Unleash the power of your data with Graph Technology

Nik Vora
Vice President, APAC

HSBC

- Global Bank
- Complex Digital footprint
- Fast paced updates
- Dynamic Standards
- **Automate software updates**
- **Risk of downtimes**
- **Risk of breaking standards**
- **Nervous or slow process due to high risks**

At the heart of every enterprise challenge is an explosion of data complexity

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DATA GROWTH IS ACCELERATING.
EVERYONE IS CONNECTED TO EVERYTHING

200+
Zettabytes

In cloud data storage
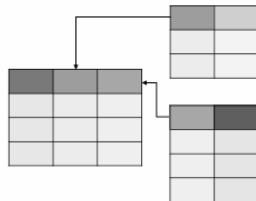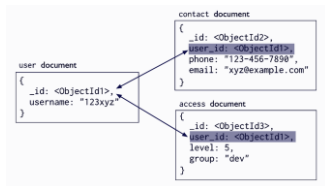by 2025

98

Average volume of
enterprise SaaS apps

41B

Connected IOT
devices by 2025

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Legacy systems
can't keep up

"Relational" Databases
don't handle relationships well

Other NoSQL Databases
don't handle relationships <u>at all</u>

DOING MORE OF THE SAME
IS THE WRONG ANSWER

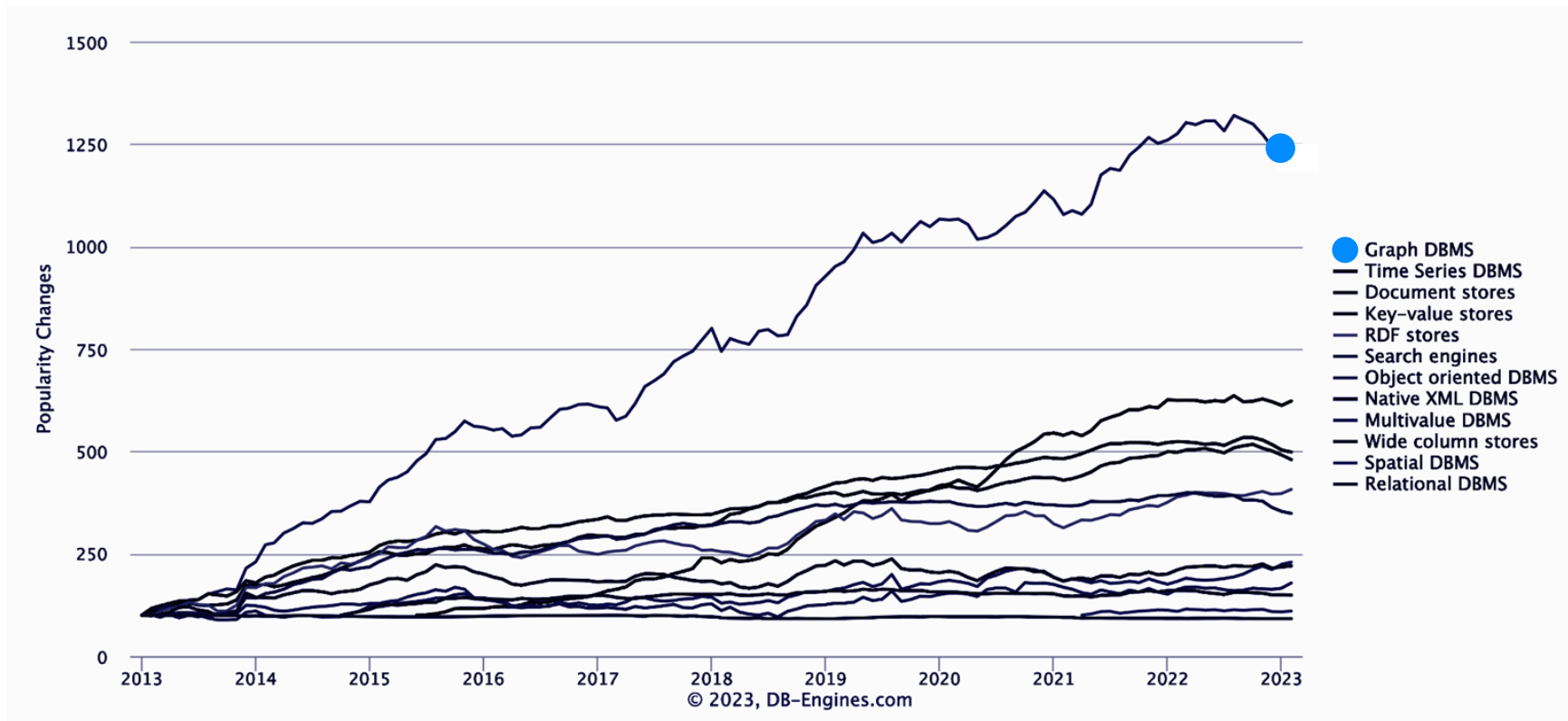# A fundamentally new approach is needed
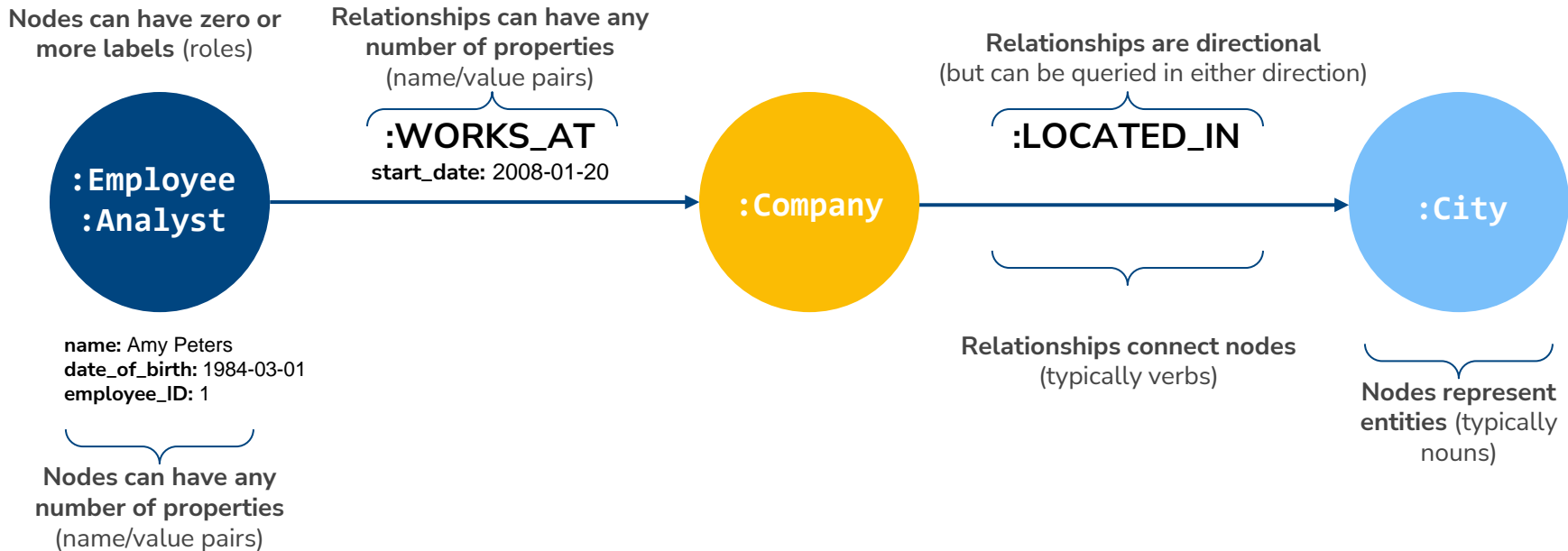
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Data, meet Graph

