

Graph Database Market by Solutions (Graph Extension, Graph Processing Engines, Native Graph Database, Knowledge Graph Engines), Application (Data Governance and Master Data Management, Infrastructure and Asset Management) - Global Forecast to 2030

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Abstracts

The Graph Database market is estimated at USD 507.6 million in 2024 to USD 2,143.0 million by 2030, at a Compound Annual Growth Rate (CAGR) of 27.1%. Graph databases are at the forefront of the rise of AI and ML by making it possible to analyze data more accurately and with deeper insights. Graph databases handle interconnected data very well, and this is what enables AI/ML models to find more profound relationships and hidden patterns that traditional systems might miss. Complex data structures are supported by graph databases, improving predictive accuracy and making them indispensable in applications such as fraud detection, personalized recommendations, and customer insights. With AI and ML advancement, graph databases are available to support massive datasets so that the predictability would be higher, and the data-driven decisions could be quite reliable.

'By vertical, the BFSI segment will hold the largest market size during the forecast period.'

Graph databases revolutionize the BFSI sector by allowing real-time insights into complex, interconnected datasets. It is especially effective in payment fraud because it can detect intricate patterns that stretch over multiple connections, which are otherwise missed by traditional analytics solutions. Graph databases help reduce risks by linking internal financial data with external databases, including sanctions and politically

exposed persons (PEP) lists, for regulatory compliance. The databases also help improve credit risk evaluation, analyzing relationships across various financial records and transactions. In customer engagement, graph databases aid in developing a complete 360-degree view and integrate data from channels to enhance personalization and cross-selling while minimizing churn. This holistic approach allows BFSI institutions to provide tailored services and remain relevant in evolving customer expectations and dynamic markets.

“The Infrastructure and Asset Management segment will register the fastest growth rate during the forecast period.”

Graph databases provide Infrastructure and Asset Management with crucial support by enabling the modeling of complex asset networks and interrelations. They allow organizations to efficiently track the status, location, and lifecycle of assets to have an overall real-time view of the infrastructure. This facility helps optimize maintenance planning and identifies risk, therefore helping make wise decisions on asset utilization and upgrade. In addition, graph databases help identify patterns and dependencies with predictive maintenance and performance improvement. They enhance resource use, reduce downtime, and improve operational efficiency by correlating data points like maintenance records, usage statistics, and operational conditions.

“Asia Pacific will witness the highest market growth rate during the forecast period.”

The graph database market in Asia-Pacific is gaining traction due to businesses and governments seeking more advanced solutions to managing interconnected data. In Japan, Fujitsu has played a critical role in merging knowledge graphs with generative AI technologies to improve logical reasoning and decrease AI hallucinations. Progress made has been immense with such projects as GENIAC. This fusion of AI and graph technology is also being applied to conversational AI, making the outputs of businesses more reliable and accurate. Graph databases are being implemented in India in innovative city initiatives and logistics sectors, with companies such as Neo4j providing solutions to manage big data and enhance real-time decision-making. Similarly, in South Korea, graph databases are being widely implemented across various sectors, from the telecom to the manufacturing industry, to provide better data management and analytics services toward implementing a smart city and Industry 4.0.

In-depth interviews have been conducted with chief executive officers (CEOs), Directors, and other executives from various key organizations operating in the Graph Database market.

By Company Type: Tier 1 – 40%, Tier 2 – 35%, and Tier 3 – 25%

By Designation: Directors –25%, Managers – 35%, and Others – 40%

By Region: North America – 37%, Europe – 42%, Asia Pacific – 21

The major players in the Graph Database market include IBM Corporation (US), Oracle (US), Microsoft Corporation (US), AWS (US), Neo4j (US), RelationalAI (US), Progress Software (US), TigerGraph (US), Stardog (US), Datastax (US), Franz Inc (US), Ontotext (Bulgaria), Openlink Software (US), Dgraph Labs (US), Graphwise (US), Altair (US), Bitnine (South Korea), ArangoDB (US), Fluree (US), Blazegraph (US), Memgraph UK, Objectivity (US), GraphBase (Australia), Graph Story (US), Oxford Semantic Technologies (UK), and FalkorDB (Israel). These players have adopted various growth strategies, such as partnerships, agreements and collaborations, new product launches, enhancements, and acquisitions to expand their Graph Database market footprint.

Research Coverage

The market study covers the Graph Database market size across different segments. It aims at estimating the market size and the growth potential across various segments, including by offering (solutions (by type (Graph Extension, Graph Processing Engines, Native Graph Database, Knowledge Graph Engines) by deployment type (cloud, on-premises) and services (professional services (consulting services, deployment and integration services, support and maintenance services) managed services) by model type (resource description framework, property graph (Labeled property graph (LPG), Typed property graph)), by application (data governance and master data management, data analytics and business intelligence, knowledge and content management, virtual assistants, self-service data and digital asset discovery, product and configuration management, infrastructure and asset management, process optimization and resource management, risk management, compliance, regulatory reporting, market and customer intelligence, sales optimization, other applications) by vertical (Banking, Financial Services, and Insurance (BFSI), retail and e-commerce, healthcare, life sciences, and pharmaceuticals, telecom and technology, government, manufacturing and automotive, media & entertainment, energy, utilities and infrastructure, travel and hospitality, transportation and logistics, other verticals) and Region (North America, Europe, Asia

Pacific, Middle East & Africa, and Latin America). The study includes an in-depth competitive analysis of the leading market players, their company profiles, key observations related to product and business offerings, recent developments, and market strategies.

