Sous la co-tutelle de :
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Abstraction of Query Languages for Property Graphs

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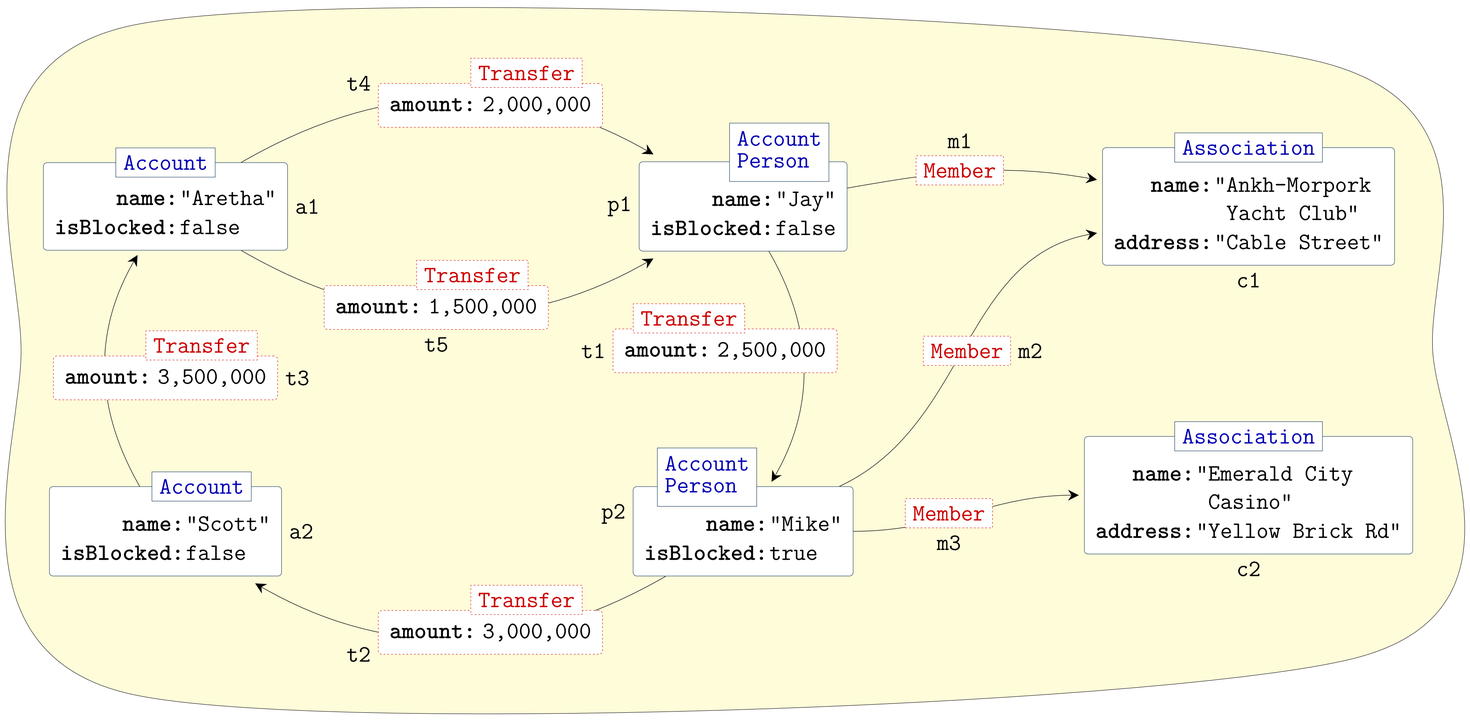
Property graphs, one of the major data models



