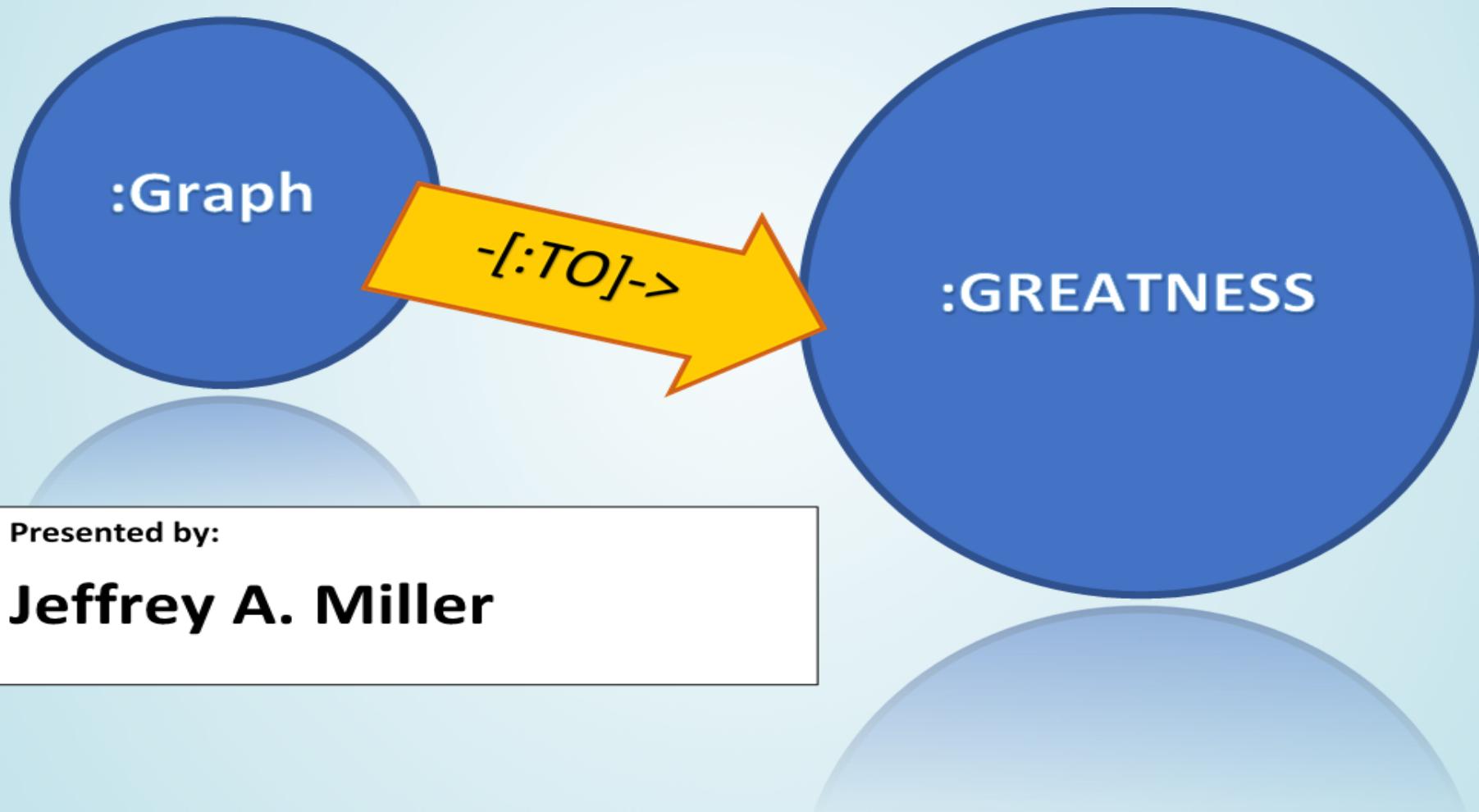
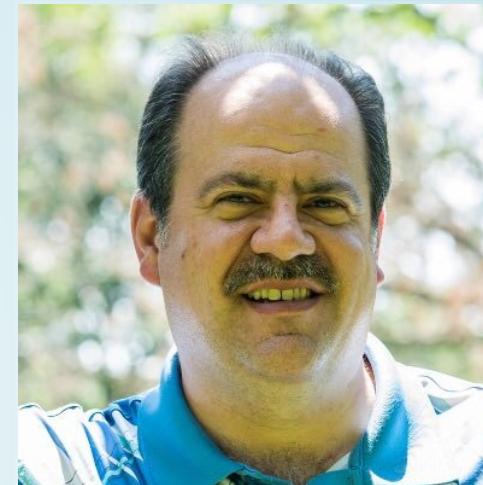


GRAPH TO GREATNESS



ABOUT ME

JEFFREY A. MILLER
SENIOR CONSULTANT, ICC
NEO4J CERTIFIED PROFESSIONAL



SKEETERS

SUPPORTING ADOPTION

SKEETERBOOKS.COM



AGENDA

- Intro to graphs
- Common use cases
- Cypher query language

- Examples
- Tool demos
- Resources

WHAT'S NOT COVERED:

- Deep NoSQL feature comparison
- Advanced Neo4j application programming

WHAT IS A GRAPH?

A graph is a data structure or model that depicts the connections between nodes.

WIKIPEDIA DEFINITION

"mathematical structures used to model pairwise relations between objects"

-Graph theory on Wikipedia

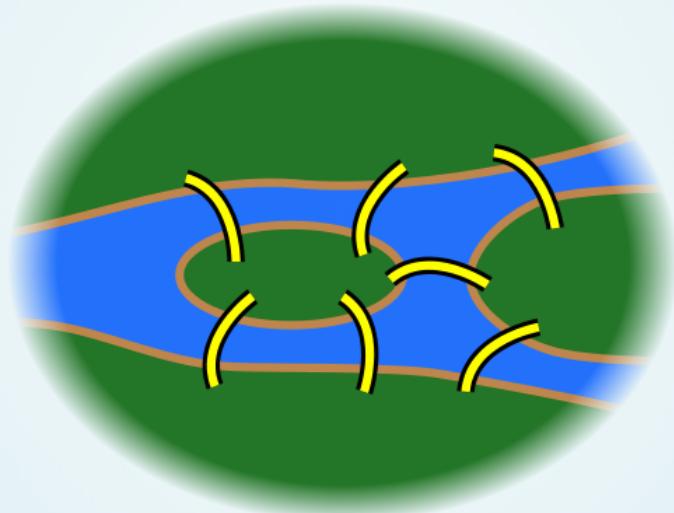
WHAT IS NOT A GRAPH?



