When GenAI meets Mythology

From Ancient Epic to Modern Marvel

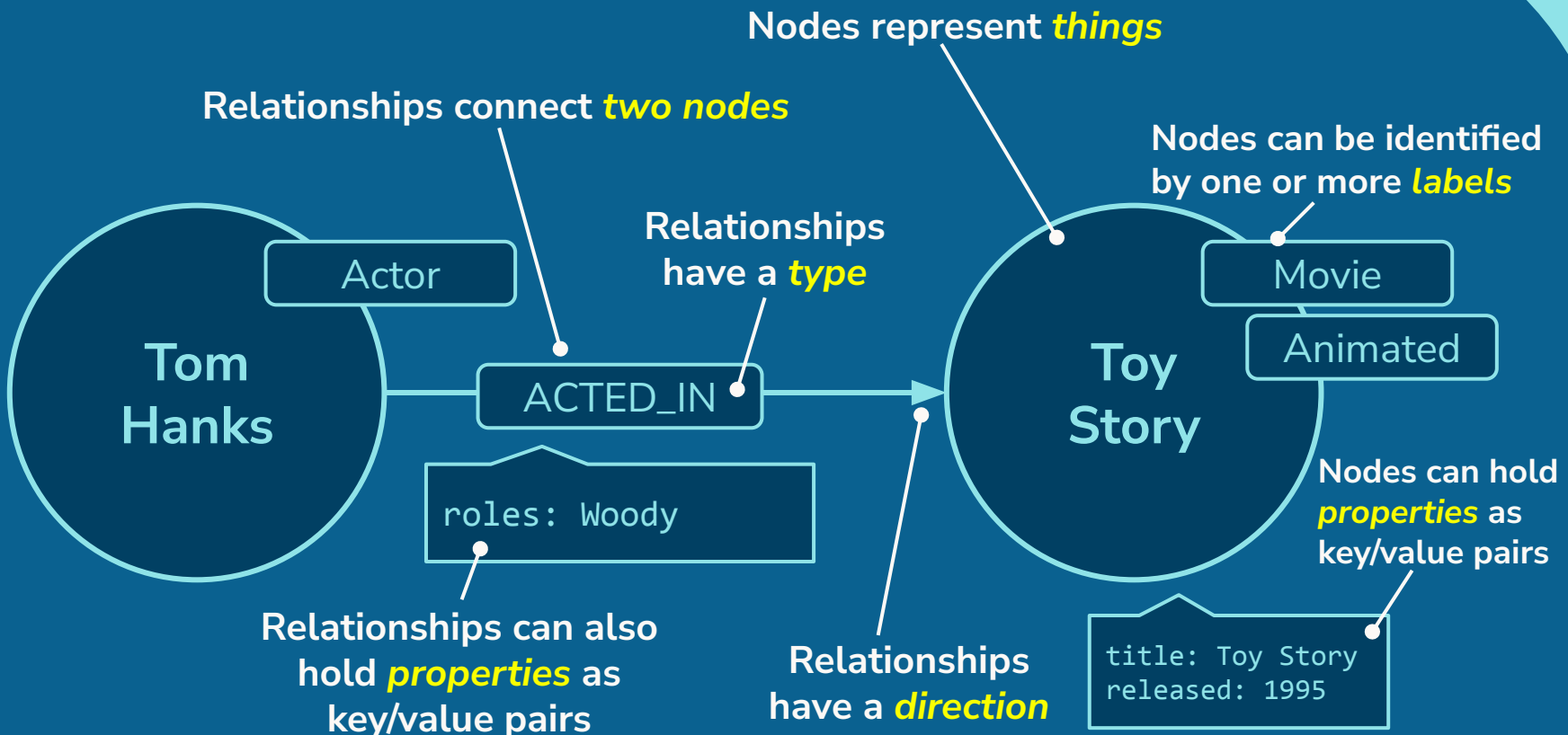
Hi, I'm Sid 👋

Developer Relations, APAC at Neo4j

- Started my career with IBM as Java Technology Engineer
- 10+ years in Developer Relations & Community Building
- Ex-Google and worked at 2 Startups
- Google Developer Expert in Gen-AI
- GDG and GDG Cloud Bengaluru Organizer

Scan me

Who has heard of and worked with Neo4j?


Nodes represent *things*
Relationships connect *two nodes*
Nodes can be identified by one or more *labels*
Relationships have a *type*
Actor
Movie
Animated
Tom Hanks
ACTED_IN
Toy Story
roles: Woody
Nodes can hold *properties* as key/value pairs
Relationships can also hold *properties* as key/value pairs
Relationships have a *direction*
title: Toy Story
released: 1995

Neo4j: Graph Data Platform

Native Graph Database
The foundation of the Neo4j platform; delivers enterprise-scale and performance, security, and data integrity for transaction and analytical workloads.

Data Science and Analytics
Explorative tools, rich algorithm library, and Integrated supervised Machine Learning framework.

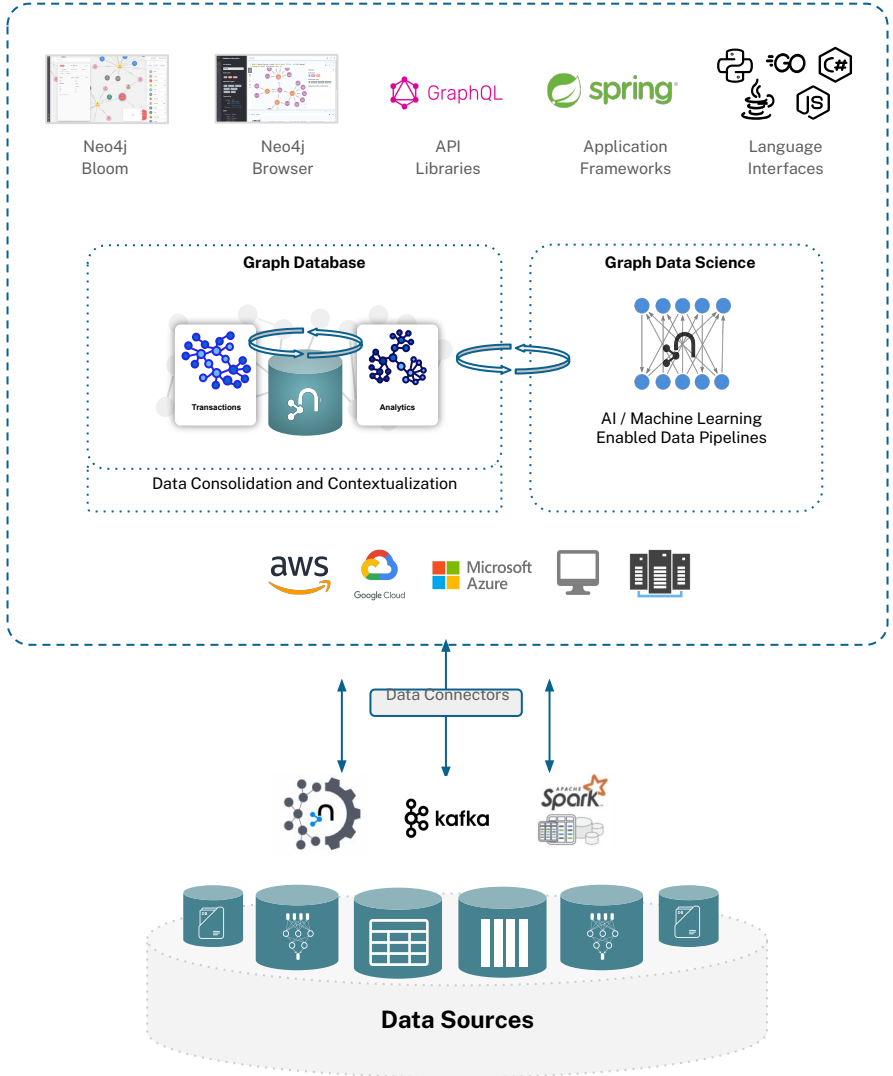
Development Tools & Frameworks
Tooling, APIs, query builder, multi-language support for development, admin, modeling, and rapid prototyping needs.

Discovery & Visualization
Code-free querying, data modeling and exploration tools for data scientists, developers, and analysts.

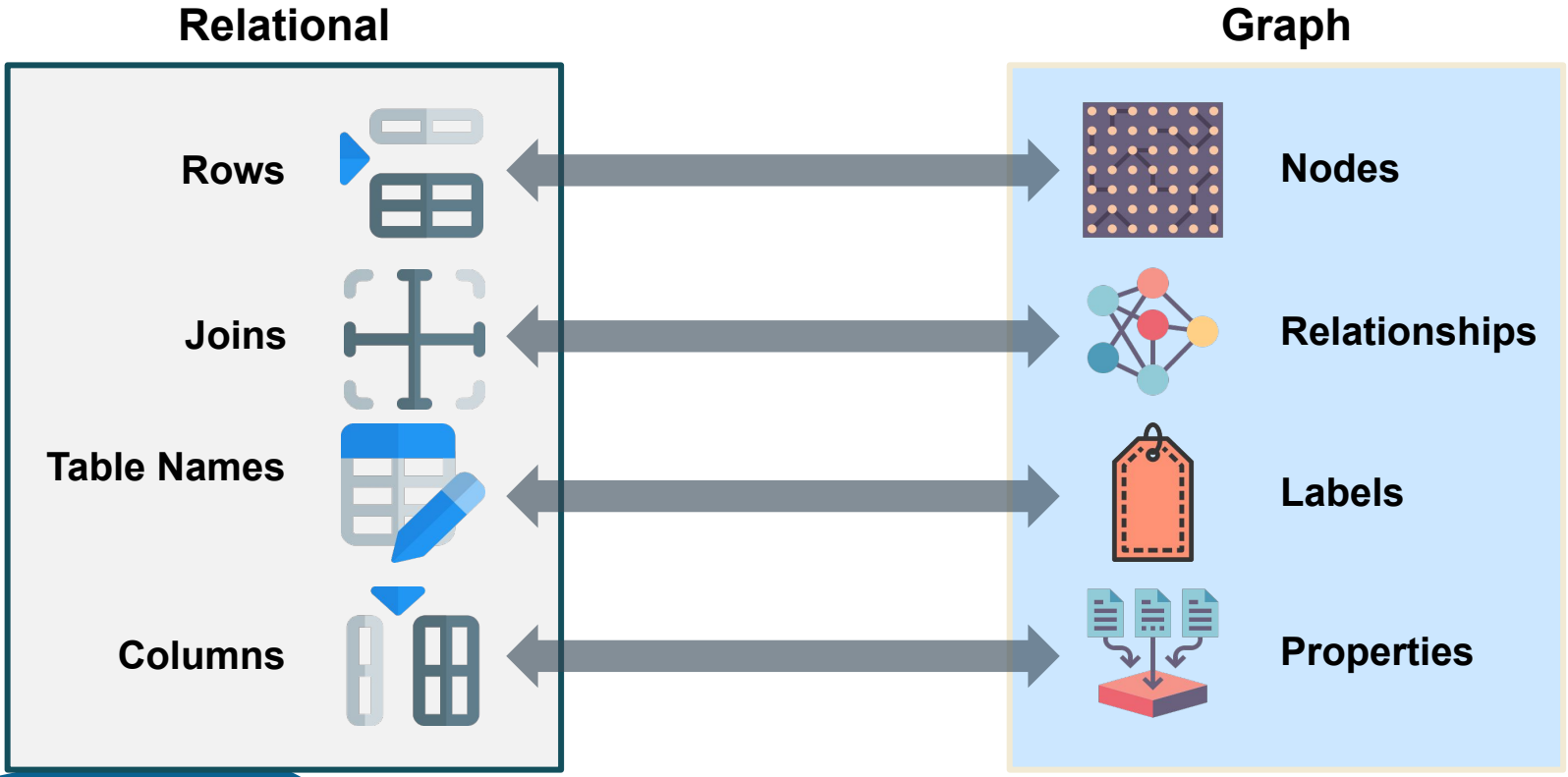
Graph Query Language Support
Cypher & openCypher; Ongoing leadership and standards work (GQL) to establish lingua franca for graphs.

Ecosystem & Integrations
Rich ecosystem of tech and integration partners. Ingestion tools (JDBC, Kafka, Spark, BI Tools, etc.) for bulk and streaming needs.

Runs Anywhere
Deploy as-a-Service (AuraDB) or self-hosted within your cloud of choice (AWS, GCP, Azure) via their marketplace, or on-premises.



