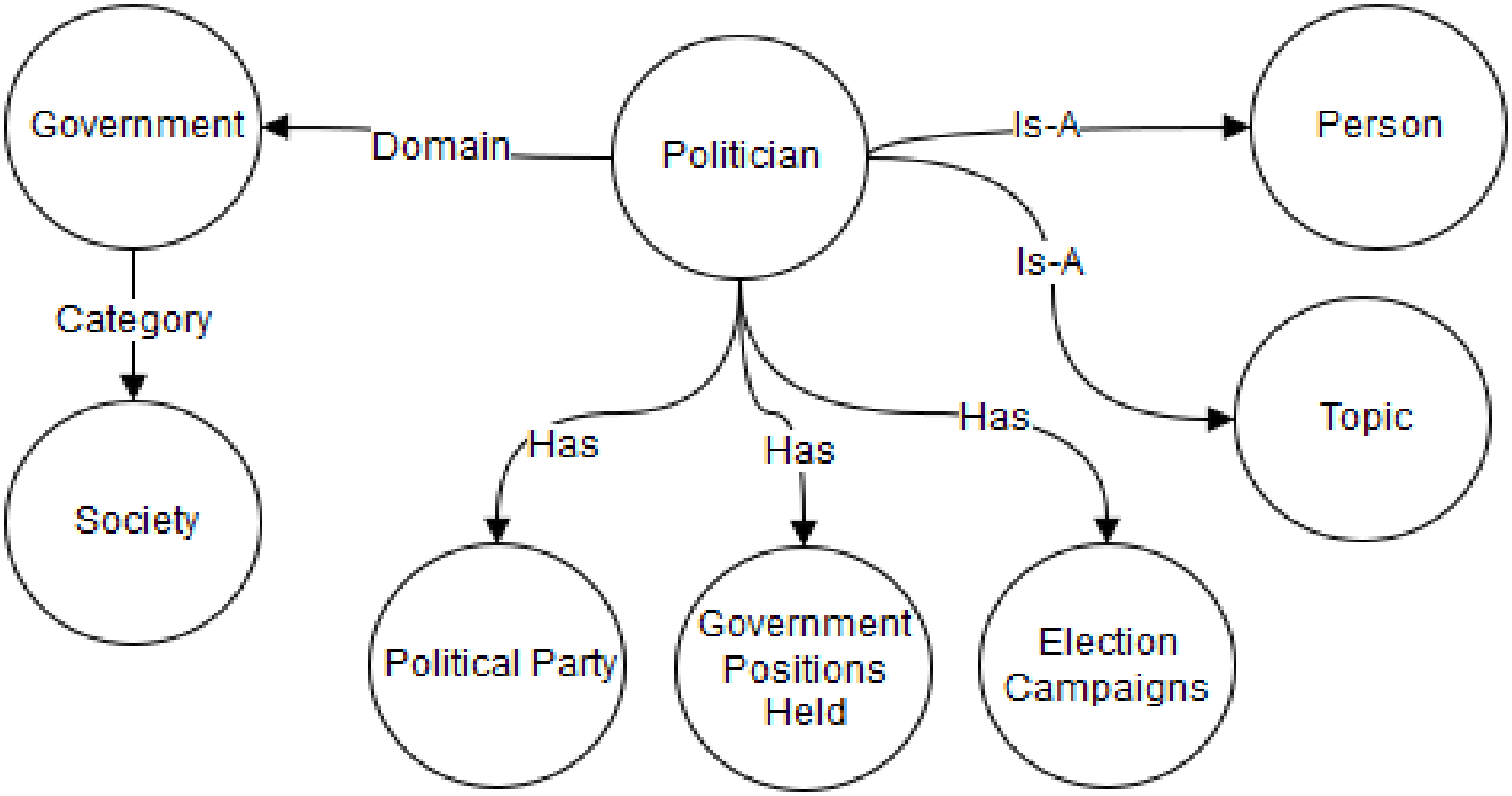
Source: Kirrily Robert ,Freebase 101 Presentation, August 2010

What we are trying to visualise?