NOT Charts NOT Graphics

"SEVEN BRIDGES"

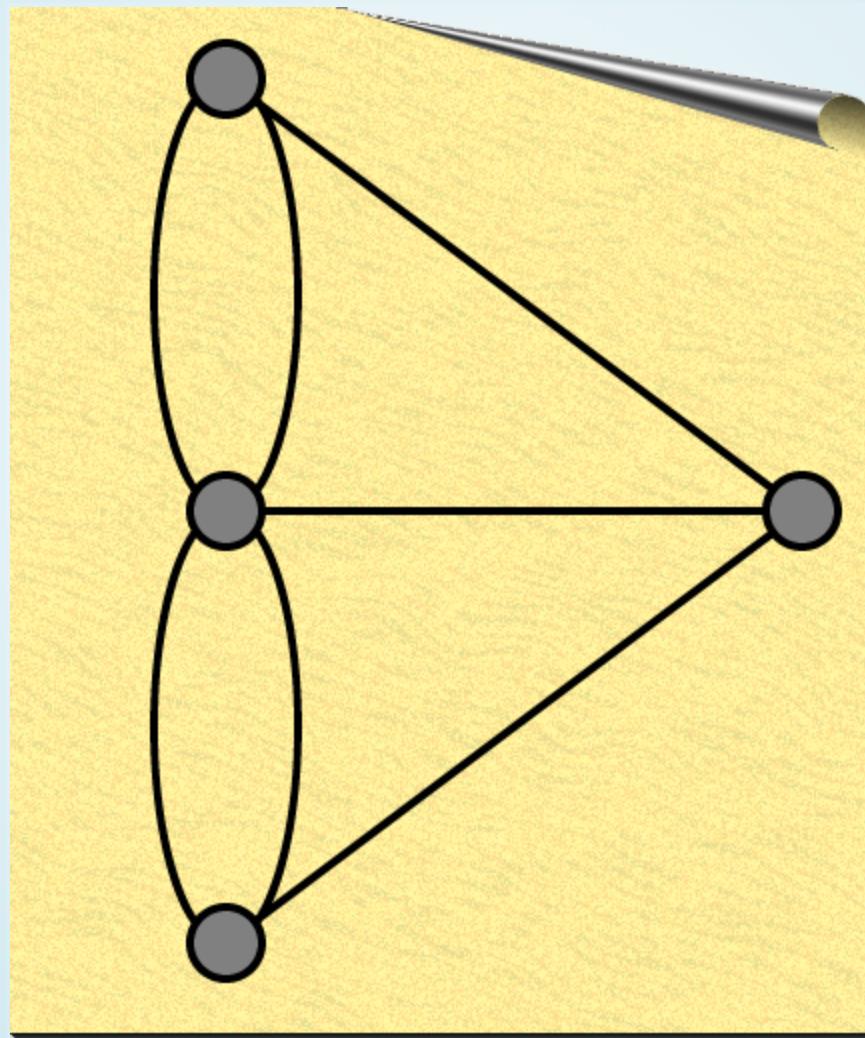
LEONHARD EULER IN 1730S



(A:MAP)-[:BECAME]->...

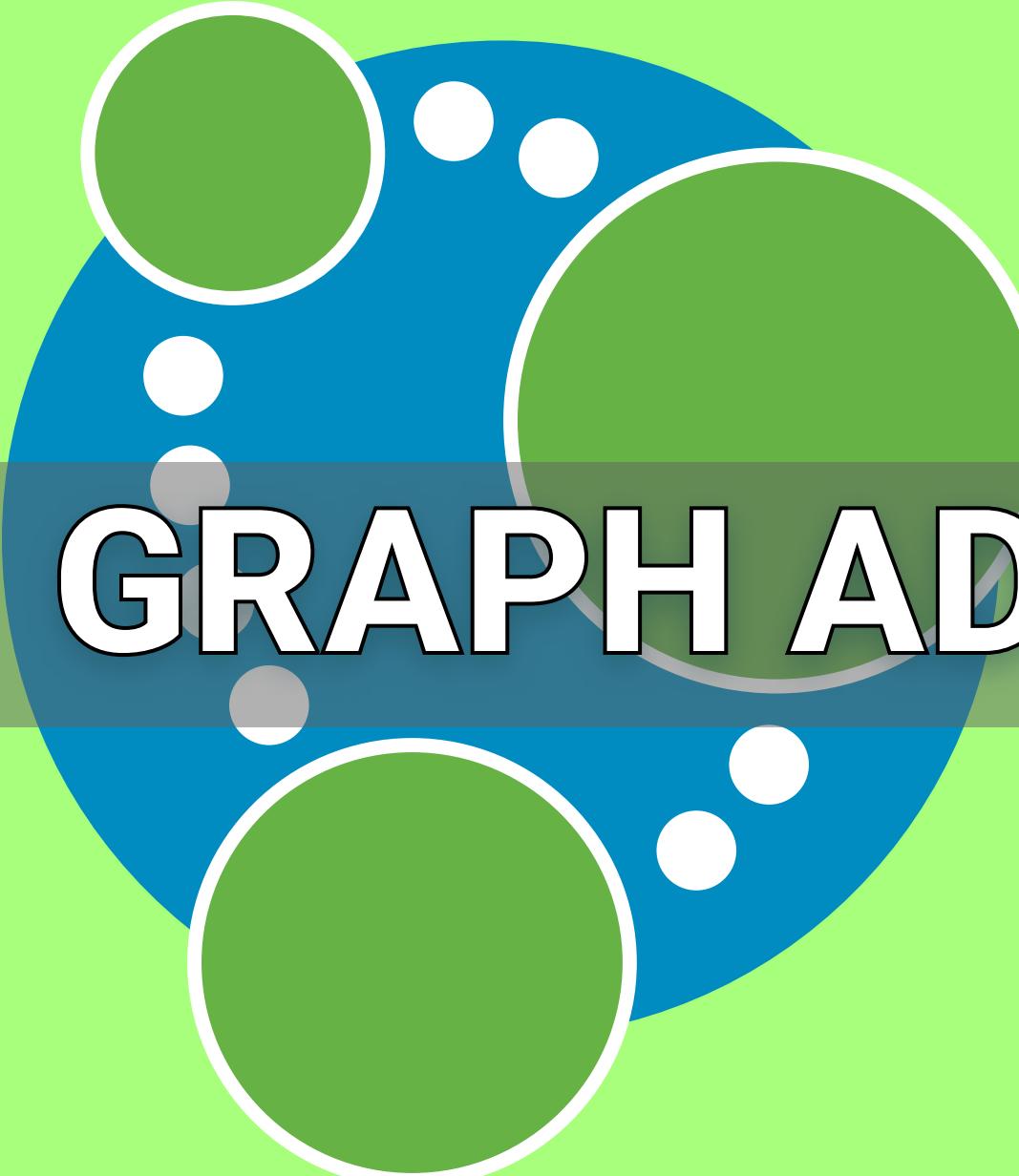
Graph theory on Wikipedia

... (A:MATH_PROBLEM)!