Conceptual Mapping **Relational → Graph**

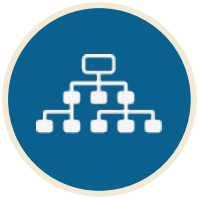


Popular Graph Use Cases

Real-Time Recommendations

Fraud Detection

Network & IT Operations



Master Data Management

Risk & Compliance

Identity & Access Management

ebay, KERRY, JCPenney, adeo, NORDSTROM, Marriott, COMCAST, Staples

ZURICH, DISCOVER FINANCIAL SERVICES, WESTERN UNION, 浙商银行 CZBANK, BMO, dun & bradstreet

AVIVA, at&t, SOCIETE GENERALE, orange, BT, EDF, Alcatel·Lucent, LinkedIn

AstraZeneca, LOCKHEED MARTIN, Adobe, UBS, citi, verizon, VOLVO

RBC, MERCK, Santander, BASF The Chemical Company, AkerBP

Current, AIRBUS, J.P.Morgan, cisco, Royal Bank of Scotland, Microsoft

How many characters are there in Mahabharata?

How many relationships are there in Mahabharata?

Mahabharata: A Monumental Epic of Characters and Connections

1 **100,000 verses** with over **1.8 million words**

2 **200** significant **characters**
(and countless secondary figures)

3 A **dense** web of **relationships**

Dense web of relationships

Familial relationships: Father-son, siblings, etc.

Marital alliances: Marriages for political alliance and family continuity

Teacher-student: Relationships such as those between Drona and his disciples

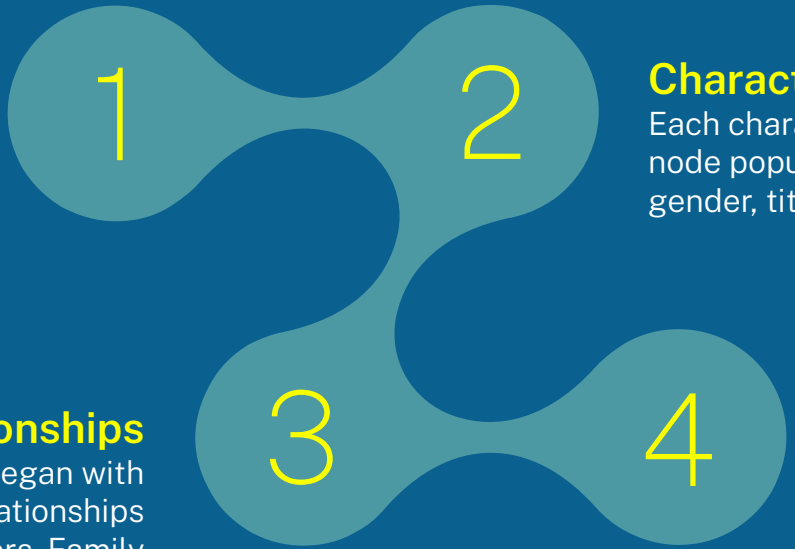
Adversarial relationships: Rivalries and enmities

Part 1: Graphing the Epic

Son	Father	Son2	Mother	Husband	Wife	Brothers1_1	Brothers1_2	Brothers2_1	Brothers2_2
Devavrata	Shantanu	Devavrata	Ganga	Shantanu	Ganga	Pandu	Dhritarastra	Bhima	Arjuna
Bhishma	Shantanu	Bhishma	Ganga	Shantanu	Satyavati	Pandu	Vidura	Bhima	Yudhisthira
Vichitravirya	Shantanu	Vichitravirya	Satyavati	Vichitravirya	Ambalika	Dhritarastra	Pandu	Bhima	Nakula
Chitrangada	Shantanu	Chitrangada	Satyavati	Vichitravirya	Ambika	Dhritarastra	Vidura	Bhima	Sahadeva
Dhritarastra	Vichitravirya	Dhritarastra	Ambika	Dhritarastra	Gandhari	Vidura	Pandu	Arjuna	Bhima
Pandu	Vichitravirya	Pandu	Ambalika	Pandu	Kunti	Vidura	Dhritarastra	Arjuna	Yudhisthira
Vidura	Vichitravirya	Bhima	Kunti	Pandu	Madri			Arjuna	Nakula
Yudhisthira	Pandu	Arjuna	Kunti	Arjuna	Subhadra			Arjuna	Sahadeva
Bhima	Pandu	Yudhisthira	Kunti	Yudhisthira	Draupadi			Yudhisthira	Bhima
Arjuna	Pandu	Nakula	Madri	Bhima	Draupadi			Yudhisthira	Arjuna
Nakula	Pandu	Sahadeva	Madri	Arjuna	Draupadi			Yudhisthira	Nakula
Sahadeva	Pandu	Abhimanyu	Subhadra	Nakula	Draupadi			Yudhisthira	Sahadeva
Abhimanyu	Arjuna	Prativindya	Draupadi	Sahadeva	Draupadi			Nakula	Bhima
Prativindya	Yudhisthira	Sutasoma	Draupadi					Nakula	Arjuna
Sutasoma	Bhima	Srutakarman	Draupadi					Nakula	Yudhisthira
Srutakirti	Arjuna	Srutakirti	Draupadi					Nakula	Sahadeva
Ghatotkacha	Bhima	Satanika	Draupadi					Sahadeva	Bhima
Babhruvahana	Arjuna	Babhruvahana	Chitrangada					Sahadeva	Arjuna
Duryodhana	Dhritarastra	Duryodhana	Gandhari					Sahadeva	Yudhisthira
Duhshasana	Dhritarastra	Duhshasana	Gandhari					Sahadeva	Nakula
		Karna	Kunti						

Graphing the Epic

Data Gathering
Character lists, family trees, and detailed descriptions from the epic itself.



Character Creation
Each character becomes a node populated with name, gender, title, etc.

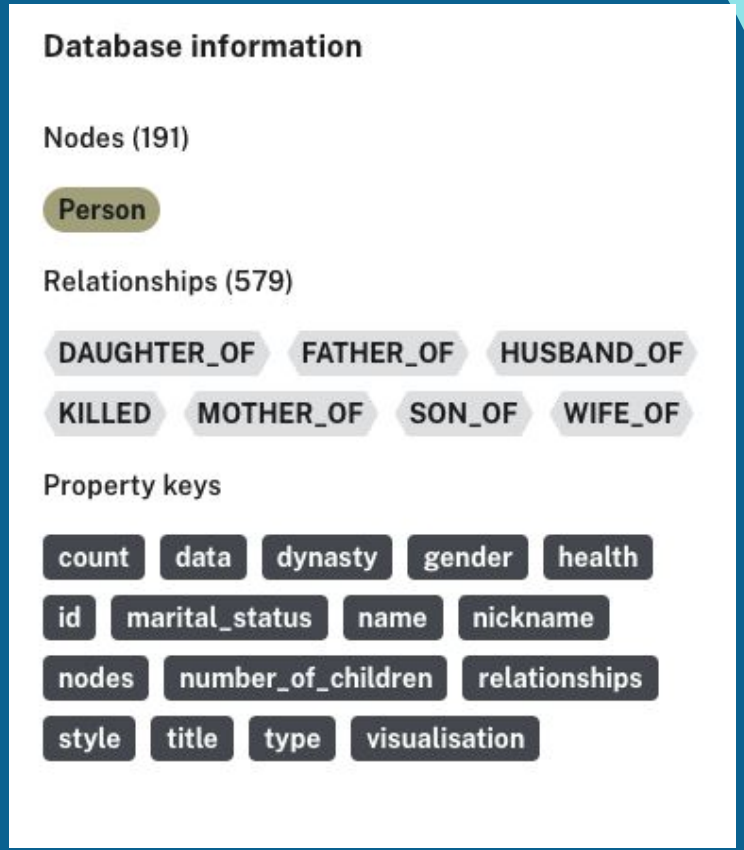
Defining Relationships
The real magic began with defining the relationships between characters. Family bonds, alliances, rivalries, etc.

Populating the Graph
With nodes and edges in place, populate the graph with all the characters and their connections with meticulous attention to detail.

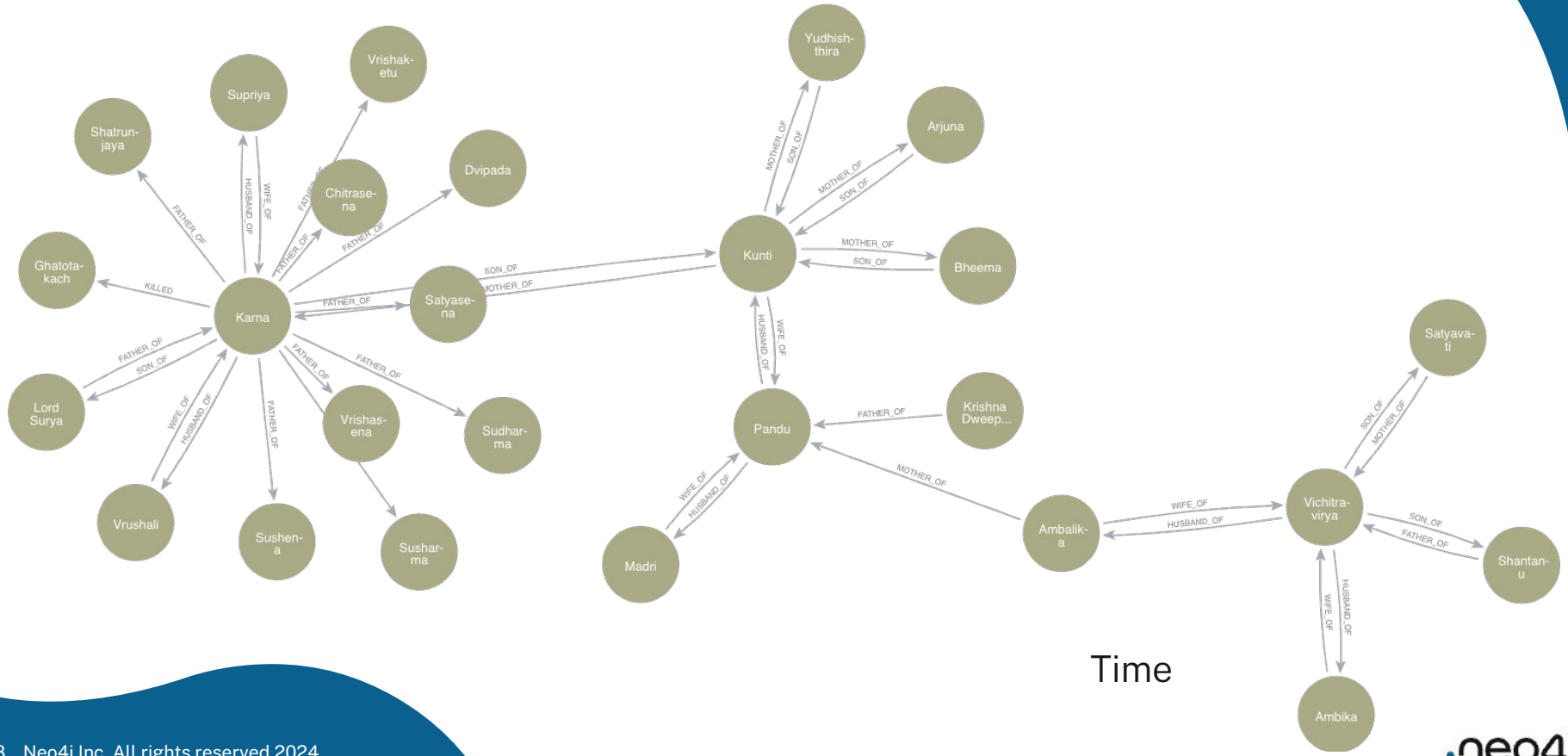
Graphing the Epic

```
CREATE CONSTRAINT IF NOT EXISTS FOR (p:Person) REQUIRE (p.name) IS UNIQUE;
CREATE INDEX IF NOT EXISTS FOR (p:Person) ON (p.gender);

CREATE (Brahma:Person {name: 'Brahma', gender: 'Male'})
CREATE (Marichi:Person {name: 'Marichi', gender: 'Male'})
CREATE (Brahma)-[:FATHER_OF]->(Marichi)
CREATE (Marichi)-[:SON_OF]->(Brahma)
CREATE (Kala:Person {name: 'Kala', gender: 'Female'})
CREATE (Marichi)-[:HUSBAND_OF]->(Kala)
CREATE (Kala)-[:WIFE_OF]->(Marichi)
CREATE (Kashyapa:Person {name: 'Kashyapa', gender: 'Male', type: 'sage'})
CREATE (Marichi)-[:FATHER_OF]->(Kashyapa)
CREATE (Kala)-[:MOTHER_OF]->(Kashyapa)
CREATE (Kashyapa)-[:SON_OF]->(Marichi)
CREATE (Kashyapa)-[:SON_OF]->(Kala)
....
```