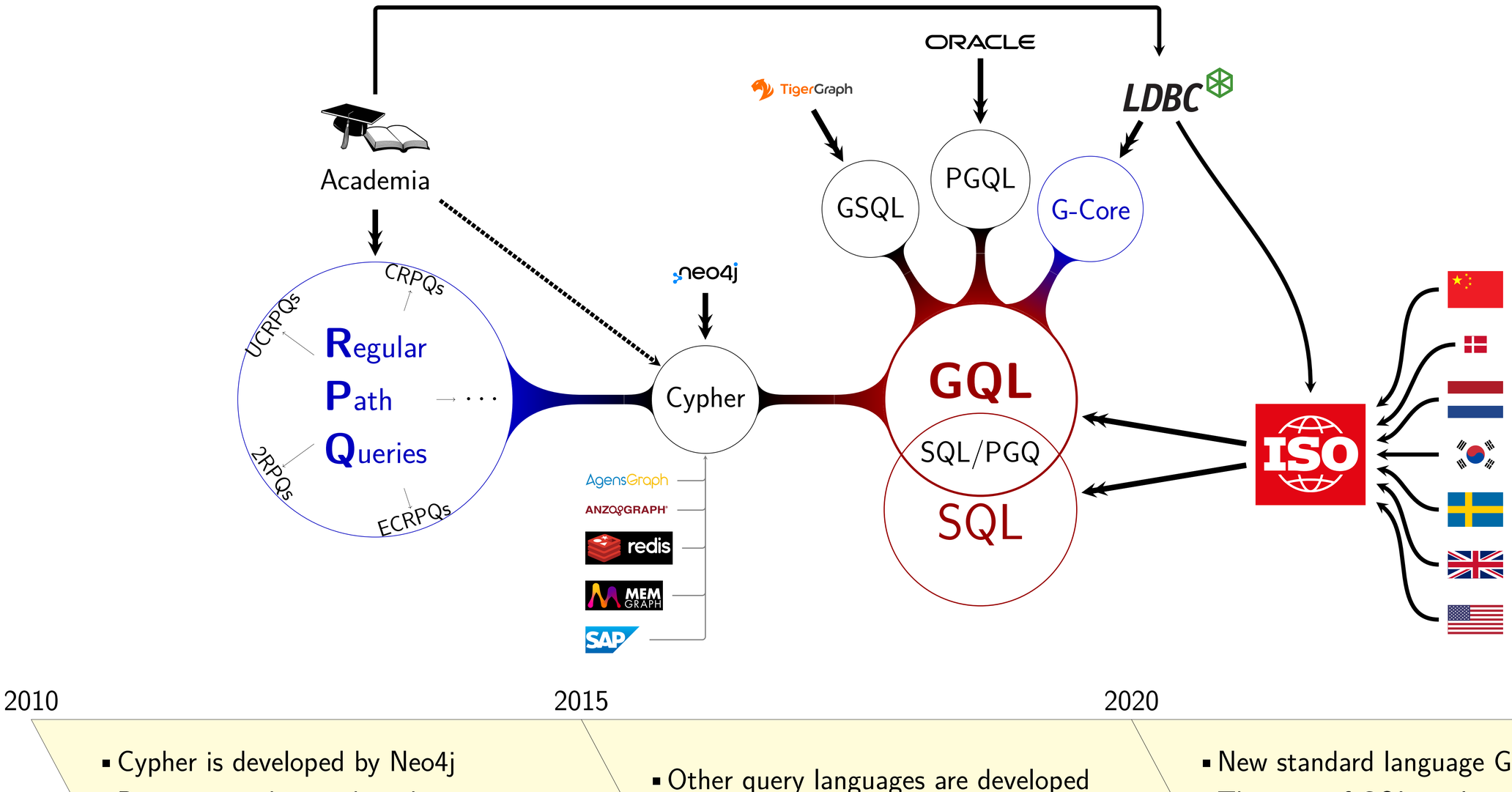
A property graph consists in:

- ▷ **Nodes**: a1, p1, c1, a2, ...
- ▷ **Edges**: t4, m1, t3, t1, ...

Nodes or edges carry zero or more:

- ▷ **Labels**: Account, Transfer, Person, ...
- ▷ **Properties**, that is, key-value pairs: **name**:"Aretha", **isBlocked**:false, **amount**:2,000,000, ...

The industry has been designing GQL, a new standard query language...



- Cypher is developed by Neo4j
- Pattern-matching is based on theoretical formalism of RPQs
- Cypher is successful

- Other query languages are developed
- Cypher used in many products
- **Formalisation of Cypher [4, 5, 6]**

- New standard language GQL (2024)
- The core of GQL is also an extension of SQL (via SQL/PGQL, 2023)
- **Formalisation of GQL [1, 2, 3]**

...and we contributed to its design and abstract formalisation

[1] A. Deutsch, N. Francis, et al. "Graph Pattern Matching in GQL and SQL/PGQ". In: *SIGMOD'22*. 2022.

[2] N. Francis, A. Gheerbrant, et al. "A Researcher's Digest of GQL". In: *ICDT*. Invited talk. 2023.

[3] N. Francis, A. Gheerbrant, et al. "GPC: A Pattern Calculus for Property Graphs". In: *PODS'23*. 2023.

[4] N. Francis, A. Green, et al. "Cypher: An Evolving Query Language for Property Graphs". In: *SIGMOD'18*. ACM, 2018.

[5] N. Francis, A. Green, et al. *Formal Semantics of the Language Cypher*. Tech. rep. Arxiv:1802.09984. 2018.

[6] A. Green, P. Guagliardo, et al. "Updating Graph Databases with Cypher". In: *VLDB*. 2019.