WHAT IS A NODE?

A node can be thought of a single focal point in a series of other connected points in a graph.



GRAPH ADVANTAGES

PERFORMANCE ADVANTAGES

- Storage is optimized for traversing relationships
- Nodes and relationships are stored together

A young boy with short brown hair, wearing a dark suit jacket over a light blue shirt and khaki shorts, is running towards the camera on a paved road. He has a black backpack on his back and is smiling. The background is a blurred green landscape.

**RELATIONSHIPS
ARE
FIRST-CLASS!**

- 
- A young boy with short brown hair, wearing a light blue button-down shirt, khaki shorts, and brown shoes, walks away from the camera on a paved path. He has a dark backpack on his back. The background is a blurred green landscape.
- No more JOINs or many-to-many tables!
 - Descriptive labels tell type
 - Properties are allowed

"WHITEBOARD FRIENDLY"

EASIER BUSINESS COMMUNICATION

(DATA IS STORED
HOW WE
REASON ABOUT IT)

COMMON USE CASES

- Fraud Detection
- Impact Analysis
- Supply Chain Management

- Network/Data Center Management
- Master Data Management
- Software Development Process Model

- Natural Language Processing (NLP)

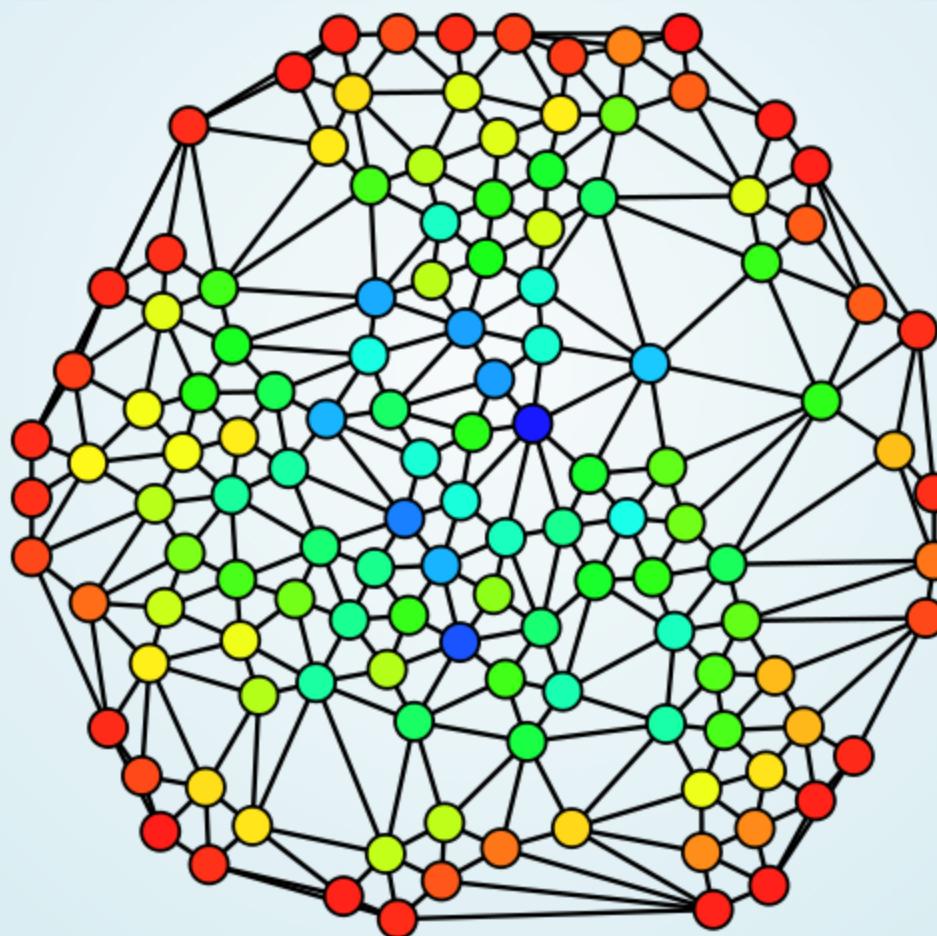
NEO4J IN THE NEWS

PANAMA PAPERS

*We exposed how billionaires, sports stars
[...] and politicians all use tax havens to hide
their money.*

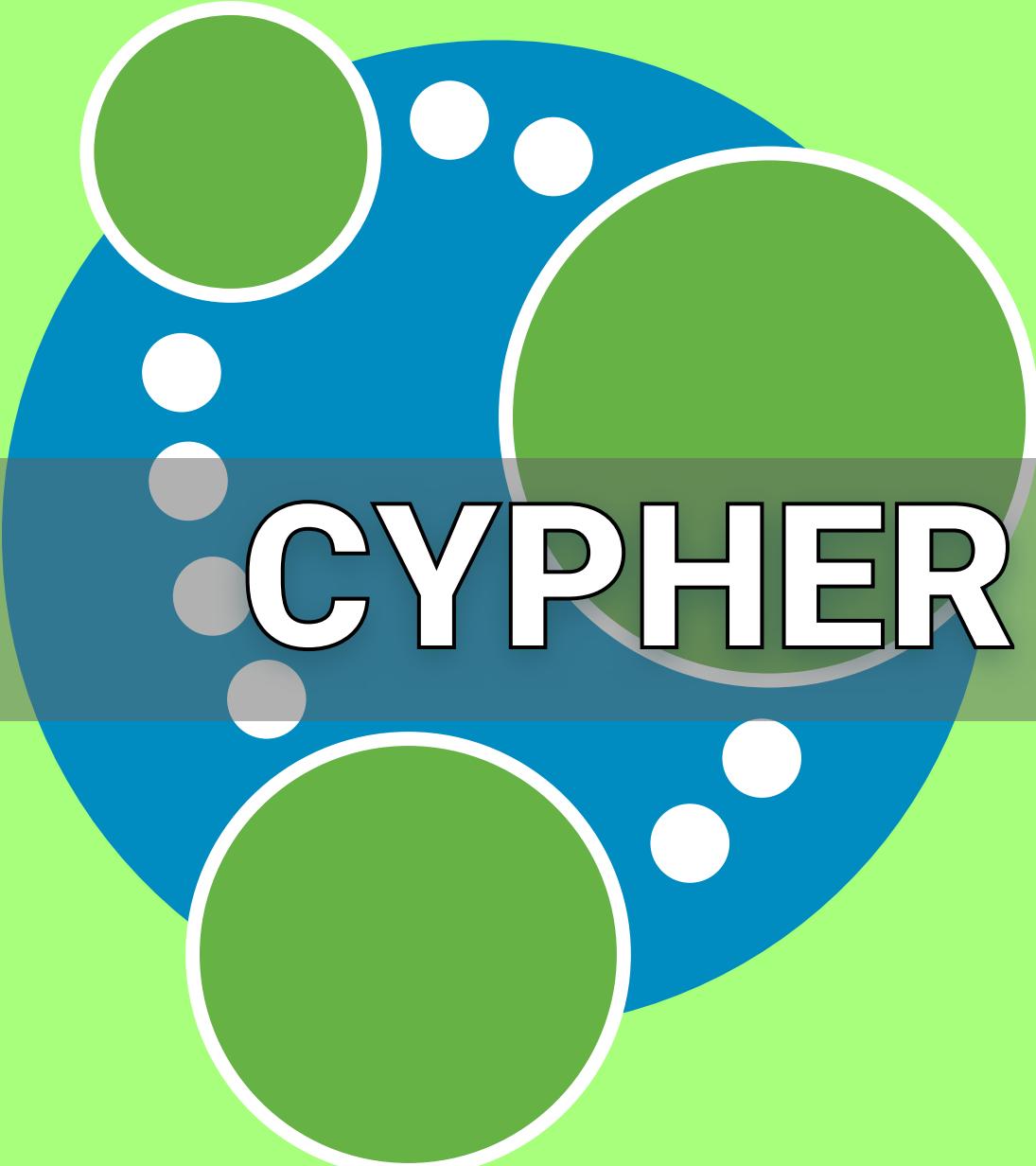
[How the ICIJ Used Neo4j to Unravel the Panama Papers](#)