Key Benefits of Buying the Report

The report will help the market leaders/new entrants with information on the closest approximations of the global Graph Database market's revenue numbers and subsegments. This report will help stakeholders understand the competitive landscape and gain more insights to position their businesses better and plan suitable go-to-market strategies. Moreover, the report will provide insights for stakeholders to understand the market's pulse and provide them with information on key market drivers, restraints, challenges, and opportunities.

The report provides insights on the following pointers:

Analysis of key drivers (the rising demand for generative AI, need to incorporate real-time big data mining with result visualization, growing demand for solutions to process low-latency queries, massive data generation across BFSI, retail, and media & entertainment industries, rapid use of virtualization for big data analytics), restraints (shortage of standardization and programming ease) opportunities (data unification and rapid proliferation of knowledge graphs, provision of semantic knowledgeable graphs to address complex-scientific research, emphasis on the emergence of open knowledge networks), and challenges (lack of technical expertise) influencing the growth of the Graph Database market.

Product Development/Innovation: Detailed insights on upcoming technologies, research & development activities, and new product & service launches in the Graph Database market.

Market Development: The report provides comprehensive information about lucrative markets and analyses the Graph Database market across various regions.

Market Diversification: Exhaustive information about new products & services, untapped geographies, recent developments, and investments in the Graph Database market.

Competitive Assessment: In-depth assessment of market shares, growth strategies, and service offerings of leading include IBM Corporation (US), Oracle (US), Microsoft

Corporation (US), AWS (US), Neo4j (US), RelationalAI (US), Progress Software (US), TigerGraph (US), Stardog (US), Datastax (US), Franz Inc (US), Ontotext (Bulgaria), Openlink Software (US), Dgraph Labs (US), Graphwise (US), Altair (US), Bitnine (South Korea) ArangoDB (US), Fluree (US), Blazegraph (US), Memgraph UK), Objectivity (US), GraphBase (Australia), Graph Story (US), Oxford Semantic Technologies (UK), and FalkorDB (Israel).

Contents

1 INTRODUCTION

- 1.1 STUDY OBJECTIVES
- 1.2 MARKET DEFINITION
- 1.3 STUDY SCOPE
 - 1.3.1 MARKET SEGMENTATION
 - 1.3.2 INCLUSIONS AND EXCLUSIONS
 - 1.3.3 YEARS CONSIDERED
- 1.4 CURRENCY CONSIDERED
- 1.5 STAKEHOLDERS
- 1.6 SUMMARY OF CHANGES

2 RESEARCH METHODOLOGY

- 2.1 RESEARCH DATA
 - 2.1.1 SECONDARY DATA
 - 2.1.1.1 Key data from secondary sources
 - 2.1.2 PRIMARY DATA
 - 2.1.2.1 Primary interviews with experts
 - 2.1.2.2 Breakdown of primary interviews
 - 2.1.2.3 Key industry insights
- 2.2 MARKET SIZE ESTIMATION
 - 2.2.1 TOP-DOWN APPROACH
 - 2.2.1.1 Supply-side analysis
 - 2.2.2 BOTTOM-UP APPROACH
 - 2.2.2.1 Demand-side analysis
- 2.3 DATA TRIANGULATION
- 2.4 RESEARCH ASSUMPTIONS
- 2.5 RESEARCH LIMITATIONS
- 2.6 RISK ASSESSMENT

3 EXECUTIVE SUMMARY

4 PREMIUM INSIGHTS

- 4.1 OPPORTUNITIES FOR KEY PLAYERS IN GRAPH DATABASE MARKET
- 4.2 GRAPH DATABASE MARKET, BY OFFERING

- 4.3 GRAPH DATABASE MARKET, BY SERVICE
- 4.4 GRAPH DATABASE MARKET, BY PROFESSIONAL SERVICE
- 4.5 GRAPH DATABASE MARKET, BY APPLICATION
- 4.6 GRAPH DATABASE MARKET, BY MODEL TYPE
- 4.7 GRAPH DATABASE MARKET, BY VERTICAL
- 4.8 NORTH AMERICA: GRAPH DATABASE MARKET, BY OFFERING AND MODEL TYPE

5 MARKET OVERVIEW AND INDUSTRY TRENDS

5.1 MARKET DYNAMICS

5.1.1 DRIVERS

- 5.1.1.1 Increasing Gen AI applications
- 5.1.1.2 Surging need for incorporating real-time big data mining with result visualization

- 5.1.1.3 Rising demand for solutions that can process low-latency queries

- 5.1.1.4 Rapid use of virtualization for big data analytics

- 5.1.1.5 Growing demand for semantic search across unstructured content

5.1.2 RESTRAINTS

- 5.1.2.1 Lack of standardization and programming ease

- 5.1.2.2 Rapid proliferation of data management technologies

- 5.1.2.3 High implementation costs

5.1.3 OPPORTUNITIES

- 5.1.3.1 Data unification and rapid proliferation of knowledge graphs

- 5.1.3.2 Provision of semantic knowledgeable graphs to address complex-scientific research

- 5.1.3.3 Emphasis on emergence of open knowledge networks

5.1.4 CHALLENGES

- 5.1.4.1 Lack of technical expertise

- 5.1.4.2 Difficulty in demonstrating benefits of knowledge graphs in single application or use case