Graph creates a more intuitive and connected view of data relationships, unlocking deeper understanding and context

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THE FASTEST GROWING DATABASE CATEGORY FOR 10 YEARS

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THE PROPERTY GRAPH: SIMPLY POWERFUL

Nodes can have zero or more labels (roles)

Relationships can have any number of properties (name/value pairs)

Relationships are directional (but can be queried in either direction)

:WORKS_AT

start_date: 2008-01-20

:LOCATED_IN

:Employee :Analyst

:Company

:City

name: Amy Peters
date_of_birth: 1984-03-01
employee_ID: 1

Relationships connect nodes (typically verbs)

Nodes can have any number of properties (name/value pairs)

Nodes represent entities (typically nouns)

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Graph enables organizations to <u>quickly</u> and <u>easily</u> uncover hidden relationships and patterns across billions of data connections

Powering applications that are <u>impossible</u> with other technologies

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HSBC

Uncovering hidden dependencies across their entire platform to manage downtime, enforce standards, and automate go-live was not possible at scale
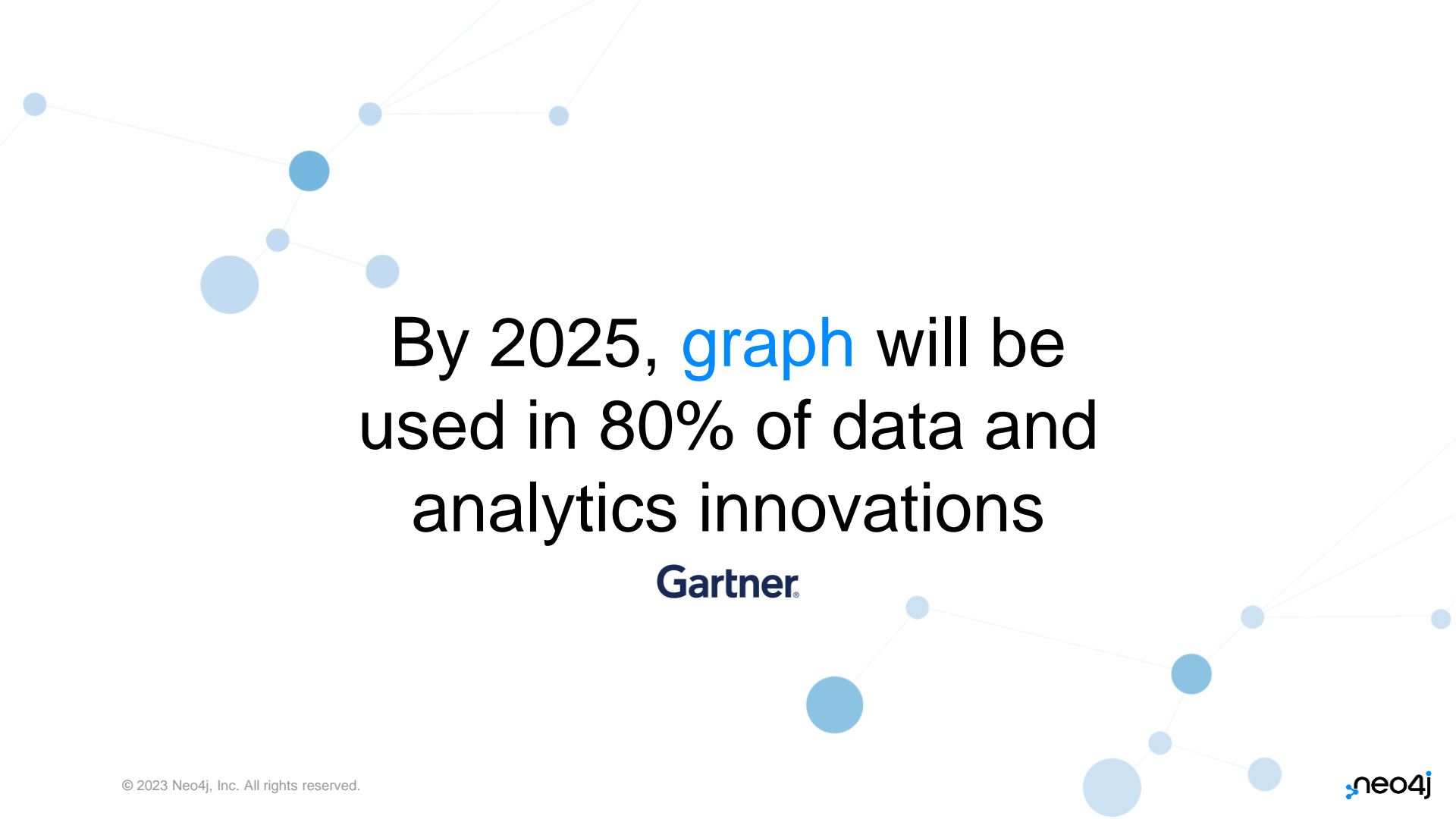