ASK A GRAPH!



ASK A GRAPH!

- What's related?
- How closely?
- What's the shortest path?



CYPHER QUERIES

PATTERN MATCHING

MEET THE NODE

(*node*)

RELATIONSHIPS HAVE A *DIRECTION*

(a) \dashrightarrow (b)

RELATIONSHIPS HAVE

A *TYPE*

(a)-[r:*FRIENDS_WITH*]->(b)

Degrees of separation

(a)-[*1..3]- (b)

LABELS AND PROPERTIES

```
(i:Person { name: "Jeffrey"})
```

```
-[r:LIKES]->
```

```
(t:Dog { name: "Tucker"})
```

LABELS AND PROPERTIES

(i:Person *{ name: "Jeffrey" }*)

-[r:LIKES]->

(t:Dog *{ name: "Tucker" }*)

KEYWORDS - RETRIEVAL

- MATCH
- OPTIONAL MATCH
- WHERE
- RETURN, LIMIT

"HUMAN" NODE DOMAIN

```
// Find Node Types  
// in the "Human" Node Domain  
MATCH (m) WHERE  
    m:Person OR m:Group OR  
    m:Role OR m:Organization  
RETURN m;
```

CHANGING DATA

- MERGE
- SET
- DELETE, DETACH, DELETE
- LOAD CSV

CREATE A NODE

```
// Create Kevin
MERGE (kevin:Person
      { name: "Kevin" })
RETURN kevin;
```

WHAT'S A GRAPHGIST?

A GraphGist is a hybrid document and interactive Neo4j tutorial.

- **Neo4j GraphGist Intro**
- **neo4j.com/graphgists/**

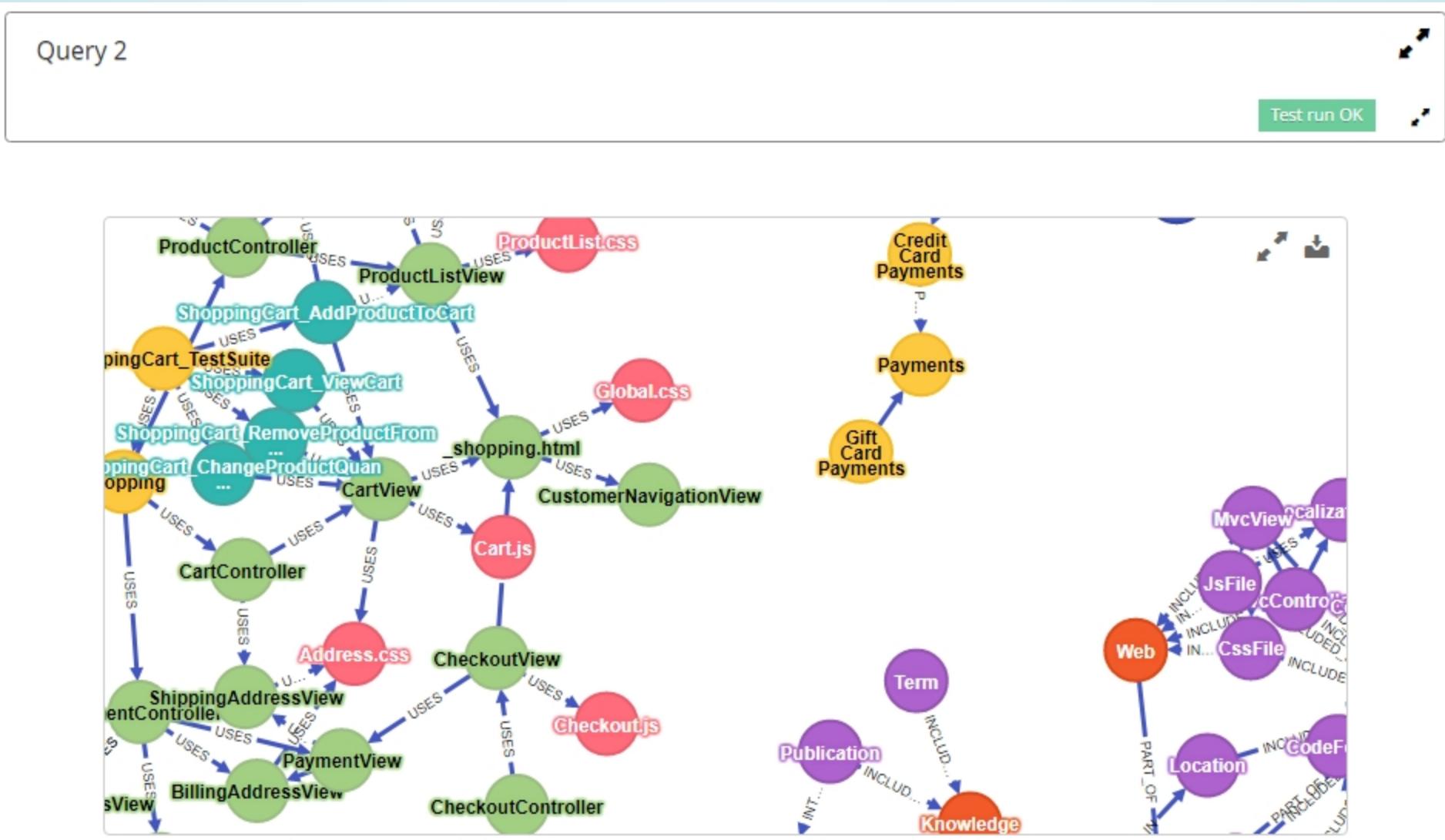
AsciiDoc format

```
// .d8888b.           888     .d8888b. d8b      888
// d88P  Y88b          888     d88P  Y88b Y8P      888
// 888   888          888     888   888      888
// 888   888d888 8888b. 88888b. 88888b. 888     888 .d8888b 888888
// 888   88888 888P"    "88b 888 "88b 888 "88b 888 88888 888 88K      888
// 888   888 888 .d888888 888 888 888 888 888 888 888 "Y8888b. 888
// Y88b  d88P 888 888 888 888 888 d88P 888 888 Y88b  d88P 888      X88 Y88b.
// "Y8888P88 888 "Y888888 88888P" 888 888 "Y8888P88 888 88888P" "Y888
//
//                                     888
//                                     888
//                                     888
```