Graphing the Epic



neo4j

Part 2: Bringing the Epic to Life

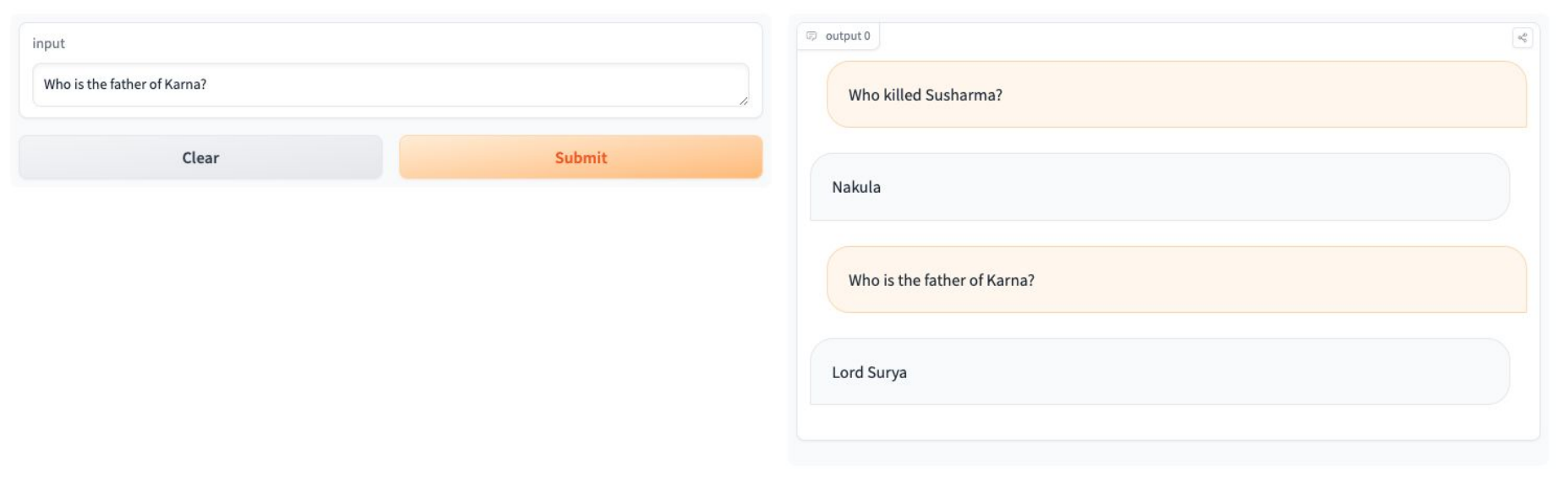
Reading from Neo4j

```
// Find the parents of Lord Kashyapa
MATCH (kashyapa:Person)-[:SON_OF]->(m:Person)

WHERE kashyapa.name = “Kashyapa”

RETURN m
```

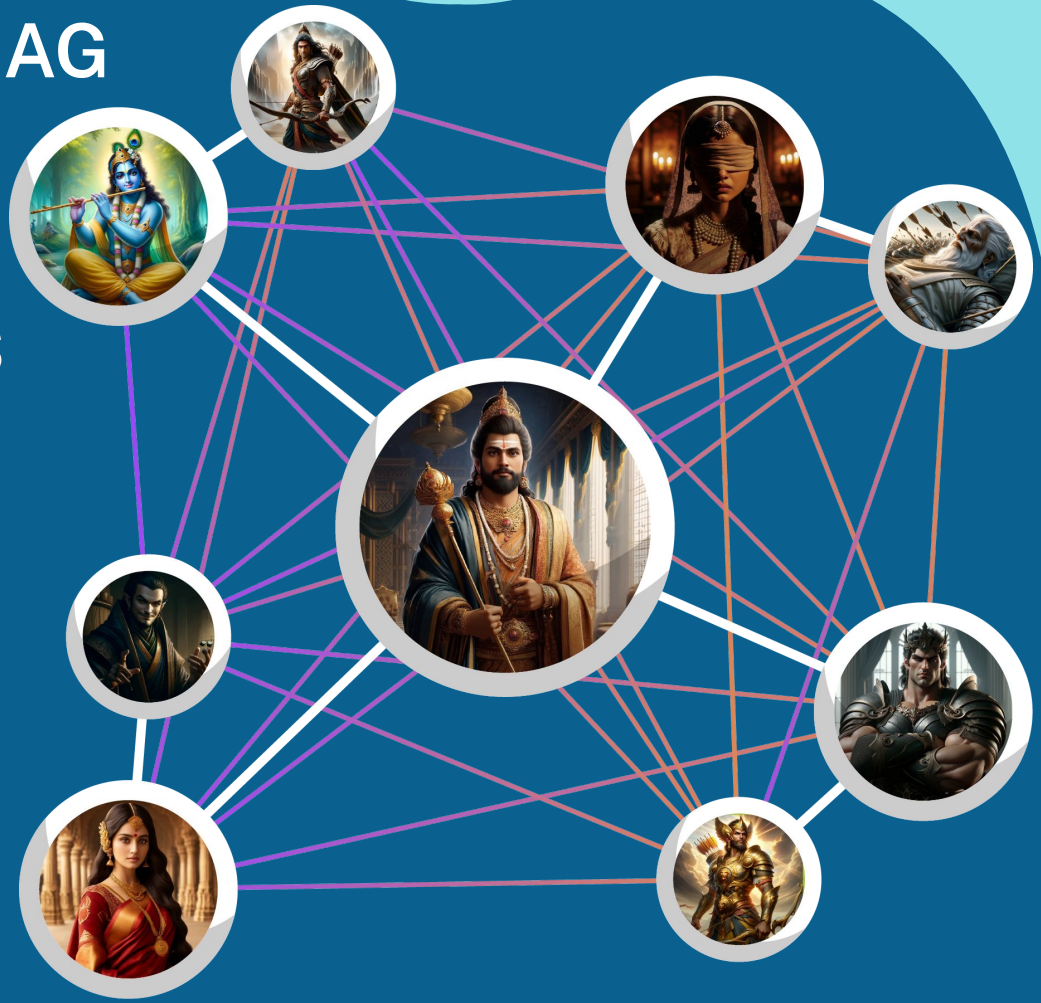
Mahabharata Chatbot v1



Part 3: GraphRAG Meets the Mahabharata

Demystifying GraphRAG

18 Books/Parvas
=
18 PDFs
(avg. 300 pages/pdf)



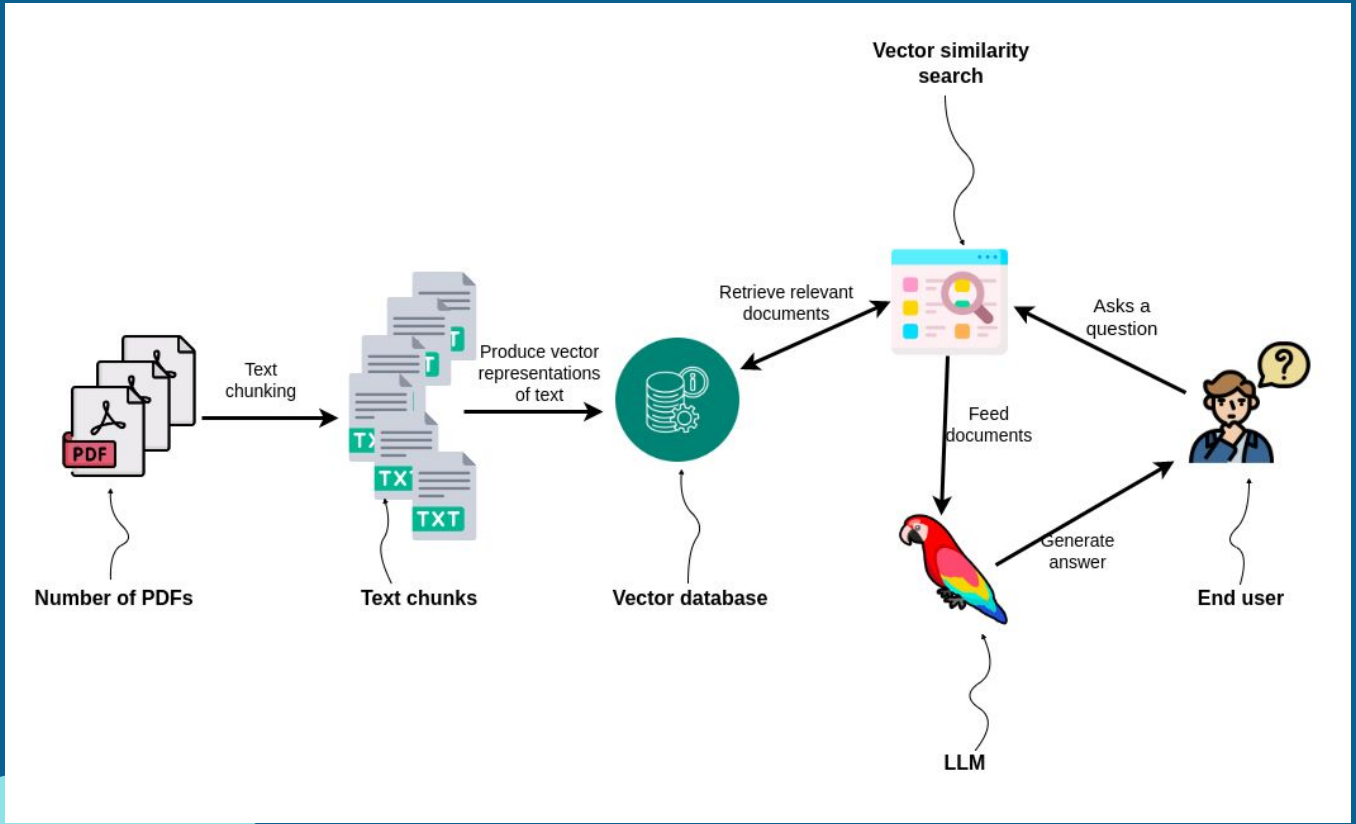
Demystifying GraphRAG

Total Pages:
18 PDFs × 300 pages/PDF = **5400 pages**

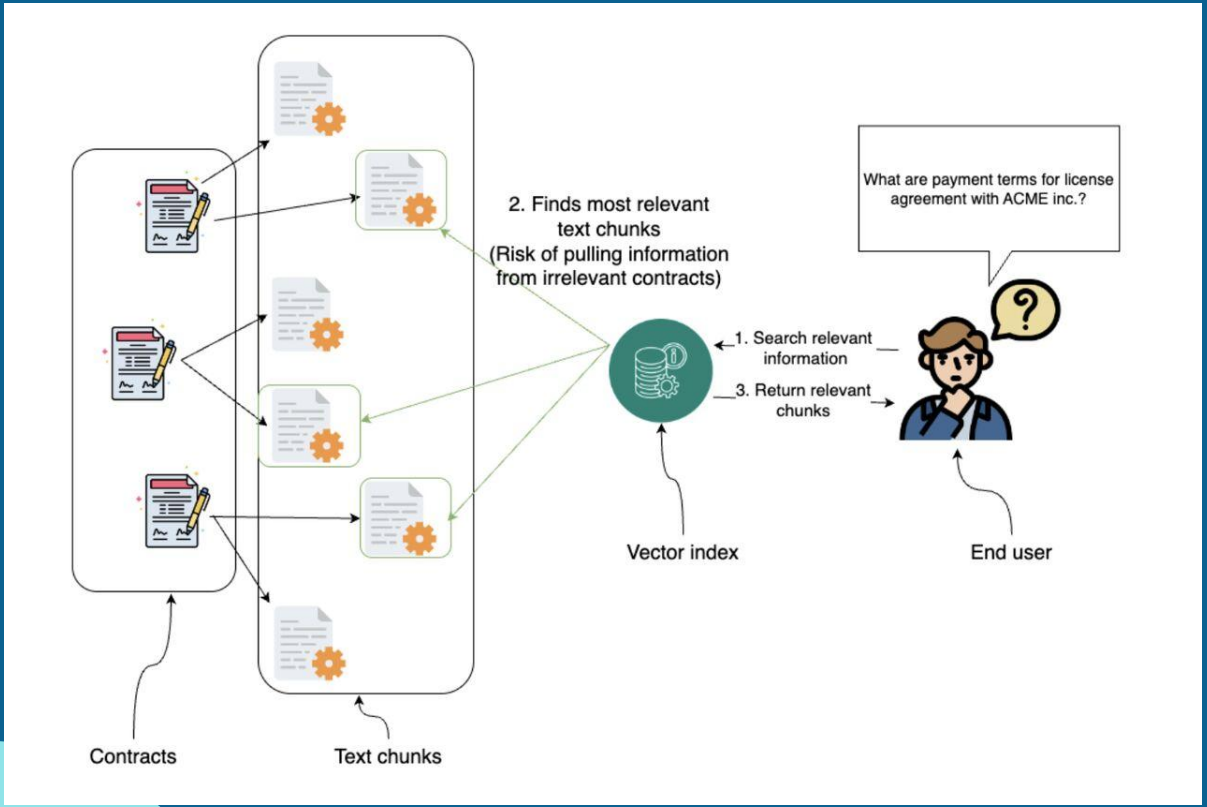
Total Characters:
5400 pages × 2000 characters/page = **~10.8 million characters**