5.2 BEST PRACTICES IN GRAPH DATABASE MARKET

5.2.1 VALIDATION OF USE CASES

5.2.2 AVOIDANCE OF INEFFICIENT TRAVERSAL PATTERNS

5.2.3 USAGE OF DATA MODELING

5.2.4 ENSURING DATA CONSISTENCY

5.2.5 PARTITIONING OF COSMOS DB

5.2.6 FOSTERING TEAM EXPERTISE IN GRAPH DATABASE

5.3 EVOLUTION OF GRAPH DATABASE MARKET

5.4 ECOSYSTEM ANALYSIS

5.5 CASE STUDY ANALYSIS

5.5.1 NEO4J-POWERED KNOWLEDGE GRAPH HELPED INTUIT PROVIDE REAL-TIME INSIGHTS AND FACILITATE SWIFT RESPONSES TO SECURITY THREATS

5.5.2 WESTJET IMPROVED ITS CUSTOMER BOOKING EXPERIENCE BY INTEGRATING NEO4J'S GRAPH TECHNOLOGY

5.5.3 NEWDAY IMPROVED FRAUD DETECTION CAPABILITIES WITH TIGERGRAPH CLOUD

5.5.4 CYBER RESILIENCE LEADER LEVERAGED TIGERGRAPH TO ELEVATE ITS NEXT-GENERATION CLOUD-BASED CYBERSECURITY SERVICES

5.5.5 XBOX CHOSE TIGERGRAPH TO EMPOWER ITS GRAPH ANALYTICS CAPABILITIES

5.5.6 DGRAPH'S CUTTING-EDGE DATABASE SOLUTION ENABLED MOONCAMP TO STREAMLINE ITS BACKEND OPERATIONS

5.5.7 NEO4J'S GRAPH DATABASE AND APPLICATION PLATFORM HELPED KERBEROS CONTROL COMPLEX LEGAL OBLIGATIONS

5.5.8 BLAZEGRAPH HELPED YAHOO7 DRIVE NATIVE REAL-TIME ADVERTISING USING GRAPH QUERIES

5.5.9 NEO4J ENABLED ICU'S TEAM TO VISUALIZE AND ANALYZE CONNECTIONS BETWEEN ELEMENTS OF PANAMA PAPERS LEAKS

5.5.10 NEO4J'S GRAPH TECHNOLOGY HELPED U.S. ARMY BY TRACKING AND ANALYZING EQUIPMENT MAINTENANCE

5.5.11 JAGUAR LAND ROVER ACHIEVED REDUCED INVENTORY COSTS AND HIGHER PROFITABILITY USING TIGERGRAPH'S SOLUTION

5.5.12 MACY'S REDUCED CATALOG DATA REFRESH TIME BY SIX-FOLD

5.5.13 METAPHACTS AND ONTOTEXT ENABLED GLOBAL PHARMA COMPANY TO BOOST R&D KNOWLEDGE DISCOVERY

5.6 SUPPLY CHAIN ANALYSIS

5.7 INVESTMENT AND FUNDING SCENARIO

5.8 IMPACT OF GENERATIVE AI ON GRAPH DATABASE MARKET

5.8.1 USE CASES OF GENERATIVE AI IN GRAPH DATABASE

5.8.1.1 Neo4j LLM Knowledge Graph Builder enabled users to extract nodes and relationships from unstructured text

5.8.1.2 Data?'s flagship analytics platform, reView, delivered powerful insights by integrating customer data into Neo4j-backed knowledge graph