Software Development Process Model

```
1 = Software Development Process Model
2
3 :neo4j-version: 3.0.0
4 :author: Jeffrey A. Miller
5 :twitter: xagronaut
6
7 === Introduction
8
9 Sometimes software just seems to happen haphazardly, despite our allegiance to diligence and process
some combination of people, skills, and tools. The result is often a mass of unfamiliar and unclear
with little understanding of the big picture.
10
11 === Benefits of a Broad Awareness
12
13 Software, when managed well, benefits from a broad awareness of the "moving parts" in the ecosystem
consumption. Real people interact with the systems we build, and we should build better models to tr
14
15 === Fragmented Functions and Isolated Teams
16
17 Many times teams dedicated to a specific function like Quality Assurance have applications and system
directly relevant to their job function, BUT!&hellip; these teams don't have a master system that ties
teams and job functions. Neo4j can solve this with the right modeling in place.
18
19 === Connecting the Concerns
```

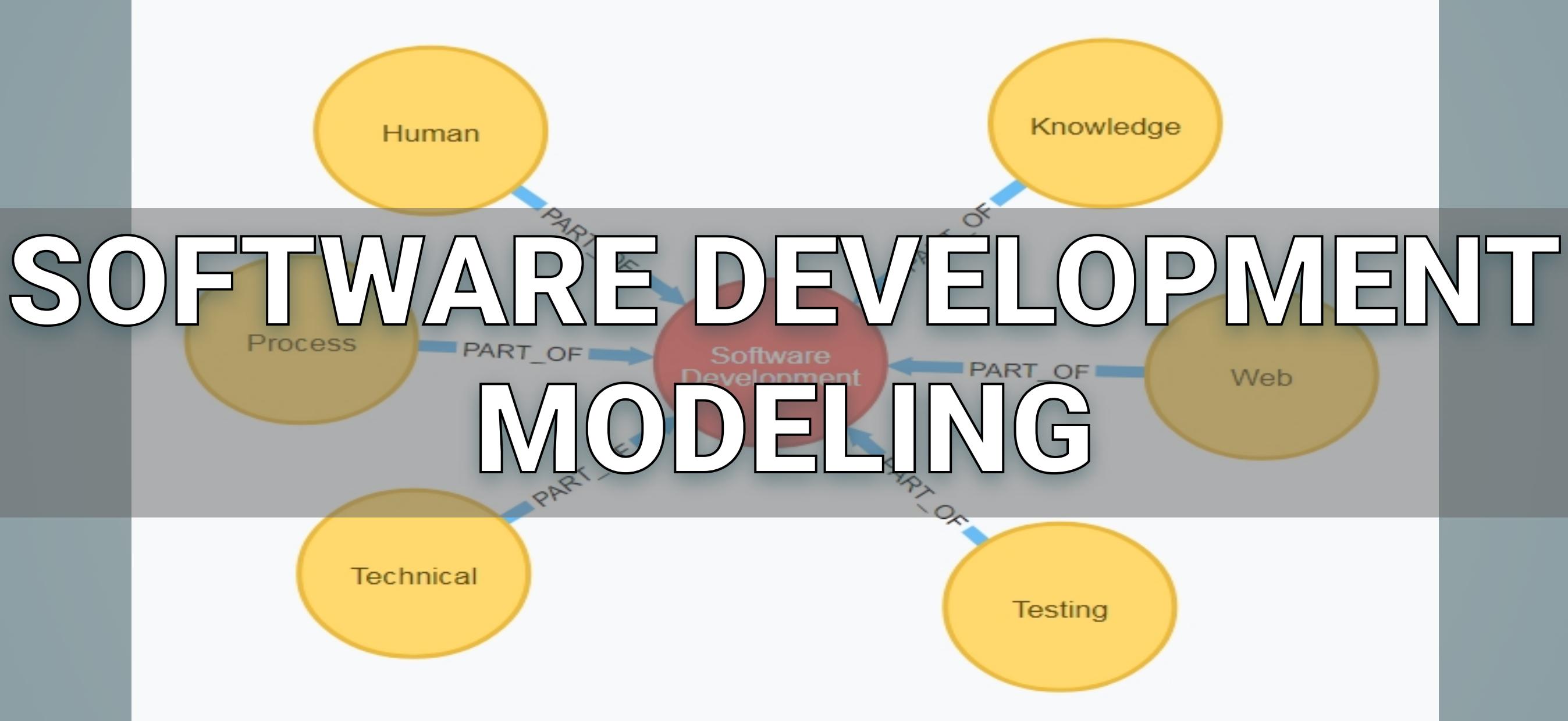
RESULTS



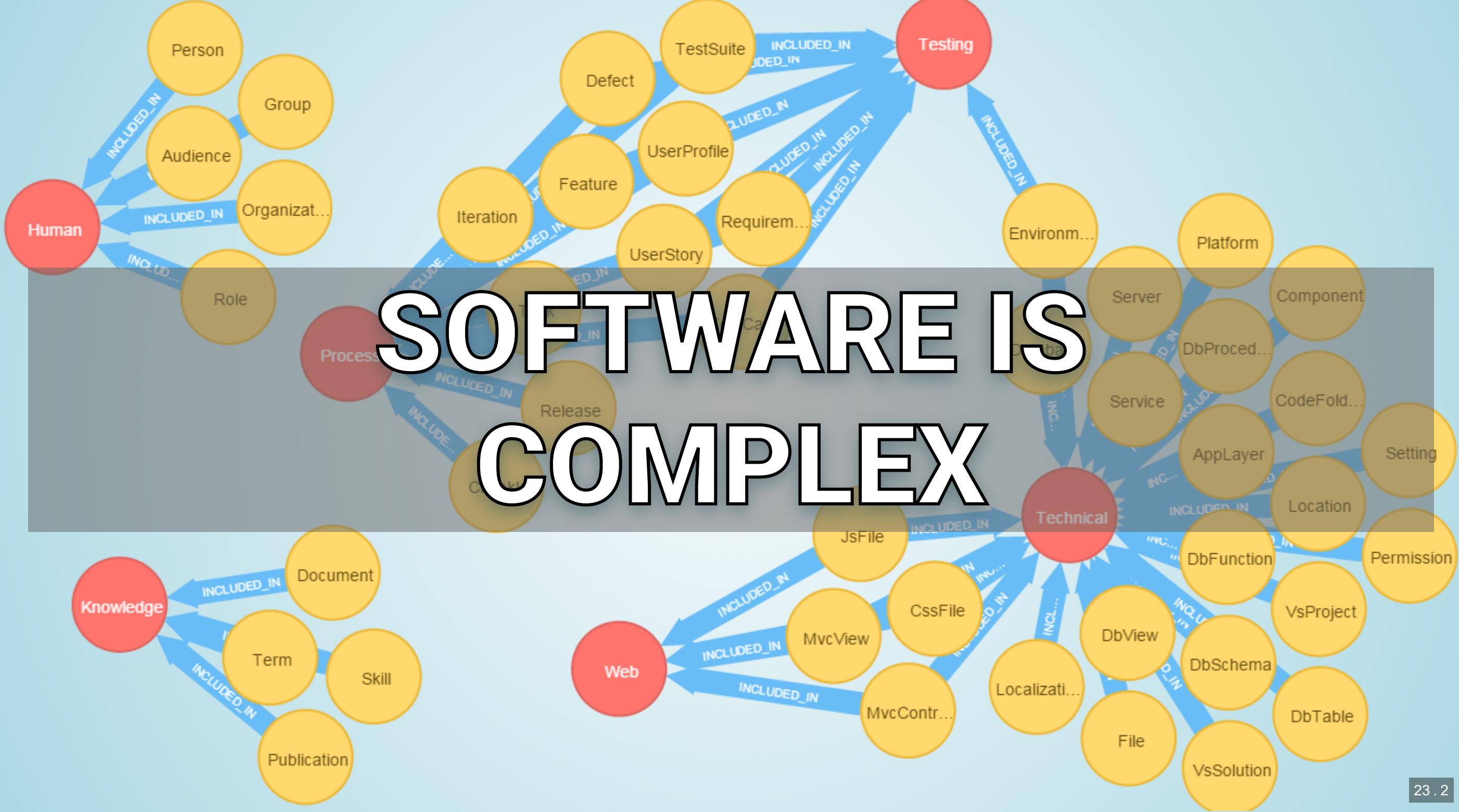
EXAMPLES

- Belgian Beer Graph by Rik Van Bruggen
- Software Development Process Model by Jeffrey A. Miller

SOFTWARE DEVELOPMENT MODELING



SOFTWARE IS COMPLEX



LOTS OF PARTS...

- Technical
- Web
- Testing
- Knowledge
- Human
- Process

DEMO: GRAPH GIST