Total Tokens:
10,800,000 characters ÷ 4 characters/token = **~2.7 million tokens**

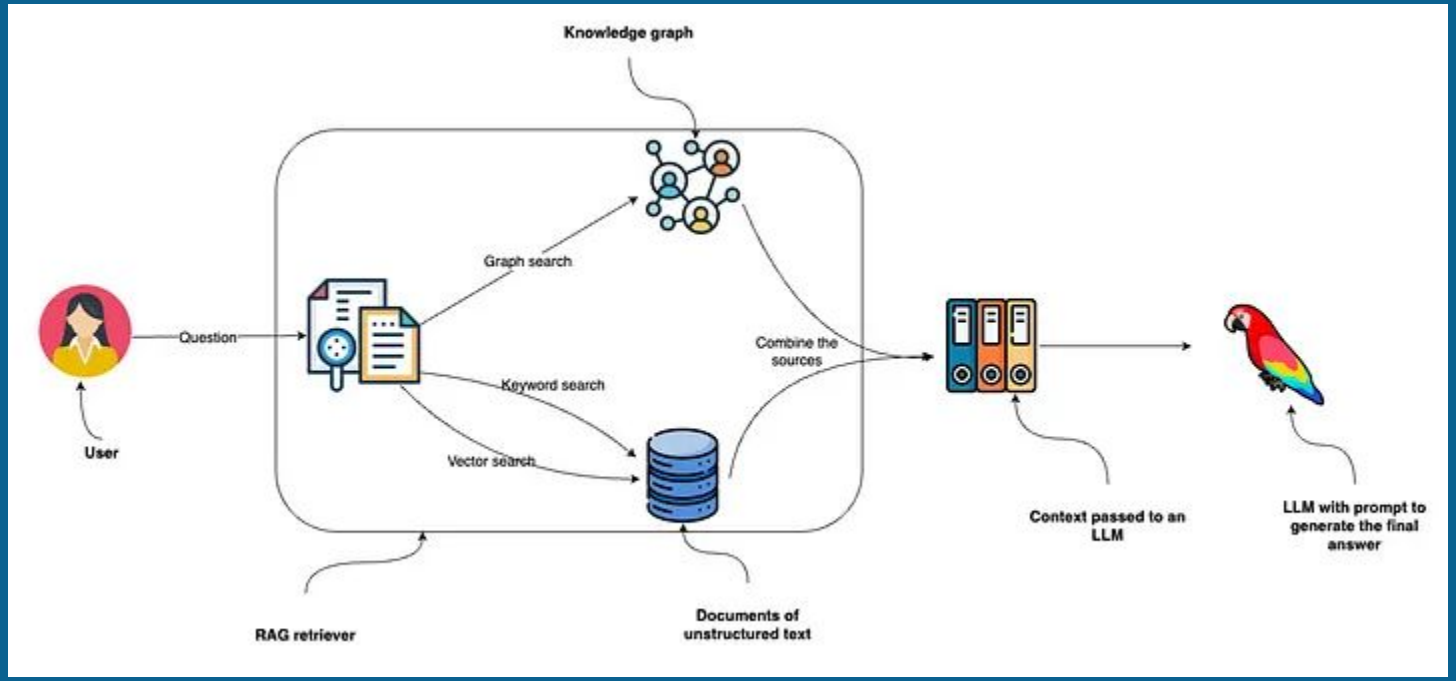
Vector RAG


Vector similarity search
Retrieve relevant documents
Asks a question
Text chunking
Produce vector representations of text
Feed documents
Generate answer
PDF
TXT
Number of PDFs
Text chunks
Vector database
End user
LLM

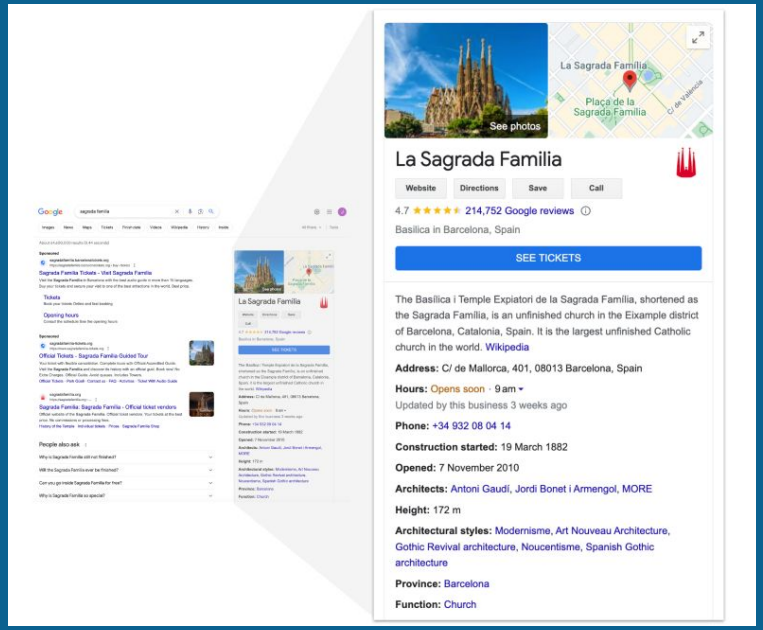
Why Vector RAG alone might fail miserably?



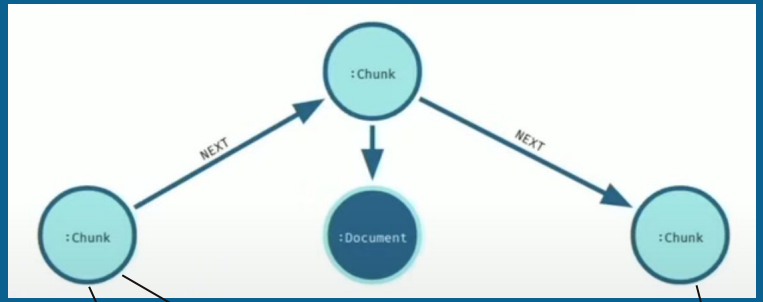
GraphRAG



Knowledge Graphs



Document or Lexical Graph



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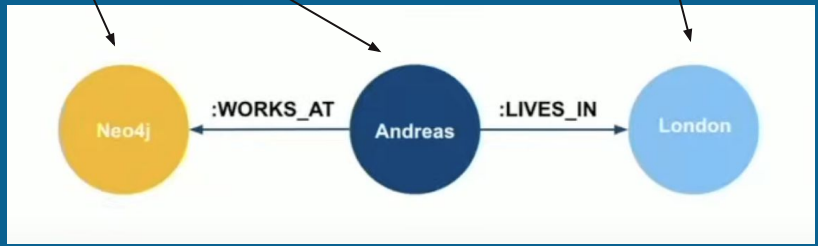
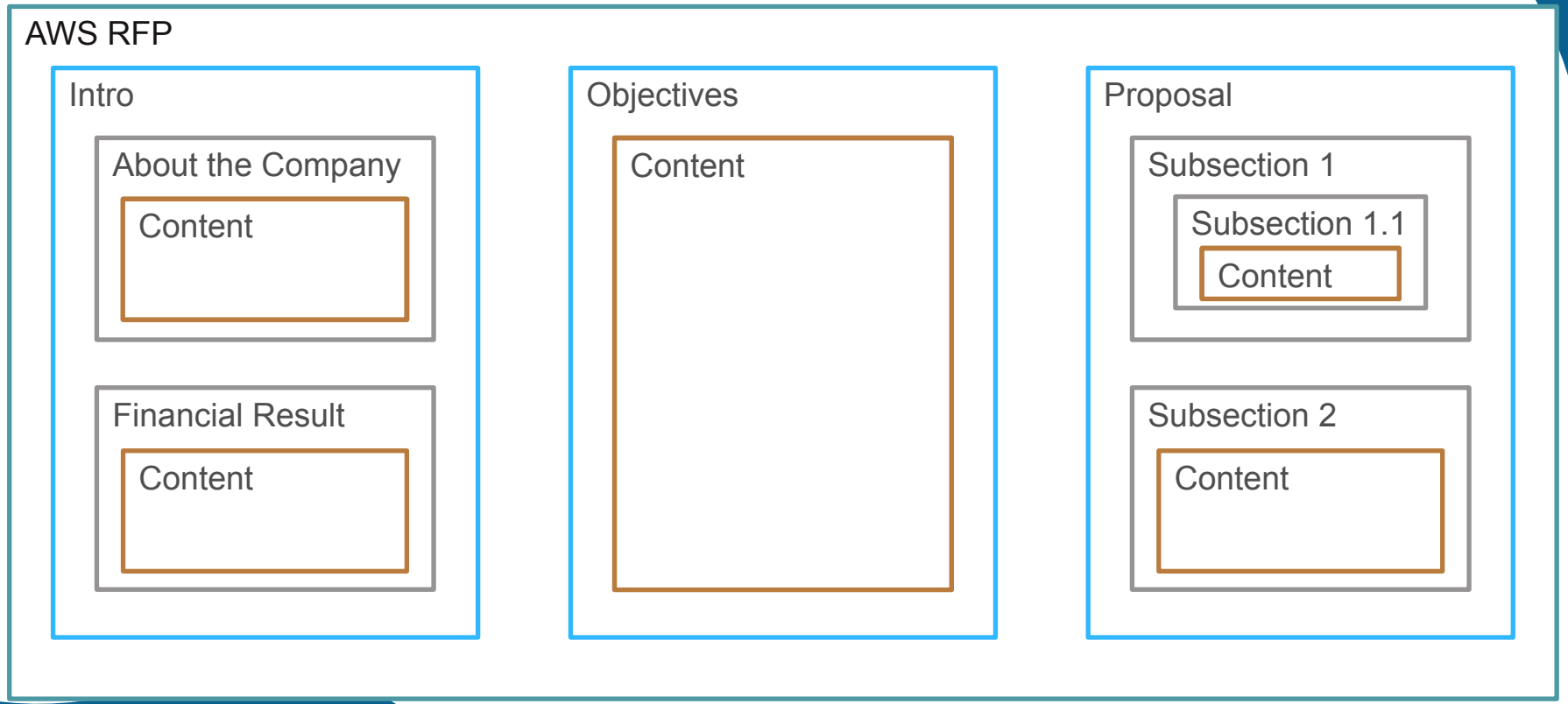
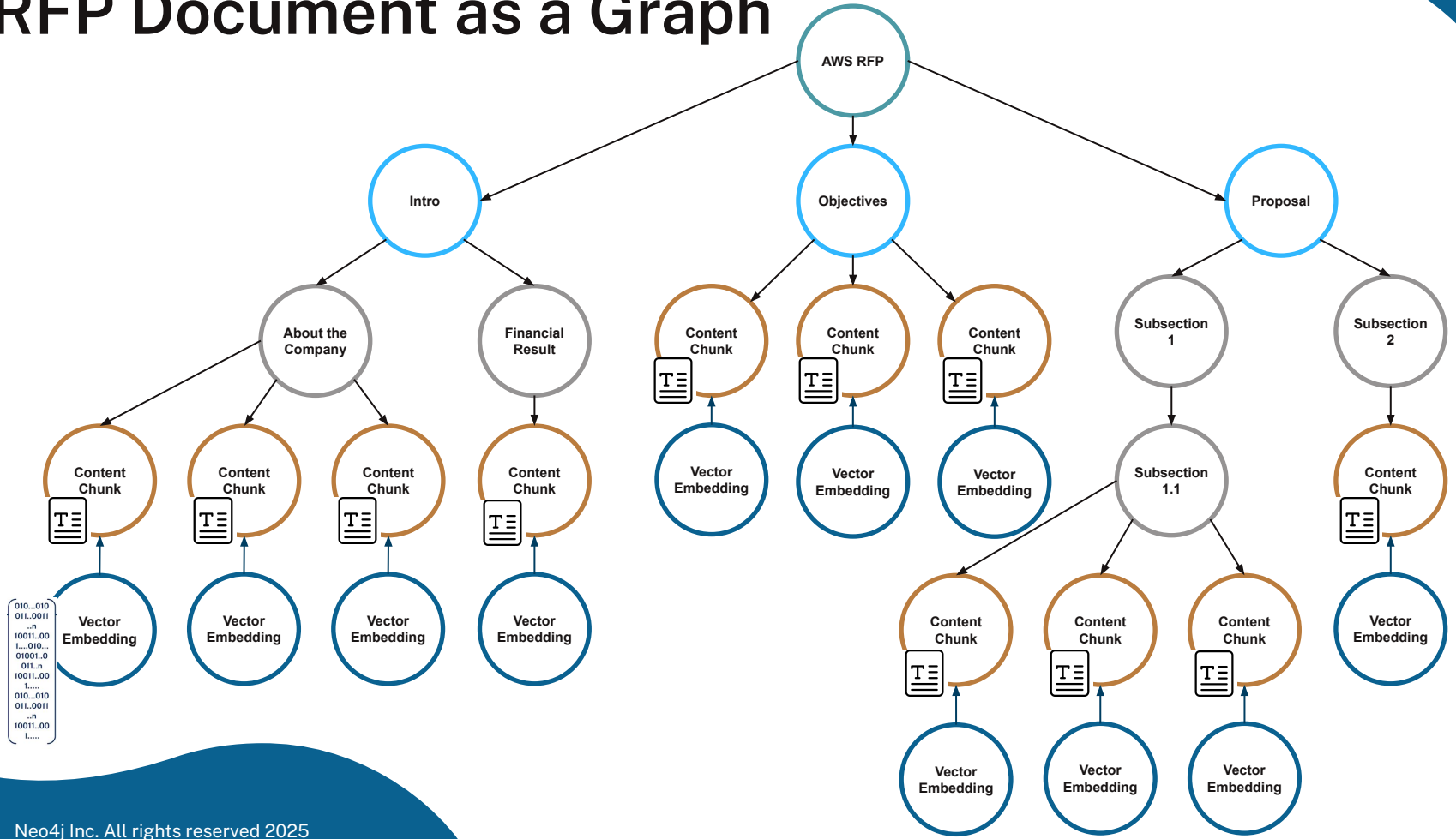


