

## Neo4j Graph Data Modeling Design Efficient And Flexible Databases By Optimizing The Power Of Neo4j

The rise of intelligence and computation within technology has created an eruption of potential applications in numerous professional industries. Techniques such as data analysis, cloud computing, machine learning, and others have altered the traditional processes of various disciplines including healthcare, economics, transportation, and politics. Information technology in today's world is beginning to uncover opportunities for experts in these fields that they are not yet aware of. The exposure of specific instances in which these devices are being implemented will assist other specialists in how to successfully utilize these transformative tools with the appropriate amount of discretion, safety, and awareness. Considering the level of diverse uses and practices throughout the globe, the fifth edition of the Encyclopedia of Information Science and Technology series continues the enduring legacy set forth by its predecessors as a premier reference that contributes the most cutting-edge concepts and methodologies to the research community. The Encyclopedia of Information Science and Technology, Fifth Edition is a three-volume set that includes 136 original and previously unpublished research chapters that present multidisciplinary research and expert insights into new methods and processes for understanding modern technological tools and their applications as well as emerging theories and ethical controversies surrounding the field of information science. Highlighting a wide range of topics such as natural language processing, decision support systems, and electronic government, this book offers strategies for implementing smart devices and analytics into various professional disciplines. The techniques discussed in this publication are ideal for IT professionals, developers, computer scientists, practitioners, managers, policymakers, engineers, data analysts, and programmers seeking to understand the latest developments within this field and who are looking to apply new tools and policies in their practice. Additionally, academicians, researchers, and students in fields that include but are not limited to software engineering, cybersecurity, information technology, media and communications, urban planning, computer science, healthcare, economics, environmental science, data management, and political science will benefit from the extensive knowledge compiled within this publication.

Summary Neo4j in Action is a comprehensive guide to Neo4j, aimed at application developers and software architects. Using hands-on examples, you'll learn to model graph domains naturally with Neo4j graph structures. The book explores the full power of native Java APIs for graph data manipulation and querying. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Much of the data today is highly connected—from social networks to supply chains to software dependency management—and more connections are continually being uncovered. Neo4j is an ideal graph database tool for highly connected data. It is mature, production-ready, and unique in enabling developers to simply and efficiently model and query connected data. About the Book Neo4j in Action is a comprehensive guide to designing, implementing, and querying graph data using Neo4j. Using hands-on examples, you'll learn to model graph domains naturally with Neo4j graph structures. The book explores the full power of native Java APIs for graph data manipulation and querying. It also covers Cypher, Neo4j's graph query language. Along the way, you'll learn how to integrate Neo4j into your domain-driven app using Spring Data Neo4j, as well as how to use Neo4j in standalone server or embedded modes. Knowledge of Java basics is required. No prior experience with graph data or Neo4j is assumed. What's Inside Graph database patterns How to model data in social networks How to use Neo4j in your Java applications How to configure and set up Neo4j About the Authors Aleksa Vukotic is an architect specializing in graph data models. Nicki Watt, Dominic Fox, Tareq Abedrabbo, and Jonas Partner work at OpenCredo, a Neo Technology partner, and have been involved in many projects using Neo4j. Table of Contents PART 1 INTRODUCTION TO NEO4J A case for a Neo4j database Data modeling in Neo4j Starting development with Neo4j The power of traversals Indexing the data PART 2 APPLICATION DEVELOPMENT WITH NEO4J Cypher: Neo4j query language Transactions Traversals in depth Spring Data Neo4j PART 3 NEO4J IN PRODUCTION Neo4j: embedded versus server mode

This book constitutes the refereed proceedings of the 345th International Conference on Conceptual Modeling, ER 2016, held in Gifu, Japan, in November 2016. The 23 full and 18 short papers presented together with 3 keynotes were carefully reviewed and selected from 113 submissions. The papers are organized in topical sections on Analytics and Conceptual Modeling; Conceptual Modeling and Ontologies; Requirements Engineering; Advanced Conceptual Modeling; Semantic Annotations; Modeling and Executing Business Processes; Business Process Management and Modeling; Applications and Experiments of Conceptual Modeling; Schema Mapping; Conceptual Modeling Guidance; and Goal Modeling.