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CATERPILLAR

Unlocking insights for efficient equipment repair and maintenance **across tens of millions of technical documents** was an enormous challenge for Caterpillar

WORLDLINE

Unlocking enhanced customer ticketing experience for journey planning across 6 UK travel operators, transport networks and resources was an enormous task for Worldline.

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By 2025, graph will be used in 80% of data and analytics innovations

Gartner

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Neo4j: The Graph Database & Analytics Leader

neo4j

The first-ever graph database

Creator of the market category

Continued market leader

300
1B+ Enterprise customers

$500M
in funding

170+
Global partner ecosystem

250K
Community of developers and data pros

100M+
Downloads

OUR LEADERSHIP DRIVES ENTERPRISE ADOPTION

—

Recognized in the 2022 Gartner Magic Quadrant for Cloud Database Management Systems

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 & Visualisation
Code-free querying, data modeling and exploration tools for data scientists, developers, and analysts.
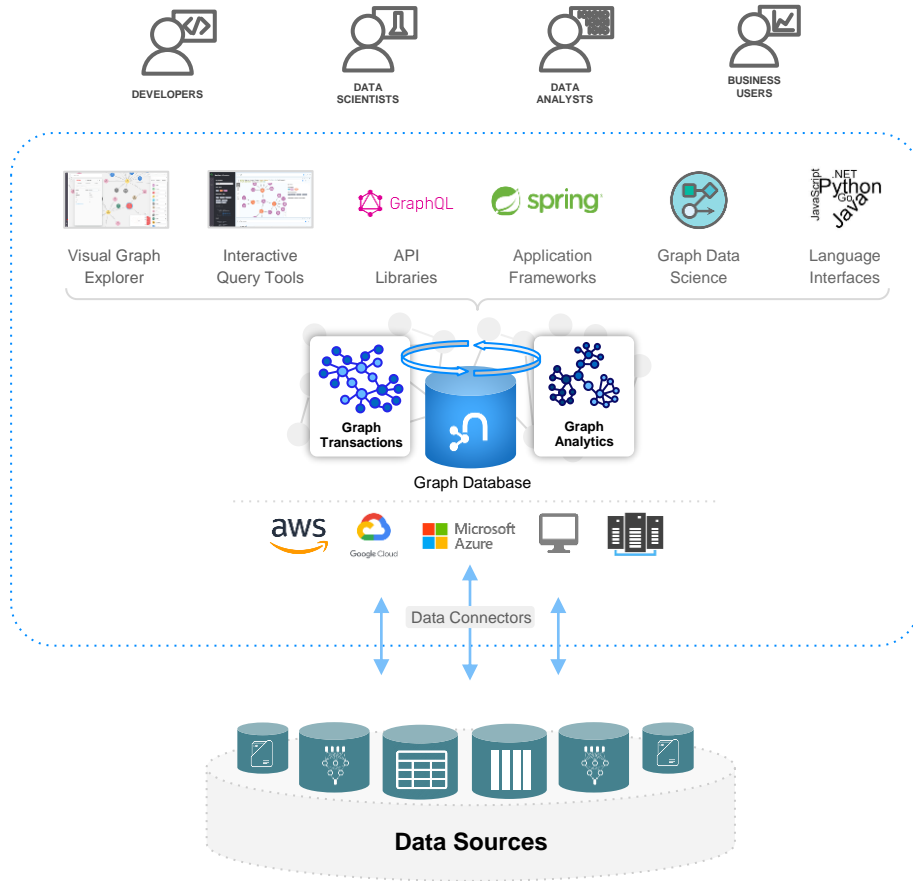
Graph Query Language Support
Cypher & openCypher; Ongoing leadership and standards work (GQL) to establish lingua franca for graphs.