Domain or Entity Graph

Anatomy of an RFP Document



RFP Document as a Graph

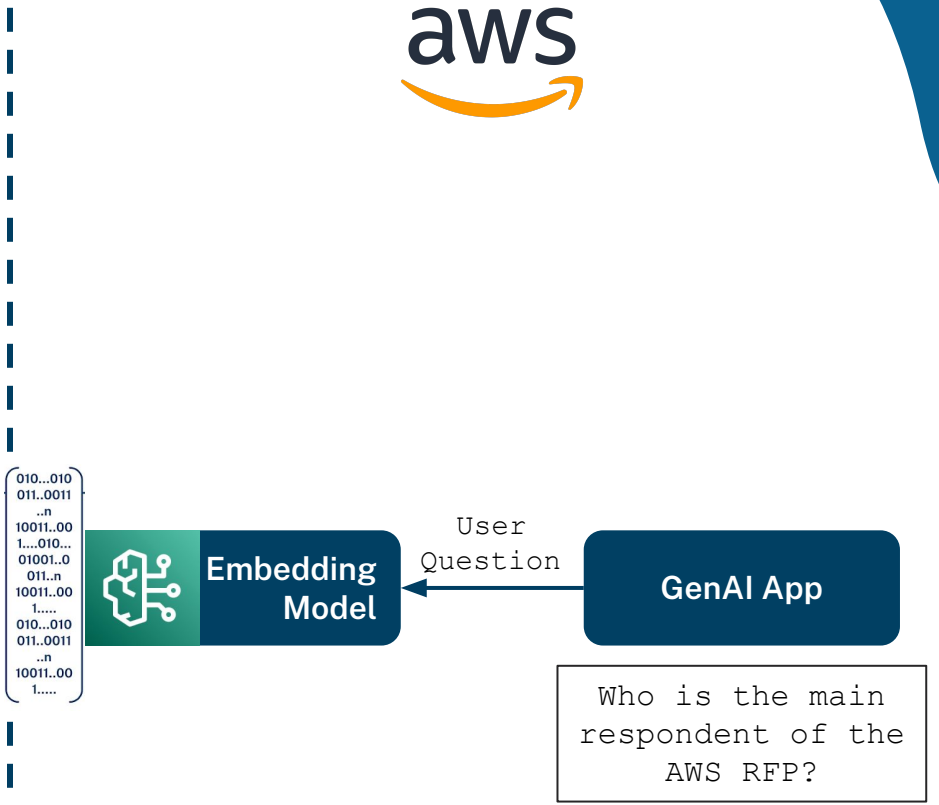


Accurate, Contextual and Explainable

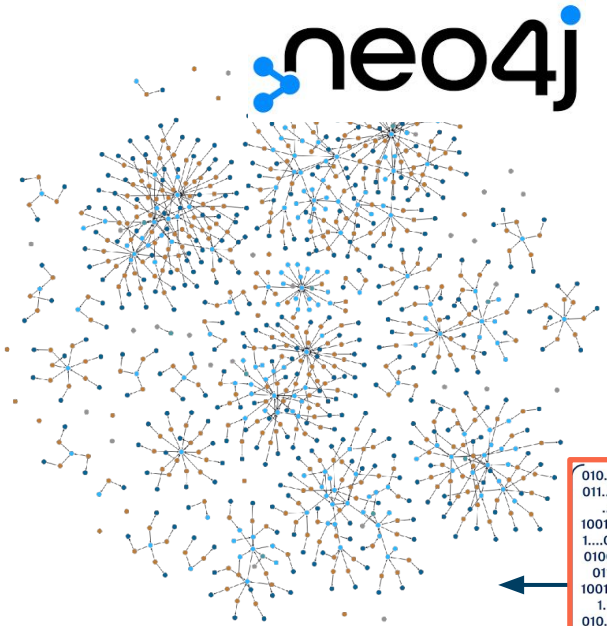
Who is the main respondent of the AWS RFP?

GenAI App

Accurate, Contextual and Explainable



Accurate, Contextual and Explainable



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010...010
011..0011
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Vector Embedding

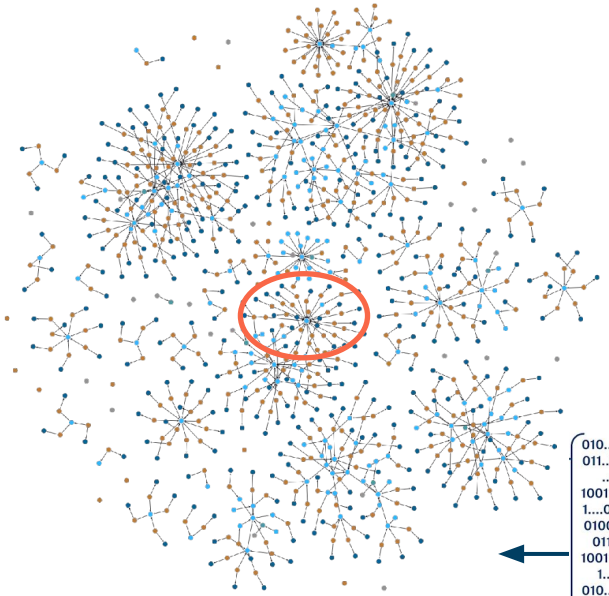
Embedding Model

User Question

GenAI App

Who is the main respondent of the AWS RFP?

Accurate, Contextual and Explainable



Similarity Search using
Neo4j Vector Index

010...010
011..0011
..n
10011..00
1....010...
01001..0
011..n
10011..00
1.....
010...010
011..0011
..n
10011..00
1.....

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Embedding Model

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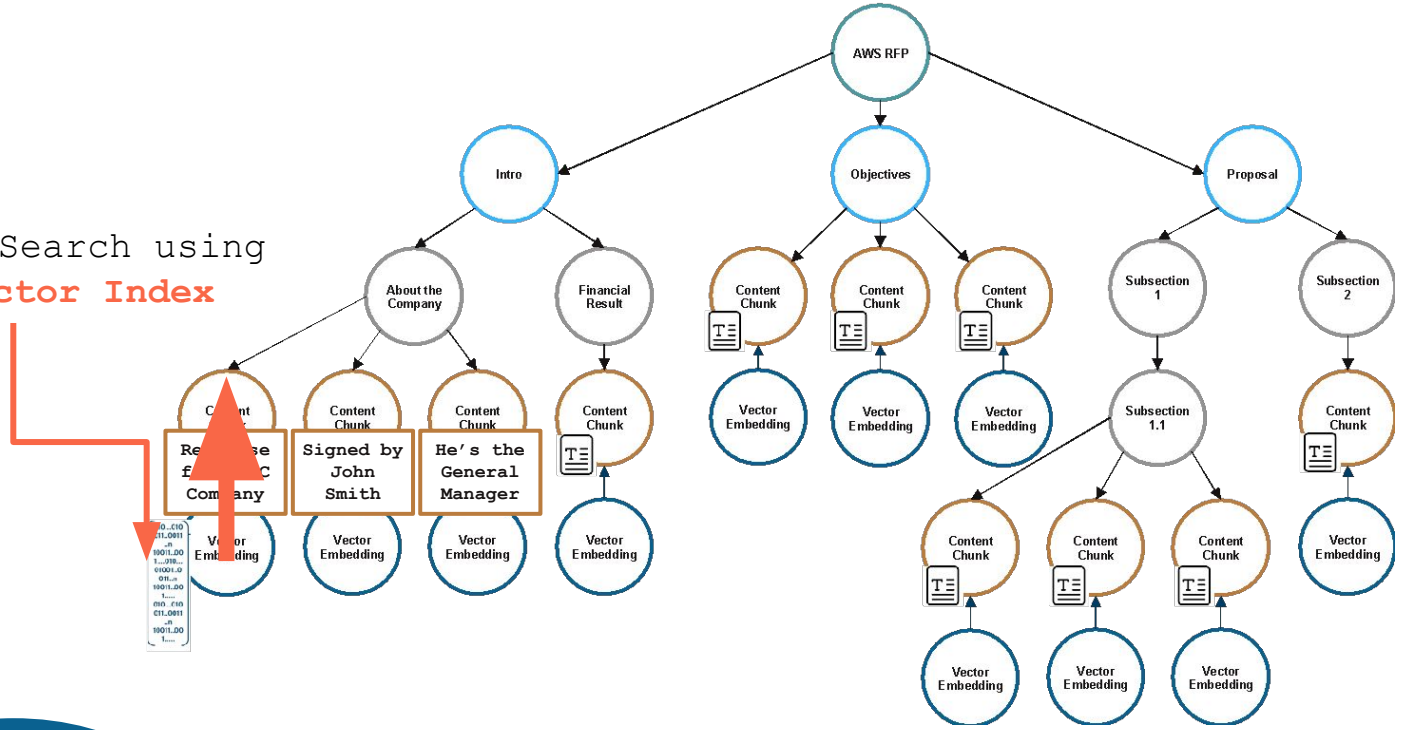
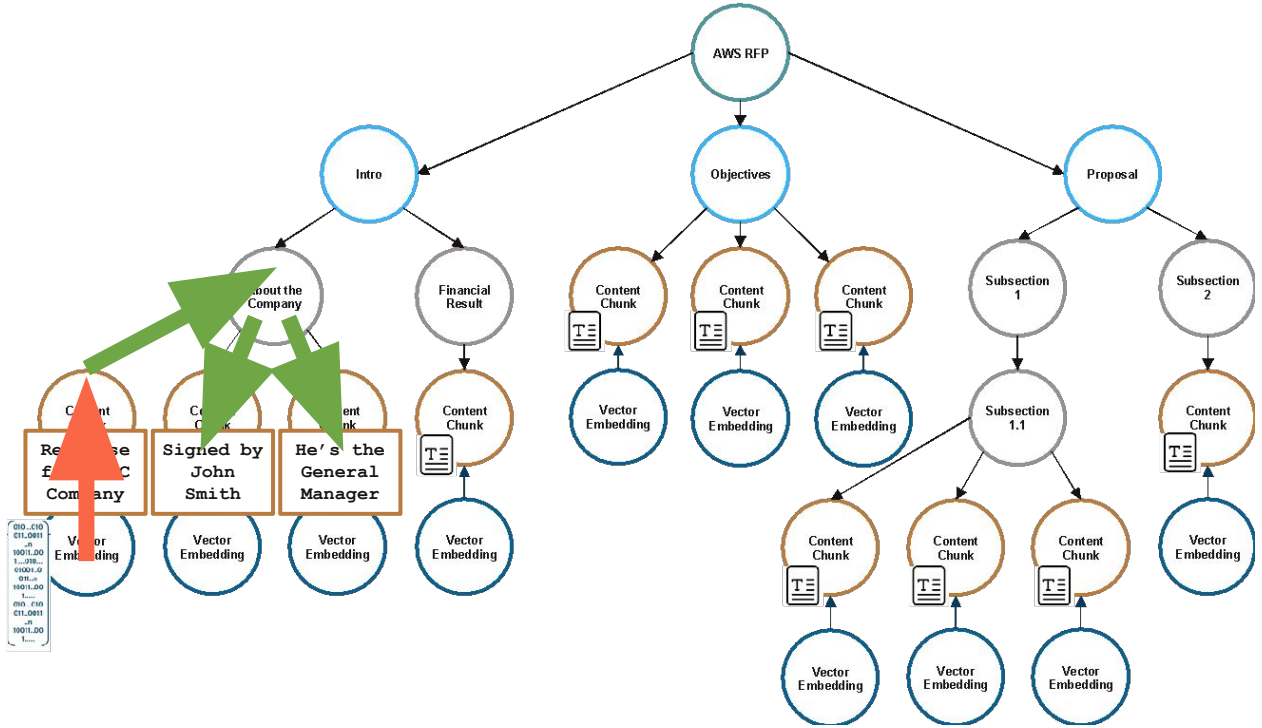
Accurate, Contextual and Explainable

