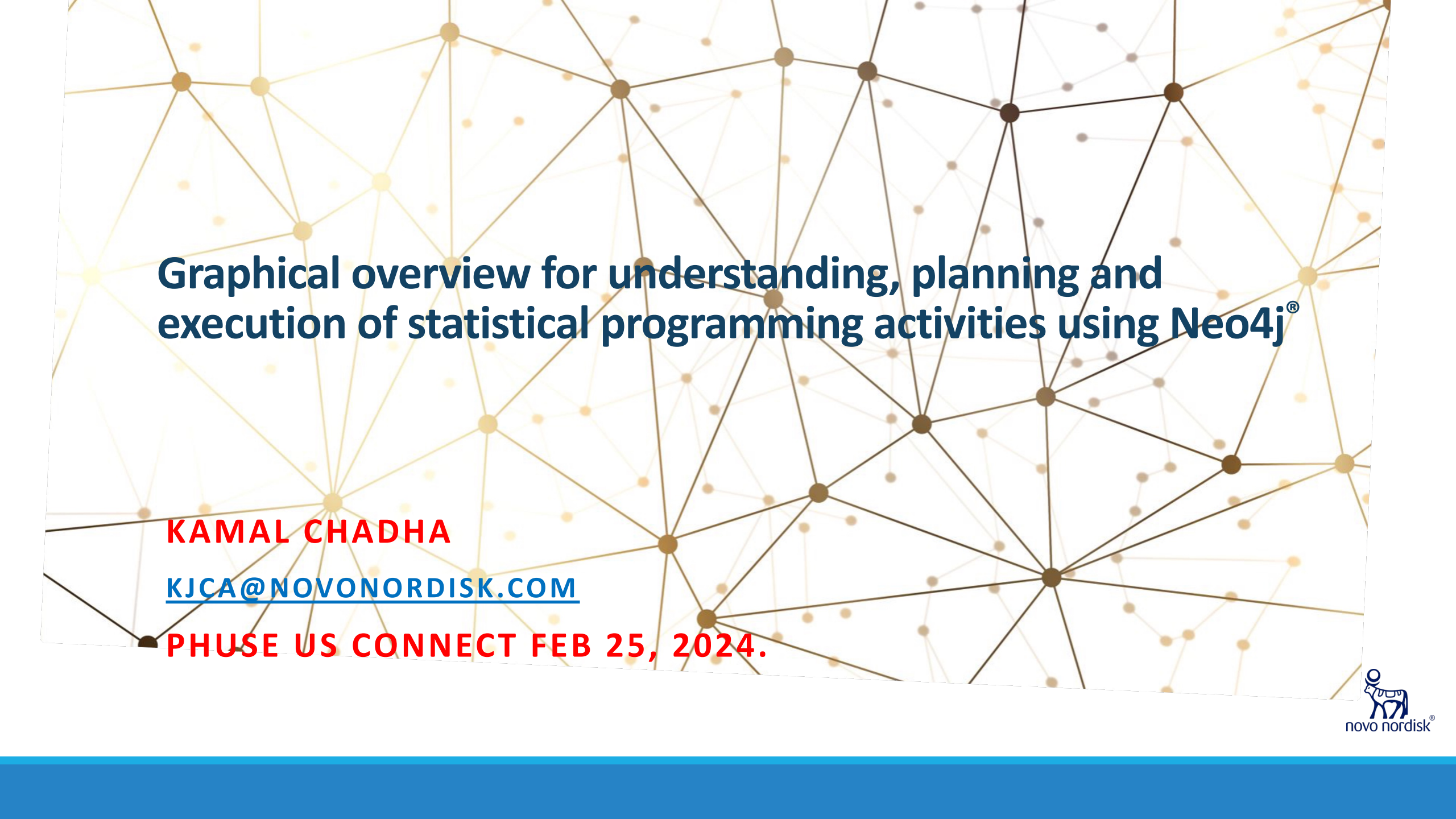




Graphical overview for understanding, planning and execution of statistical programming activities using Neo4j®

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PHUSE US CONNECT FEB 25, 2024.

Agenda

Introduction to Graph theory.

Information about Neo4j.

A live demo – for data visualization using Neo4j.