5.8.1.3 JPMorgan leveraged LLMs to detect fraudulent activities

5.8.1.4 Mastercard leveraged GenAI capabilities to strengthen its fraud detection system

5.9 TECHNOLOGY ROADMAP OF GRAPH DATABASE MARKET

5.10 REGULATORY LANDSCAPE

5.10.1 REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS

5.10.2 KEY REGULATIONS

5.10.2.1 North America

5.10.2.1.1 SCR 17: Artificial Intelligence Bill (California)

5.10.2.1.2 S1103: Artificial Intelligence Automated Decision Bill (Connecticut)

5.10.2.1.3 National Artificial Intelligence Initiative Act (NAIIA)

5.10.2.1.4 The Artificial Intelligence and Data Act (AIDA) - Canada

5.10.2.1.5 Cybersecurity Maturity Model Certification (CMMC) (USA)

5.10.2.2 Europe

5.10.2.2.1 The European Union (EU) - Artificial Intelligence Act (AIA)

5.10.2.2.2 General Data Protection Regulation (Europe)

5.10.2.3 Asia Pacific

5.10.2.3.1 Interim Administrative Measures for Generative Artificial Intelligence Services (China)

5.10.2.3.2 National AI Strategy (Singapore)

5.10.2.3.3 Hiroshima AI Process Comprehensive Policy Framework (Japan)

5.10.2.4 Middle East & Africa

5.10.2.4.1 National Strategy for Artificial Intelligence (UAE)

5.10.2.4.2 National Artificial Intelligence Strategy (Qatar)

5.10.2.4.3 AI Ethics Principles and Guidelines (Dubai)

5.10.2.5 Latin America

5.10.2.5.1 The Santiago Declaration (Chile)

5.10.2.5.2 Brazilian Artificial Intelligence Strategy-EBIA

5.11 PATENT ANALYSIS

5.11.1 METHODOLOGY

5.11.2 LIST OF MAJOR PATENTS

5.12 TECHNOLOGY ANALYSIS

5.12.1 KEY TECHNOLOGIES

5.12.1.1 Semantic Web

5.12.1.2 Generative AI and natural language processing

5.12.1.3 Graph RAG

5.12.2 COMPLEMENTARY TECHNOLOGIES

5.12.2.1 Cloud computing

5.12.2.2 AI and ML

5.12.2.3 Big data & analytics

5.12.2.4 Graph neural networks

5.12.2.5 Vector databases and full-text search engines

- 5.12.2.6 Multimodal databases
- 5.12.3 ADJACENT TECHNOLOGIES
 - 5.12.3.1 Digital twin
 - 5.12.3.2 IoT
 - 5.12.3.3 Blockchain
 - 5.12.3.4 Edge computing
- 5.13 PRICING ANALYSIS
 - 5.13.1 AVERAGE SELLING PRICE OF KEY PLAYERS, BY COUNTRY, 2023
 - 5.13.2 INDICATIVE PRICING ANALYSIS, BY KEY PLAYER, 2023
- 5.14 KEY CONFERENCES AND EVENTS, 2024–2025
- 5.15 PORTER'S FIVE FORCES ANALYSIS
 - 5.15.1 THREAT OF NEW ENTRANTS
 - 5.15.2 THREAT OF SUBSTITUTES
 - 5.15.3 BARGAINING POWER OF SUPPLIERS
 - 5.15.4 BARGAINING POWER OF BUYERS
 - 5.15.5 INTENSITY OF COMPETITIVE RIVALRY
- 5.16 TRENDS/DISRUPTIONS IMPACTING CUSTOMER BUSINESS
- 5.17 KEY STAKEHOLDERS AND BUYING CRITERIA
 - 5.17.1 KEY STAKEHOLDERS IN BUYING PROCESS
 - 5.17.2 BUYING CRITERIA

6 GRAPH DATABASE MARKET, BY OFFERING

- 6.1 INTRODUCTION
 - 6.1.1 OFFERING: GRAPH DATABASE MARKET DRIVERS
- 6.2 SOLUTIONS
 - 6.2.1 INCREASING NEED FOR ENHANCING PRODUCTIVITY AND MAINTAINING BUSINESS CONTINUITY TO DRIVE MARKET
 - 6.2.2 BY SOLUTION TYPE
 - 6.2.2.1 Graph extensions
 - 6.2.2.2 Graph processing engines
 - 6.2.2.3 Native graph database
 - 6.2.2.4 Knowledge graph engines
 - 6.2.3 BY DEPLOYMENT MODE
 - 6.2.3.1 Cloud
 - 6.2.3.2 On-premises
- 6.3 SERVICES
 - 6.3.1 MANAGED SERVICES
 - 6.3.1.1 Specialized skills for maintaining and updating graph database solutions to

drive market

6.3.2 PROFESSIONAL SERVICES

6.3.2.1 Consulting services

6.3.2.1.1 Integration of graph databases with analytics and virtualization frameworks

to boost market

6.3.2.2 Deployment & integration services

6.3.2.2.1 Growing need to overcome system-related issues effectively to drive market

6.3.2.3 Support & maintenance services

6.3.2.3.1 Services provided for upgradation and maintenance of operating ecosystem post-implementation to fuel market growth