This book constitutes the refereed proceedings of the 14th International Conference entitled Beyond Databases, Architectures and Structures, BDAS 2018, held in Poznań, Poland, in September 2018, during the IFIP World Computer Congress. It consists of 38 carefully reviewed papers selected from 102 submissions. The papers are organized in topical sections, namely big data and cloud computing; architectures, structures and algorithms for efficient data processing; artificial intelligence, data mining and knowledge discovery; text mining, natural language processing, ontologies and semantic web; image analysis and multimedia mining.

This book constitutes the refereed proceedings of the 38th International Conference on Conceptual Modeling, ER 2019, held in Salvador, Brazil, in November 2019. The 22 full and 22 short papers presented together with 4 keynotes were carefully reviewed and selected from 142 submissions. This event covers a wide range of topics, covered in the following sessions: conceptual modeling, big data technology I, process modeling and analysis, query approaches, big data technology II, domain specific models I, domain specific models II, decision making, complex systems modeling, model unification, big data technology III, and requirements modeling.

A beginner's guide to get you up and running with Cassandra, DynamoDB, HBase, InfluxDB, MongoDB, Neo4j, and Redis Key Features Covers the basics of 7 NoSQL databases and how they are used in the enterprises Quick introduction to MongoDB, DynamoDB, Redis, Cassandra, Neo4j, InfluxDB, and HBase Includes effective techniques for database querying and management Book Description This is the golden age of open source NoSQL databases. With enterprises having to work with large amounts of unstructured data and moving away from expensive monolithic architecture, the adoption of NoSQL databases is rapidly increasing. Being familiar with the popular NoSQL databases and knowing how to use them is a must for budding DBAs and developers. This book introduces you to the different types of NoSQL databases and gets you started with seven of the most popular NoSQL databases used by enterprises today. We start off with a brief overview of what NoSQL databases are, followed by an explanation of why and when to use them. The book then covers the seven most popular databases in each of these

categories: MongoDB, Amazon DynamoDB, Redis, HBase, Cassandra, InfluxDB, and Neo4j. The book doesn't go into too much detail about each database but teaches you enough to get started with them. By the end of this book, you will have a thorough understanding of the different NoSQL databases and their functionalities, empowering you to select and use the right database according to your needs. What you will learn Understand how MongoDB provides high-performance, high-availability, and automatic scaling Interact with your Neo4j instances via database queries, Python scripts, and Java application code Get familiar with common querying and programming methods to interact with Redis Study the different types of problems Cassandra can solve Work with HBase components to support common operations such as creating tables and reading/writing data Discover data models and work with CRUD operations using DynamoDB Discover what makes InfluxDB a great choice for working with time-series data Who this book is for If you are a budding DBA or a developer who wants to get started with the fundamentals of NoSQL databases, this book is for you. Relational DBAs who want to get insights into the various offerings of popular NoSQL databases will also find this book to be very useful.

Discover how graph databases can help you manage and query highly connected data. With this practical book, you'll learn how to design and implement a graph database that brings the power of graphs to bear on a broad range of problem domains. Whether you want to speed up your response to user queries or build a database that can adapt as your business evolves, this book shows you how to apply the schema-free graph model to real-world problems. This second edition includes new code samples and diagrams, using the latest Neo4j syntax, as well as information on new functionality. Learn how different organizations are using graph databases to outperform their competitors. With this book's data modeling, query, and code examples, you'll quickly be able to implement your own solution. Model data with the Cypher query language and property graph model Learn best practices and common pitfalls when modeling with graphs Plan and implement a graph database solution in test-driven fashion Explore real-world examples to learn how and why organizations use a graph database Understand common patterns and components of graph database architecture Use analytical techniques and algorithms to mine graph database information