The screenshot shows a web page from the neo4j website. At the top, there is a navigation bar with links for PRODUCTS, SOLUTIONS, PARTNERS, CUSTOMERS, LEARN, and DEVELOPERS. A search bar is also present. The main content area features a large title "GraphGist: Software Development Process Model" by Jeffrey A. Miller. Below the title, there is a network graph visualization. At the bottom of the page, there is a sidebar with links for GRAPHGISTS HOME and SOFTWARE DEVELOPMENT PROCESS MODEL, and a "Gist Source →" link. The main content area includes sections for "Use Case(s)" (with icons for a briefcase and a car) and "Introduction". The introduction text begins with: "Sometimes software just seems to happen haphazardly, despite our allegiance to diligence and process. Systems creep into our".

Browser

Logs

Terminal

Settings

Plugins

Upgrade

NEO4J BROWSER



neo4j

Learn about Neo4j

A graph epiphany awaits you.

- What is a graph database?
- How can I query a graph?

Jump into code

Use Cypher, the graph query language.

- Code walkthroughs
- RDBMS to Graph

LOADING DATA

- Neo4j Browser (Cypher)
- LOAD CSV
- Command-line tools
- Write apps with native APIs

LOAD CSV

```
// Load CSV from "That Conference 2018"
WITH { name: "That Conference 2018" }
LOAD CSV WITH HEADERS FROM
  "https://www.thatconference.com/data.csv"
RETURN item;
```

EXTRACTING DATA

- Tabular (CSV)
- Graph data (JSON)
- Visual (Images)