7 GRAPH DATABASE MARKET, BY MODEL TYPE

7.1 INTRODUCTION

7.1.1 MODEL TYPE: GRAPH DATABASE MARKET DRIVERS

7.2 RESOURCE DESCRIPTION FRAMEWORK

7.2.1 NEED FOR INTELLIGENT DATA MANAGEMENT SOLUTIONS TO DRIVE DEMAND FOR GRAPH DATABASE

7.3 PROPERTY GRAPH

7.3.1 INCREASING URGE TO FIND RELATIONSHIPS AMONG NUMEROUS ENTITIES TO BOOST MARKET

7.3.1.1 Labeled property graph

7.3.1.2 Typed property graph

8 GRAPH DATABASE MARKET, BY APPLICATION

8.1 INTRODUCTION

8.1.1 APPLICATION: GRAPH DATABASE MARKET DRIVERS

8.2 DATA GOVERNANCE & MASTER DATA MANAGEMENT

8.2.1 NEED FOR MANAGING, INTEGRATING, AND SECURING COMPLEX DATA RELATIONSHIPS TO DRIVE MARKET

8.3 DATA ANALYTICS & BUSINESS INTELLIGENCE

8.3.1 SUPERIOR QUERY PERFORMANCE FOR COMPLEX OPERATIONS TO BOOST MARKET

8.4 KNOWLEDGE & CONTENT MANAGEMENT

8.4.1 INTUITIVE AND DYNAMIC WAY OF ORGANIZING, CONNECTING, AND RETRIEVING INFORMATION TO FUEL MARKET GROWTH

8.5 VIRTUAL ASSISTANTS, SELF-SERVICE DATA, AND DIGITAL ASSET

DISCOVERY

8.5.1 PERSONALIZED, INTELLIGENT, AND CONTEXT-AWARE INTERACTIONS TO SUPPORT MARKET GROWTH

8.6 PRODUCT & CONFIGURATION MANAGEMENT

8.6.1 VISIBILITY INTO INTERDEPENDENCIES ACROSS TEAMS TO ENSURE TRACEABILITY AND BETTER DECISION-MAKING

8.7 INFRASTRUCTURE & ASSET MANAGEMENT

8.7.1 MODELING AND ANALYSIS OF INTRICATE RELATIONSHIPS BETWEEN ASSETS TO DRIVE MARKET

8.8 PROCESS OPTIMIZATION & RESOURCE MANAGEMENT

8.8.1 OPTIMIZE PROCESS BY ANALYZING COMPLEX, INTERCONNECTED DATA THROUGH GRAPH DATA SCIENCE

8.9 RISK MANAGEMENT, COMPLIANCE, AND REGULATORY REPORTING

8.9.1 IDENTIFICATION AND ASSESSMENT OF RISKS BY VISUALIZING CONNECTIONS TO BOOST MARKET

8.10 MARKET & CUSTOMER INTELLIGENCE AND SALES OPTIMIZATION

8.10.1 GRAPH DATABASES TO IMPROVE SALES EFFECTIVENESS AND CUSTOMER ENGAGEMENT

8.11 OTHER APPLICATIONS

9 GRAPH DATABASE MARKET, BY VERTICAL

9.1 INTRODUCTION

9.1.1 VERTICAL: GRAPH DATABASE MARKET DRIVERS

9.2 BANKING, FINANCIAL SERVICES, AND INSURANCE

9.2.1 GROWING ADOPTION OF FINANCIAL STANDARDS AND COMPLIANCE WITH REGULATIONS TO DRIVE MARKET

9.2.2 CASE STUDY

9.2.2.1 Fraud detection & risk management

9.2.2.1.1 Neo4j-powered system helped BNP Paribas Personal Finance achieve a 20% reduction in fraud

9.2.2.1.2 Zurich Switzerland enhanced fraud investigations with Neo4j

9.2.2.2 Anti-money laundering

9.2.2.2.1 US bank leveraged TigerGraph's graph analytics capabilities to detect intricate money laundering network

9.2.2.2.2 KERBEROS enhanced money laundering capabilities with Neo4j's graph database and Structr application platform

9.2.2.3 Identity & access management

9.2.2.3.1 Ability for mapping and querying intricate relationships to drive market

9.2.2.4 Risk management

9.2.2.4.1 Rising usage of graph database tools and services for enhancing risk intelligence capabilities to aid market growth

9.2.2.4.2 UBS implemented Neo4j's graph database to improve its data lineage and governance

9.2.2.4.3 Marionete integrated its various databases with the Neo4j graph database, enabling it to reduce credit risk and influence charges

9.2.2.5 Data integration & governance

9.2.2.5.1 Optimizing data security and privacy

9.2.2.5.2 Real-time monitoring and audit

9.2.2.6 Know Your Customer (KYC) process

9.2.2.6.1 Neo4j's graph technology helped institutions save time in compliance workflows

9.2.2.7 Operational resilience for bank IT systems

9.2.2.7.1 Stardog's platform allowed for easy navigation through interconnected data, helping organizations identify dependencies and analyze systemic risks

9.2.2.8 Regulatory compliance

9.2.2.8.1 Streamlining regulatory compliance with RDFoc

9.2.2.9 Customer 360° view

9.2.2.9.1 Unified, holistic perspective of each customer by integrating data from multiple sources

9.2.2.10 Market analysis & trend detection

9.2.2.10.1 Graph databases to help gain deeper insights into organizations' complex relationships and enhance customer experiences

9.2.2.11 Policy impact analysis

9.2.2.11.1 Real-time updates to ensure quick adaptability to changing regulations, minimizing disruptions, and maintaining operational efficiency

9.2.2.12 Self-service data and digital asset discovery

9.2.2.12.1 Empowerment of users without technical expertise to independently find, explore, and handle data fosters market growth

9.2.2.13 Customer support

9.2.2.13.1 Quick issue resolution, personalized responses, and customized recommendations to boost market

9.3 RETAIL & ECOMMERCE

9.3.1 INCREASING NEED FOR IDENTIFYING CUSTOMER BEHAVIOR IN REAL-TIME TO DRIVE MARKET

9.3.2 CASE STUDY

9.3.2.1 Fraud detection in eCommerce

9.3.2.1.1 PayPal leveraged real-time graph databases and graph analysis to combat

fraud effectively

9.3.2.2 Dynamic pricing optimization

9.3.2.2.1 Deployment of Neo4j-based system significantly improved efficiency and scalability in Marriott's pricing operations

9.3.2.3 Personalized product recommendations

9.3.2.3.1 Neo4j's graph-based approach allowed Walmart to enhance online shopping experience and maintain competitive edge

9.3.2.3.2 AboutYou transformed personalized shopping with ArangoDB, boosting engagement and efficiency

9.3.2.4 Market basket analysis

9.3.2.4.1 Analyzing relationship between product pricing and consumer behavior to support development of optimized pricing strategies

9.3.2.5 Customer experience enhancement

9.3.2.5.1 Retailer achieved enhanced store operations and improved customer satisfaction with TigerGraph's platform

9.3.2.6 Churn Prediction & Prevention

9.3.2.6.1 Predicting churn helps companies identify customers at risk of leaving

9.3.2.7 Social media influence on buying behavior

9.3.2.7.1 Increasing need for understanding and leveraging dynamics of social media influencing consumer-buying decisions to fuel market growth

9.3.2.8 Product Configuration & Recommendation

9.3.2.8.1 Neo4j's graph database enabled eBay achieve seamless and intelligent product discovery experience

9.3.2.9 Customer Segmentation & Targeting

9.3.2.9.1 Targeted advertising and personalized shopping experiences to help drive sales

9.3.2.10 Customer 360° View

9.3.2.10.1 Tracking of customer's purchase behavior to aid market growth

9.3.2.10.2 Neo4j empowered H?stens to build comprehensive 360-degree view of its data, operations, customers, and partners

