

# Graph Databases

What you need to know

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[github.com/JoelGallagher/GraphDB\\_Public](https://github.com/JoelGallagher/GraphDB_Public)



# Joel Gallagher

Melbourne <> Málaga



- Full Stack Developer
- DevOps
- Data Nerd
- Speaker & Trainer



# Agenda

- Anatomy of a Graph model
- Graph History
- Graphs Today
- Demo - Neo4j
- Real world Graphs
- Questions

# What is a Graph Database?

# Anatomy of a Graph Model



# Anatomy of a Graph Model



Joel



Romina

# Anatomy of a Graph Model

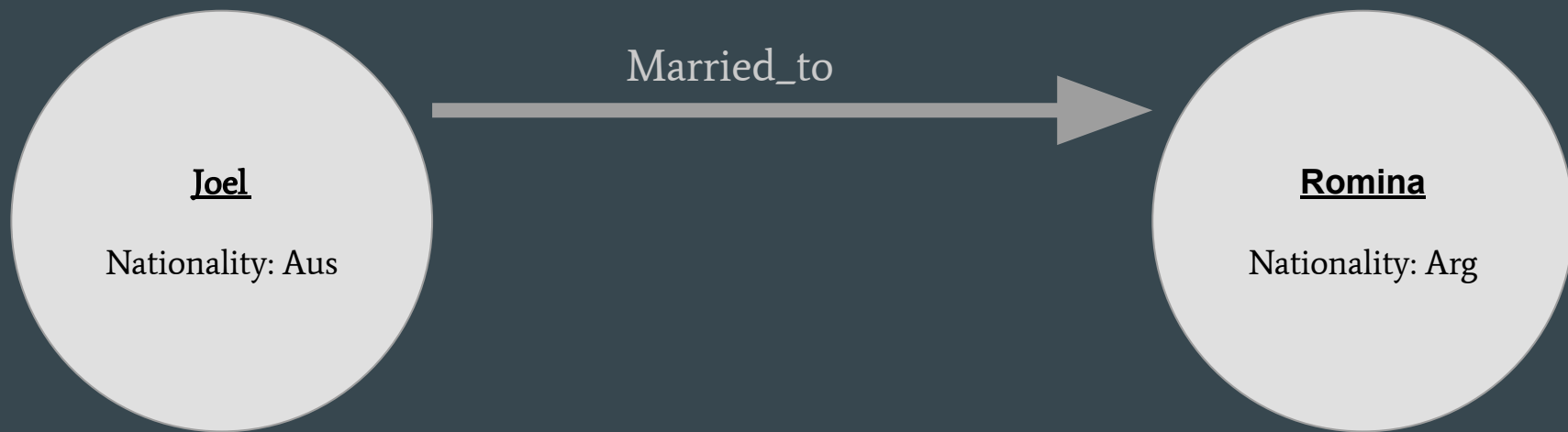
Joel

Nationality: Aus

Romina

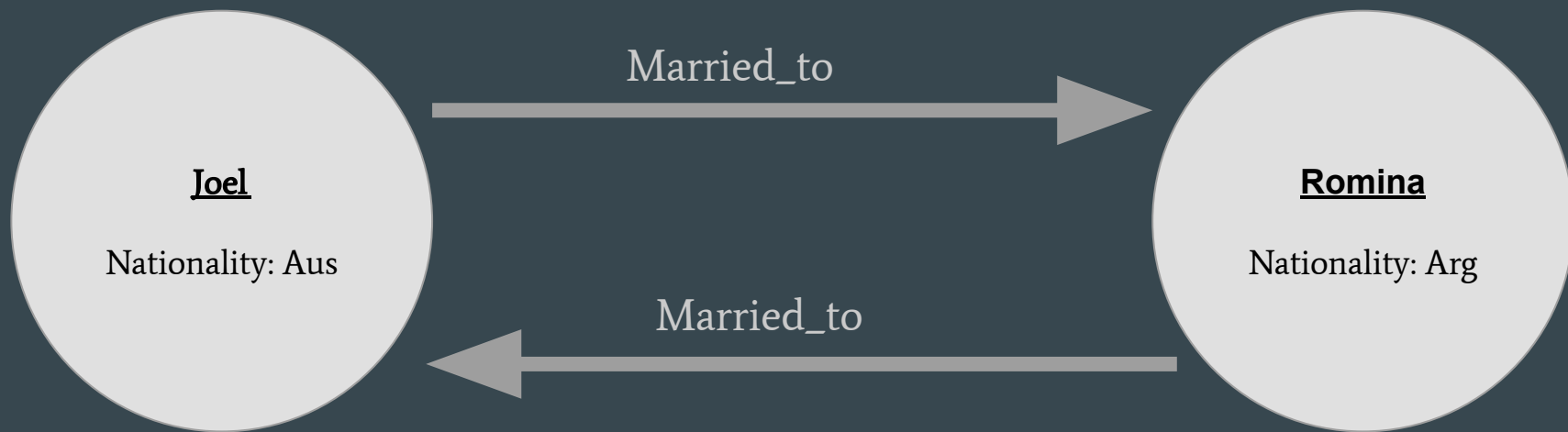
Nationality: Arg

# Anatomy of a Graph Model

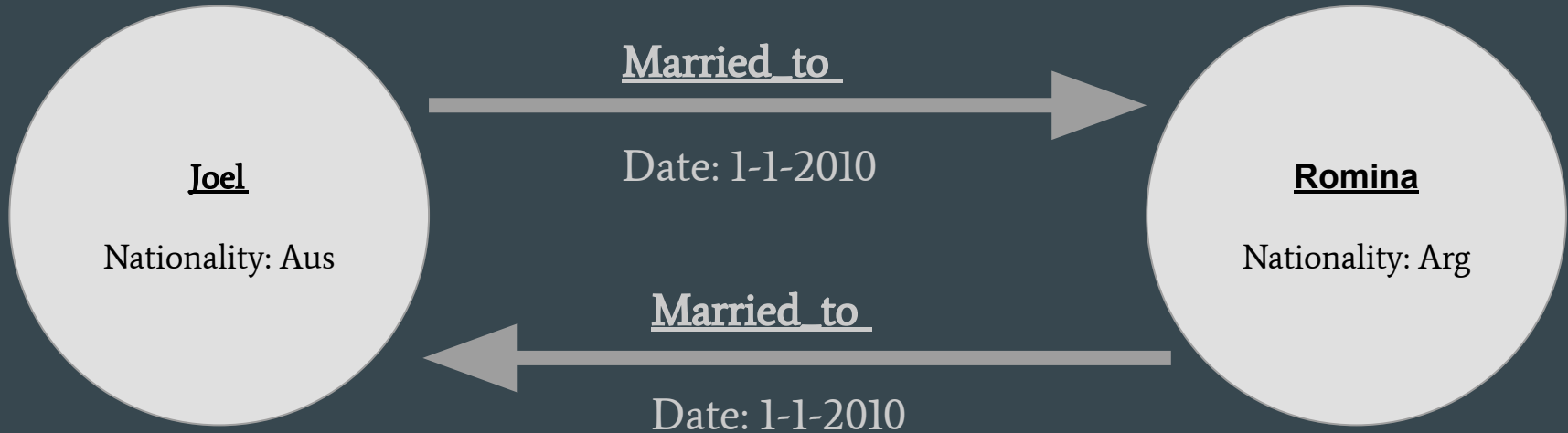