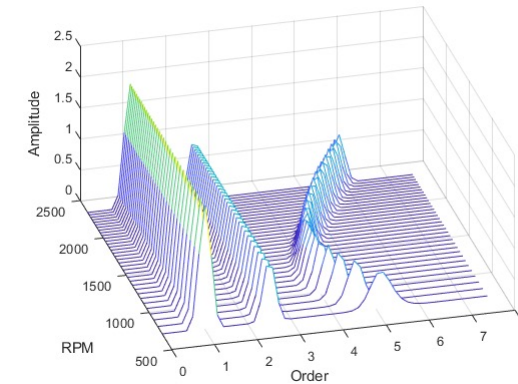
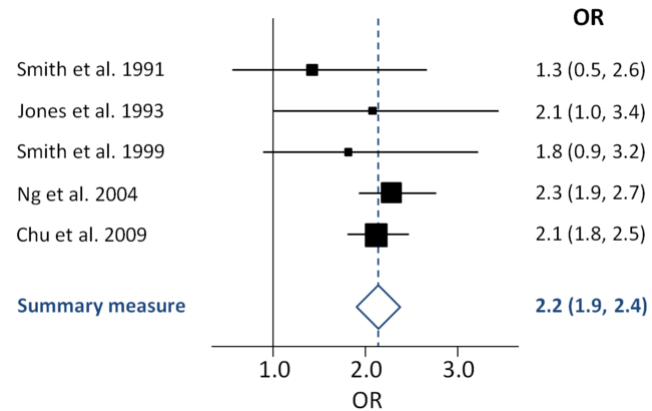
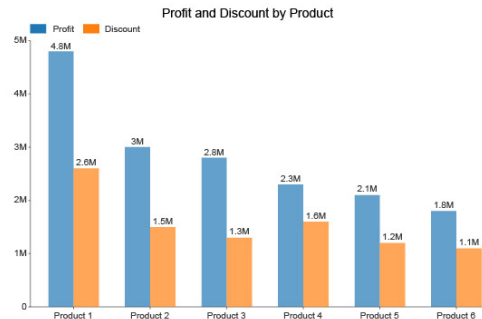
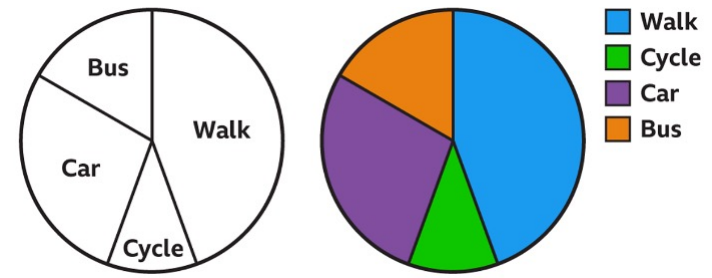
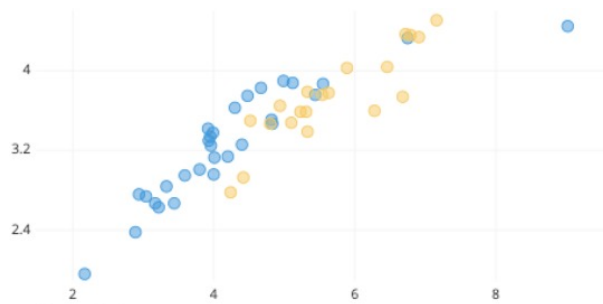
A fun activity.

Q&A.

Disclaimer

Views and experiences expressed are those of the presenter, and not necessarily Novo Nordisk.
Also, this presentation should not be seen as an advertisement for Neo4j®.

Data Visualization



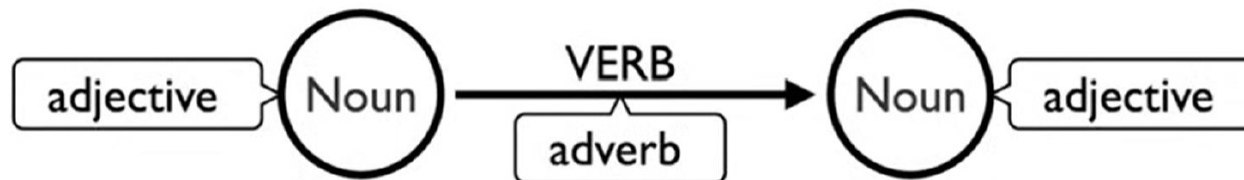
Introduction: Graph Theory

Study of Relationships – where a set of discrete objects, are connected to each other...