9.3.2.11 Review & reputation management

9.3.2.11.1 To enhance and manage customer review to protect reputation

9.3.2.12 Customer Support

9.3.2.12.1 To improved customer satisfaction, faster response times, and stronger customer loyalty

9.4 TELECOM & TECHNOLOGY

9.4.1 SURGING DEMAND FOR IMPROVED SERVICES TO DRIVE MARKET

9.4.2 CASE STUDY

9.4.2.1 Network optimization & management

9.4.2.1.1 Australia's leading carrier enhanced network monitoring and security with ArangoDB

9.4.2.2 Data integration & governance

9.4.2.2.1 D&B achieved significant revenue growth and expanded its customer base using Neo4j's graph technology

9.4.2.3 IT asset management

9.4.2.3.1 Orange leveraged ArangoDB to build digital twin platform for enhanced process optimization

9.4.2.4 Network security analysis

9.4.2.4.1 Zeta Global chose Amazon Neptune for its scalability, elasticity, and cost-effectiveness

9.4.2.5 IoT device management & connectivity

9.4.2.5.1 BT Group leveraged Neo4j to deliver lightning-fast inventory management and streamline operations

9.4.2.5.2 Amazon Neptune's capabilities empowered telecom & IT sectors to achieve enhanced device orchestration and seamless integration of IoT data

9.4.2.6 Self-service data & digital asset discovery

9.4.2.6.1 Optimizing telecom operations with self-service data and digital asset discovery

9.4.2.7 Identity & access management

9.4.2.7.1 Interconnected data model helped Telenor Norway eliminate performance bottlenecks and deliver faster insights

9.4.2.7.2 Enhanced identity management and recommendations with TigerGraph

9.4.2.8 Metadata enrichment

9.4.2.8.1 Enhancing document findability with metadata enrichment at Cisco

9.4.2.9 Service incident management

9.4.2.9.1 Proactive incident management with Neo4j-powered intelligent network analysis tool

9.5 HEALTHCARE, LIFE SCIENCES, AND PHARMACEUTICALS

9.5.1 NEED FOR IMPROVED PATIENT-CENTRIC EXPERIENCE AND REAL-TIME TREATMENT TO DRIVE MARKET

9.5.2 CASE STUDY

9.5.2.1 Drug discovery & development

9.5.2.1.1 Novartis harnessed cutting-edge biological insights for drug discovery

9.5.2.1.2 Revolutionizing biodiversity insights with graph-powered knowledge mapping

9.5.2.2 Clinical trial management

9.5.2.2.1 Neo4j's knowledge graph-based application helped Novo Nordisk achieve end-to-end consistency and increased automation

9.5.2.3 Medical claims processing

9.5.2.3.1 UnitedHealth improved medical claim processing with graph databases

9.5.2.4 Clinical intelligence

9.5.2.4.1 UnitedHealth Group deployed graph database to enhance patient care

9.5.2.4.2 Dooloo turned to Neo4j's Graph Data Platform for delivering personalized, data-driven insights

9.5.2.5 Healthcare network provider analysis

9.5.2.5.1 Boston Scientific utilized Neo4j's Graph Data Science Library to simplify complex medical supply chain analysis

9.5.2.5.2 Amgen enhanced data analysis and scalability with TigerGraph for healthcare insights

9.5.2.6 Customer support

9.5.2.6.1 Exact Sciences enhanced customer engagement with implementation of Doctor-and-Product 360 solution powered by TigerGraph

9.5.2.6.2 Optimizing healthcare customer support with Graph RAG-powered chatbots

9.5.2.7 Patient journey & care pathway analysis

9.5.2.7.1 Neo4j's scalable and interconnected data model empowered Care-for-Rare to transform vast, siloed datasets into actionable medical insights

9.5.2.8 Self-service data & digital asset discovery

9.5.2.8.1 Stardog-powered enterprise knowledge graph enabled Boehringer Ingelheim to address its challenge of siloed research data

9.6 GOVERNMENT & PUBLIC SECTOR

9.6.1 RISING NEED FOR ENHANCED DATA SECURITY AND ADVANCED INTELLIGENCE TO DRIVE MARKET

9.6.2 CASE STUDY

9.6.2.1 Government service optimization

9.6.2.1.1 Empowering government agencies with Stardog Voicebox for seamless data insights and enhanced decision-making

9.6.2.2 Legislative & regulatory analysis

9.6.2.2.1 Streamlining legislative and regulatory analysis with graph databases for enhanced compliance and decision-making

9.6.2.3 Crisis management & disaster response planning

9.6.2.3.1 Strengthening cybersecurity with graph databases for proactive threat detection and risk management

9.6.2.4 Environmental impact analysis & ESG

9.6.2.4.1 NASA leveraged Stardog's Enterprise Knowledge Platform, enabling seamless integration and analysis

9.6.2.5 Social network analysis for security and law enforcement

9.6.2.5.1 Global financial institution leveraged Neo4j and Linkurious Enterprise (LE) to enhance fraud detection

9.6.2.6 Policy impact analysis

9.6.2.6.1 Transforming information access at IDB with knowledge graphs

9.6.2.7 Knowledge management

9.6.2.7.1 Neo4j's graph database helped NASA leverage historical insights to reduce project timelines and prevent disasters

9.6.2.8 Data integration & governance

9.6.2.8.1 Transforming product lifecycle management with graph technology

9.7 MANUFACTURING & AUTOMOTIVE

9.7.1 GROWING NEED FOR EXTENDING FACTORY EQUIPMENT LIFESPAN AND REDUCING PRODUCTION RISK DELAYS TO BOOST GROWTH

9.7.2 CASE STUDY

9.7.2.1 Equipment management & predictive maintenance

9.7.2.1.1 Leveraging graph databases for flexible and robust operations

9.7.2.2 Product lifecycle management

9.7.2.2.1 Japanese automotive manufacturer optimized product life cycle and validation with Neo4j-powered knowledge graph