Ecosystem & Integrations
Rich ecosystem of tech and integration partners. Ingestion tools (JDBC, Kafka, Spark, BI Tools, etc.) for bulk and streaming needs.
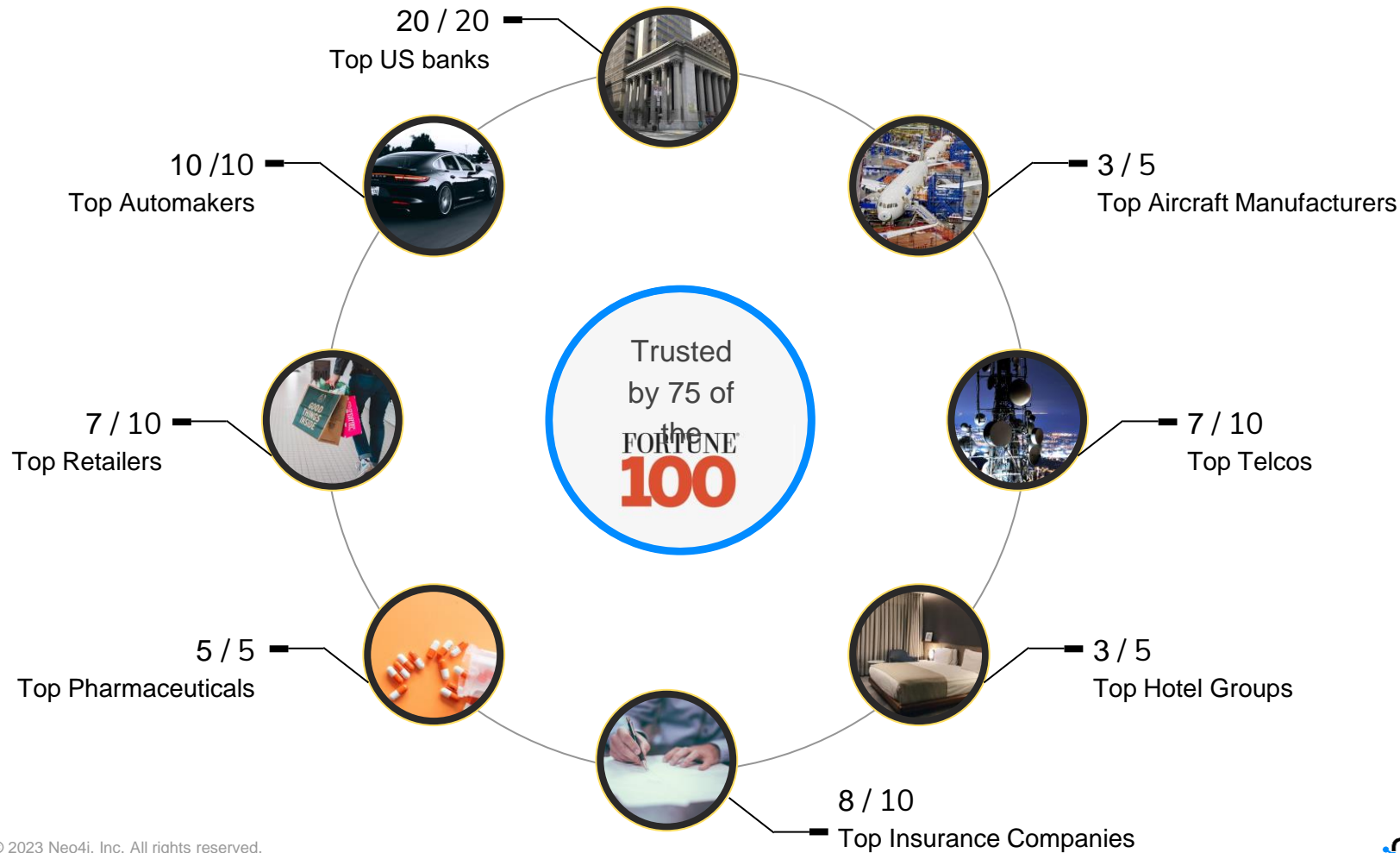
Runs Anywhere
Deploy as-a-Service (AuraDB) or self-hosted within your cloud of choice (AWS, GCP, Azure) via their marketplace, or on-premises.