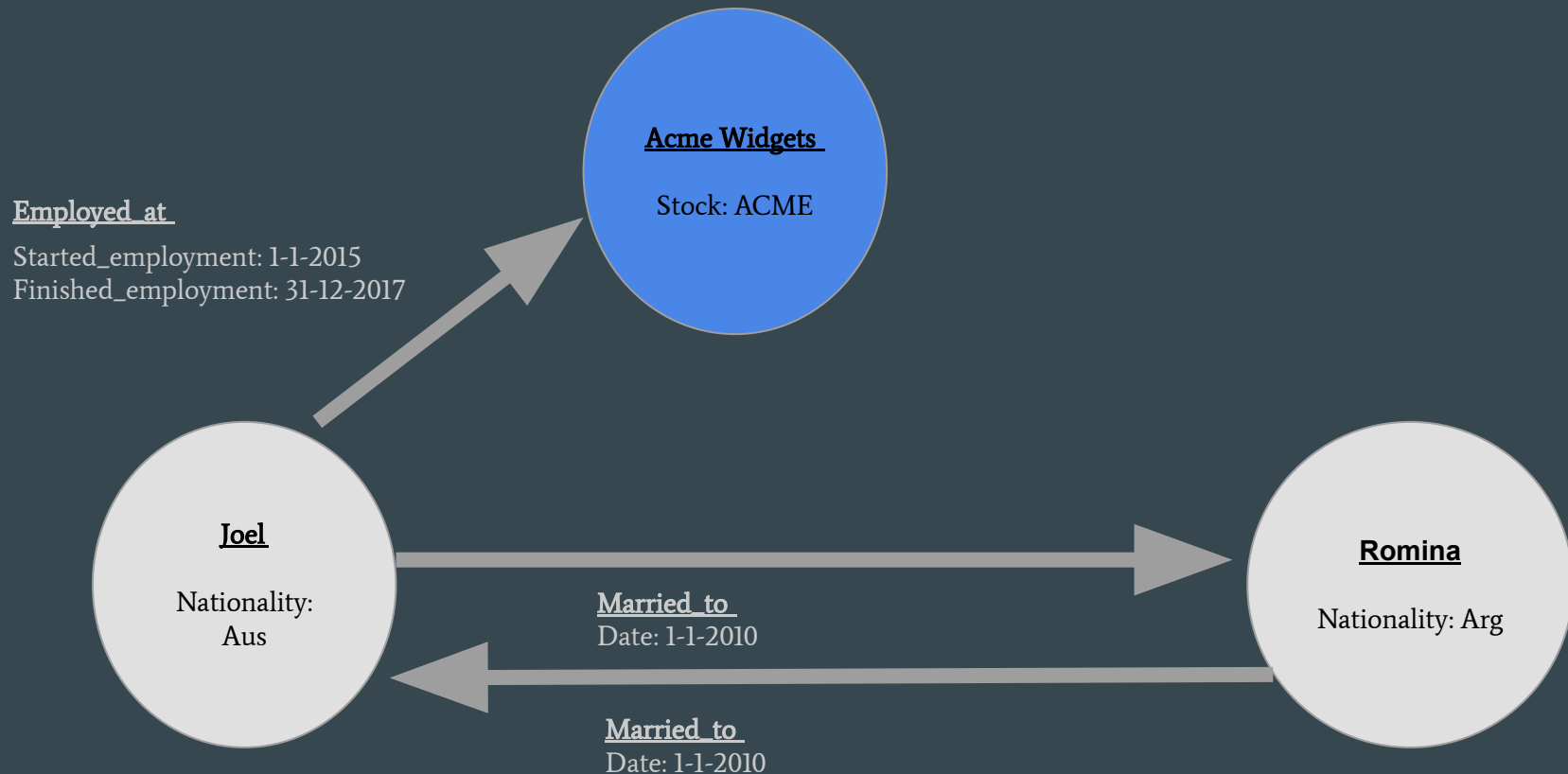
# Anatomy of a Graph Model



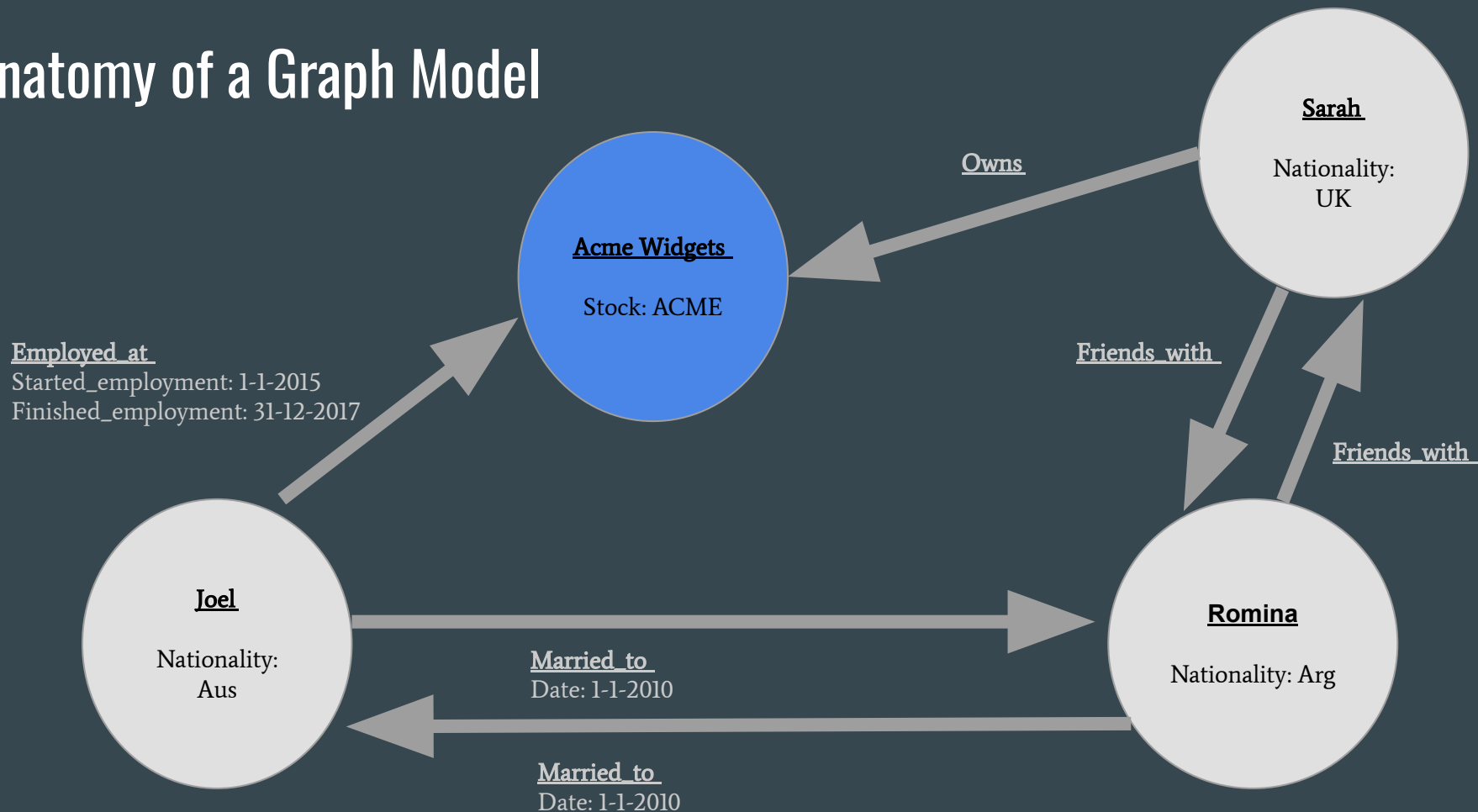
# Anatomy of a Graph Model

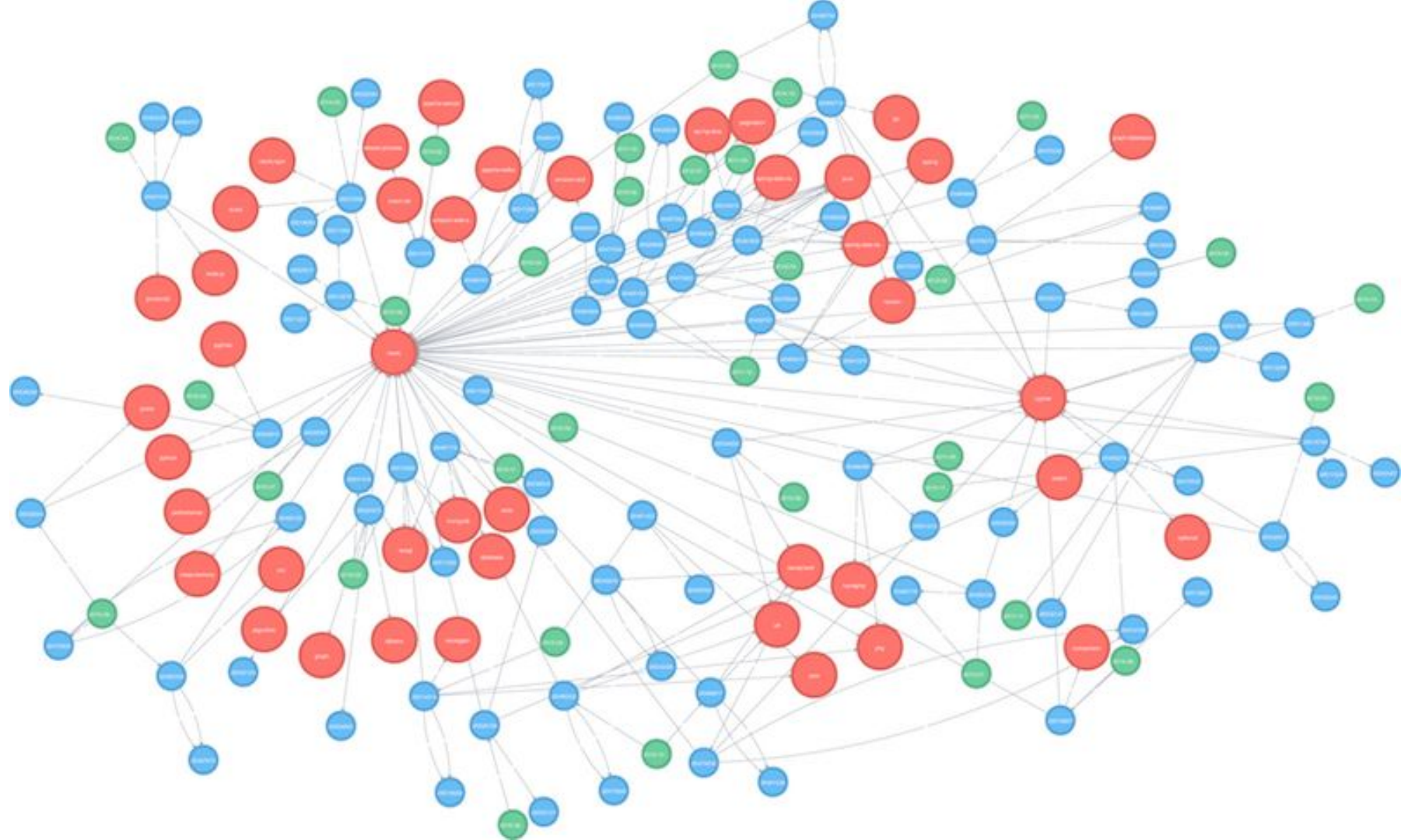


# Anatomy of a Graph Model



# Anatomy of a Graph Model





# Graph Theory

Leonhard Euler

b: 15 April 1707

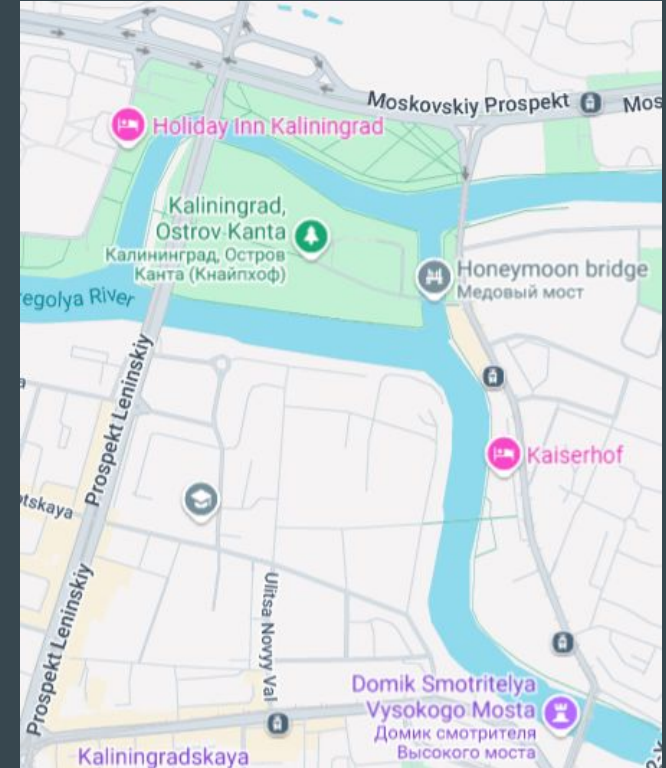
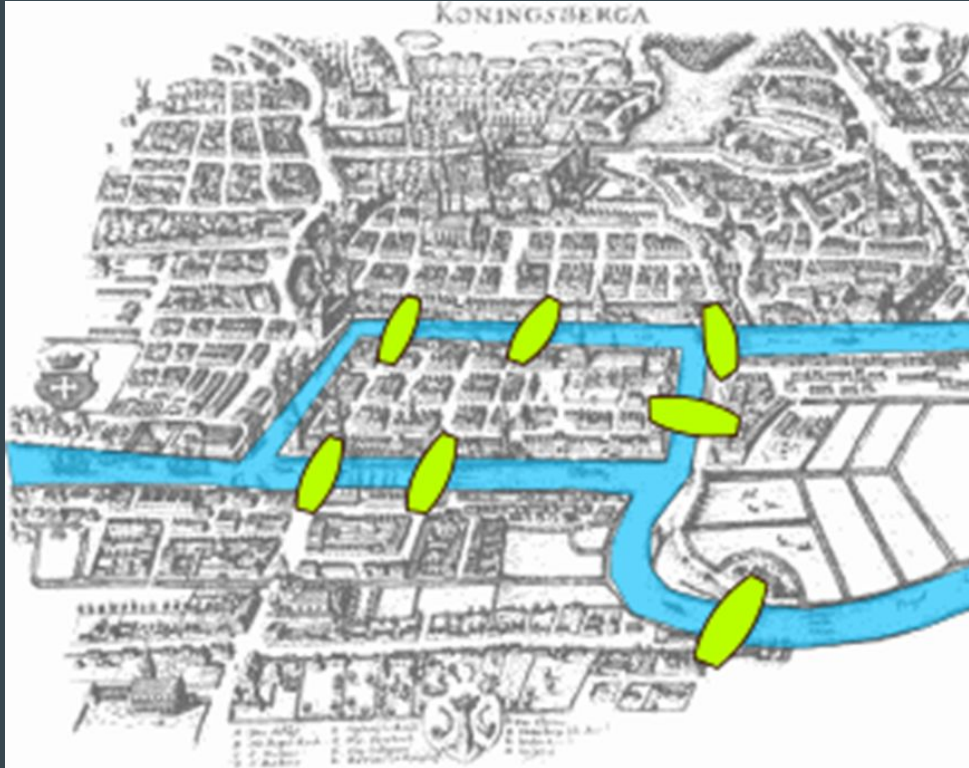
d: 18 September 1783