9.7.2.3 Manufacturing process optimization

9.7.2.3.1 Optimizing manufacturing processes with Stardog Voicebox and Databricks for enhanced quality and efficiency

9.7.2.3.2 Ford enhanced manufacturing efficiency with TigerGraph

9.7.2.4 Enhanced vehicle safety and reliability

9.7.2.4.1 Increase vehicle safety with advanced technologies and graph databases

9.7.2.5 Optimization of industrial processes

9.7.2.5.1 Enhancing smart manufacturing with Siemens' knowledge graph and AI-driven automation

9.7.2.5.2 Optimizing automotive pricing and processes with Neo4j and AWS

9.7.2.6 Root cause analysis

9.7.2.6.1 Leveraging knowledge graphs for transparent and effective root cause analysis

9.7.2.7 Inventory management & demand forecasting

9.7.2.7.1 Optimizing Inventory management with dynamic stock calculation and cost analysis

9.7.2.8 Service incident management

9.7.2.8.1 Improving service incident management with graph databases in manufacturing and automotive

9.7.2.9 Staff & resource allocation

9.7.2.9.1 Enhancing resource and staff allocation efficiency using graph databases

9.7.2.10 Product configuration & recommendation

9.7.2.10.1 Cox Automotive built identity graph using Amazon Neptune to connect and analyze large datasets of shopper information

9.8 MEDIA & ENTERTAINMENT

9.8.1 DEMAND FOR MODELING-USER PREFERENCES AND CONTENT INTERACTIONS TO FOSTER MARKET GROWTH

9.8.2 CASE STUDY

9.8.2.1 Content recommendation & personalization

9.8.2.1.1 Graph databases enable media companies to provide highly accurate content recommendations and personalized experiences

9.8.2.1.2 Kickdynamic adopted TigerGraph on AWS Cloud to power its recommendation engine

9.8.2.1.3 Musimap adopted Neo4j graph database to offer personalized music recommendations

9.8.2.2 Social media influence analysis

9.8.2.2.1 Myntelligence optimized social media campaigns with TigerGraph's real-time analytics

9.8.2.2.2 TigerGraph's advanced analytics enable OpenCorporates to support complex investigative queries with real-time response times

9.8.2.3 Content recommendation system

9.8.2.3.1 IppenDigital's adoption of TigerGraph's graph database technology helped deliver hyper-personalized content recommendations

9.8.2.3.2 Netflix leveraged graph databases for personalization and scalability

9.8.2.4 User engagement analysis

9.8.2.4.1 Enabling enterprises to capture and dissect intricate associations among users

9.8.2.4.2 Graph technology powered personalized smart home automation for Xfinity

9.8.2.5 Copyright and licensing management

9.8.2.5.1 Enhancing license and copyright management in media & entertainment industry through graph database technology

9.8.2.6 Knowledge management

9.8.2.6.1 Graph technology to enhance collaboration and accelerate decision-making

9.8.2.7 Audience segmentation and targeting

9.8.2.7.1 Optimizing audience segmentation and targeting for maximum impact

9.8.2.8 Self-service data and digital asset discovery

9.8.2.8.1 Consistent metadata management, robust security, user training, and scalability required to handle growing volume of assets effectively

9.9 ENERGY & UTILITIES

9.9.1 SURGING DEMAND FOR DECREASING OPERATIONAL RISKS AND COSTS TO DRIVE MARKET

9.9.2 CASE STUDY

9.9.2.1 Smart grid management

9.9.2.1.1 Adoption of graph database to manage complex relationships and interconnected data

9.9.2.2 Energy trading optimization

9.9.2.2.1 Unlocking efficient energy trading with graph database technology

9.9.2.3 Renewable energy integration & optimization

9.9.2.3.1 Graph databases to enhance visibility into entire energy ecosystem

9.9.2.4 Public Infrastructure Management

9.9.2.4.1 Enhancing public infrastructure management with graph databases

9.9.2.5 Customer Engagement And Billing

9.9.2.5.1 Ease billing process to improve customer satisfaction

9.9.2.6 Service incident management

9.9.2.6.1 Exchange transformed energy grid management with graph-based digital twins for real-time insights and cost savings

9.9.2.7 Environmental impact analysis and ESG

9.9.2.7.1 Optimizing energy sustainability and environmental impact with graph databases

9.9.2.7.2 Integration of advanced technologies to enhance data management and insights

9.9.2.8 Railway asset management

9.9.2.8.1 Customized knowledge graphs enable smarter decision-making, predictive maintenance, and cost-effective operations

