

Expertise Finder

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Back-end



Neo4j Instance: Options

- Neo4j Server
- Neo4j Docker
- Community Edition
- Enterprise Edition

Neo4j Instance: Options

- Neo4j Server
- **Neo4j Docker**
- Community Edition
- **Enterprise Edition**

Neo4j Docker

- Easy installation
- Isolated dependencies
- Distributed easily across different servers/OS
- Additional Neo4j documentation

Neo4j Docker

- *docker-compose pull*
- *docker-compose up neo4j*

```
version: "3.8"

services:
  # Actual Neo4j DB container
  neo4j:
    image: neo4j:latest
    pull_policy: if_not_present
    restart: always
    container_name: neo4j
    ports:
      - 7474:7474
      - 7687:7687
    environment:
      - NEO4J_AUTH=${USER_AUTH}/${PASS_AUTH}
    volumes:
      - ./conf:/conf
      - ./data:/data
      - ./logs:/logs

# Pull images: docker-compose pull

# Start up: docker-compose up neo4j (neo4j-admin) (-d)
# optional: (-d) detach
```

Neo4j Enterprise Edition

- Role-based authentication/authorization
- Scale-up/Clustering
- Multiple Databases
- Unknown cost
 - Educational purposes?
 - Contact neo4j again

Neo4j Enterprise Edition

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Neo4j Enterprise Edition

Community	Enterprise
Download	Contact Sales
<h2>Server Architecture</h2> <ul style="list-style-type: none">✓ Native Graph Processing & Storage✓ ACID Transactions✓ Auto Reuse of Deleted Space✓ Property Graph Model✓ High Performance Caching✓ Cypher Graph Query Language <h2>Indexing</h2> <ul style="list-style-type: none">✓ Full Text Indexing and Search✓ Native Index Population <h2>Client, Drivers and Connectivity</h2> <ul style="list-style-type: none">✓ Neo4j Desktop and Browser✓ Bolt Binary Protocol✓ Language Drivers✓ Reactive Drivers✓ High Throughput Load Balancing✓ Spring Boot Starter <h2>Graph Data Science (GDS)</h2> <ul style="list-style-type: none">✓ Algorithms and Embeddings	<h2>High Availability & Operations</h2> <ul style="list-style-type: none">✓ Causal Clustering✓ Hot Backups✓ Multi-Database✓ Consistent 24x7 performance with Auto Cache Reheating✓ Advanced Monitoring✓ Enterprise Diagnostics✓ Production Certified <h2>Security</h2> <ul style="list-style-type: none">✓ Role-Based Security✓ LDAP/Active Directory Integration✓ Schema-Based Security✓ Intra-Cluster Encryption✓ Security Event Logging✓ Brute Force Protection <h2>Client, Drivers and Connectivity</h2> <ul style="list-style-type: none">✓ Neo4j Desktop, Browser, and Bloom✓ Bolt Binary Protocol✓ Language Drivers

Neo4j Enterprise Edition

- ✓ Algorithms and Embeddings
- ✓ Pregel API
- ✓ Parallelization
- ✓ Model Catalog

- ✓ Reactive Drivers
- ✓ High Throughput Load Balancing
- ✓ Spring Boot Starter

Scalability & Performance

- ✓ Sharding & Federation with Fabric
- ✓ Graphs of Unlimited Size
- ✓ Faster Cypher

Fabric

- ✓ Multi-Graph Database
- ✓ Federated Data
- ✓ Data Sharding

Graph Data Science (GDS)*

- ✓ Algorithms and Embeddings
- ✓ Pregel API
- ✓ Unlimited Parallelization
- ✓ Fine Grained Security
- ✓ Unlimited Model Catalog
- ✓ Model Persistence & Publication
- ✓ Low Memory Analytics Graph Format

Neo4j Version

- Newest version
 - Most secure
 - Docker image *:latest*
- ~Monthly release

Web and Logic Backend: Options

- NginX/Apache
- Web Application framework of choice

Web and Logic Backend

- Conceal DB password & username
- Optional additional logic

Hosting Hardware



Hosting Hardware: Options

- Cloud: AWS, Google Cloud, Azure, ...
- Neo4j Hosting: AuraDB
- KULeuven:
 - Hosting services
 - IT-governance: current Expertise Finder

Hosting Hardware: Options

- Cloud: AWS, Google Cloud, Azure, ...
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 - **Hosting services**
 - IT-governance: current Expertise Finder

Hosting Hardware: Cloud

- AWS, Google Cloud, Azure, ...
 - Potential unexpected costs
 - Familiar with specific cloud system

Hosting Hardware: Neo4j AuraDB

- Free option
 - 200k nodes
 - 400k relationships
 - Bloom and Neo4j browser
- No possibility to host webserver

Hosting Hardware: Neo4j AuraDB

AuraDB Free

Free

For small development projects, learning, experimentation, and prototyping.