*Solutio problematis ad geometriam situs pertinentis*

(The solution of a problem relating to the geometry of position)

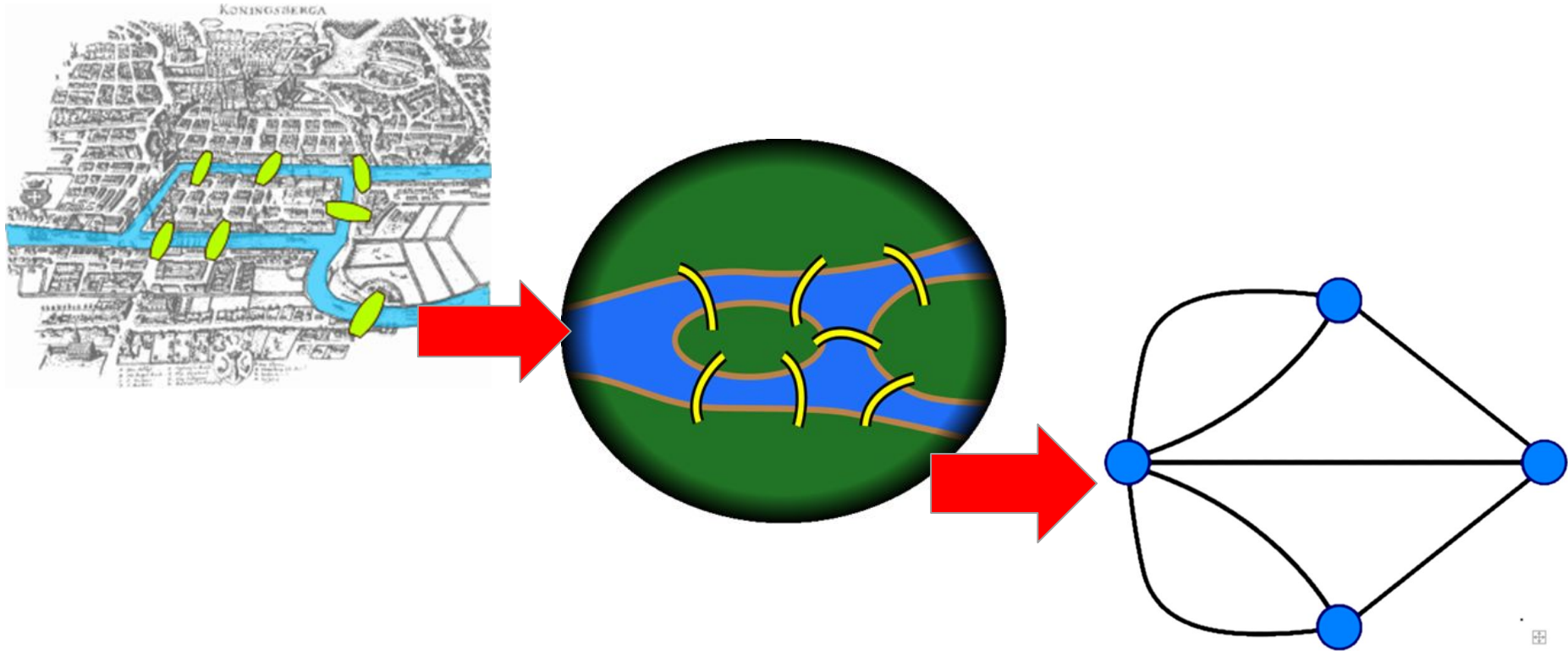


# Graph Theory



[https://en.wikipedia.org/wiki/Seven\\_Bridges\\_of\\_K%C3%B6nigsberg](https://en.wikipedia.org/wiki/Seven_Bridges_of_K%C3%B6nigsberg)

# Graph Theory





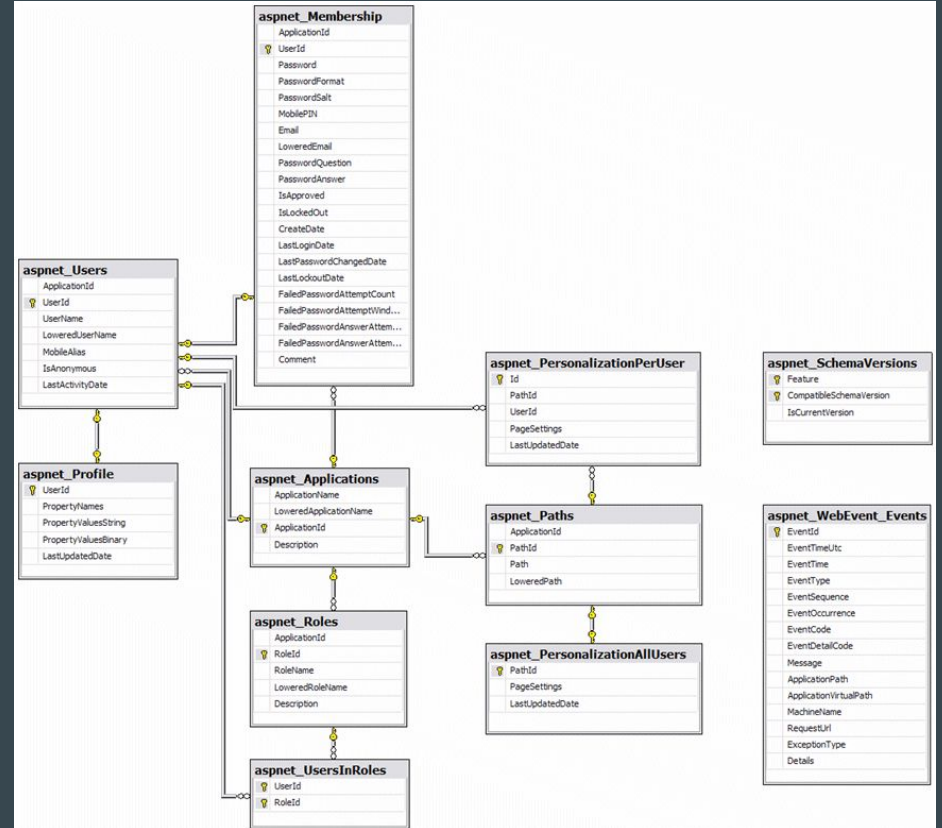
# Graph Databases Today

Yet Another DB Format?