9.9.2.9 Staff and resource allocation

9.9.2.9.1 Optimizing staff and resource allocation for sustainable energy operations

9.10 TRAVEL & HOSPITALITY

9.10.1 FOCUS ON FOSTERING TRAVEL PLANS FOR BETTER CUSTOMER EXPERIENCES TO DRIVE MARKET EXPANSION

9.10.2 CASE STUDY

9.10.2.1 Personalized travel recommendations

9.10.2.1.1 Revolutionizing personalized travel recommendations with graph databases

9.10.2.2 Dynamic pricing optimization

9.10.2.2.1 Transforming dynamic price management with graph databases

9.10.2.3 Customer journey mapping

9.10.2.3.1 Customer journey mapping to give personalized recommendations

9.10.2.4 Booking and reservation management

9.10.2.4.1 Graph databases ensure seamless customer experiences and efficient operations

9.10.2.5 Customer experience management

9.10.2.5.1 Transforming customer experience with unified data and actionable insights

9.10.2.6 Product configuration and recommendation

9.10.2.6.1 Dynamic product configuration and personalized recommendations in travel and hospitality

9.11 TRANSPORTATION & LOGISTICS

9.11.1 RISING NEED FOR GAINING COMPLETE AND REAL-TIME VISIBILITY TO DRIVE MARKET

9.11.2 TRANSPORT FOR LONDON (TFL) REDUCED CONGESTION BY 10% USING DIGITAL TWIN POWERED BY NEO4J

9.11.3 USE CASES

9.11.3.1 Route optimization and fleet management

9.11.3.1.1 Careem achieved enhanced fraud detection with AWS

9.11.3.1.2 Optimizing delivery routes and scaling logistics with precision data

9.11.3.2 Supply chain management

9.11.3.2.1 Transforming supply chains with Google Cloud and Neo4j

9.11.3.3 Asset tracking and management

9.11.3.3.1 Graph databases to model intricate relationships and dependencies between assets, locations, and stakeholders

9.11.3.4 Equipment maintenance and predictive maintenance

9.11.3.4.1 Optimizing equipment maintenance with predictive insights powered by graph databases

9.11.3.5 Supply chain management

9.11.3.5.1 Revolutionizing supply chain visibility through real-time digital twin solutions

9.11.3.6 Vendor and supplier analysis

9.11.3.6.1 Graph database to enable comprehensive view of supply chain

9.11.3.7 Operational efficiency & decision-making

9.11.3.7.1 Optimizing delivery routes and scaling logistics with precision data

9.12 OTHER VERTICALS

10 GRAPH DATABASE MARKET, BY REGION

10.1 INTRODUCTION

10.2 NORTH AMERICA

10.2.1 NORTH AMERICA: MACROECONOMIC OUTLOOK

10.2.2 US

10.2.2.1 Increasing use of graph databases in medical science and political campaigns to foster market growth

10.2.3 CANADA

10.2.3.1 Stringent data regulation and extensive applications of graph databases in research to drive growth

10.3 EUROPE

10.3.1 EUROPE: MACROECONOMIC OUTLOOK

10.3.2 UK

10.3.2.1 Government initiatives and healthcare-focused projects to drive market growth

10.3.3 ITALY

10.3.3.1 Increasing use of graph databases in financial sector to accelerate market growth

10.3.4 GERMANY

10.3.4.1 Increasing focus on enhancing interoperability to boost market

10.3.5 FRANCE

10.3.5.1 Graph databases to drive innovation, enabling data-driven decision-making across key industries

10.3.6 SPAIN

10.3.6.1 Government initiatives and geographical research to bolster market growth

10.3.7 REST OF EUROPE

10.4 ASIA PACIFIC

10.4.1 ASIA PACIFIC: MACROECONOMIC OUTLOOK

10.4.2 CHINA

10.4.2.1 Major players and use of graph databases in telecom fueling market growth

10.4.3 INDIA

10.4.3.1 Increasing focus on digital transformation to support market growth

10.4.4 JAPAN

10.4.4.1 Integration of knowledge graphs with generative AI to fuel market growth

10.4.5 AUSTRALIA & NEW ZEALAND

10.4.5.1 Strategic initiatives and presence of major players to drive adoption of graph databases

10.4.6 SOUTH KOREA

10.4.6.1 Increasing applications of graph databases in fraud detection, network analysis, and AI-powered innovations to aid market growth

10.4.7 REST OF ASIA PACIFIC

10.5 MIDDLE EAST & AFRICA

10.5.1 MIDDLE EAST & AFRICA: MACROECONOMIC OUTLOOK

10.5.2 MIDDLE EAST

10.5.2.1 KSA

10.5.2.1.1 Digitalization initiatives to drive market growth

10.5.2.2 UAE

10.5.2.2.1 Increasing applications of graph databases for environmental insights and research collaboration to drive market growth

10.5.2.3 Qatar

10.5.2.3.1 Rising demand for advanced data analytics and interconnected data management solutions to drive market growth

10.5.2.4 Turkey

10.5.2.4.1 Increasing adoption of graph technologies to address challenges in data analytics, decision-making, and innovation

10.5.2.5 Rest of Middle East

10.5.3 AFRICA

10.5.3.1 Strategic investments in cloud and AI technologies to drive adoption of graph databases

10.6 LATIN AMERICA

10.6.1 LATIN AMERICA: MACROECONOMIC OUTLOOK

10.6.2 BRAZIL

10.6.2.1 Growing adoption of graph databases across industries and key collaborative initiatives to drive market

10.6.3 ARGENTINA

10.6.3.1 Advancements in cloud infrastructure and AI to further enable scalable deployment of graph databases

10.6.4 MEXICO

10.6.4.1 Increasing investments in cloud infrastructure to accelerate adoption of graph databases

10.6.5 REST OF LATIN AMERICA

11 COMPETITIVE LANDSCAPE

11.1 INTRODUCTION

11.2 KEY PLAYER STRATEGIES/RIGHT TO WIN

11.3 MARKET SHARE ANALYSIS, 2024

11.3.1 MARKET RANKING ANALYSIS

11.4 REVENUE ANALYSIS, 2019–2023

11.5 COMPANY EVALUATION MATRIX: KEY PLAYERS, 2024

11.5.1 STARS

11.5.2 EMERGING LEADERS

11.5.3 PERVASIVE PLAYERS

11.5.4 PARTICIPANTS

11.5.5 COMPANY FOOTPRINT: KEY PLAYERS, 2024

11.5.5.1 Company footprint

11.5.5.2 Offering footprint

11.5.5.3 Model type footprint

11.5.5.4 Application footprint

11.5.5.5 Vertical footprint

11.5.5.6 Region footprint

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