LANGUAGE SUPPORT

- Java
- .NET
- REST
- JavaScript
- Python

JAVA AND NEO4J

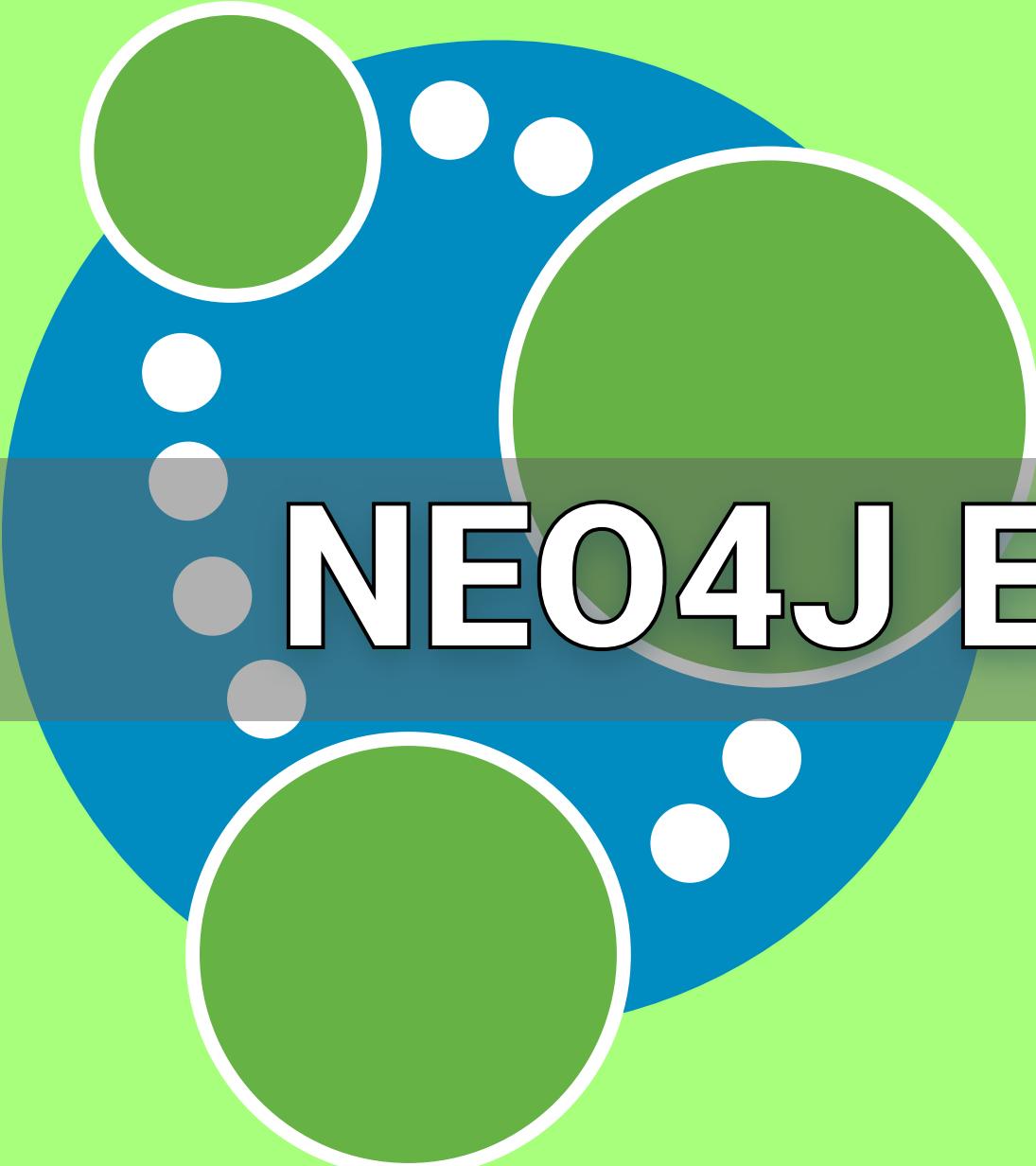
Neo4j is written in Java

- Official Neo4j Java Driver
- Spring Data Neo4j

- Object-Graph-Mapping
Neo4j-OGM
- Embedded Java API

JAVA TOOL REFERENCES

- Java Developer's Manual
- Example Project



NEO4J EDITIONS

COMMUNITY EDITION

- Free and Open Source
- Is embeddable (Java)
- Single-instance
- Lacks replication and hot backup

ENTERPRISE EDITION

- \$\$ subscription
- Support from Neo Technology
- High Availability, LDAP
- Alternative storage

SCALING NEO4J

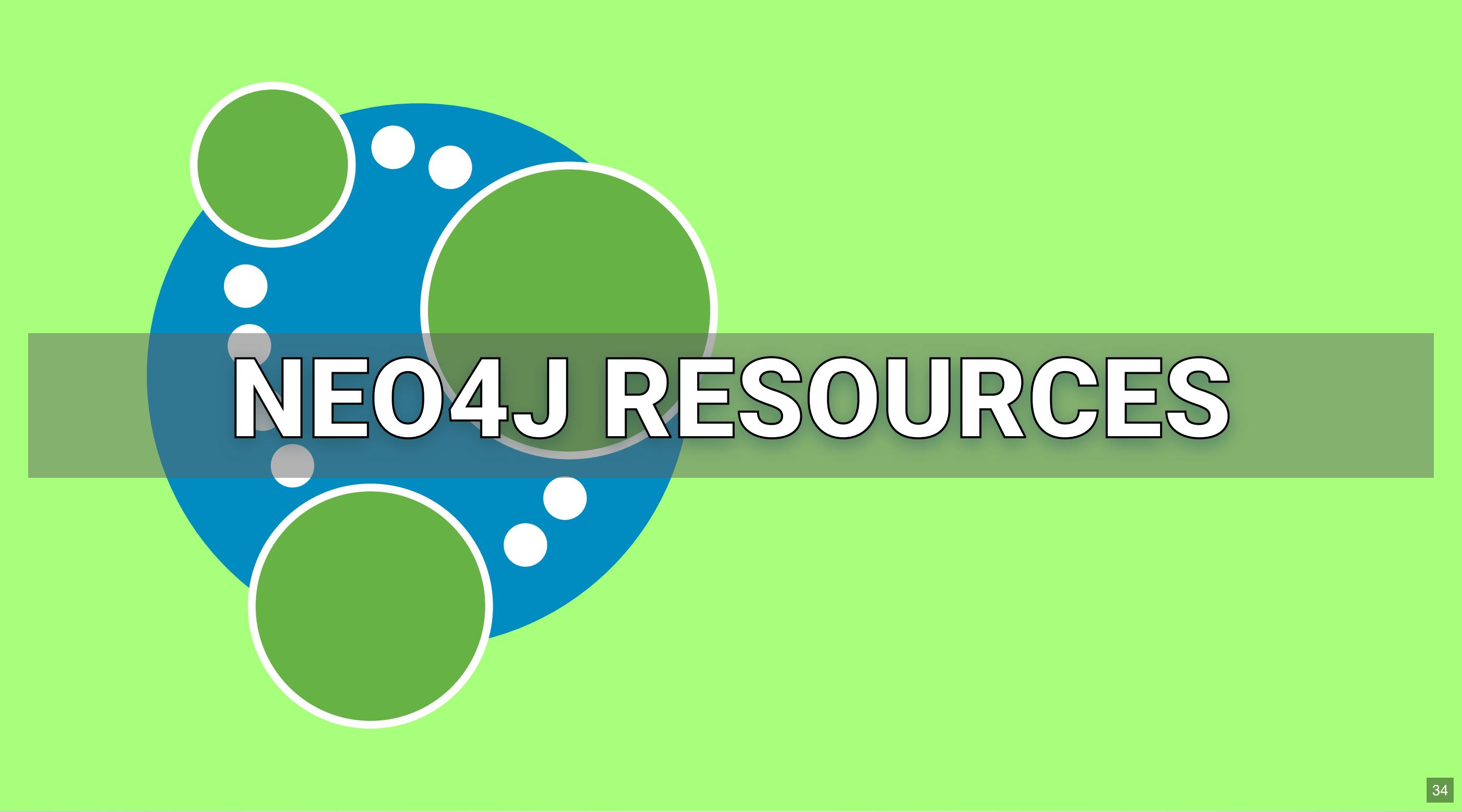
- Enterprise Edition recommended
- Replication
- Causal Clustering
- Page Cache size

HOW I USE NEO4J

- Knowledge Management
- Application Catalog and X-ref
- Analysis Tool (deduplication)
- Personal Contact Manager

WHAT CAN YOU DO?