[Get Started Free](#)

Feature Highlights:

- ✓ Forever free! One fully managed graph database
- ✓ No credit card or other payment method required
- ✓ Up to 200k nodes and 400k relationships
- ✓ More sample datasets to explore
- ✓ Bloom data discovery and visualization included
- ✓ Access to the largest online graph community

AuraDB Professional

Starting at

\$65/month*

For medium-scale applications in advanced development or production environments.

[Sign Up](#)

[View Pricing Table](#)

Everything in Free, plus:

- ✓ Up to 64 GB memory per database instance
- ✓ Unlimited database instances
- ✓ Daily backups, 7-day retention
- ✓ On-demand snapshots
- ✓ Credit card payment or Cloud marketplace billing integration
- ✓ Support for analytical queries with Parallel Runtime

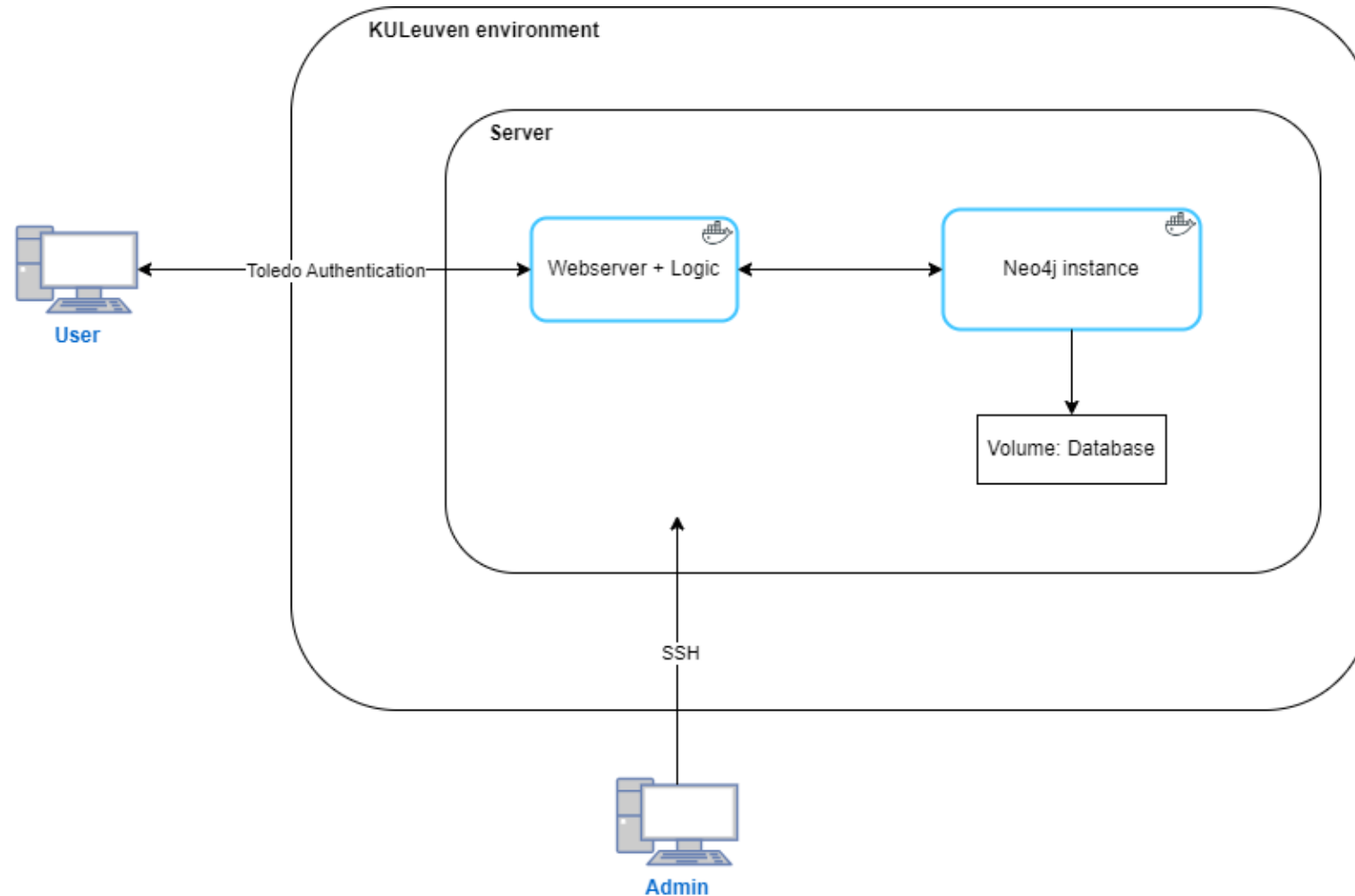
Hosting Hardware: KULeuven

- IT-Governance for official hosting
 - Toledo authentication
 - Current Expertise Finder
 - Documents & requests...

Hosting Hardware: KULeuven

- Hosting as a service
 - Container as a Service (CaaS)
 - 2Ghz GPU / 2GB RAM
 - 4GB Storage + extensions
 - Cheap: €66,56/year

Architecture



Graphical Interface



Admin Management

- **Neo4j Browser**
 - Available in every edition

Admin Management

The screenshot displays the Neo4j Admin console interface. On the left, the 'Database Information' sidebar shows the 'recommendations' database selected. It lists node labels (Genre, Movie, Person, User) and relationship types (DIRECTED, IN_GENRE, RATED). The main panel shows a Cypher query: `recommendations$ MATCH p()-[:ACTED_IN]->() RETURN p LIMIT 25;`. Below the query, a graph visualization shows a network of nodes and