



Neo4j Graph Analytics Your Path to Intelligent Applications

onnectivity is the single most pervasive characteristic of today's networks and systems. From protein interactions to power grids, from the World Wide Web to airline routes and from social networks to supply chains – networks with even a modest degree of complexity are not random, which means connections are not evenly distributed or static. This is why simple statistical analysis alone fails to sufficiently describe, let alone predict, the behavior of connected systems. Consequently, most big data analytics today do not adequately address real-world systems and have fallen short

in extracting value from our huge volumes of connected data.

As the world becomes increasingly interconnected and systems increasingly complex, it's imperative we use technologies built to leverage relationships and dynamic characteristics. It's no wonder that interest in graph analytics has exploded: Graph analytics were explicitly developed to evaluate connected data. They can reveal the workings of intricate systems and networks at massive scales—for not only large labs but for any organization.



Embracing Graph Analytics

Graph analytics were designed to examine the overall nature of networks and complex systems through their connections. Understanding real-world networks and their dynamics offers immense value for breakthroughs in science and business as well as safeguards against vulnerabilities, especially those unforeseen.

Unfortunately it's been impractical for businesses to capitalize on graph analytics. What's been missing is a connections-first approach where the value of data relationships is never lost and a democratization of graph analytics that frees teams to explore meaning and develop solutions without the burden of unoptimized infrastructure, complicated tools or unattainable specialists. Organizations mired with cumbersome and outdated methods for analyzing systems will continue to overlook opportunities, react late to business dynamics and make costly mistakes. Alternatively, when teams leverage graph analytics that are powerful, easy to use, and accessible, they will make new discoveries, develop solutions faster and have clear, efficient paths to operations. Embracing more practical graph analytics will enable you to demonstrate a clear information advantage and industry influence.

Reveal New Insights

Understanding how networks and complex systems operate, your teams will uncover previously hidden relationships and patterns, leading to new insights and discoveries as well as superior real-time operations.

Build Intelligent Applications Faster

Greatly increase the productivity of data scientists and solutions teams by deploying integrated methods for testing hypotheses and developing prototypes – especially important for these highly iterative processes. You can also immediately assess results and make refinements when you integrate real-time transactional data into your analysis.

Streamline Your Path to Success



"Graph analysis is possibly the single most effective competitive differentiator for organizations pursuing data-driven operations and decisions."

– Gartner Research

Neo4j Graph Analytics



Using a graph platform that spans both analytics and operations enables you to move solutions into production without leaving a common environment. And leveraging user-friendly tools will expand the engagement of technical staff and reduce the dependence on highly specialized experts.

Demand a Powerful and Practical Solution

Historically, the worlds of analytics (OLAP) and transactions (OLTP) have been siloed despite their interdependence, which is especially painful as our information and systems become more intertwined. Your graph analytics must fully support and enhance the lifecycle of your connected data: From ideas and discoveries to hypothesis and prototyping, all the way to deploying applications and operationalizing transactions. And it must do this in the cyclical, iterative reality of your workflow. Furthermore, with the increasing complexity of solutions you need a single source of truth for your connected information—one that connects relationships at load time. In doing so, you'll avoid the need to recreate, re-source, re-match and recalculate all of your connections for each particular operation. With a graph system of record, you'll improve performance and confidence in results.

To effectively create breakthrough solutions, organizations need to shift their thinking and demand both powerful and practical graph analytics. Powerful graph algorithms are required to reveal the underlying structure of networks and dynamics of actual systems. And just as relevant, graph analytics must be efficient, straightforward and broadly accessible to various teams – in other words, practical.

Graph-Enhanced Artificial Intelligence

Many breakthroughs in intelligent applications use graph frameworks with a range of enhancements for artificial intelligence (AI):

Knowledge Graphs

Provide richer and deeper context for prescriptive analytics and AI such as natural language processing (NLP) and understanding (NLU).

Graph-Enriched Data

Clean and augment data using graph analytics, such as community detection algorithms, to improve source information for AI applications.

Graph-Based Feature Extraction

Identify influential features using centrality algorithms for more accurate machine learning models and measurable predictive lift.

Graph-Accelerated AI Development

Quickly evaluate which datasets best fit your machine learning goals and correlate modeling errors for faster root-cause analysis.

AI Visibility

Use human-friendly graph visualizations to display deep learning processes to advance data scientists' work and build confidence in Al solutions.

Graph Execution of AI

High-performance graph transactions (OLTP) can more suitably operationalize and monitor real-time AI applications and analytics (OLAP).

The major areas of Artificial Intelligence are, "speech, NLP, computer vision, machine learning, [and] knowledge graph."

– Andrew Ng, CSO Baidu

Bringing Together Analytics and Transactions

Neo4j offers an innovative, reliable, native Graph Platform that reveals the value and maintains the integrity of connected data. First, we delivered the Neo4j graph database, originally used in online transaction processing with exceptionally fast transversals. Then we added advanced, yet practical, graph analytic tools for data scientists and solutions teams.

For eBay's ShopBot application, our Neo4j Knowledge Graph, "helps figure out the best follow-up questions to ask in order to find the best results in the least amount of time."

> – RJ Pittman, Chief Product Officer, eBay

Neo4j Graph Analytics

Cypher – Human-Readable, Declarative Query Language

Neo4j uses Cypher, a declarative language that can be likened to SQL for graphs. It's incredibly readable, describing patterns visually, and is widely supported with an open source corollary: openCypher is aimed to improve growth and adoption of graph processing and analysis.

Cypher for Apache Spark™ (CAPS)

Neo4j also enables you to run Cypher queries for Apache Spark, in memory, supporting both Neo4j as well as Hadoop as a source. This complements existing SQLbased querying against a tabular view of the same data.

APOC – Awesome Procedures on Cypher

APOC is a library of over 300 user-defined procedures to make your queries even easier. Widely supported by an active community with procedures in areas such as data integration, graph algorithms and data conversion.

Neo4j Graph Algorithms – Powerful and Efficient

We offer an open library of highperformance algorithms that are optimized for faster results. This set of highly tuned, global graph algorithms help reveal the hidden patterns and uncover the structure in your connected data in several key areas: Pathfinding to quickly find the shortest path or evaluate route availability and quality; centrality to determine the importance of distinct nodes in the network; and community detection to evaluate how your graph is clustered or partitioned.

Neo4j Integrations

To further help Neo4j users easily leverage their favorite tools we also provide various options such as direct access to Spark and HDFS data, data import tools and integrations for great resources like GraphQL.

Fundamentally we are bringing together the two worlds of graph analytics and graph transactions in an unprecedented way; making each realm more accessible to the other. Other solutions add graph features to non-native graph databases, which increases complexity, overhead and the potential to lose connections. Neo4j eliminates the need to use multiple graph analytics tools with efficient, accessible algorithms.

Using Neo4j Graph Analytics, you'll reveal the inner workings of systems for new breakthroughs and develop intelligent applications faster. That's seriously powerful and a practical path to success.

To learn more, go to **neo4j.com/graphanalytics** or contact us at info@neo4j.com.

Neo4j, Inc. is the graph company behind the #1 platform for connected data. The Neo4j graph platform helps organizations make sense of their data by revealing how people, processes and digital systems are interrelated. This connections-first approach powers intelligent applications tackling challenges such as artificial intelligence, fraud detection, real-time recommendations and master data.

The company boasts the world's largest dedicated investment in native graph technology, has amassed more than eight million downloads, and has a huge developer community deploying graph applications around the globe.

Questions about Neo4j?

Contact us: 1-855-636-4532 info@neo4j.com