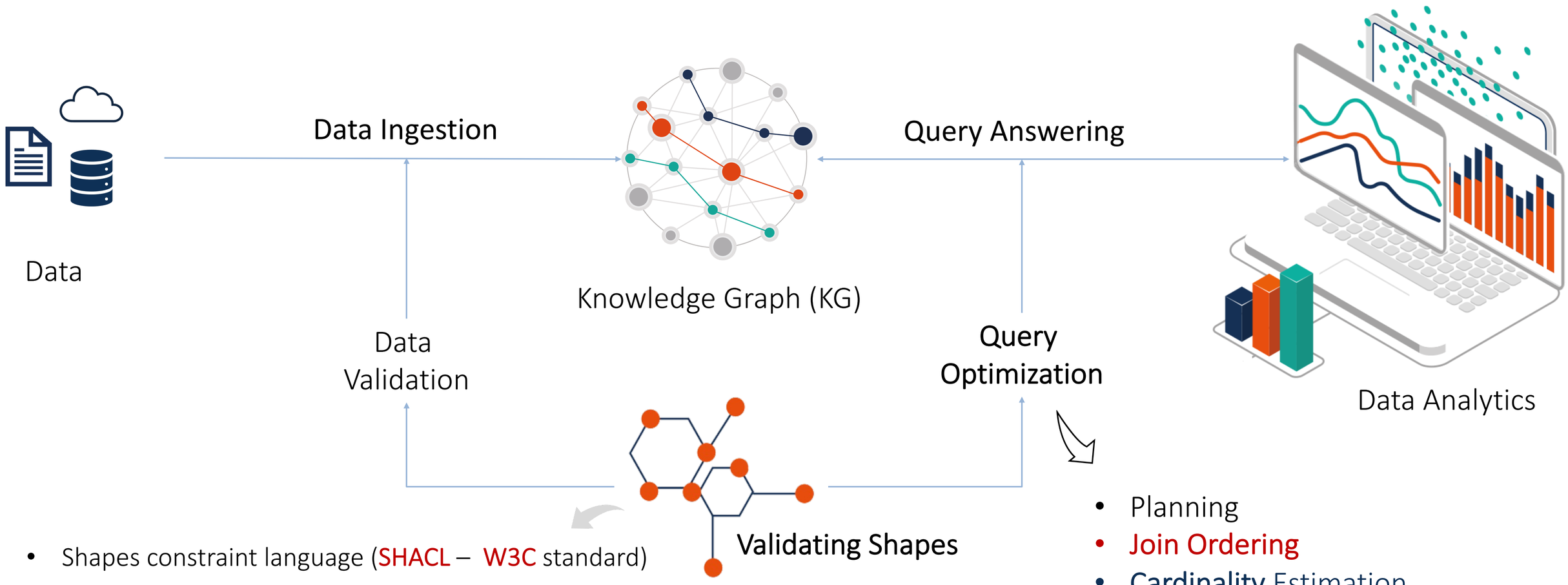
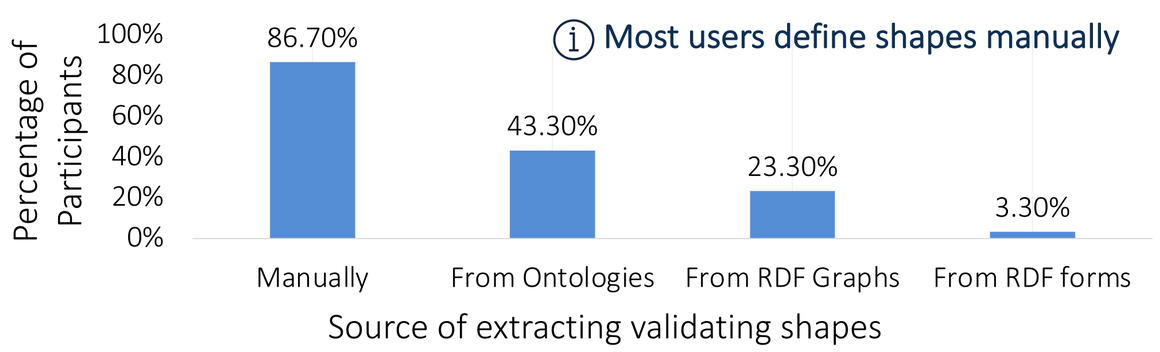
Extraction and **Exploitation** of **Shapes** for **Efficient Query Processing** over Knowledge Graphs



Validating Shapes – Survey [1]

- How validating shapes are being **generated /adopted**?