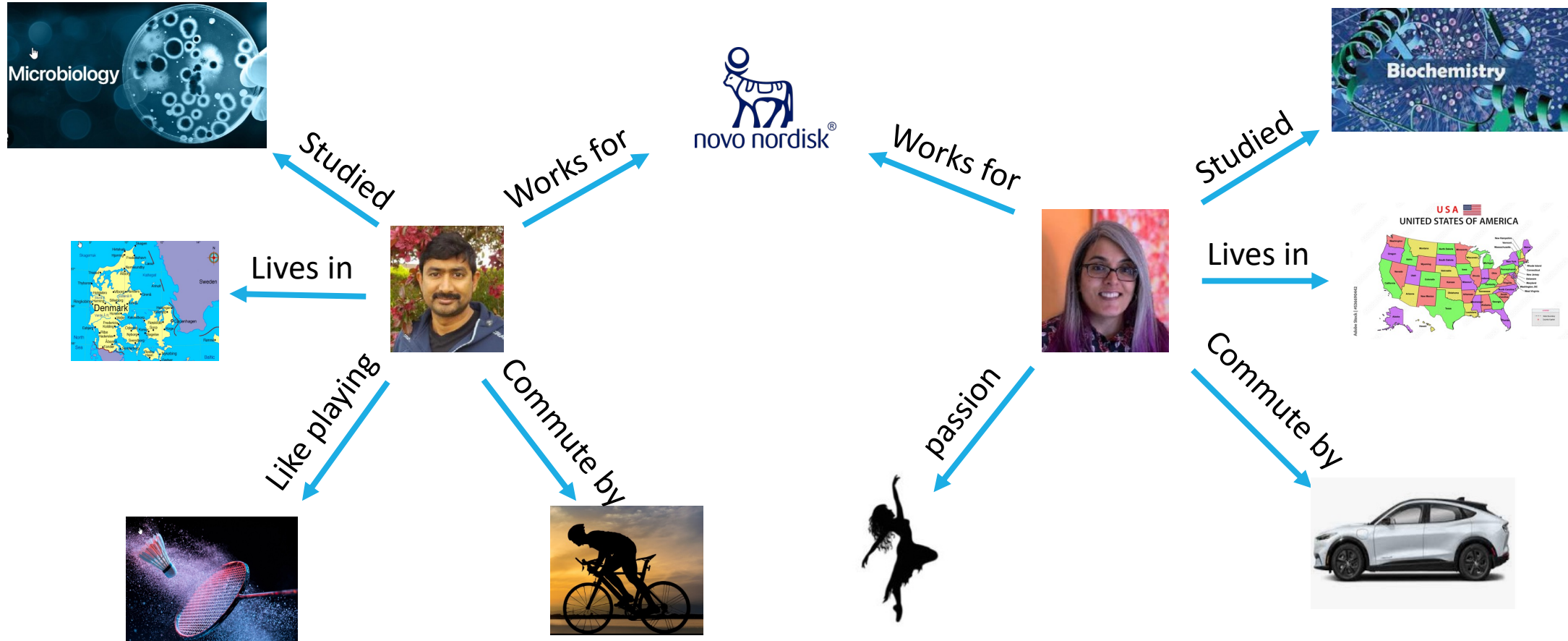
Represented by NODES (aka. Vertices) and EDGES (represented by Relationships).



In language terminology, above image can be shown as



Introduction: Graph Theory



Introduction: Neo4j®

2000

Neo4j's founders encountered performance problems with RDBMS and started building the first Neo4j prototype



Emil



Johan



Peter

2002

Developed the first ever version of Neo4j

2003

First 24x7 production Neo4j deployment

2007

Formed a Swedish-based company behind Neo4j. Also open sourced the first graph database, Neo4j, under the GPL

2010



Released
Neo4j version 1.0

2011

Raised A round and moved headquarters to Silicon Valley

Introduction: Neo4j®

Products:

GRAPH DATABASE

Neo4j Graph Database:

Self-managed, deploy anywhere

Neo4j AuraDB:

Fully managed graph database as a service

GRAPH DATA SCIENCE

Neo4j Graph Data Science:

Graph Analytics and modeling platform.