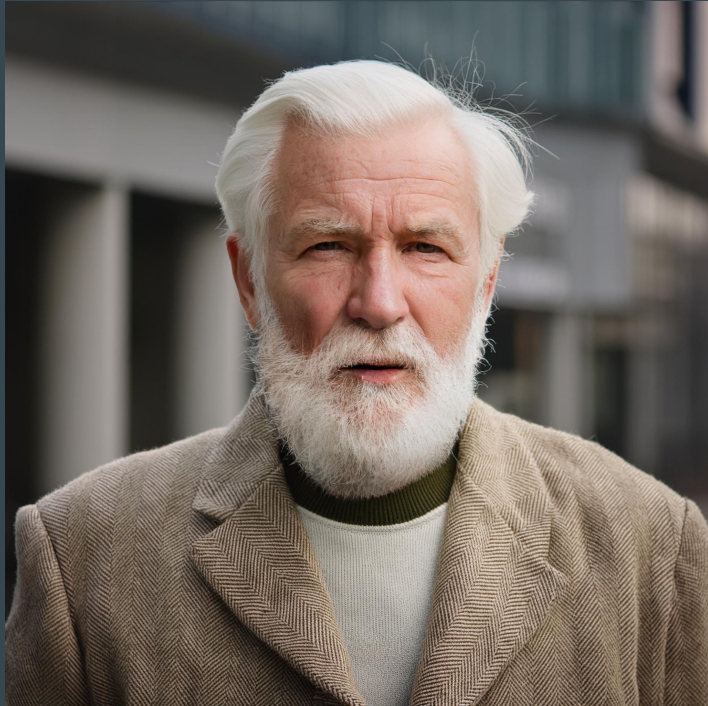
# Relational



ORACLE®



# Relational



- Structured
- Ordered
- Constrained & Fixed
- Efficient
- Integrity

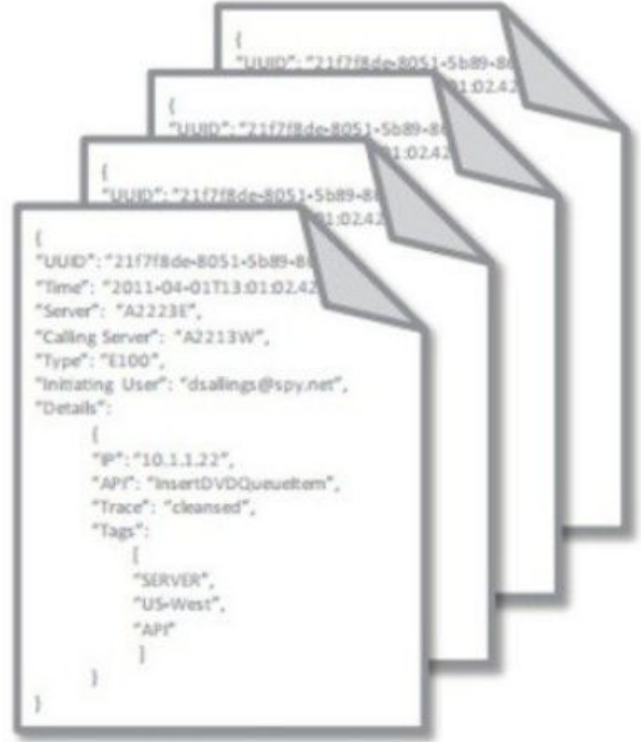
# NoSql



CouchDB



mongoDB



# NoSql



- Flexible
- Accepting
- Unconstrained
- Real-time

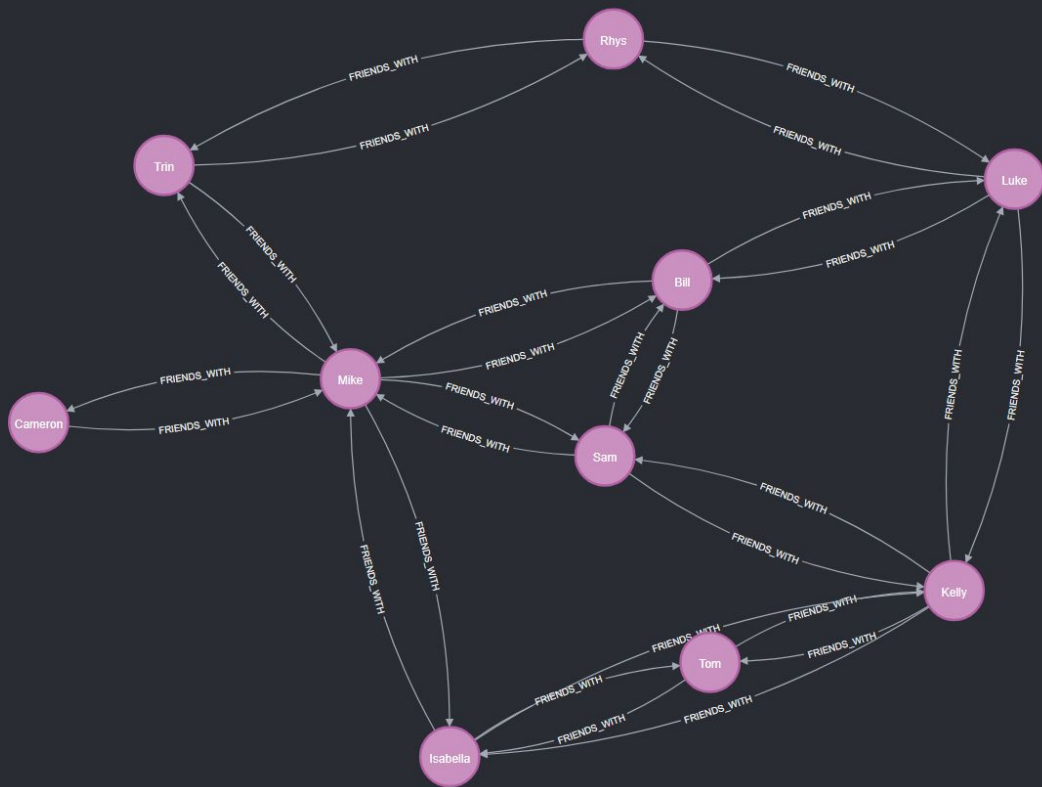
# Graph DB



Amazon  
Neptune



Apache TinkerPop



# Graph DB

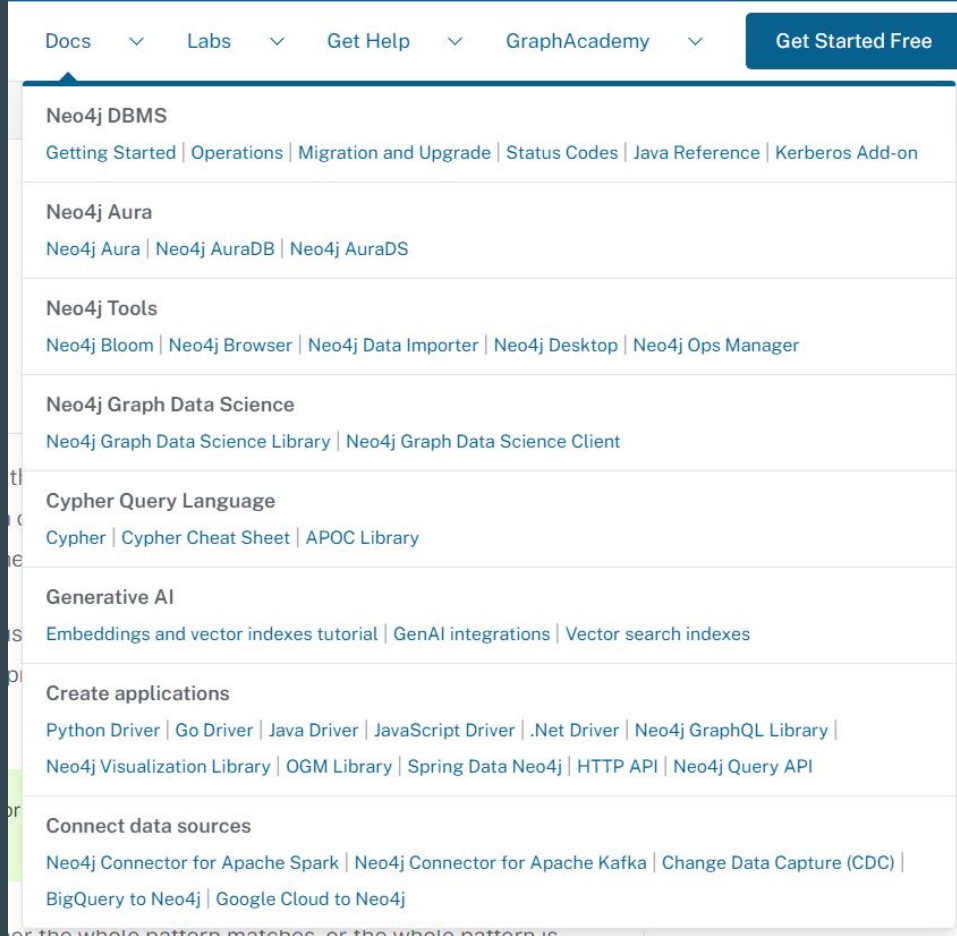


- Connections  
*(influencers, followers, likes)*
- Unconstrained
- Real-time

Demo







<https://neo4j.com/docs/>