Graph Databases in Action introduces you to graph database concepts by comparing them with relational database constructs. You'll learn just enough theory to get started, then progress to hands-on development. Discover use cases involving social networking, recommendation engines, and personalization. Summary Relationships in data often look far more like a web than an orderly set of rows and columns. Graph databases shine when it comes to revealing valuable insights within complex, interconnected data such as demographics, financial records, or computer networks. In Graph Databases in Action, experts Dave Bechberger and Josh Perryman illuminate the design and implementation of graph databases in real-world applications. You'll learn how to choose the right database solutions for your tasks, and how to use your new knowledge to build agile, flexible, and high-performing graph-powered applications! Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Isolated data is a thing of the past! Now, data is connected, and graph databases—like Amazon Neptune, Microsoft Cosmos DB, and Neo4j—are the essential tools of this new reality. Graph databases represent relationships naturally, speeding the discovery of insights and driving business value. About the book Graph Databases in Action introduces you to graph database concepts by comparing them with relational database constructs. You'll learn just enough theory to get started, then progress to hands-on development. Discover use cases involving social networking, recommendation engines, and personalization. What's inside Graph databases vs. relational databases Systematic graph data modeling Querying and navigating a graph Graph patterns Pitfalls and antipatterns About the reader For software developers. No experience with graph databases required. About the author Dave Bechberger and Josh Perryman have decades of experience building complex data-driven systems and have worked with graph databases since 2014. Table of Contents PART 1 - GETTING STARTED WITH GRAPH DATABASES 1 Introduction to graphs 2 Graph data modeling 3 Running basic and recursive traversals 4 Pathfinding traversals and mutating graphs 5 Formatting results 6 Developing an application PART 2 - BUILDING ON GRAPH DATABASES 7 Advanced data modeling techniques 8 Building traversals using known walks 9 Working with subgraphs PART 3 - MOVING BEYOND THE BASICS 10 Performance, pitfalls, and anti-patterns 11 What's next: Graph analytics, machine learning, and resources

This book constitutes the refereed proceedings of the 8th Language and Technology Conference: Challenges for Computer Science and Linguistics, LTC 2017, held in Poznan, Poland, in November 2017. The 31 revised papers presented in this volume were carefully reviewed and selected from 108 submissions. The papers selected to this volume belong to various fields of: Speech Processing; Multiword Expressions; Parsing; Language Resources and Tools; Ontologies and Wordnets; Machine Translation; Information and Data Extraction; Text Engineering and Processing; Applications in Language Learning; Emotions, Decisions and Opinions; Less-Resourced Languages.

Neo4j is a graph database that allows you to model your data as a graph and find solutions to complex real-world problems that are difficult to solve using any other type of database. This book is designed to help you understand the intricacies of modeling a graph for any domain. The book starts with an example of a graph problem and then introduces you to modeling non-graph problems using Neo4j. Concepts such as the evolution of your database, chains, access control, and recommendations are addressed, along with examples and are modeled in a graph. Throughout the book, you will discover design choices and trade-offs, and understand how and when to use them. By the end of the book, you will be able to effectively use Neo4j to model your database for efficiency and flexibility.

This book constitutes the refereed proceedings of the 8th International Conference on Model and Data Engineering, MEDI 2018, held in Marrakesh, Morocco, in October 2018. The 23 full papers and 4 short papers presented together with 2 invited talks were carefully reviewed and selected from 86 submissions. The papers covered the recent and relevant topics in the areas of databases; ontology and model-driven engineering; data fusion, classification and learning; communication and information technologies; safety and security; algorithms and text processing; and specification, verification and validation.

This book constitutes the proceedings of the 16th International Conference on Web Information Systems and Applications, WISA 2019, held in Qingdao, China, in September 2019. The 39 revised full papers and 33 short papers presented were carefully reviewed and selected from 154 submissions. The papers are grouped in topical sections on machine learning and data mining, cloud computing and big data, information retrieval, natural language processing, data privacy and security, knowledge graphs and social networks, blockchain, query processing, and recommendations.

Run blazingly fast queries on complex graph datasets with the power of the Neo4j graph database About This Book Get acquainted with graph database systems and apply them in real-world use cases Use Cypher query language, APOC and other Neo4j extensions to derive meaningful analysis from complex data sets. A practical guide filled with ready to use examples on querying, graph processing and visualizing information to build smarter spatial applications. Who This Book Is For This book is for developers who want an alternative way to store and process data within their applications. No previous graph database experience is required; however, some basic database knowledge will help you understand the concepts more easily. What You Will Learn Understand the science of graph theory, databases and