Freebase Schema

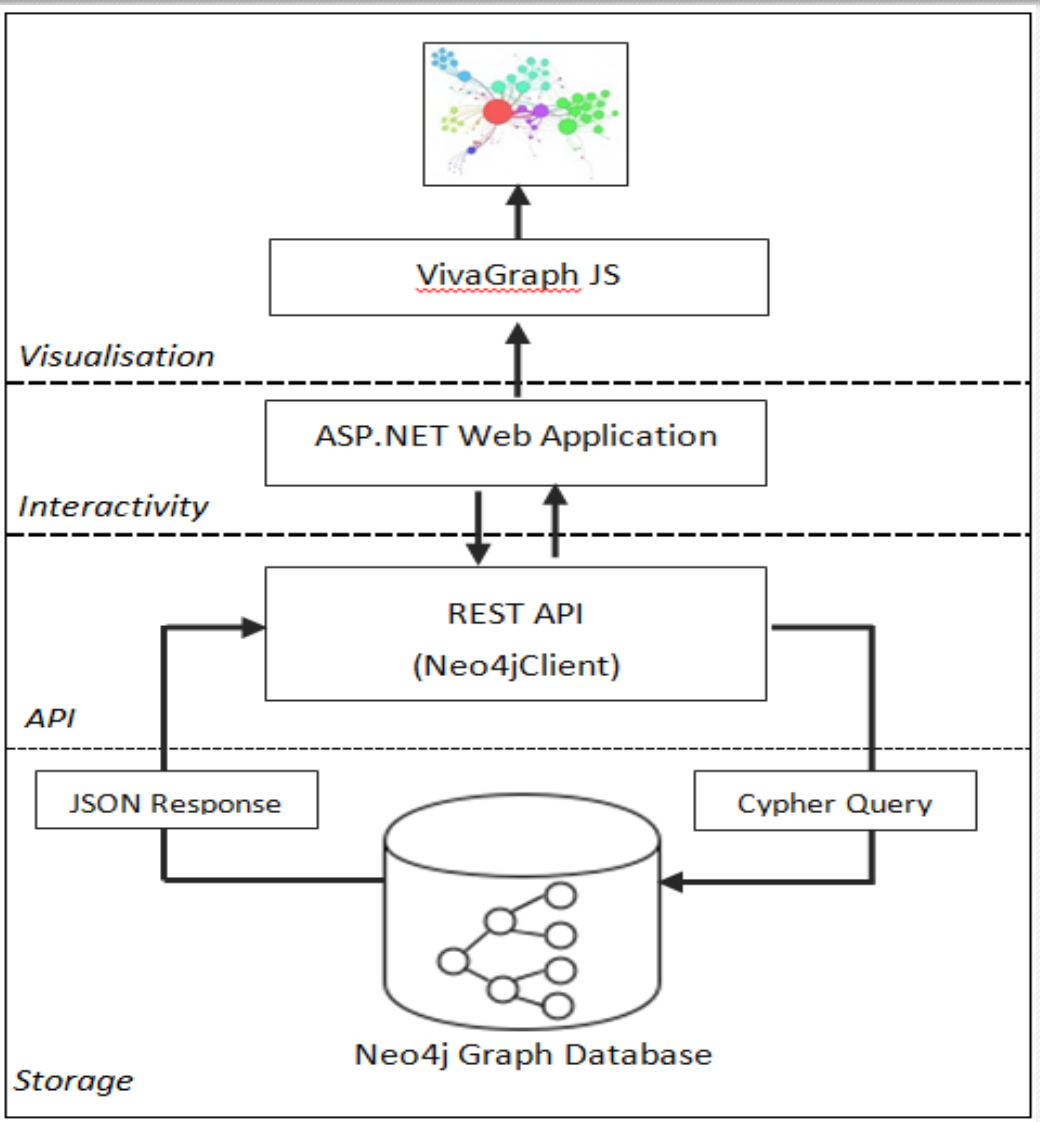


Example: What we are trying to visualise?



Proposed Approach

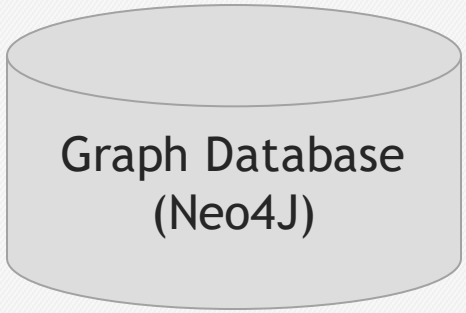
Architecture Overview



Why Graph Database?