Industry leaders choose graph

Trusted by 75 of the FORTUNE 100

20 / 20
Top US banks

3 / 5
Top Aircraft Manufacturers

10 / 10
Top Automakers

7 / 10
Top Telcos

7 / 10
Top Retailers

3 / 5
Top Hotel Groups

5 / 5
Top Pharmaceuticals

8 / 10
Top Insurance Companies

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PLUGS INTO YOUR EXISTING DATA ECOSYSTEM

PART OF A THRIVING PARTNER ECOSYSTEM

Cloud

Google Cloud

aws

Azure

Global Systems Integrators

EY

Deloitte.

accenture

tcs

Infosys

Capgemini

Technology

databricks

+ableau

CONFLUENT
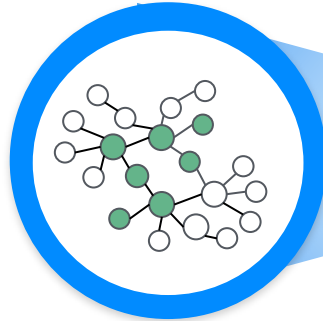
Solutions

LINKURIOUS

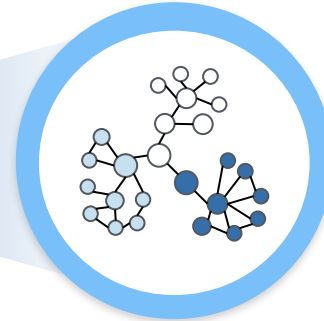
NEORIS

GraphAware

微云数聚
www.we-yun.com

LARUS

expero

neo4j

NEO4J: FOR APPLICATIONS <u>AND</u> ANALYTICS

Intelligent Applications

Better Predictions
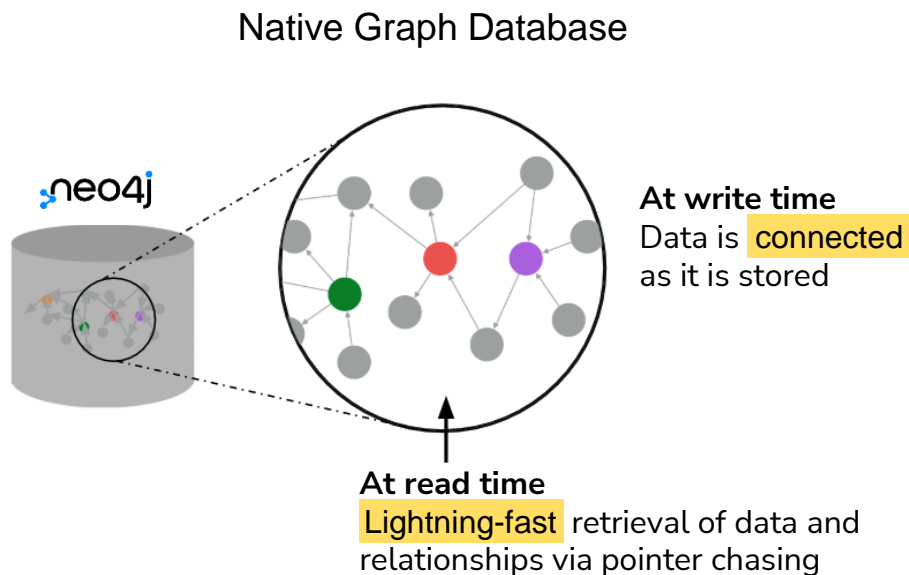
Graph Transactions,
Storage & Querying

Graph Analytics, ML,
& Data Science

NATIVE GRAPH ARCHITECTURE: FAST, FLEXIBLE, SCALABLE

Native Graph Database

At write time
Data is connected as it is stored

At read time
Lightning-fast retrieval of data and relationships via pointer chasing

Native Graph Storage
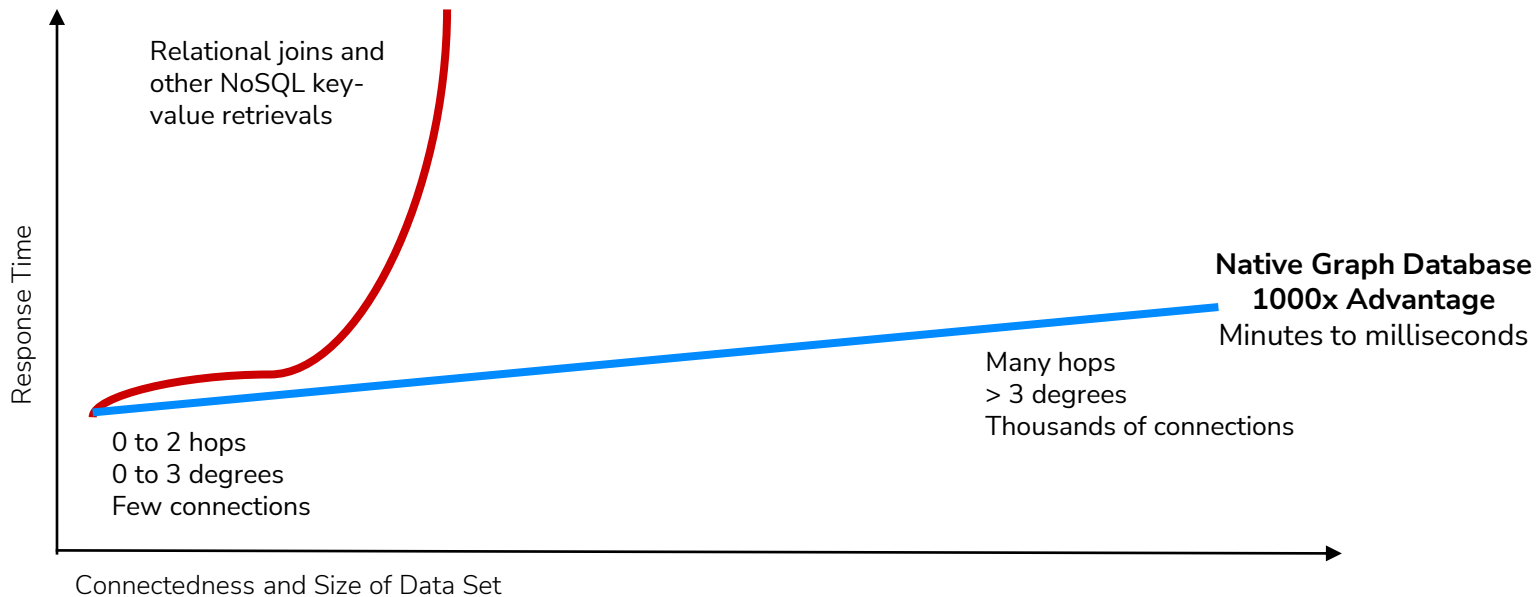✔ No model mismatch
✔ Data integrity with ACID
✔ Flexible schema