its advantages over traditional databases. Install Neo4j, model data and learn the most common practices of traversing data Learn the Cypher query language and tailor-made procedures to analyze and derive meaningful representations of data Improve graph techniques with the help of precise procedures in the APOC library Use Neo4j advanced extensions and plugins for performance optimization. Understand how Neo4j's new security features and clustering architecture are used for large scale deployments. In Detail Neo4j is a graph database that allows traversing huge amounts of data with ease. This book aims at quickly getting you started with the popular graph database Neo4j. Starting with a brief introduction to graph theory, this book will show you the advantages of using graph databases along with data modeling techniques for graph databases. You'll gain practical hands-on experience with commonly used and lesser known features for updating graph store with Neo4j's Cypher query language. Furthermore, you'll also learn to create awesome procedures using APOC and extend Neo4j's functionality, enabling integration, algorithmic analysis, and other advanced spatial operation capabilities on data. Through the course of the book you will come across implementation examples on the latest updates in Neo4j, such as in-graph indexes, scaling, performance improvements, visualization, data refactoring techniques, security enhancements, and much more. By the end of the book, you'll have gained the skills to design and implement modern spatial applications, from graphing data to unraveling business capabilities with the help of real-world use cases. Style and approach A step-by-step approach of adopting Neo4j, the world's leading graph database. This book includes a lot of background information, helps you grasp the fundamental concepts behind this radical new way of dealing with connected data, and will give you lots of examples of use cases and environments where a graph database would be a great fit

This book describes recent advances on hybrid intelligent systems using soft computing techniques for diverse areas of application, such as intelligent control and robotics, pattern recognition, time series prediction and optimization complex problems. Soft Computing (SC) consists of several intelligent computing paradigms, including fuzzy logic, neural networks and bio-inspired optimization algorithms, which can be used to produce powerful hybrid intelligent systems. The book is organized in five main parts, which contain a group of papers around a similar subject. The first part consists of papers with the main theme of type-2 fuzzy logic, which basically consists of papers that propose new models and applications for type-2 fuzzy systems. The second part contains papers with the main theme of bio-inspired optimization algorithms, which are basically papers using nature-inspired techniques to achieve optimization of complex optimization problems in diverse areas of application. The third part contains papers that deal with new models and applications of neural networks in real world problems. The fourth part contains papers with the theme of intelligent optimization methods, which basically consider the proposal of new methods of optimization to solve complex real world optimization problems. The fifth part contains papers with the theme of evolutionary methods and intelligent computing, which are papers considering soft computing methods for applications related to diverse areas, such as natural language processing, recommending systems and optimization.

If you are already using Neo4j in your application and want to learn more about data analysis or database graphs, this is the book for you. This book also caters for your needs if you are looking to migrate your existing application to Neo4j in the future. We assume that you are already familiar with any general purpose programming language and have some familiarity with Neo4j.

Get up to speed on the game-changing developments in SQL Server 2019. No longer just a database engine, SQL Server 2019 is cutting edge with support for machine learning (ML), big data analytics, Linux, containers, Kubernetes, Java, and data virtualization to Azure. This is not a book on traditional database administration for SQL Server. It focuses on all that is new for one of the most successful modernized data platforms in the industry. It is a book for data professionals who already know the fundamentals of SQL Server and want to up their game by building their skills in some of the hottest new areas in technology. SQL Server 2019 Revealed begins with a look at the project's team goal to integrate the world of big data with SQL Server into a major product release. The book then dives into the details of key new capabilities in SQL Server 2019 using a "learn by example" approach for Intelligent Performance, security, mission-critical availability, and features for the modern developer. Also covered are enhancements to SQL Server 2019 for Linux and gain a comprehensive look at SQL Server using containers and Kubernetes clusters. The book concludes by showing you how to virtualize your data access with Polybase to Oracle, MongoDB, Hadoop, and Azure, allowing you to reduce the need for expensive extract, transform, and load (ETL) applications. You will then learn how to take your knowledge of containers, Kubernetes, and Polybase to build a comprehensive solution called Big Data Clusters, which is a marquee feature of 2019. You will also learn how to gain access to Spark, SQL Server, and HDFS to build intelligence over your own data lake and deploy end-to-end machine learning applications. What You Will Learn Implement Big Data Clusters with SQL Server, Spark, and HDFS Create a Data Hub with connections to Oracle, Azure, Hadoop, and other sources Combine SQL and Spark to build a machine learning platform for AI applications Boost your performance with no application changes using Intelligent Performance Increase security of your SQL Server through Secure Enclaves and Data Classification Maximize database uptime through online indexing and Accelerated Database Recovery Build new modern applications with Graph, ML Services, and T-SQL Extensibility with Java Improve your ability to deploy SQL Server on Linux Gain in-depth knowledge to run SQL Server with containers and Kubernetes Know all the new database engine features for performance, usability, and diagnostics Use the latest tools and methods to migrate your database to SQL Server 2019 Apply your knowledge of SQL Server 2019 to Azure Who This Book Is For IT professionals and developers who understand the fundamentals of SQL Server and wish to focus on learning about the new, modern capabilities of SQL Server 2019. The book is for those who want to learn about SQL Server 2019 and the new Big Data Clusters and AI feature set, support for machine learning and Java, how to run SQL Server with containers and Kubernetes, and increased capabilities around Intelligent Performance, advanced security, and high availability. With coverage of the entire research process in social media, data collection and analysis on specific platforms, and innovative developments in the field, this handbook is the ultimate resource for those looking to tackle the challenges that come with doing research in this sphere.