High Reasoning Capabilities:
Supported by complex graph traversals

Graph-based Queries:
Optimized for graph operations



Flexibility:
Schema-less data model

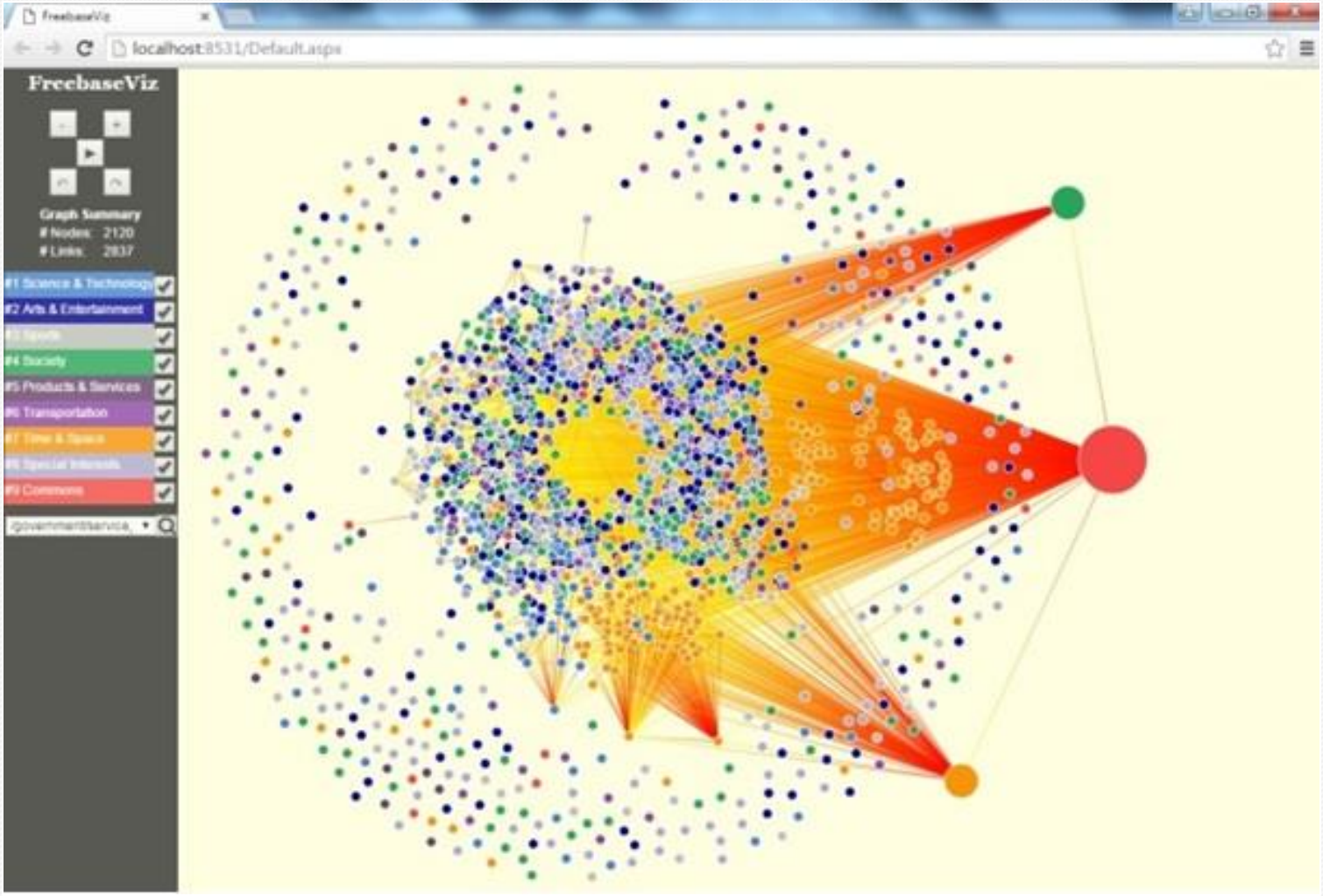
NoSQL:
Can Scale horizontally

Live Demo

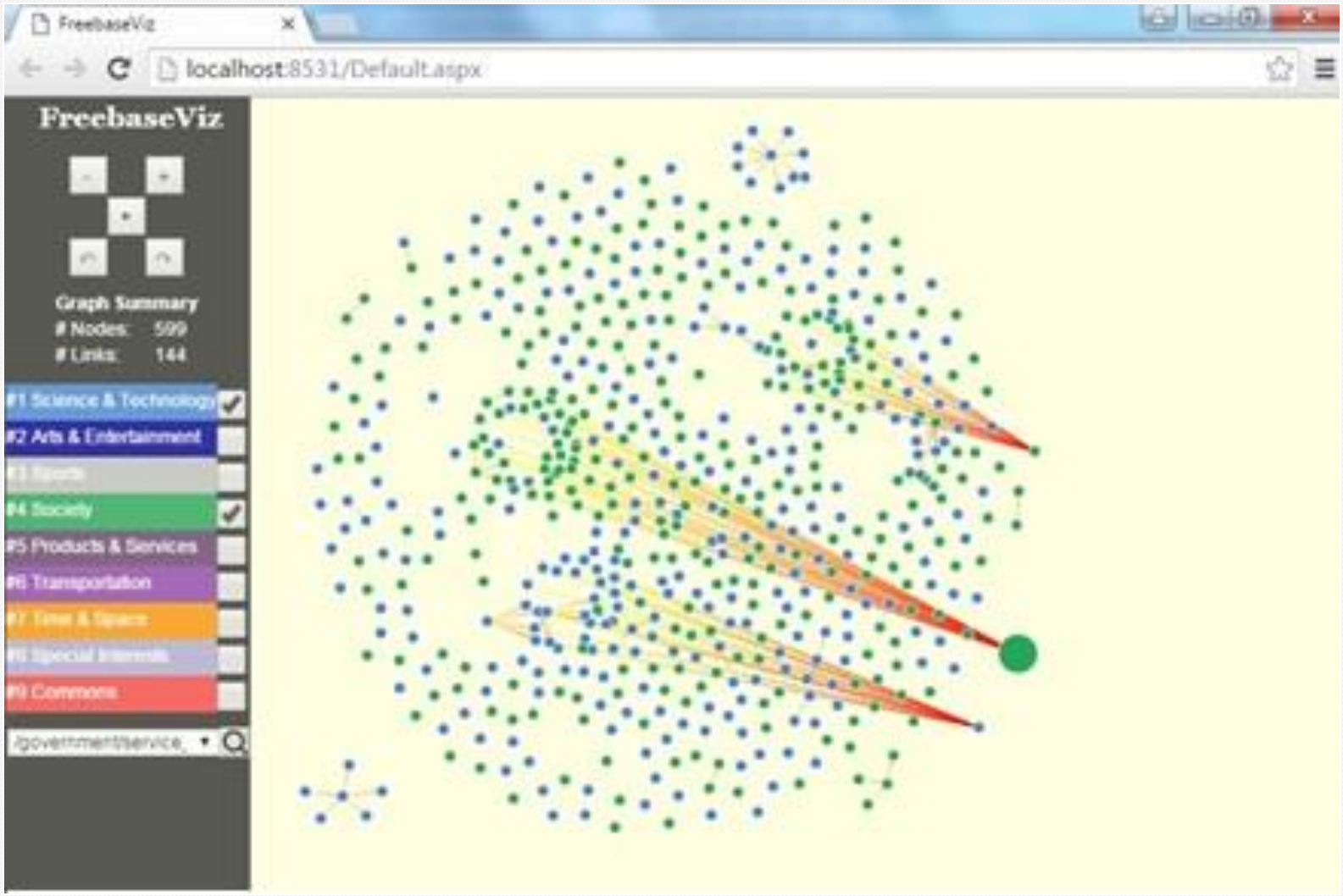
http://freebaseviz.apphb.com/

Visualisation Scenarios

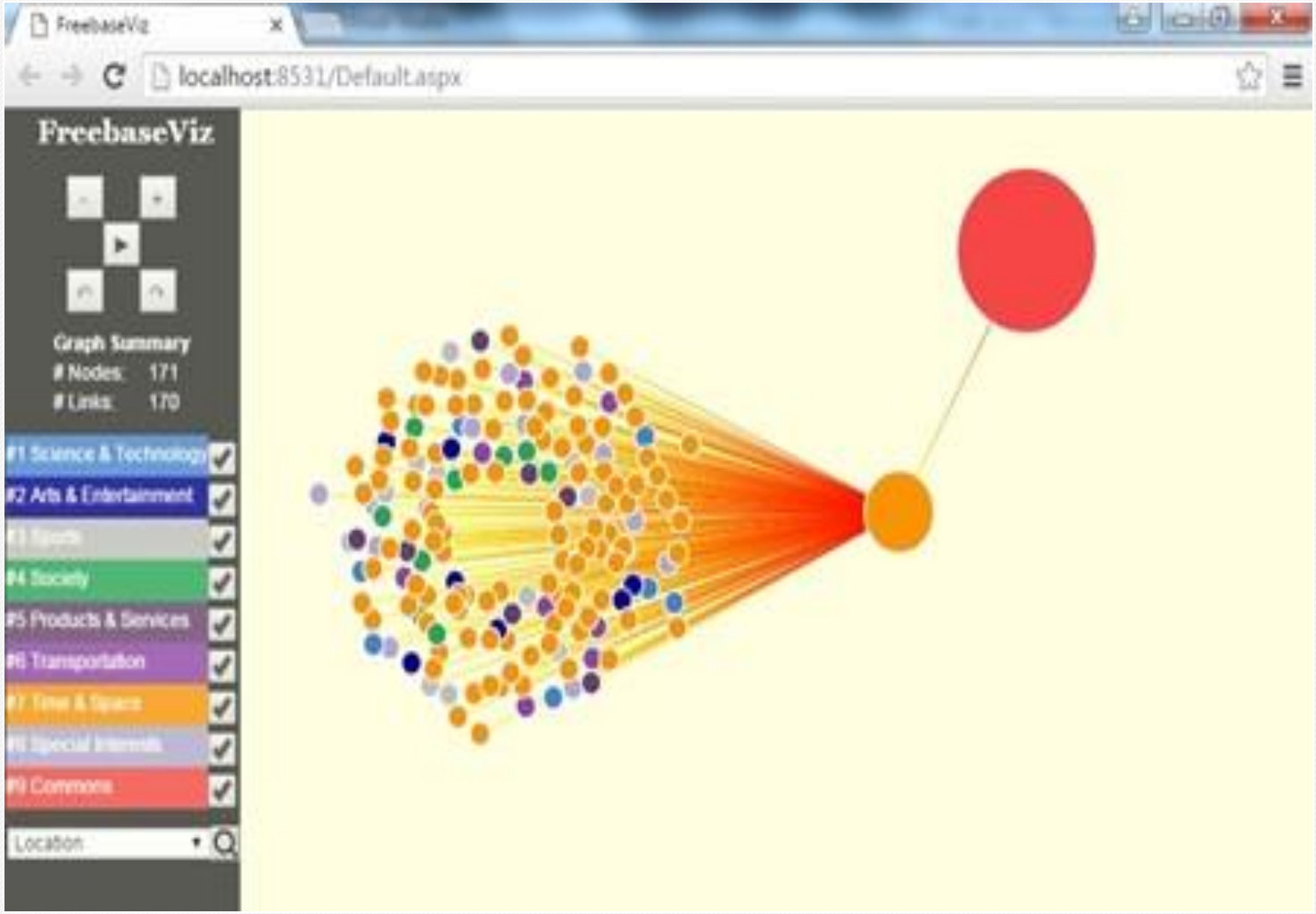
Scenario 1: Finding Dominant Types



Scenario 2: Category-Filtered Schema Graph



Scenario 3: Type-Filtered Schema Graph



Conclusions and Observations

- The Freebase schema resembled the structure of a scale-free network.
- The degree distribution followed a power law distribution.
- A few super-connected nodes dominated the schema graph connections.
- In contrast, a considerable proportion of the schema Types seemed isolated with no connections in the schema graph.

Conclusions and Observations (cont'd)

Graph databases can present promising potentials for visualisation environments as follows:

- Flexible schema-less modeling.
- Powerful query potentials.
- Complex graph traversal can answer queries requiring extensive navigation around a graph.
- Advantageous scalability compared to traditional relational models.

Original Paper

The original paper can be accessed from:

- https://books.google.ie/books?id=0YSKDQAAQBAJ&pg=PT130

- https://www.researchgate.net/publication/321716603_FreebaseViz_Interactive_Exploration_of_Freebase_Schema_Using_Query-Driven_Visualisation

Thank You!

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