GRAPH TOOLS

Neo4j Developer Tools

Neo4j Workspace

Neo4j Bloom

Cypher Query Language

Neo4j® AuraDB Free

AuraDB Free

Free

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

[Get Started Free](#)

AuraDB Professional

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\$65/month*

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

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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

Over to Live Demo.

Applications

Novo Nordisk: Leveraging the Graph for Clinical Trials and Standards

Global healthcare company Novo Nordisk uses Neo4j as the backbone of an application that streamlines the process of collecting and reporting clinical studies data.

In the world of pharmaceuticals, rigorous testing must take place before new drugs and treatments advance out of the laboratory. But before a new drug gets to market — this goes for Novo Nordisk and all other pharma firms — they must prove the drug is effective against the disease and that it's safe to use.

Enter clinical trials and their many phases. Putting a new treatment through clinical trial is rigorous and time consuming; the trial must be documented every step of the way using universally accepted controlled terminology for the values and items within datasets. This gets even more complicated when the trial is global, with data being collected in different languages, units of measure, and more.

By the numbers: Novo Nordisk

- **Nodes:** One Million
- **Relationships:** Two Million +
- **Platform:** Neo4j Enterprise



Use Cases

- Knowledge Graph

Related Articles

Combating Disease Using
Graphs: The 5-Minute Interview
With Henrik Enquist

Applications

Novartis Case Study

Novartis Captures the Latest Biological Knowledge for Drug Discovery

The Challenge

Novartis has amassed decades of data on how various compounds affect protein targets, such as enzymes, with about a billion data points in all. That historical data is critical but sparse compared with the amazing granularity of the data currently being collected.

Today, Novartis uses an automated process that captures high-content image data showing how a particular compound has affected an entire cell culture. This generates terabytes of phenotypic data.

Novartis faced the challenge of combining its historical data stores with this burgeoning phenotypic data. They also needed a way to place all this data within the larger context of ongoing medical



NOVARTIS

Use Cases

- Knowledge Graph

Applications

Knowledge Graph-Powered Diabetes Research

The Challenge

About seven million Germans suffer from diabetes –one of the biggest common national diseases. In order to better understand its causes, DZD scientists examine the disease from different angles.

"Our goal was to enable access to the data across locations, disciplines, species, and data types," said Prof. Dr. Martin Hrabě de Angelis, DZD board member. "At the same time, the more than 450 scientists in the DZD should also be able to access external expertise."

The Solution

Launched in 2017, DZDconnect, the DZD's knowledge graph built on Neo4j, serves affiliated healthcare and medical professionals. Layered on top of the DZD's relational databases, DZDconnect links the systems and data silos of the health centers.



DZD
German Center for
Diabetes Research

Use Cases

- Data Discovery

Applications

Graph Data Science Streamlines Complex Medical Supply Chain Analysis

The Challenge

Boston Scientific is highly vertically integrated in the development, design, manufacturing and sales of its medical products. This means that the company manufactures its complex devices, starting with raw materials such as resin and metal. Starting with raw materials requires a significant amount of batch processing in addition to discrete manufacturing of finished products.

With its complex manufacturing supply chains, Boston Scientific has numerous engineering teams aligned based on the process technology they're using.

Many devices use multiple technologies, so multiple teams are involved. With multiple teams, often in different countries, working on the same problems in parallel, engineers resort to analyzing their data in spreadsheets.

Decentralized ad-hoc analytics led to inconsistencies and, most importantly, an inability to find root causes of defects.