Neo4j is a graph database that allows us to model our data as a graph and find solutions to complex real-world problems that are difficult to solve using any other type of database. This book is designed and presented to help you understand the intricacies of modeling a graph for any practical domain. The book starts with an example of a graph problem and then introduces you to modeling non-graph problems using Neo4j. Throughout the book, you will discover design choices and trade-offs, and understand how and when to use Neo4j. Starting with a brief introduction to graph theory, this book will show you the advantages of using graph databases along with data modeling techniques for graph databases. You'll gain practical hands-on experience with commonly used and lesser known features for updating graph store with Neo4j's Cypher query language. This book includes a lot of background information, helps you grasp the fundamental concepts behind this radical new way of dealing with connected data, and will give you lots of examples of use cases and environments where a graph database would be a great interest. Using this book, you'll get to learn the theory of graph database and how to use Neo4j to build up recommendations, relationships, and calculate the shortest route between two locations. With example data models, best practices, use-cases, and an application putting everything together, this book will give you everything you need to really get started with Neo4j. By the end of the book, you will be able to effectively use Neo4j to model your database for efficiency and flexibility. Simply In Depth.....

This book constitutes the refereed proceedings of the 12th Colombian Conference on Computing, CCC 2017, held in Cali, Colombia, in September 2017. The 56 revised full papers presented were carefully reviewed and selected from 186 submissions. The papers are organized in topical sections on information and knowledge management, software engineering and IT

architectures, educational informatics, intelligent systems and robotics, human-computer interaction, distributed systems and large-scale architectures, image processing, computer vision and multimedia, security of the information, formal methods, computational logic and theory of computation.

If you are a developer who wants to understand the fundamentals of modeling data in Neo4j and how it can be used to model full-fledged applications, then this book is for you. Some understanding of domain modeling may be advantageous but is not essential. Digital health and medical informatics have grown in importance in recent years, and have now become central to the provision of effective healthcare around the world. This book presents the proceedings of the 30th Medical Informatics Europe conference (MIE). This edition of the conference, hosted by the European Federation for Medical Informatics (EFMI) since the 1970s, was due to be held in Geneva, Switzerland in April 2020, but as a result of measures to prevent the spread of the Covid19 pandemic, the conference itself had to be cancelled. Nevertheless, because this collection of papers offers a wealth of knowledge and experience across the full spectrum of digital health and medicine, it was decided to publish the submissions accepted in the review process and confirmed by the Scientific Program Committee for publication, and these are published here as planned. The 232 papers are themed under 6 section headings: biomedical data, tools and methods; supporting care delivery; health and prevention; precision medicine and public health; human factors and citizen centered digital health; and ethics, legal and societal aspects. A 7th section deals with the Swiss personalized health network, and section 8 includes the 125 posters accepted for the conference. Offering an overview of current trends and developments in digital health and medical informatics, the book provides a valuable information resource for researchers and health practitioners alike.