Native Graph Processing
✔ 1000x faster than relational
✔ Easy-to-use, native graph query language

Scalable sharded Clusters
✔ Autonomous Clustering
✔ Unlimited high throughput
✔ Elastic scale-out to 100s of machines across clusters
✔ Federated queries of scaled out shards
✔ Instant composite database
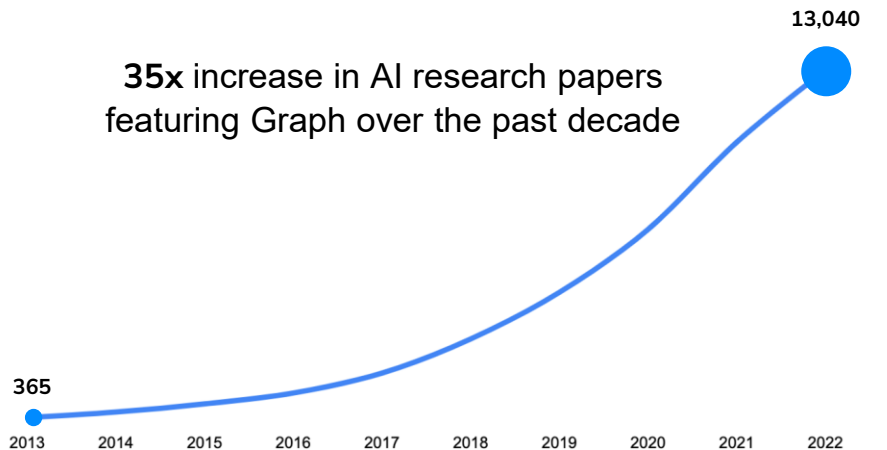
QUERY PERFORMANCE AS CONNECTIVITY INCREASES