# Why NOT Graph Databases?



# Why NOT Graph Databases?



- Your domain isn't super-connected
- Your model is highly transactional and doesn't rely on relationships
- Performance & Memory requirements can't be supported

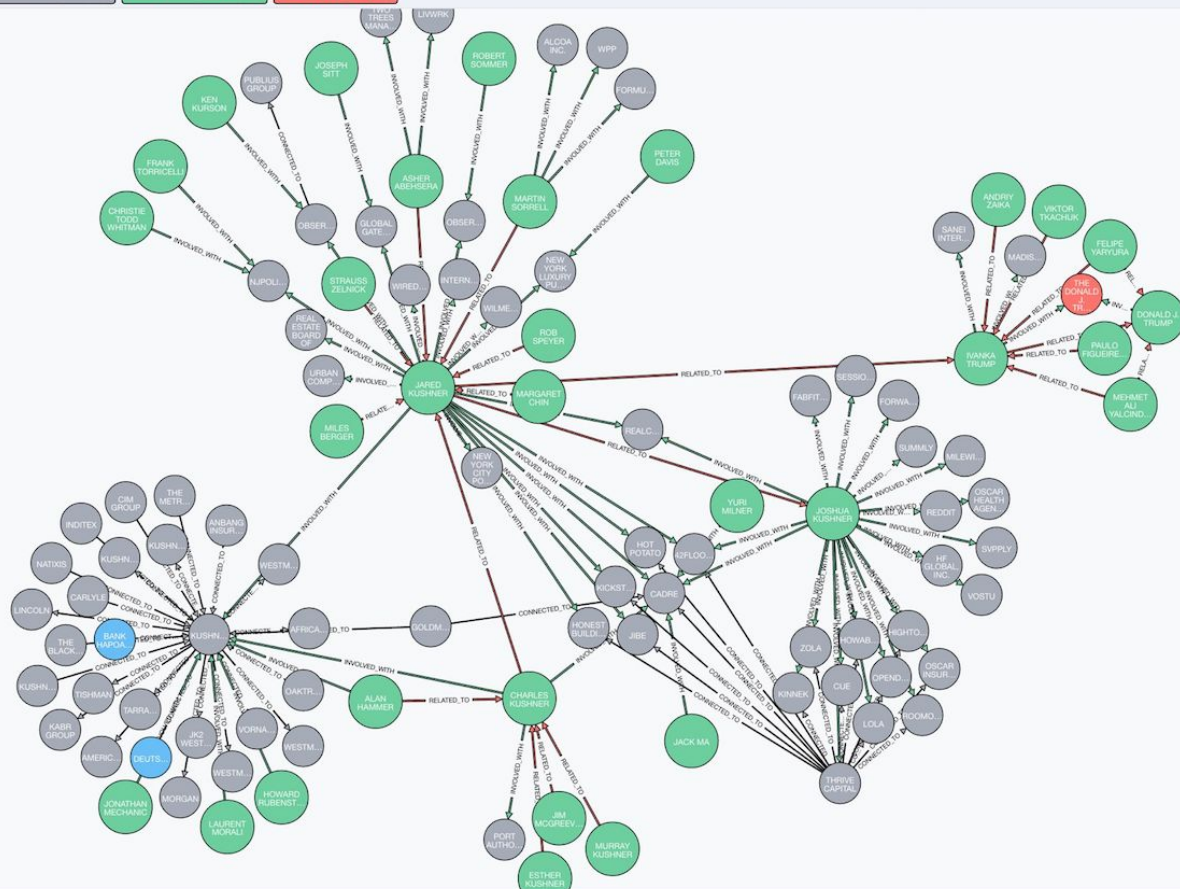
# Real-world Graphs - TrumpWorld



\$ MATCH network = (:Person {name:"JARED KUSHNER"})-[\*..2]-() RETURN network

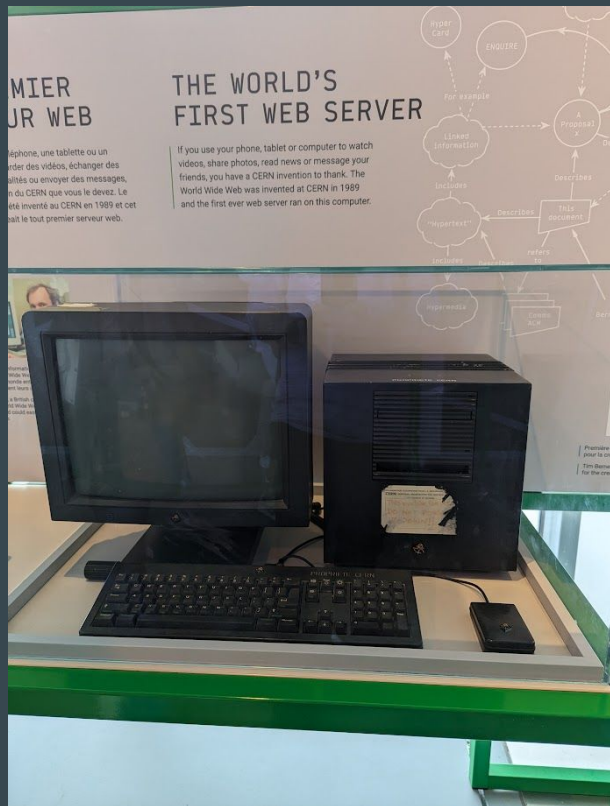
\*(106) Bank(2) Organization(75) Person(31) Trump(1)

\*(130) CONNECTED\_TO(43) INVOLVED\_WITH(66) RELATED\_TO(21)



Displaying 106 nodes, 130 relationships (completed with 12 additional relationships).