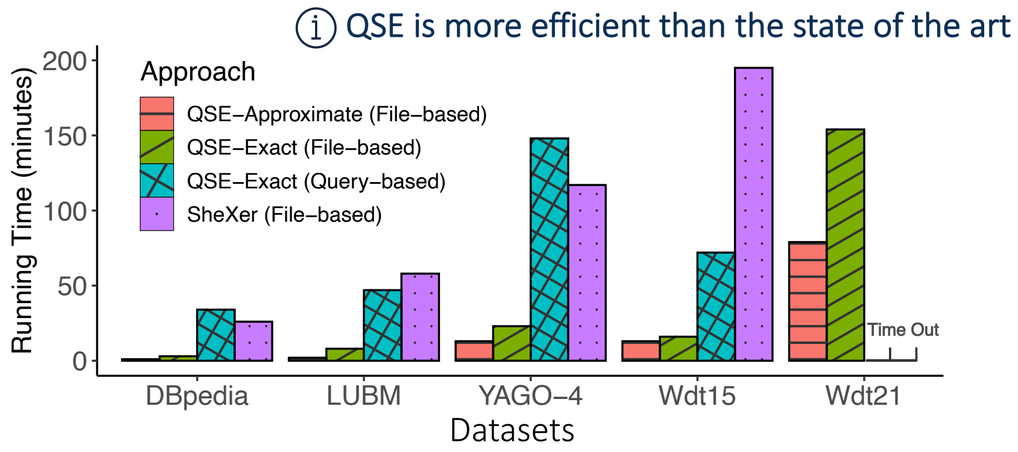
  "More research is needed to help users generate validating shapes for existing large KGs."



1

Validating Shapes – Extraction [2]

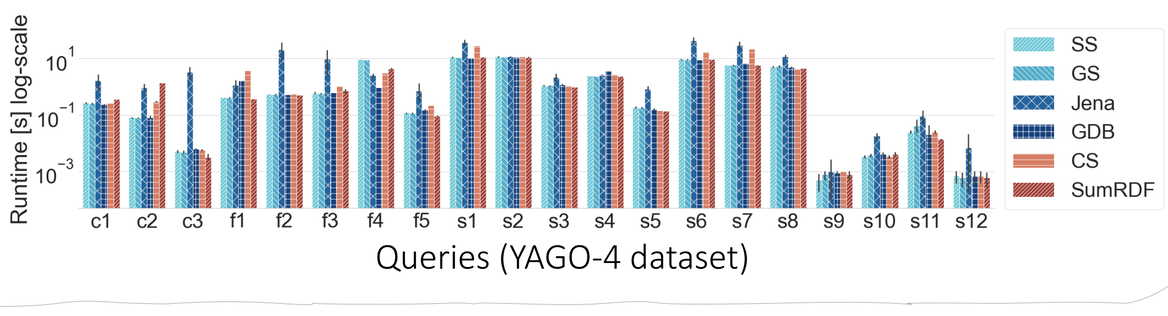
- **Efficient** extraction of validating shapes from **very large KGs**
  - **Exact** and **approximate** solution
- *Support-based Quality Shape Extraction (QSE)* to deal with the issue of **spuriousness** in shape extraction



2

Validating Shapes – Query Optimization [3]

- Enriching validating shapes with statistics of KGs: Shape Statistics
- Exploiting shape statistics **for SPARQL query optimization**



3

Federated & Hybrid Query Optimization [Planned]

- Developing a shape-statistics-based query optimizer for federated and decentralized environments, e.g., the **Comunica** query engine in the **Solid project** https://solidproject.org/
- Exploiting validating shapes for adaptive storage and hybrid query answering based on the concept of polystores

4

[1] SHACL and ShEx in the Wild: A Community Survey on Validating Shapes Generation and Adoption Kashif Rabbani, Matteo Lissandrini, and Katja Hose. In **The Web Conference 2022**
[2] Extraction of Validating Shapes from very large Knowledge Graphs. Kashif Rabbani, Matteo Lissandrini, and Katja Hose. **Under Submission 2022**
[3] Optimizing SPARQL Queries using Shape Statistics. Kashif Rabbani, Matteo Lissandrini, and Katja Hose. Pages 505-510. In **EDBT 2021**

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