relationships. On the right, an 'Overview' panel shows node labels and relationship types. The bottom section features a 'neo4j' logo and three cards: 'Getting started with Neo4j Browser', 'Try Neo4j with live data', and 'Cypher basics'. A 'server connect' command is entered in the bottom terminal, and a message confirms the connection to the 'neo4j' user.

Database Information

Use database: recommendations

Node labels: Genre (28,863), Movie (24), Person (24), User (18), Director (2)

Relationship types: DIRECTED, IN_GENRE, RATED

Property keys: bio, born, bornIs, budget, countries, died, embedding, imdbId, imdbRating, imdbVotes, languages, movieId, name, plot, poster, rating, released, revenue, role, runtime, tagline, timestamp, title, imdbId, url, userId, year

Connected as: neo4j

DBMS: Cluster role: primary, Version: 5.20.0, Edition: Community, Name: recommendations, Databases: db, Information: sysinfo, Query List: queries

recommendations\$

recommendations\$ MATCH p()-[:ACTED_IN]->() RETURN p LIMIT 25;

Overview

Node labels: Genre (28,863), Movie (24), Person (24), User (18), Director (2)

Relationship types: DIRECTED, IN_GENRE, RATED

Displaying 32 nodes, 25 relationships.

neo4j

Getting started with Neo4j Browser

Neo4j Browser user interface guide

Try Neo4j with live data

A complete example graph that demonstrates common query patterns.

Actors & movies in cross-referenced pop culture.

Cypher basics

Intro to Graphs with Cypher

What is a graph database?

How can I query a graph?

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Sign up for a free Neo4j cloud instance with neo4j cloud.

server connect

Connected to Neo4j

Nice to meet you.