# Real-world Graphs - WWW

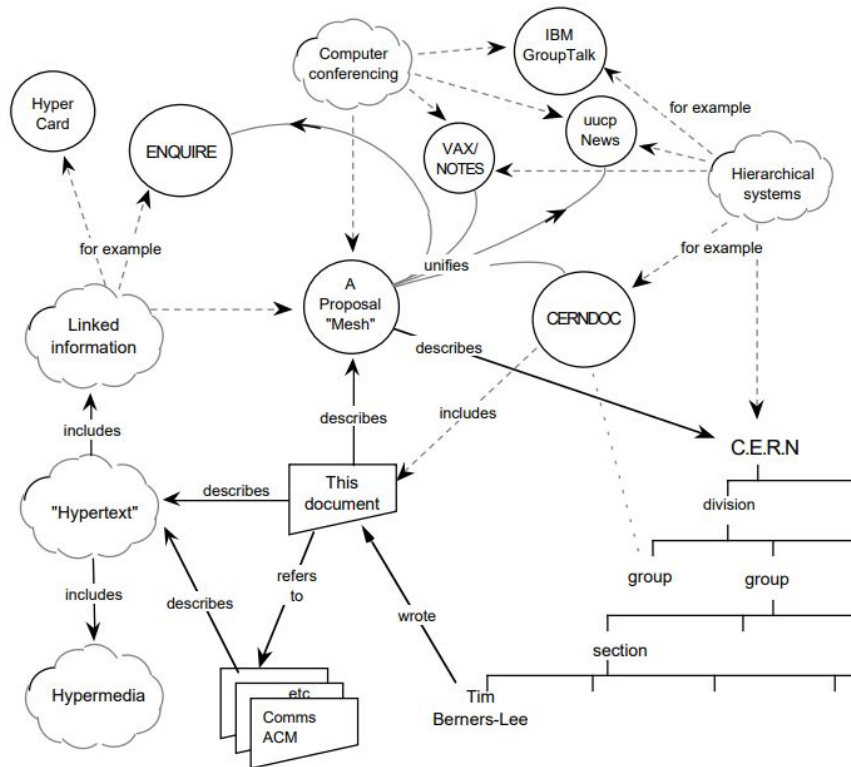


## Information Management: A Proposal

Tim Berners-Lee, CERN

March 1989, May 1990

*This proposal concerns the management of general information about accelerators and experiments at CERN. It discusses the problems of loss of information about complex evolving systems and derives a solution based on a distributed hypertext system.*




# Real-world Graphs - LinkedIn

Jobs in Worldwide

60 results

Set alert ☐


1 week ago




Software Engineer - Cloud Security

Neo4j

Malmö, Skåne County, Sweden (Hybrid)

 1 school alum works here

1 week ago




Senior Sales Engineer


Neo4j

Seattle, WA

\$190K/yr - \$260K/yr · 401(k) benefit

 1 school alum works here

Viewed · 9 applicants




Senior Sales Engineer


Neo4j

Los Angeles, CA (Remote)

\$190K/yr - \$260K/yr · 401(k), +5 benefits

 1 school alum works here

1 week ago · 19 applicants



Sr. Enterprise Account Executive (Brazil)

Neo4j

São Paulo, Brazil (Remote)

Senior Sales Engineer

Neo4j · Seattle, WA

Apply

Save

...

One of our central objectives is to provide an inclusive, diverse, and equitable workplace for everyone to develop their potential and have a positive, career-defining experience. We look forward to receiving your application.

### Neo4j Values

Neo4j is a Silicon Valley company with a Swedish soul. We foster collaboration and each of us is empowered to contribute and put our innovative stamp on projects. We hire candidates who reflect the following Neo4j core values:

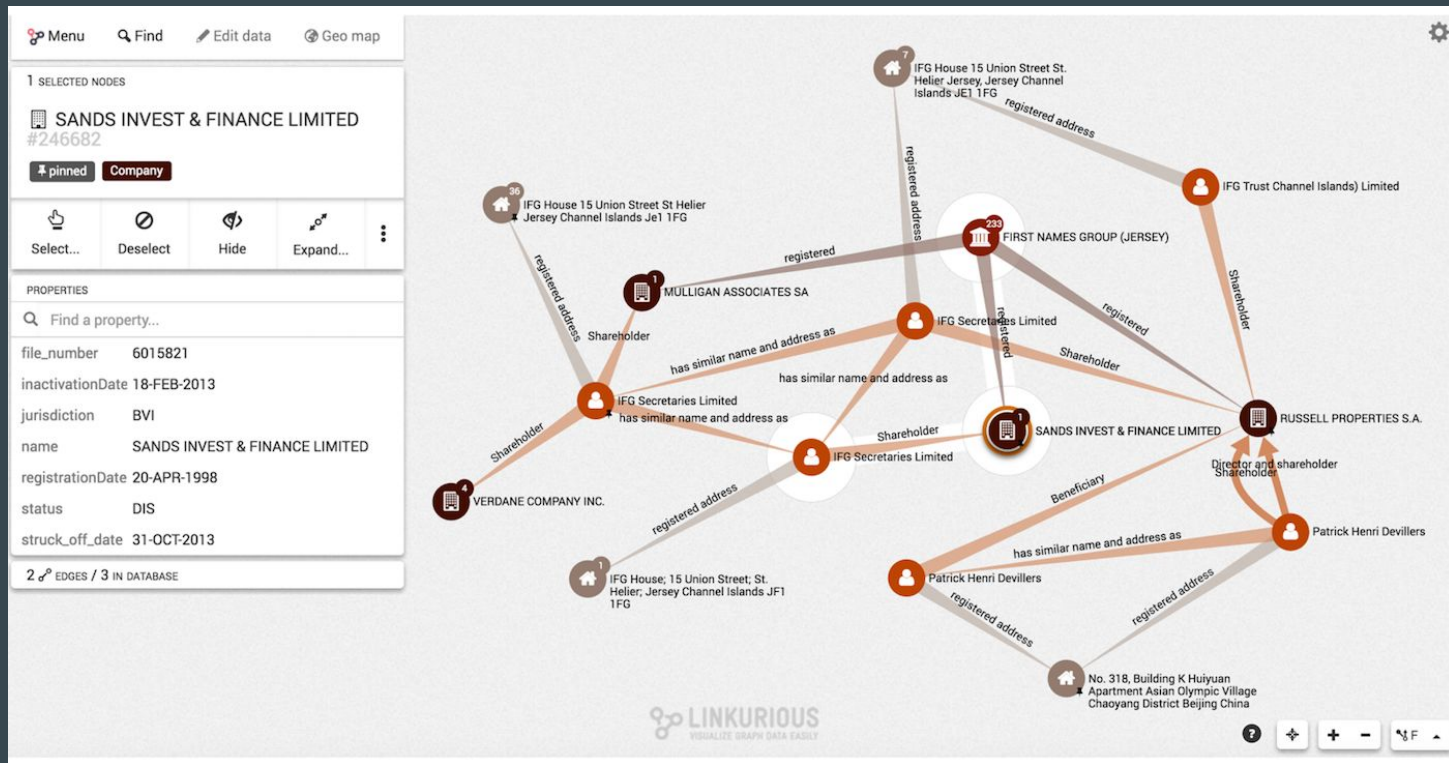
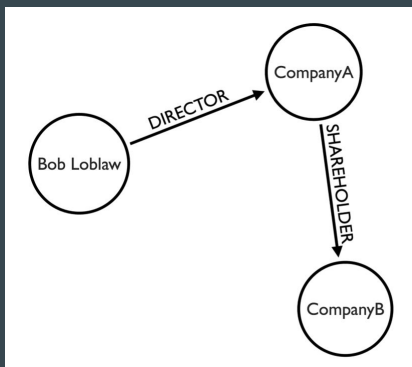
- (we)-[:VALUE]->(relationships)
- (we)-[:FOCUS\_ON]->(userSuccess)
- (we)-[:THRIVE\_IN]->(:Culture {type: ['Open', 'Inclusive']})
- (we)-[:ASSUME]->(:Intent {direction:'Positive'})
- (we)-[:WELCOME]->(:Discussions {nature: 'IntellectuallyHonest'})
- (we)-[:DELIVER\_ON]->(ourCommitments)

