



encrypt

A scalable and practical
privacy-preserving framework

Knowledge Graphs

Enhancing Interoperability for Privacy-Aware Data Integration

OBJECTIVES

- Formal data representation using standard domain ontologies
- Semantic mapping across different formats (e.g. csv, json)
- Reasoning layer for PII detection and automated privacy decisions

Goal: Enable secure, scalable, cross-domain data understanding and processing



Semantic Web standards: RDF, OWL 2



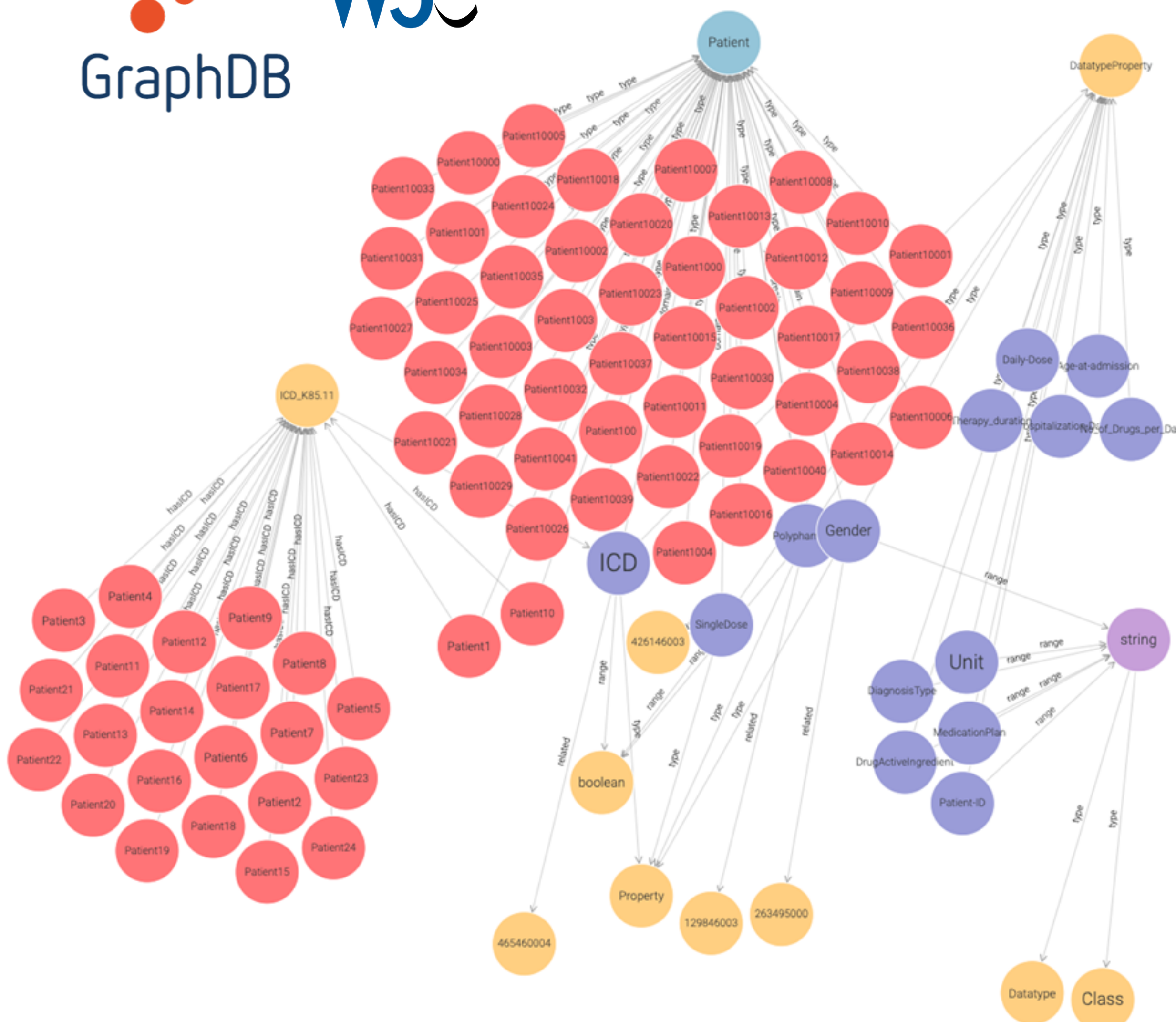
Achievements

- 93.75% mapping precision, 98.9% recall (LLMs)
- Robust cross-domain Knowledge Graphs deployed
- Semantic enrichment enhanced:
 - Interoperability
 - Querying
 - Visualization
 - Reasoning

Framework: Laravel-based unified architecture



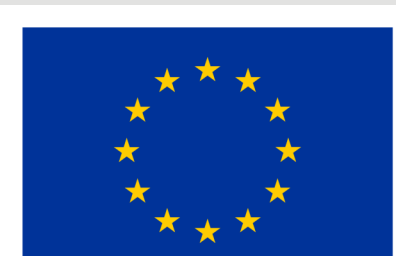
GraphDB



Example Use Case - MIRACUM

Health Domain KG shows:

- Patient-medication relationships
- Polypharmacy detection
- SNOMED CT-based semantic structure



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