Similarity Search using
Neo4j Vector Index



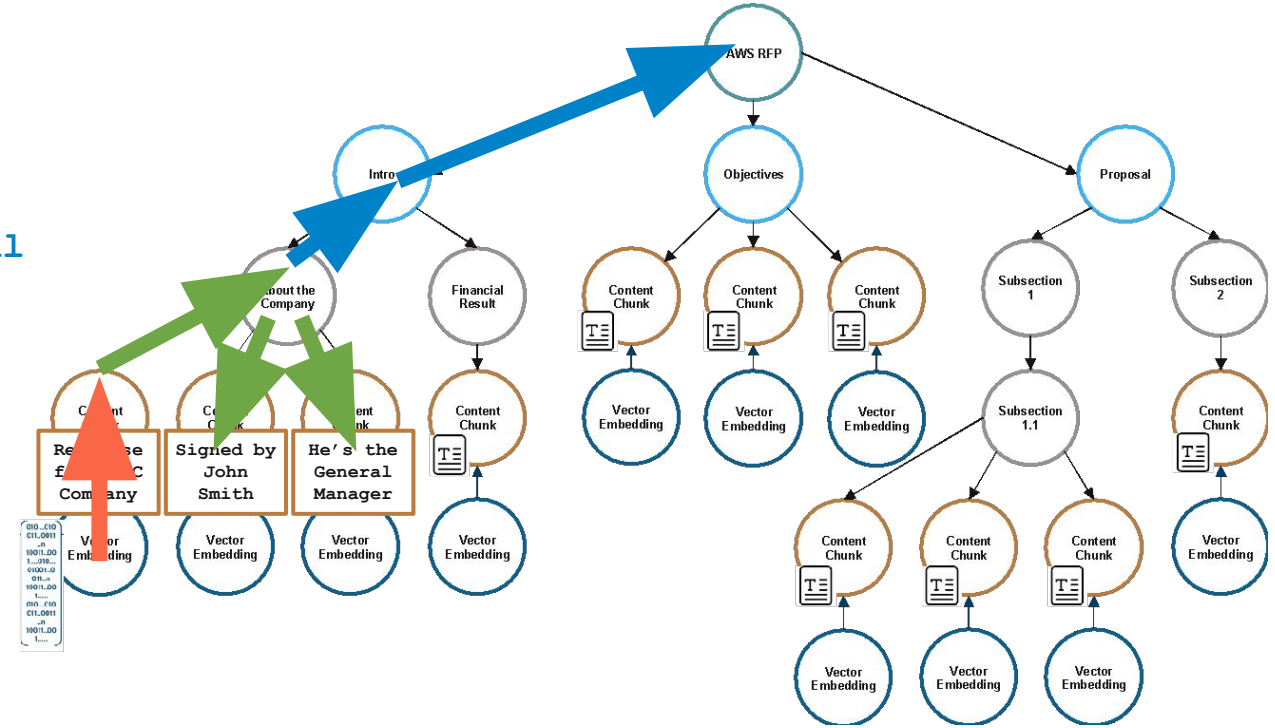
Accurate, Contextual and Explainable

Contextual Knowledge Retrieval within Neo4j KG



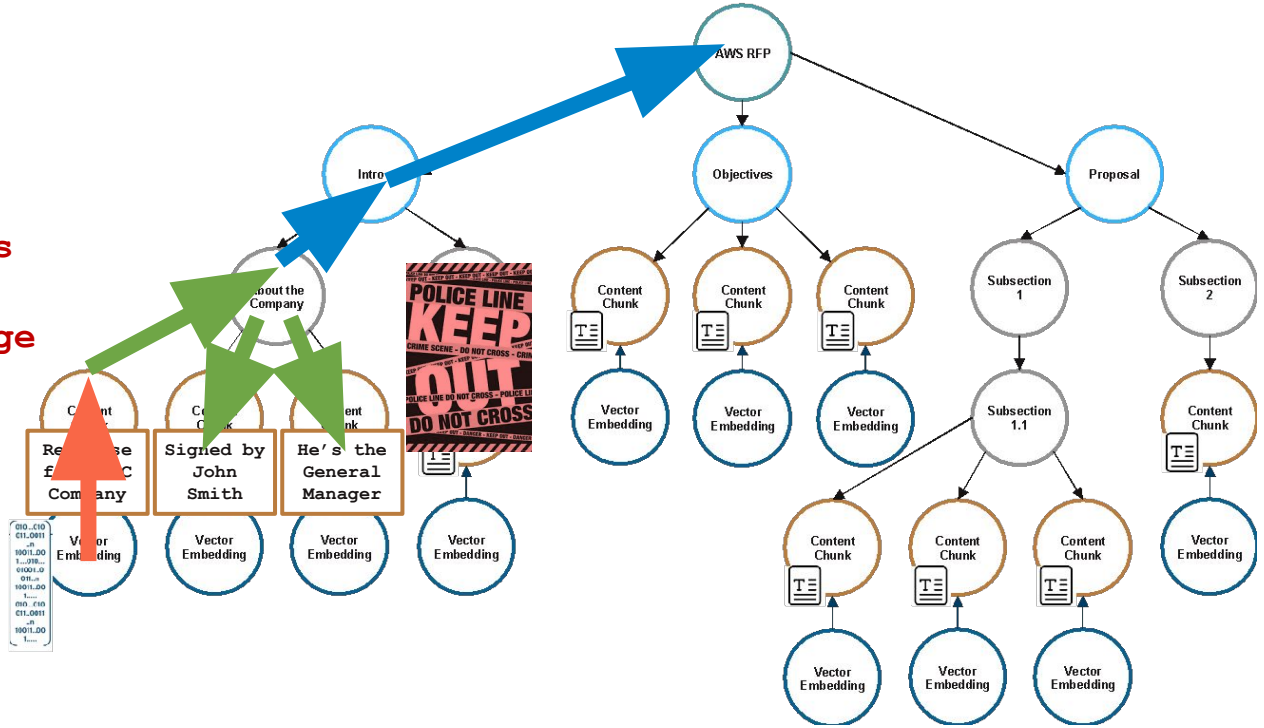
Accurate, Contextual and Explainable

Knowledge Retrieval
to aid in
Explainability

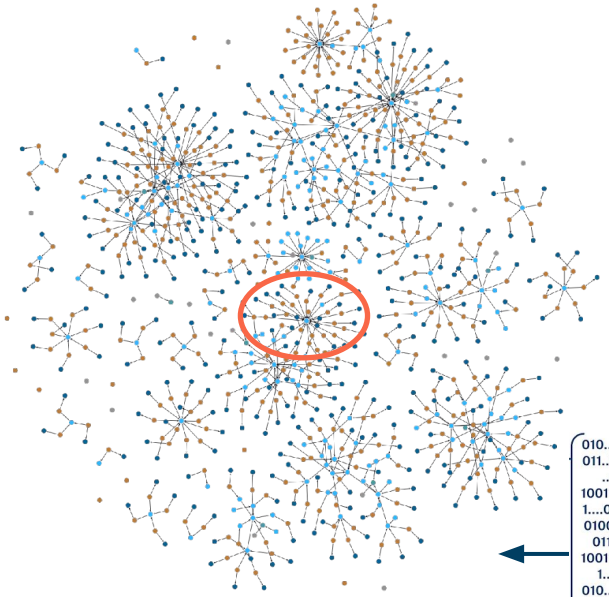


Accurate, Contextual and Explainable

Fine Grained Access Control to prevent **unwarranted Knowledge Retrieval**



Accurate, Contextual and Explainable



Similarity Search using
Neo4j Vector Index

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Vector Embedding

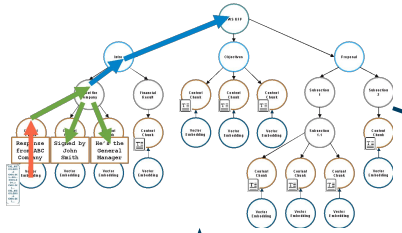
Embedding Model

User Question

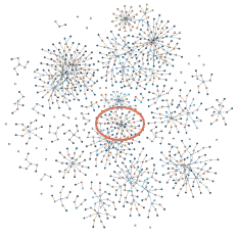
GenAI App

Who is the main respondent of the AWS RFP?

Accurate, Contextual and Explainable



Similarity Result



Similarity Search using
Neo4j Vector Index

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Vector Embedding

Embedding Model

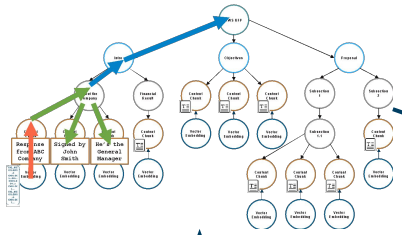
User Question

GenAI App

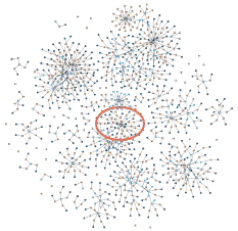
Bedrock LLM

Who is the main respondent of the AWS RFP?

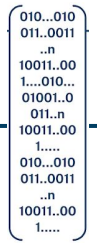
Accurate, Contextual and Explainable



Similarity Result



Similarity Search using Neo4j Vector Index



Vector Embedding

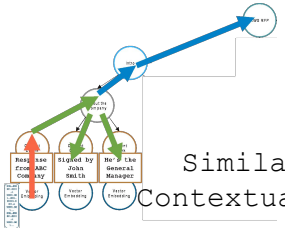
Embedding Model

User Question

GenAI App

Who is the main respondent of the AWS RFP?

Bedrock LLM



Similarity + Contextual Result

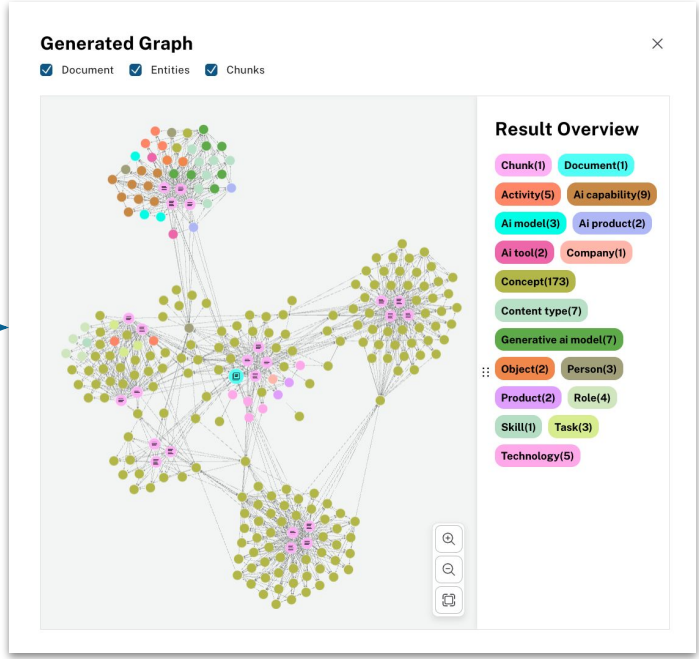
The main respondent of the AWS RFP is John Smith, General Manager XYZ Group representing ABC Company (source: RFP_AWS.pdf, page: 38)