Neo4j is committed to protecting and respecting your privacy. Please read the [privacy notice regarding Neo4j's recruitment process](#) to understand how we will handle the personal data that you provide.

More information at [www.neo4j.com](http://www.neo4j.com).

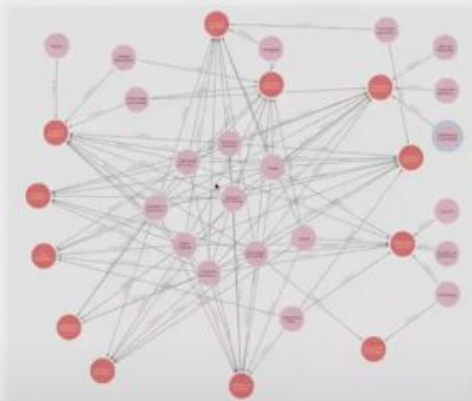


# Real-world Graphs - The Panama Papers



# Real-world Graphs - NASA

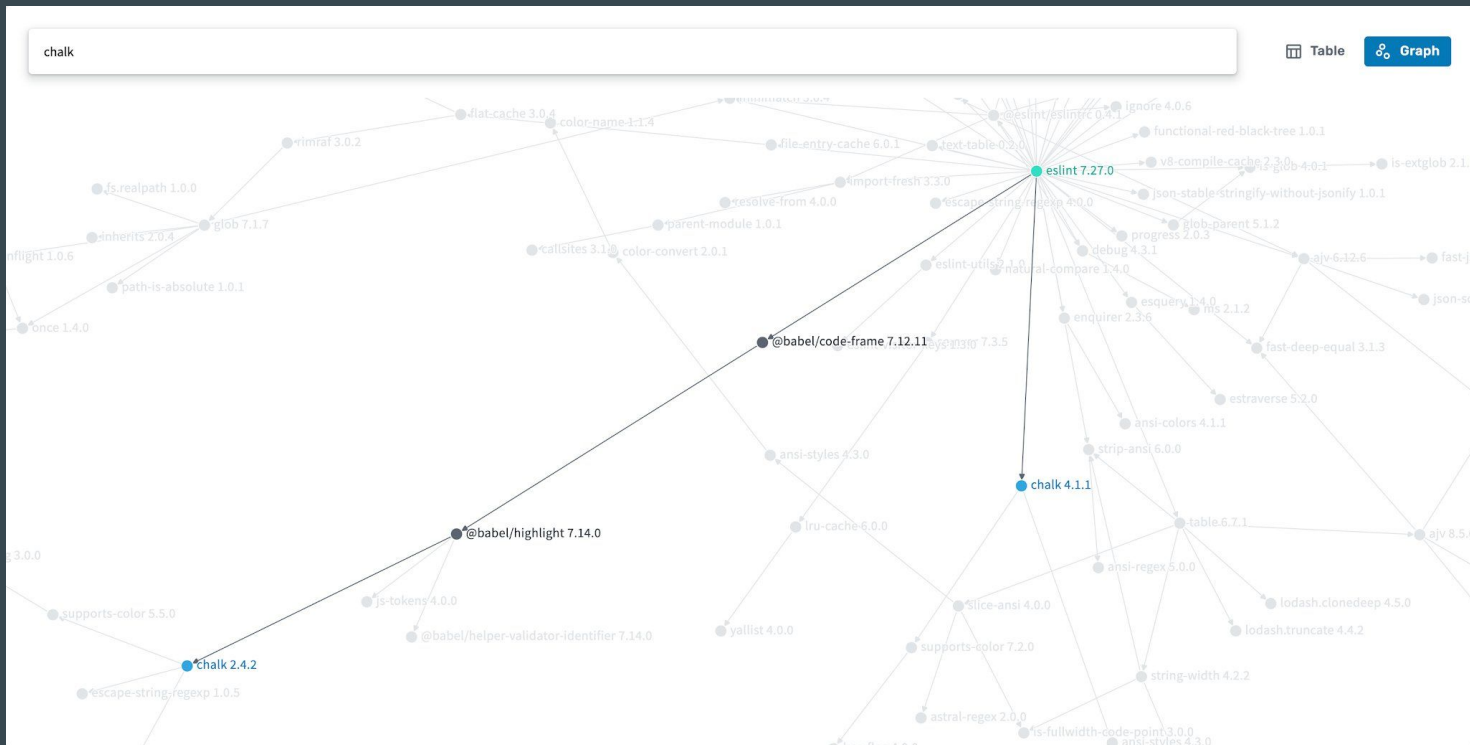
## Career Change



Occupation1	Occupation2	similarity
Management Analysts	Information Technology Project Managers	72.22%
Management Analysts	Document Management Specialists	68.75%
Management Analysts	Sustainability Specialists	68.42%
Management Analysts	Online Merchants	62.50%
Management Analysts	Business Continuity Planners	61.11%
Management Analysts	Health Informatics Specialists	60.00%
Management Analysts	Database Administrators	52.94%
Management Analysts	Information Security Analysts	47.06%
Management Analysts	Web Administrators	47.06%
Management Analysts	Computer Network Support Specialists	44.44%



# Real-world Graphs - Code Dependencies



<https://opensource.googleblog.com/2021/06/introducing-open-source-insights-project.html>

# Family Trees



# Further Reading



<https://graphdatabases.com/>

<https://neo4j.com/docs/cypher-cheat-sheet/current/>

<https://graphacademy.neo4j.com>

<https://medium.com/neo4j/tagged/data-visualization>

# Questions...



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[github.com/JoelGallagher/GraphDB\\_Public](https://github.com/JoelGallagher/GraphDB_Public)