Master a graph data modeling technique superior to traditional data modeling for both relational and NoSQL databases (graph, document, key-value, and column), leveraging cognitive psychology to improve big data designs. From Karen Lopez's Foreword: In this book, Thomas Frisendal raises important questions about the continued usefulness of traditional data modeling notations and approaches: Are Entity Relationship Diagrams (ERDs) relevant to analytical data requirements? Are ERDs relevant in the new world of Big Data? Are ERDs still the best way to work with business users to understand their needs? Are Logical and Physical Data Models too closely coupled? Are we correct in using the same notations for communicating with business users and developers? Should we refine our existing notations and tools to meet these new needs, or should we start again from a blank page? What new notations and approaches will we need? How will we use those to build enterprise database systems? Frisendal takes us through the history of data modeling, enterprise data models and traditional modeling methods. He points out, quite contentiously, where he feels we have gone wrong and in a few places where we got it right. He then maps out the psychology of meaning and context, while identifying important issues about where data modeling may or may not fit in business modeling. The main subject of this work is a proposal for a new exploration-driven modeling approach and new modeling notations for business concept models, business solutions models, and physical data models with examples on how to leverage those for implementing into any target database or datastore. These new notations are based on a property graph approach to modeling data.

In today's data-driven world, every datum is connected to a large amount of data. Relational databases have been proving itself a pioneer in the field of data storage and manipulation since 1970s. But more recently they have been challenged by NoSQL graph databases in handling data models which have an inherent graphical representation. Graph databases with the ability to store physical relationships between two nodes and native graph processing technique have been doing exceptionally well in graph data storage and management for applications like recommendation engines, biological modeling, network modeling, social media applications, etc. Instructional Module Development System (IMODS) is a web-based software system that guides STEM instructors through the complex task of curriculum design, ensures tight alignment between various components of a course (i.e., learning objectives, content, assessments), and provides relevant information about research-based pedagogical and assessment strategies. The data model of IMODS is highly connected and has an inherent graphical representation between all its entities with numerous relationships between them. This thesis focuses on developing an algorithm to determine completeness of course design developed using IMODS. As part of this research objective, the study also analyzes the data model for best fit database to run these algorithms. As part of this thesis, two separate applications abstracting the data model of IMODS have been developed - one with Neo4j (graph database) and another with PostgreSQL (relational database). The research objectives of the thesis are as follows: (i) evaluate the performance of Neo4j and PostgreSQL in handling complex queries that will be fired throughout the life cycle of the course design process; (ii) devise an algorithm to determine the completeness of a course design developed using IMODS. This thesis presents the process of creating data model for PostgreSQL and converting it into a graph data model to be abstracted by Neo4j, creating SQL and CYPHER scripts for undertaking experiments on both platforms, testing and elaborate analysis of the results and evaluation of the databases in the context of IMODS.

If you are a professional or enthusiast who has a basic understanding of graphs or has basic knowledge of Neo4j operations, this is the book for you. Although it is targeted at an advanced user base, this book can be used by beginners as it touches upon the basics. So, if you are passionate about taming complex data with the help of graphs and building high performance applications, you will be able to get valuable insights from this book.

The aim of this book is to provide an internationally respected collection of scientific research methods, technologies and applications in the area of data science. This book can prove useful to the researchers, professors, research students and practitioners as it reports novel research work on challenging topics in the area surrounding data science. In this book, some of the chapters are written in tutorial style concerning machine learning algorithms, data analysis, information design, infographics, relevant applications, etc. The book is structured as follows: • Part I: Data Science: Theory, Concepts, and Algorithms This part comprises five chapters on data Science theory, concepts, techniques and algorithms. • Part II: Data Design and Analysis This part comprises five chapters on data design and analysis. • Part III: Applications and New Trends in Data Science This part comprises four chapters on applications and new trends in data science.