LLM Graph Builder Tool to the rescue

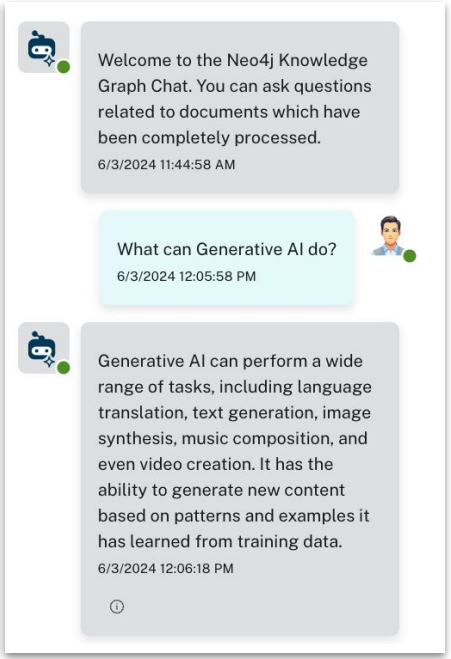
3 Simple Steps

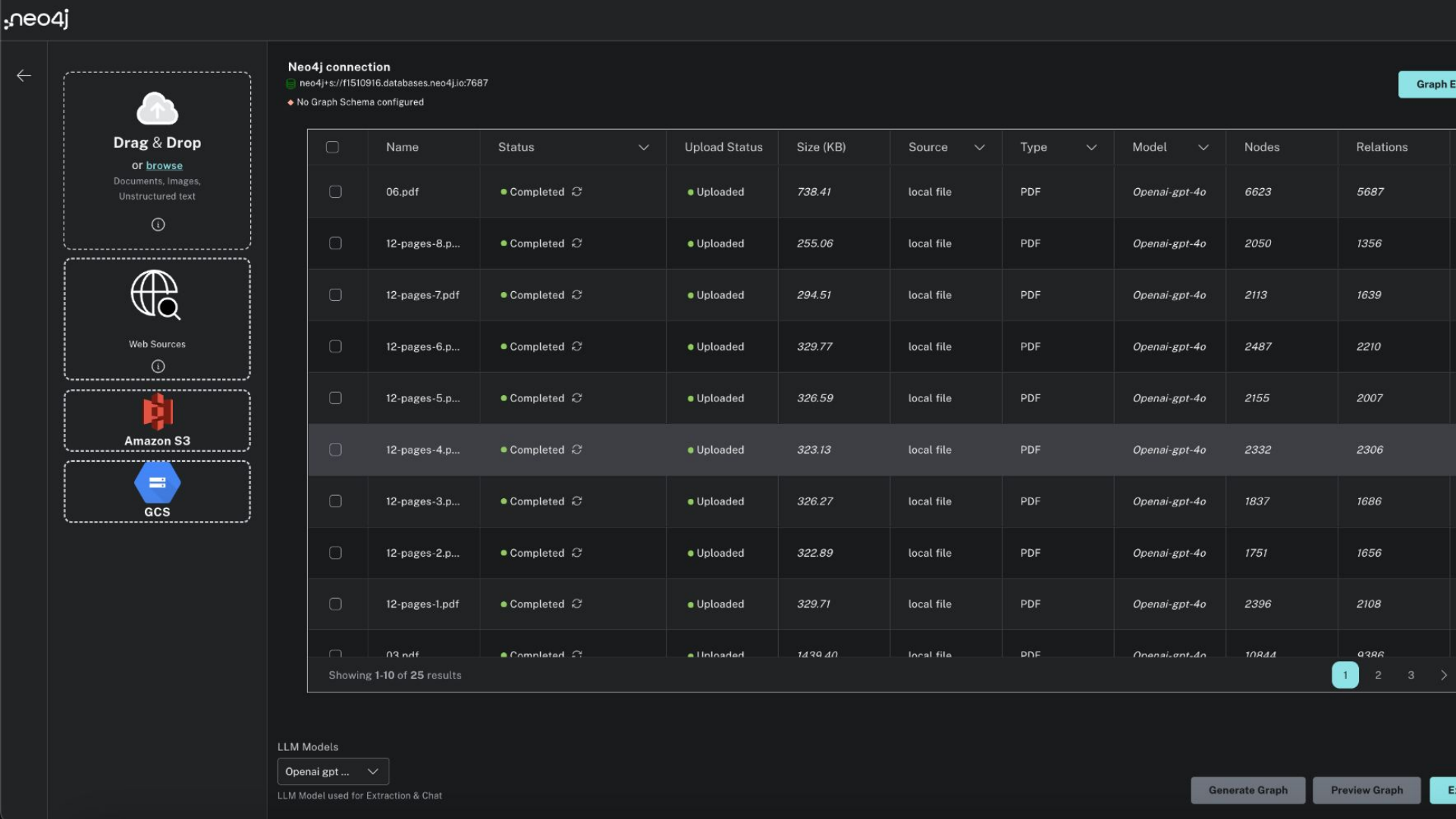
1. Connect to Neo4j
2. Upload Files — pdf, YouTube, cloud storage, wikipedia
3. Generate Graph

View & Explore Your Graph



Power GraphRAG




:neo4j
Drag & Drop
or browse
Documents, Images, Unstructured text
Web Sources
Amazon S3
GCS
Neo4j connection
neo4j+s://f1510916.databases.neo4j.io:7687
No Graph Schema configured
Graph E
Name
Status
Upload Status
Size (KB)
Source
Type
Model
Nodes
Relations
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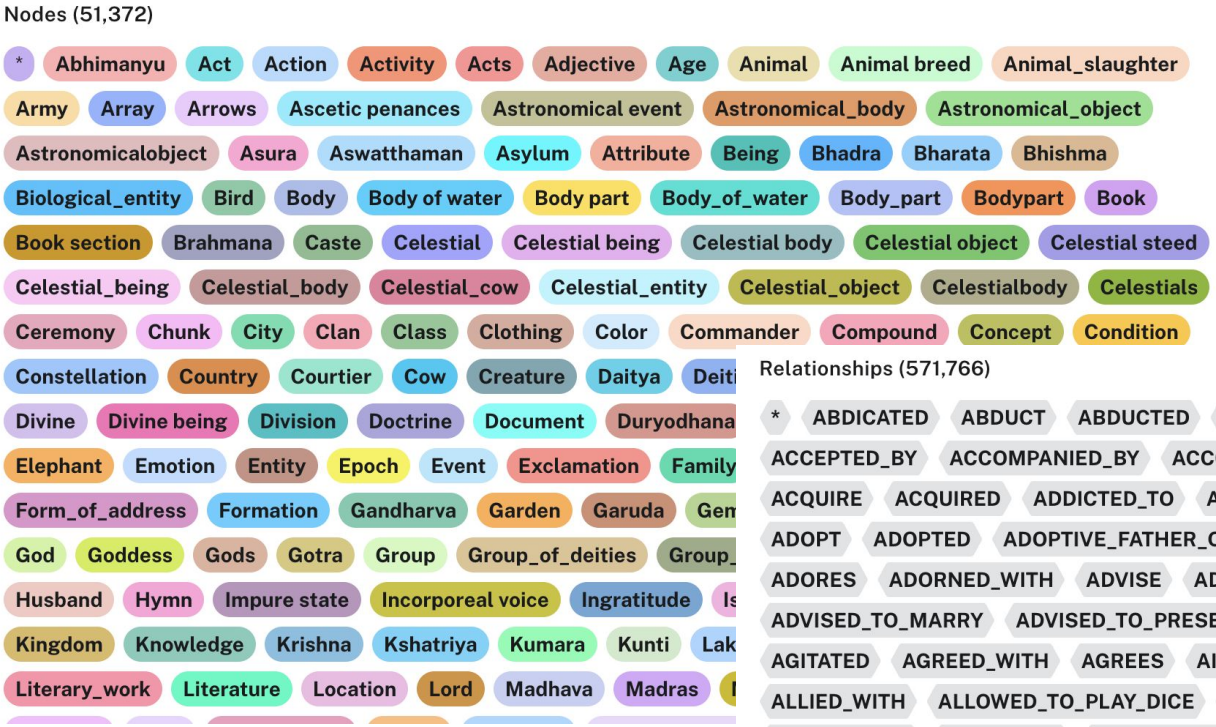
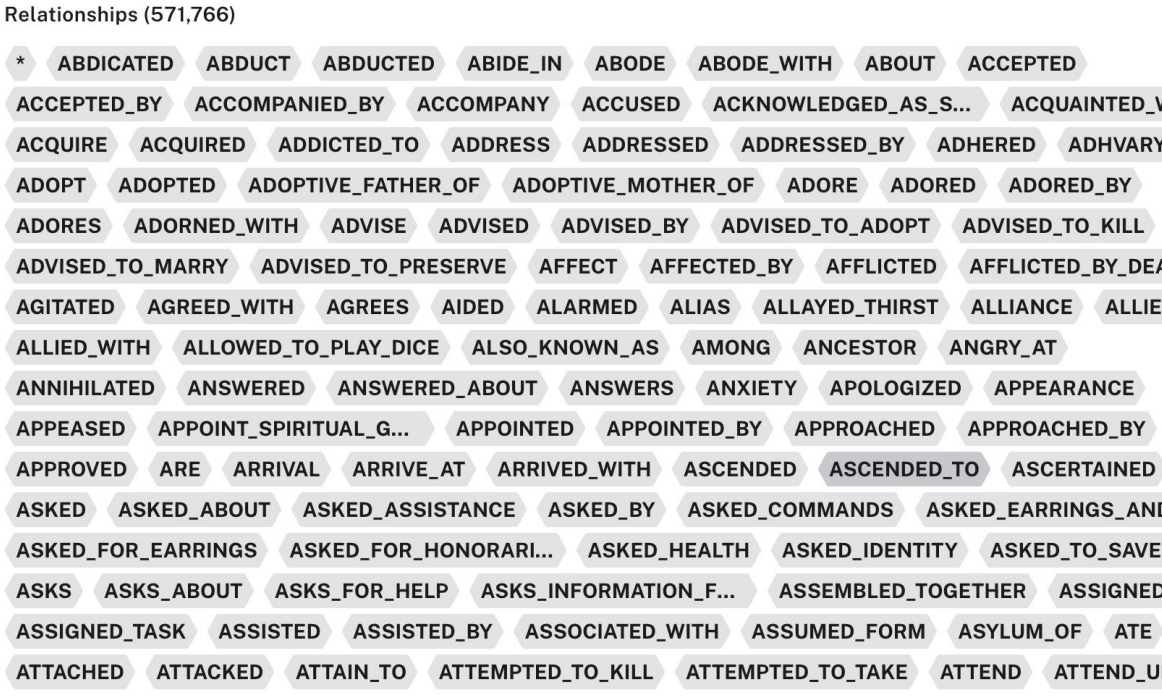
Showing 1-10 of 25 results
1 2 3
LLM Models
Openai gpt ...
LLM Model used for Extraction & Chat
Generate Graph
Preview Graph





51K+ Nodes

500K+ Relationships

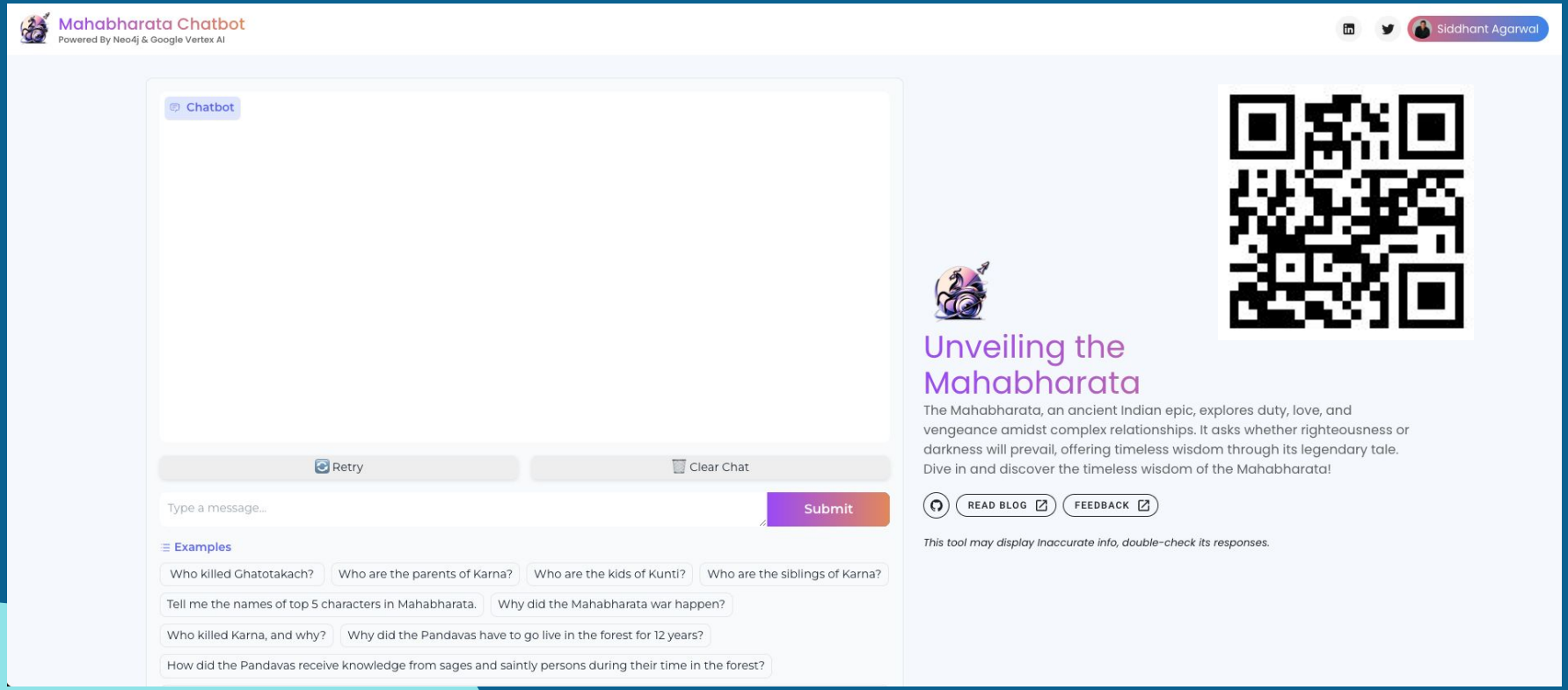
Part 4: Mahabharata 2.0


महाभारत में स्वधम का क्या महत्व है?
What is the significance of svadharma in the Mahabharata?
claude