You are connected as user neo4j to neo4j://localhost:7687

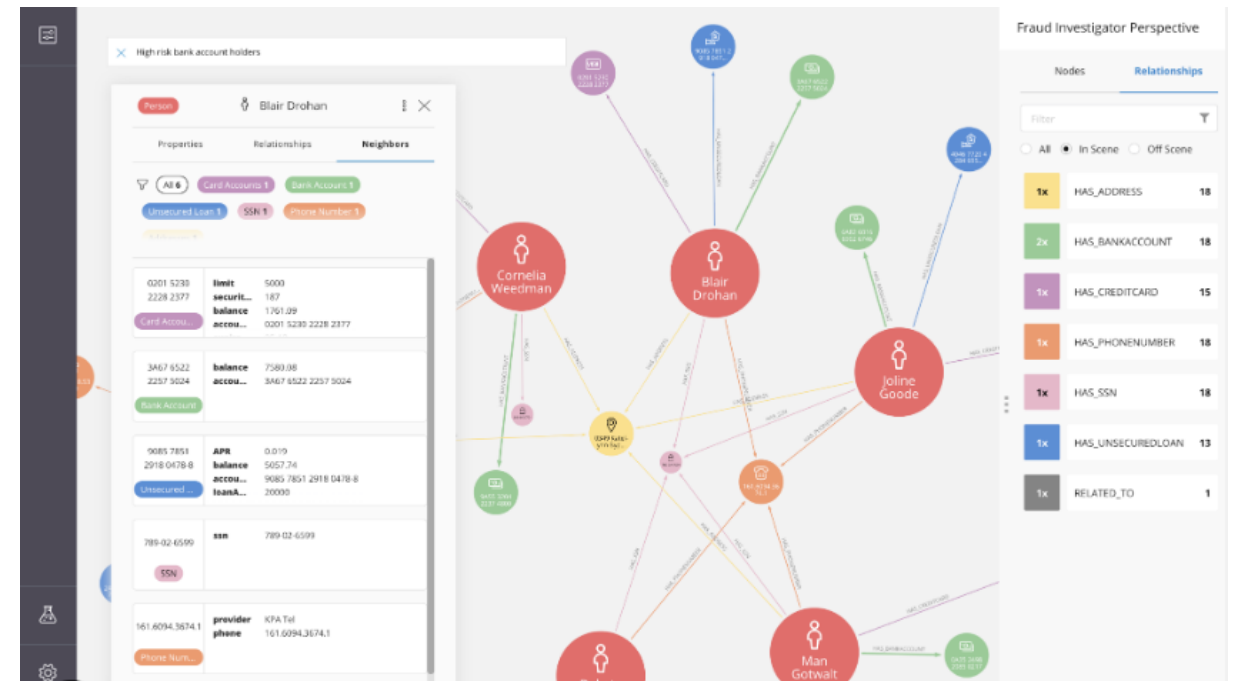
Connection credentials are stored in your web browser.

Node Graph

- Neo4j Bloom
- Neovis.js
- D3
- Neo4jD3

Node Graph

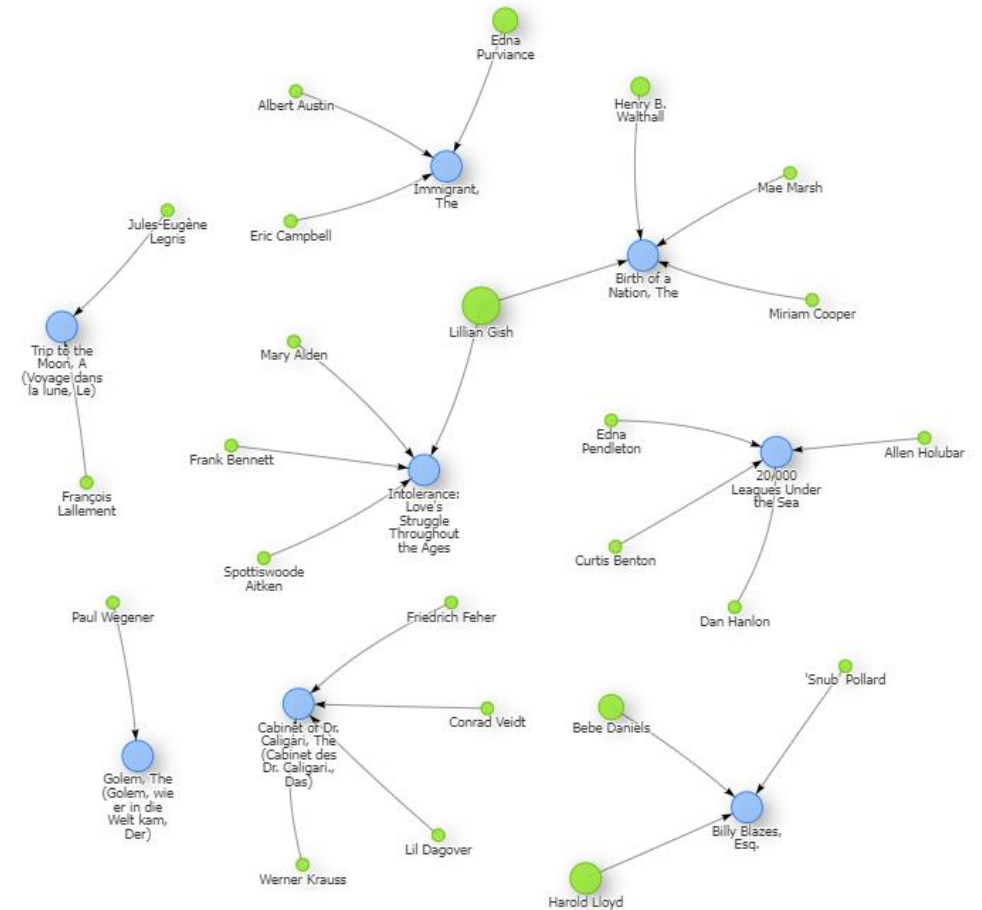
- **Neo4j Bloom**
 - Included in Enterprise edition
 - Out-of-the-box
 - No flexibility