#### Neo4j Graph Data Modeling

With this practical book, architects, CTOs, and CIOs will learn a set of patterns for the practice of architecture, including analysis, documentation, and communication. Author Eben Hewitt shows you how to create holistic and thoughtful technology plans, communicate them clearly, lead people toward the vision, and become a great architect or Chief Architect. This book covers each key aspect of architecture comprehensively, including how to incorporate business architecture, information architecture, data architecture, application (software) architecture together to have the best chance for the system's success. Get a practical set of proven architecture practices focused on shipping great products using architecture Learn how architecture works effectively with

development teams, management, and product management teams through the value chain Find updated special coverage on machine learning architecture Get usable templates to start incorporating into your teams immediately Incorporate business architecture, information architecture, data architecture, and application (software) architecture together

Discover how graph databases can help you manage and query highly connected data. With this practical book, you'll learn how to design and implement a graph database that brings the power of graphs to bear on a broad range of problem domains. Whether you want to speed up your response to user queries or build a database that can adapt as your business evolves, this book shows you how to apply the schema-free graph model to real-world problems. Learn how different organizations are using graph databases to outperform their competitors. With this book's data modeling, query, and code examples, you'll quickly be able to implement your own solution. Model data with the Cypher query language and property graph model Learn best practices and common pitfalls when modeling with graphs Plan and implement a graph database solution in test-driven fashion Explore real-world examples to learn how and why organizations use a graph database Understand common patterns and components of graph database architecture Use analytical techniques and algorithms to mine graph database information

The information infrastructure---comprising computers, embedded devices, networks and software systems---is vital to day-to-day operations in every sector: information and telecommunications, banking and finance, energy, chemicals and hazardous materials, agriculture, food, water, public health, emergency services, transportation, postal and shipping, government and defense. Global business and industry, governments, indeed society itself, cannot function effectively if major components of the critical information infrastructure are degraded, disabled or destroyed. Critical Infrastructure Protection describes original research results and innovative applications in the interdisciplinary field of critical infrastructure protection. Also, it highlights the importance of weaving science, technology and policy in crafting sophisticated, yet practical, solutions that will help secure information, computer and network assets in the various critical infrastructure sectors. Areas of coverage include: Themes and Issues, Control Systems Security, Cyber-Physical Systems Security, Infrastructure Security, Infrastructure Modeling and Simulation, Risk and Impact Assessment. This book is the ninth volume in the annual series produced by the International Federation for Information Processing (IFIP) Working Group 11.10 on Critical Infrastructure Protection, an international community of scientists, engineers, practitioners and policy makers dedicated to advancing research, development and implementation efforts focused on infrastructure protection. The book contains a selection of nineteen edited papers from the Ninth Annual IFIP WG 11.10 International Conference on Critical Infrastructure Protection, held at SRI International, Arlington, Virginia, USA in the spring of 2015. Critical Infrastructure Protection IX is an important resource for researchers, faculty members and graduate students, as well as for policy makers, practitioners and other individuals with interests in homeland security. Mason Rice is an Assistant Professor of Computer Science at the Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio, USA. Sujeet Shenoj is the F.P. Walter Professor of Computer Science and a Professor of Chemical Engineering at the University of Tulsa, Tulsa, Oklahoma, USA.

Run blazingly fast queries on complex graph datasets with the power of the Neo4j graph database About This Book\* Get acquainted with graph database systems and apply them in real-world use cases\* Use Cypher query language, APOC and other Neo4j extensions to derive meaningful analysis from complex data sets.\* A practical guide filled with ready to use examples on querying, graph processing and visualizing information to build smarter spatial applications. Who This Book Is For This book is for developers who want an alternative way to store and process data within their applications. No previous graph database experience is required; however, some basic database knowledge will help you understand the concepts more easily. What You Will Learn\* Understand the science of graph theory, databases and its advantages over traditional databases.\* Install Neo4j, model data and learn the most common practices of traversing data\* Learn the Cypher query language and tailor-made procedures to analyze and derive meaningful representations of data\* Improve graph techniques with the help of precise procedures in the APOC library\* Use Neo4j advanced extensions and plugins for performance optimization.\* Understand how Neo4j's new security features and clustering architecture are used for large scale deployments. In Detail Neo4j is a graph database that allows traversing huge amounts of data with ease. This book aims at quickly getting you started with the popular graph database Neo4j. Starting with a brief introduction to graph theory, this book will show you the advantages of using graph databases along with data modeling techniques for graph databases. You'll gain practical hands-on experience with commonly used and lesser known features for updating graph store with Neo4j's Cypher query language. Furthermore, you'll also learn to create awesome procedures using APOC and extend Neo4j's functionality, enabling integration, algorithmic analysis, and other advanced spatial operation capabilities on data. Through the course of the book you will come across implementation examples on the latest updates in Neo4j, such as in-graph indexes, scaling, performance improvements, visualization, data refactoring techniques, security enhancements, and much more. By the end of the book, you'll have gained the skills to design and implement modern spatial applications, from graphing data to unraveling business capabilities with the help of real-world use cases. Style and approach A step-by-step approach of adopting Neo4j, the world's leading graph database. This book includes a lot of background information, helps you grasp the fundamental concepts behind this radical new way of dealing with connected data, and will give you lots of examples of use cases and environments where a graph database would be a great fit