Use Cases

- Graph Data Science

Related Articles

Daten-Detektive helfen bei der Qualitätskontrolle

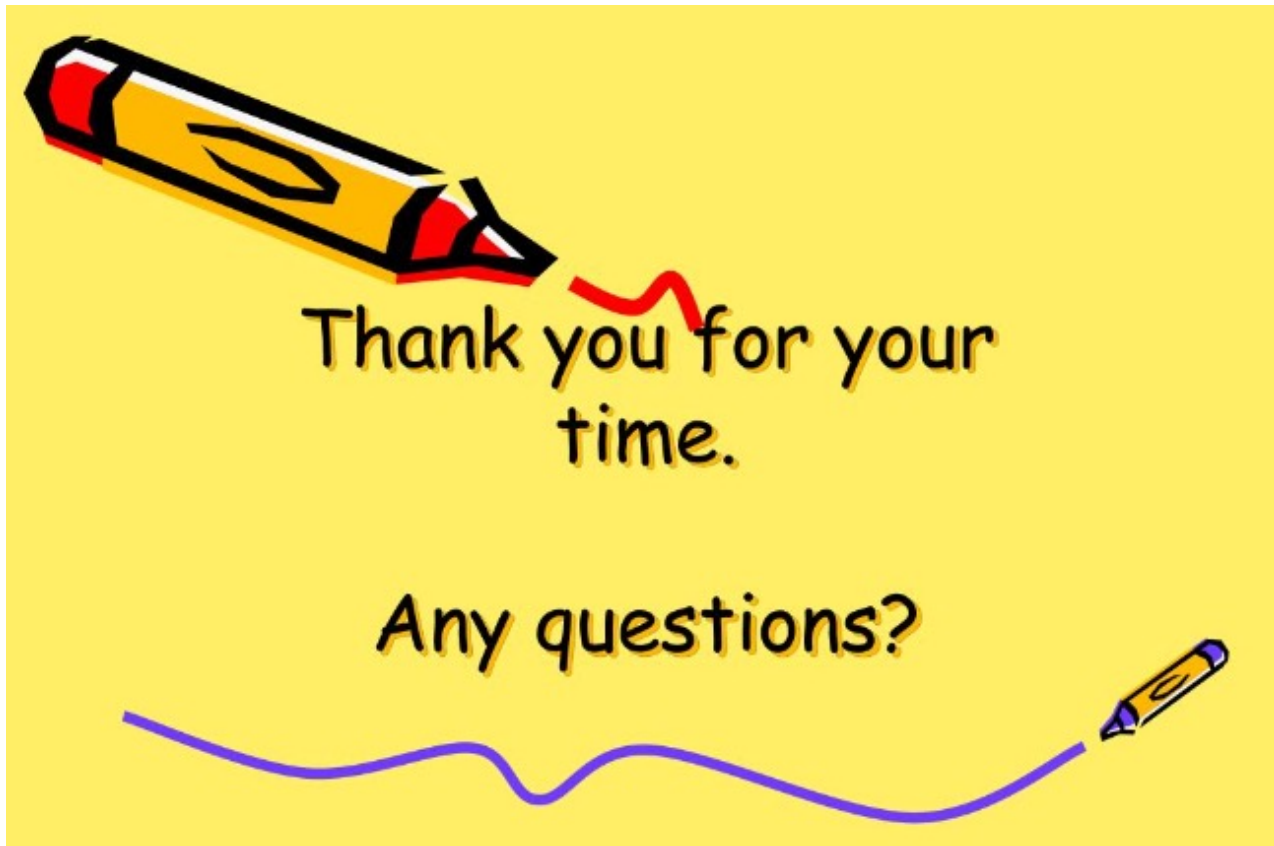
Daten-Detektive in der Qualitätskontrolle

The Journey to Cloud: Implementing AuraDB at Boston Scientific

Pros & Cons

Pros	Cons
Helps to traverse across data from point A -> Z, understanding the intricacies and dependencies.	There is a learning curve - with concepts of graph theory, softwares and associated programming languages.
The output is like drawing on a white board, with thoughts in mind translated to presentation using directional relationships.	Could be a bit confusing for first-time users, for those used to working with traditional relational databases.
It is possible to represent data in an intuitive and versatile way of visualizing data with enhanced query performance.	Constructing graph databases requires a different way of thinking and modelling data, with different query languages.

Over to Fun activity.



References

<https://neo4j.com/>

<https://neo4j.com/cloud/platform/aura-graph-database/faq/>

Intro to Cypher: <https://www.youtube.com/watch?v=pMjwgKqMzi8>

Neo4j (Graph Database) Crash Course: <https://www.youtube.com/watch?v=8jNPelugC2s>

Neo4j Course for Beginners: https://www.youtube.com/watch?v=_lgbB24scLI

Training Series - Intro to Neo4j: <https://www.youtube.com/watch?v=otCRuINPUak>