Node Graph

- **Neovis.js**

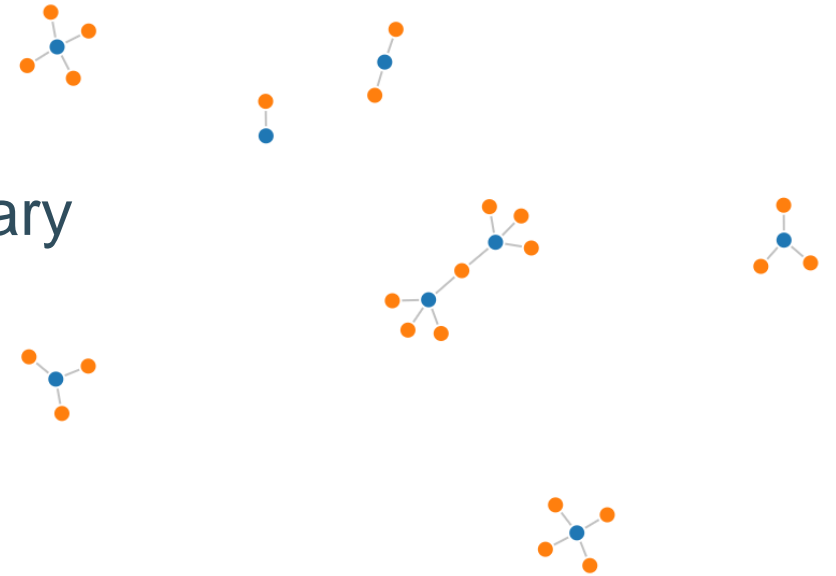
- Based on vis.js
- Useful graph functions:
 - *Weight*
 - *InitialQuery*