- IoT uses
- Personal data capture
- Game modeling



NEO4J RESOURCES

YOUTUBE VIDEOS

- Neo4j YouTube channel
- Intro to Neo4j series

RECENT VIDEOS:

- Ashley Sun: Using Neo4j for DevOps at Lending Club
- Chuck Calio (IBM): Designing High Performance Processors

GraphConnect

NEW YORK

Join 1000+ graph enthusiasts & innovators October 23-24 • Use code WEB10 for 10% off!

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Neo4j - The #1
Platform for
Connected Data

→ DOWNLOAD NEO4J

→ TRY NEO4J SANDBOX

NEO4J SANDBOX

- Hosted 3-day trial of Enterprise Edition
- Populate with sample datasets

TRY OUT A SANDBOX

DOWNLOAD DESKTOP

Platforms available:

- Windows
- Mac
- Linux

NEO4J SLACK CHANNEL

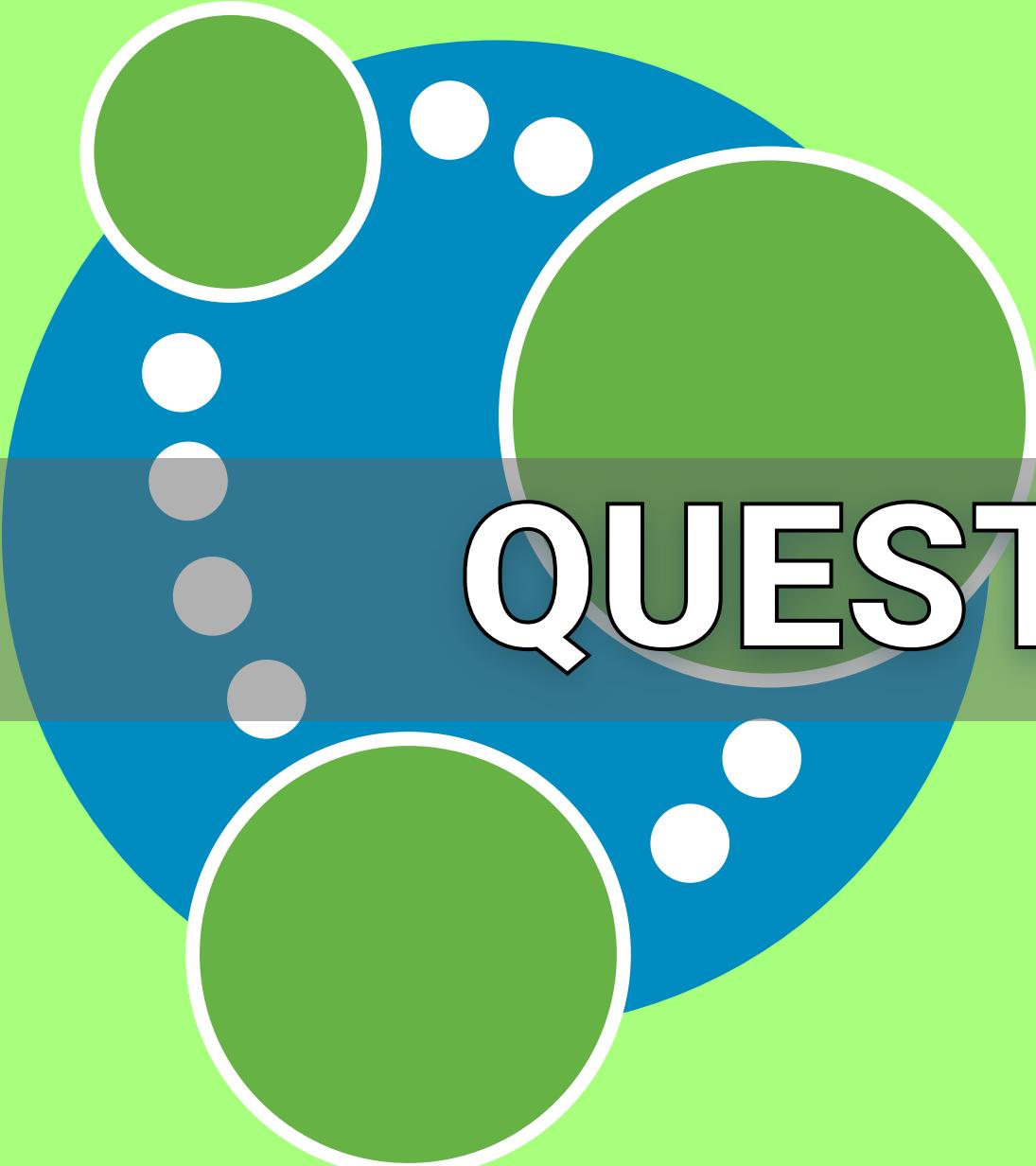


NEO4J DEVELOPER SLACK CHANNEL

JOIN UP!

GRAPHISTAS MEETUP (COLUMBUS)

The screenshot shows the homepage of the Columbus Graphistas Meetup group. At the top, there's a navigation bar with the Meetup logo, a "Create a Meetup" button, a language selector set to English, and links for "Log in" and "Sign up". Below the navigation is a large red header with the group's name, "Columbus Graphistas", in white text. The main content area has a white background. On the left, there's a sidebar with information about the group: "Columbus, OH", "Founded Nov 18, 2013", "Graphistas 149", and "Group reviews 1". To the right of the sidebar, a large text block describes the group's purpose: "Let's link our nodes together to talk and learn about Graph Data Models, Uses, Implementations, Visualizations, and Algorithms. We will explore various Graph tools such as: Neo4j, OrientDB, TitanDB, Giraph, Gremlin, Dex, VelocityGraph, Steffi, GraphLab, GraphBase, InfoGrid, YarcData, NodeXL, FlockDB, Bio4j, Reco4j, GrapheneDB, NetworkX, iGraph, imGraph, Gephi, Sigma.js, D3, VivaGraphJS, helios.js, KeyLines, Linkurious, and more! We'll". A prominent red "Join us!" button is located at the bottom right of the main content area.



QUESTIONS?



THANK YOU!

JEFFREY A. MILLER

TWITTER: @XAGRONAUT

GITHUB: GIST.GITHUB.COM/XAGRONAUT/