Relational joins and other NoSQL key-value retrievals

Response Time

Native Graph Database
1000x Advantage
Minutes to milliseconds

0 to 2 hops
0 to 3 degrees
Few connections

Many hops
> 3 degrees
Thousands of connections

Connectedness and Size of Data Set

Deeper understanding with
Graph Data Science

HUGE INTEREST IN GRAPH FUELED BY AI & ML

35x increase in AI research papers featuring Graph over the past decade

13,040
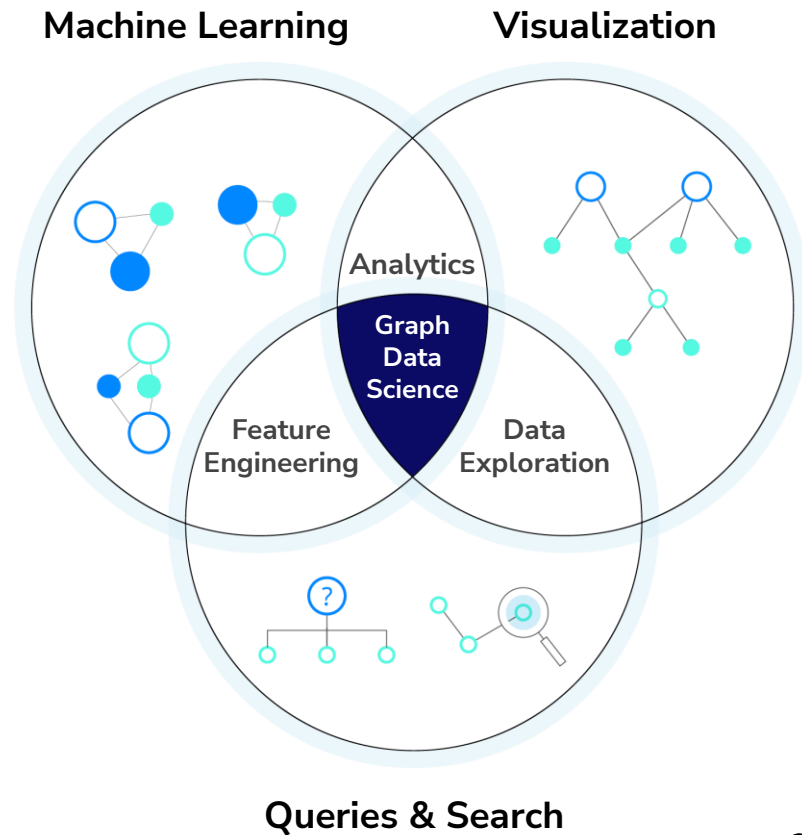
365

2013 2014 2015 2016 2017 2018 2019 2020 2021 2022

Source: Dimensions Knowledge System

"50% of Gartner inquiries on the topic
of AI involve discussion of the use of graph technology."

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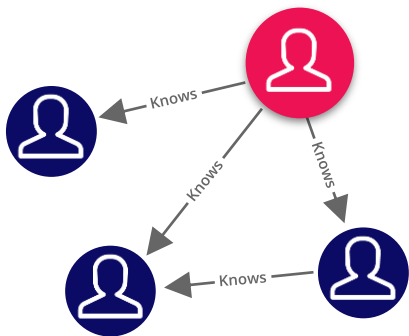
NEO4J GRAPH DATA SCIENCE AND MACHINE LEARNING

WHAT? Use context and relationships between data points to enhance analytics and ML

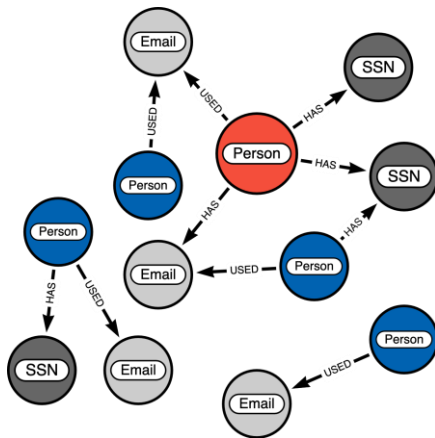**WHY?** Faster, simpler, more accurate predictions and models whenever context matter.

Machine Learning

Visualization

Analytics

Graph
Data
Science

Feature
Engineering

Data
Exploration

Queries & Search

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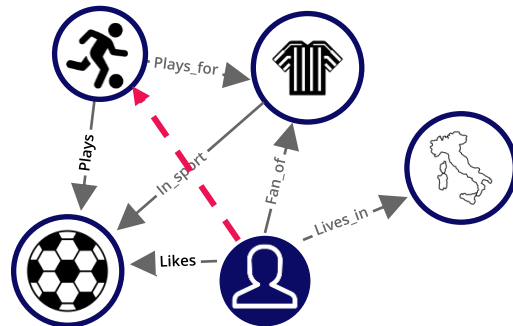# GRAPH DATA SCIENCE: MAKE SENSE OF DATA RELATIONSHIPS
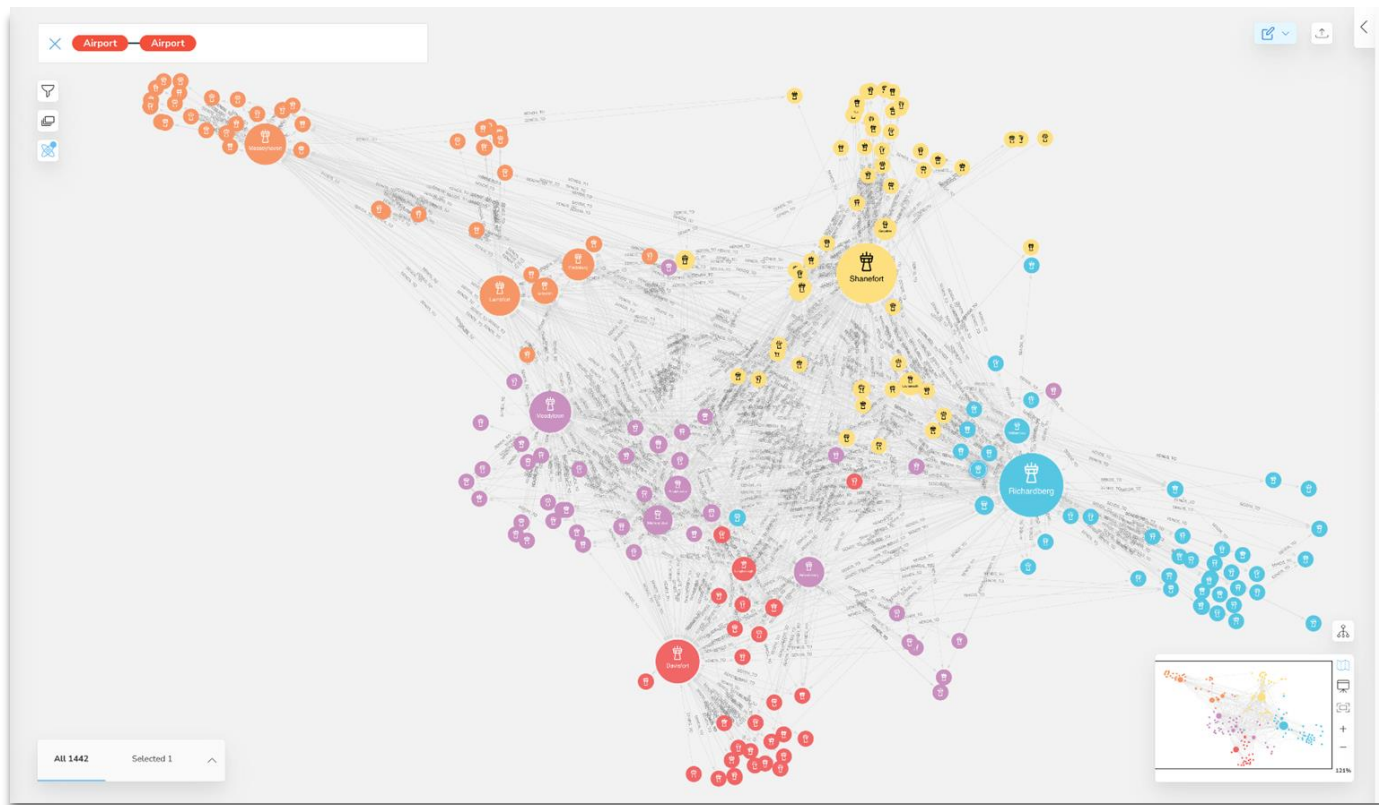