DEMO TIME

Mahabharata GraphRAG Chatbot

https://mb-aisage.netlify.app/



LLM Graph Builder Application

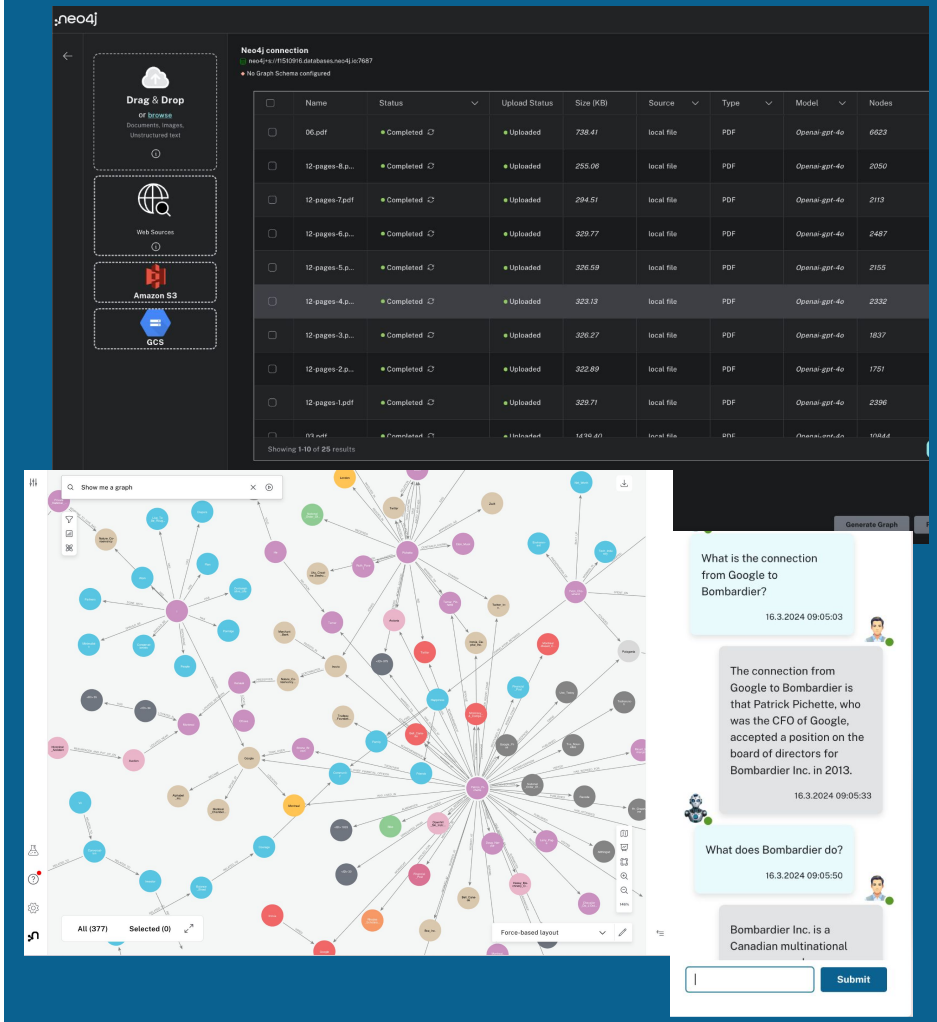
Interactive application to construct knowledge graphs from PDF, youtube transcripts etc.

Hosted on

llm-graph-builder.neo4jlabs.com

Documentation

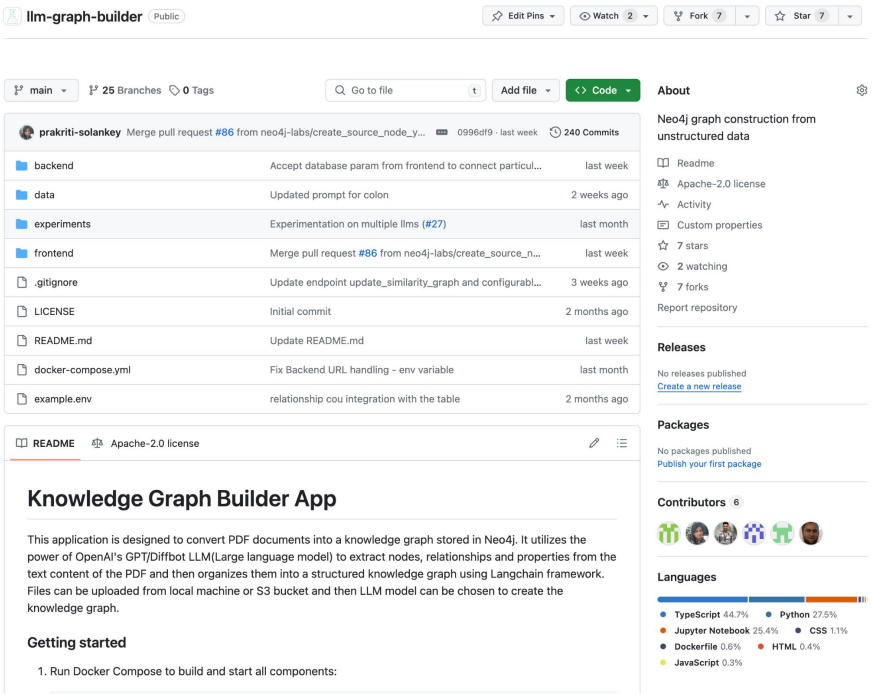
neo4j.com/labs/genai-ecosystem/llm-graph-builder



Open Source Project

github.com/neo4j-labs/llm-graph-builder

- React Front End
  - connect to Neo4j
  - load local PDF, S3 URL, YT Video
  - Wikipedia Enrichment
  - GraphRAG Chat
- Python FastAPI Back End
  - store data in neo4j
  - chunking
  - create embedding (Emb Model)
  - entity extraction (LLM, Diffbot)
  - kNN graph
- Docker(Compose) images



GraphRAG Python Package

GraphRAG Python Package

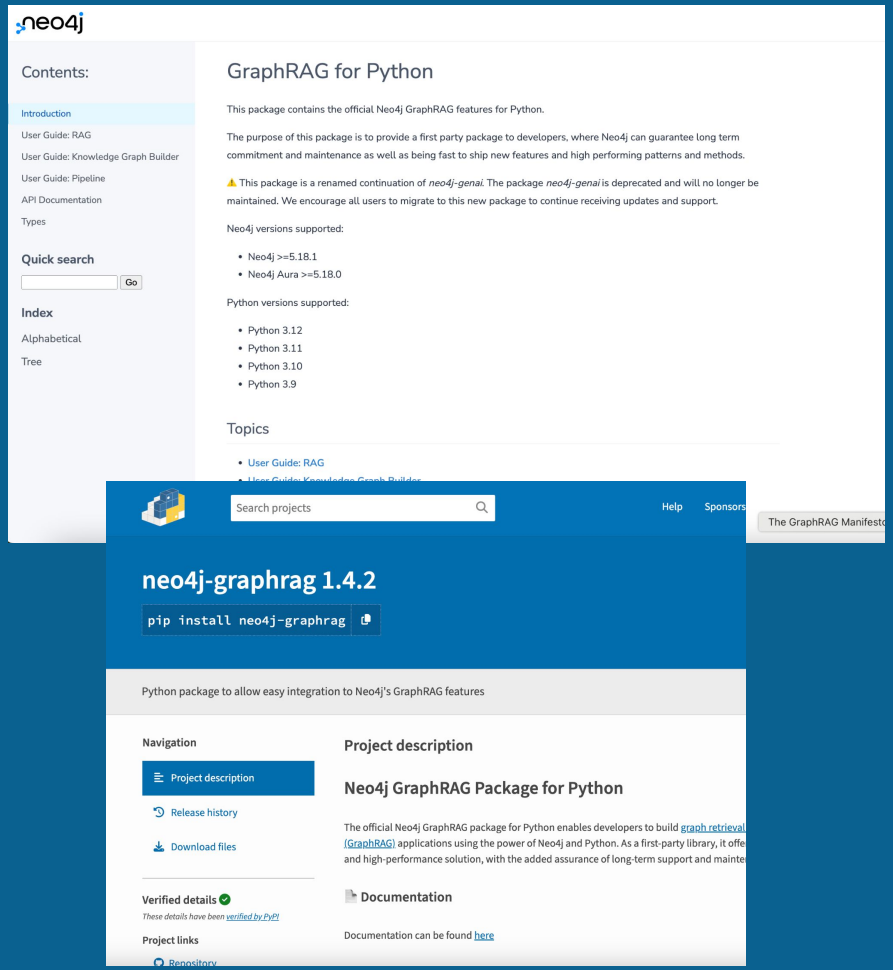
pip install neo4j-graphrag

Neo4j versions supported:

- Neo4j >=5.18.1
- Neo4j Aura >=5.18.0

Python versions supported:

- Python 3.12
- Python 3.11
- Python 3.10
- Python 3.9

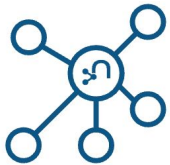


Resources

Resources & Next Steps

Code

github.com/neo4j-product-examples/graphrag-examples



GenAI Ecosystem & Free Learning Resources

Webpage: neo4j.com/genai/
Documentation: neo4j.com/labs/genai-ecosystem/

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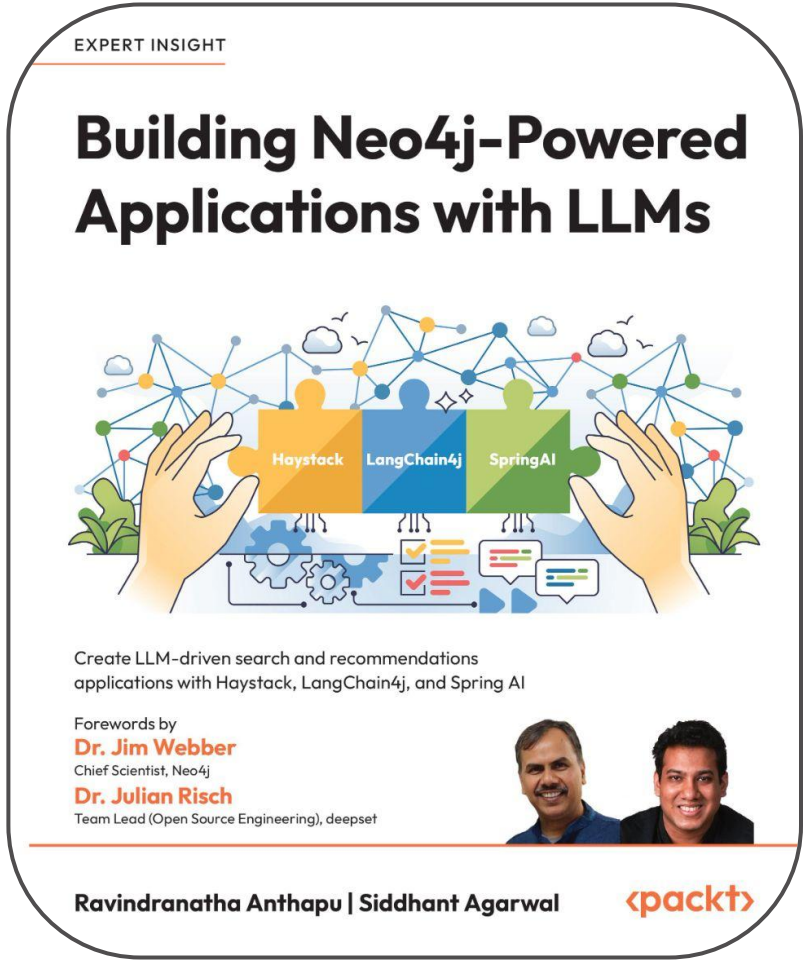

Thank you!

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