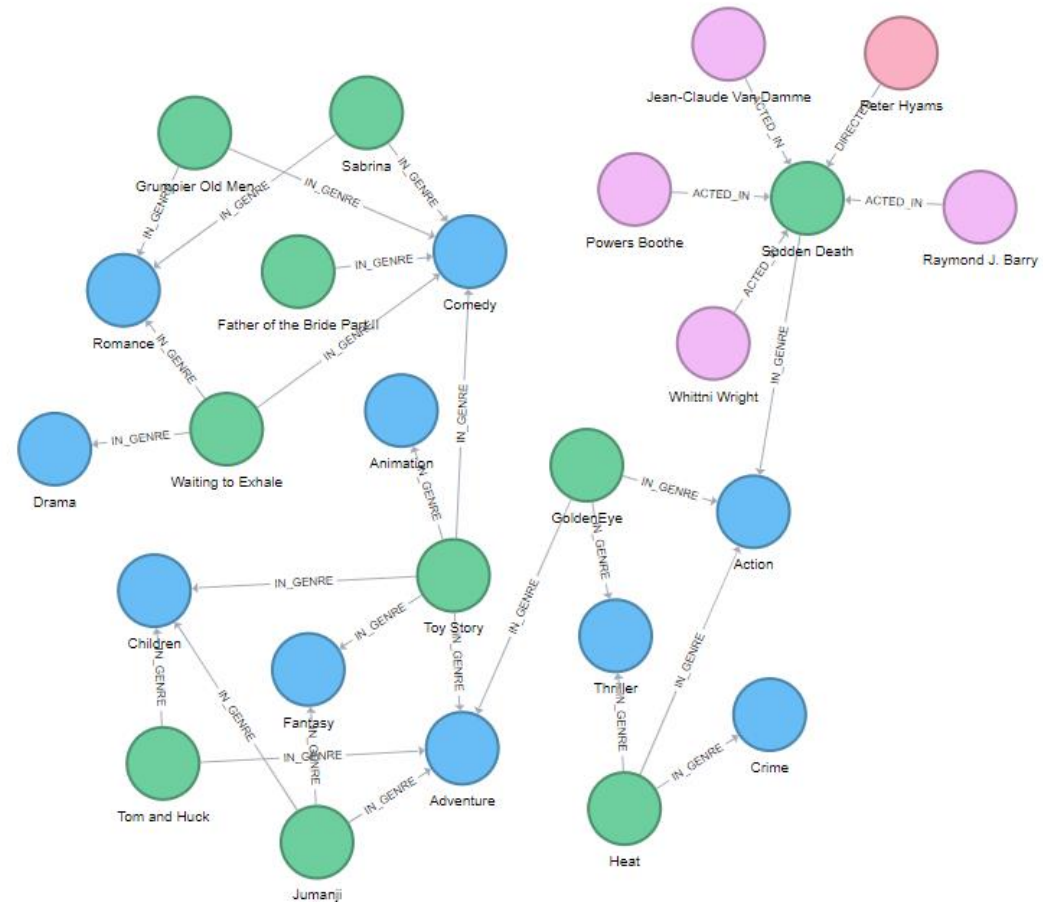
Node Graph

- **D3**

- Most popular JavaScript data visualization library
- Low level / difficult



Node Graph

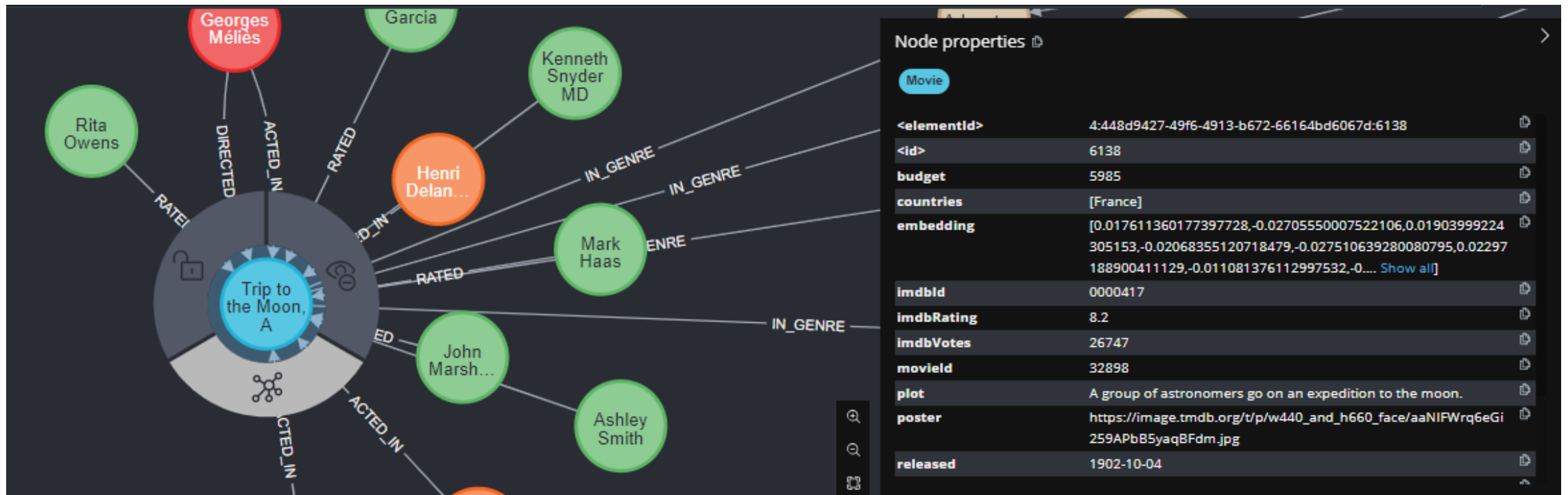


- **Neo4jD3**

- Based on D3
- Slightly out-of-date
- Solid foundation with extending possibilities using D3

User Interface

- Based on Neo4j Browser/Bloom



User Interface

- **No Cypher**
 - Add new Node of Type x
 - Controlled expansion: expand with limit and/or keyword
- **Keep graphs composed**
 - Open new browser tab when node limit reached

User Interface