What's important?

What's unusual?

What's next?

Explore the hidden patterns and features in your data

GRAPH STRUCTURE MAKES ANALYSIS EASY TO UNDERSTAND

BETTER BUSINESS OUTCOMES
WITH THE DATA YOU ALREADY HAVE

Removes complexity and eliminates pain

❌ Complex joins operations

❌ Mining multiple tables

❌ Brute force comparisons

❌ Fractured data

❌ Tedious manual approximations

+

Optimizes Data Science workflows

- **95% reduction** in Machine Learning computation time

- Up to **500x faster** than open source libraries

=

Improves business outcomes

Up to **30% improvement** in model performance

3x better churn predictability
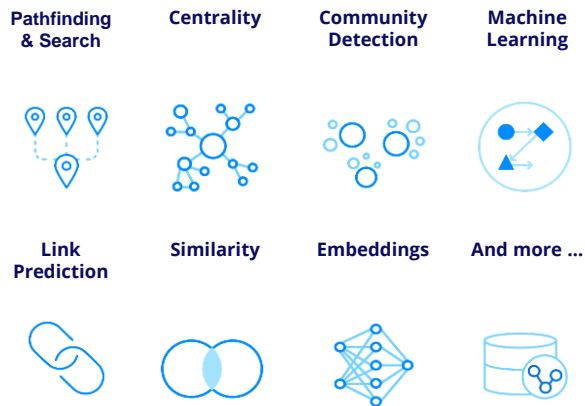
5x reduction in factory production lead time

600% improvement in traffic
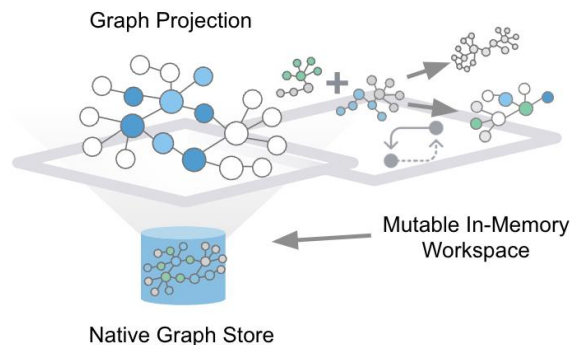
$5 million of additional fraud cases detected

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IMPROVE MODELS AND ANSWER BIG QUESTIONS

## The Largest Catalog of Graph Algorithms

Pathfinding & Search

Centrality

Community Detection

Machine Learning

Link Prediction

Similarity

Embeddings

And more ...

Over 65 pretuned, parallelized algorithms.

Native Graph Catalog and Analytics Workspace

Graph Projection

Mutable In-Memory Workspace

Native Graph Store

Iterate fast with different data sets, models, and version trained models.

Graph Embeddings for Machine Learning

node
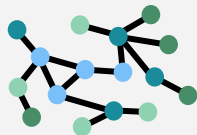
u

$f : u \to \mathbb{R}^d$

vector

$\mathbb{R}^d$
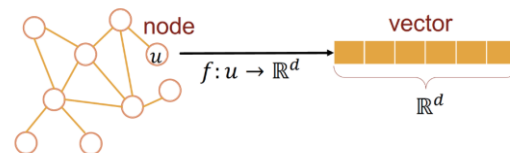
Bring the context of your connected data into a format that other pipelines can ingest.

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GRAPH DATA SCIENCE MATURITY MODEL

Knowledge Graphs

Graph Algorithms

Graph Na~~ive~~ ML

Find the patterns you're looking for in connected data

Identify associations, anomalies, and trends using unsupervised machine learning

Learn features in your graph that you don't even know are important yet

Neo4j Graph Database & Analytics
The future of enterprise data

Thank you!
See you at Neo4j Booth- 9