What separates the traditional enterprise from the likes of Amazon, Netflix, and Etsy? Those companies have refined the art of cloud native development to maintain their competitive edge and stay well ahead of the competition. This practical guide shows Java/JVM developers how to build better software, faster, using Spring Boot, Spring Cloud, and Cloud Foundry. Many organizations have already waded into cloud computing, test-driven development, microservices, and continuous integration and delivery. Authors Josh Long and Kenny Bastani fully immerse you in the tools and methodologies that will help you transform your legacy application into one that is genuinely cloud native. In four sections, this book takes you through: The Basics: learn the motivations behind cloud native thinking; configure and test a Spring Boot application; and move your legacy application to the cloud Web Services: build HTTP and RESTful services with Spring; route requests in your distributed system; and build edge services closer to the data Data Integration: manage your data with Spring Data, and integrate distributed services with Spring's support for event-driven, messaging-centric architectures Production: make your system observable; use service brokers to connect stateful services; and understand the big ideas behind continuous delivery

This book constitutes the refereed proceedings of the 32nd International Conference on Conceptual Modeling, ER 2014, held in Atlanta, GA, USA. The 23 full and 15 short papers presented were carefully reviewed and selected from 80 submissions. Topics of interest presented and discussed in the conference span the entire spectrum of conceptual modeling including research and

practice in areas such as: data on the web, unstructured data, uncertain and incomplete data, big data, graphs and networks, privacy and safety, database design, new modeling languages and applications, software concepts and strategies, patterns and narratives, data management for enterprise architecture, city and urban applications.

Model-based tools and methods are playing important roles in the design and analysis of cyber-physical systems before building and testing physical prototypes. The development of increasingly complex CPSs requires the use of multiple tools for different phases of the development lifecycle, which in turn depends on the ability of the supporting tools to interoperate. However, currently no vendor provides comprehensive end-to-end systems engineering tool support across the entire product lifecycle, and no mature solution currently exists for integrating different system modeling and simulation languages, tools and algorithms in the CPSs design process. Thus, modeling and simulation tools are still used separately in industry. The unique challenges in integration of CPSs are a result of the increasing heterogeneity of components and their interactions, increasing size of systems, and essential design requirements from various stakeholders. The corresponding system development involves several specialists in different domains, often using different modeling languages and tools. In order to address the challenges of CPSs and facilitate design of system architecture and design integration of different models, significant progress needs to be made towards model-based integration of multiple design tools, languages, and algorithms into a single integrated modeling and simulation environment. In this thesis we present the need for methods and tools with the aim of developing techniques for numerically stable co-simulation, advanced simulation model analysis, simulation-based optimization, and traceability capability, and making them more accessible to the model-based cyber physical product development process, leading to more efficient simulation. In particular, the contributions of this thesis are as follows: 1) development of a model-based dynamic optimization approach by integrating optimization into the model development process; 2) development of a graphical co-modeling editor and co-simulation framework for modeling, connecting, and unified system simulation of several different modeling tools using the TLM technique; 3) development of a tool-supported method for multidisciplinary collaborative modeling and traceability support throughout the development process for CPSs; 4) development of an advanced simulation modeling analysis tool for more efficient simulation.

Get an introduction to the visual design of GraphQL data and concepts, including GraphQL structures, semantics, and schemas in this compact, pragmatic book. In it you will see simple guidelines based on lessons learned from real-life data discovery and unification, as well as useful visualization techniques. These in turn help you improve the quality of your API designs and give you the skills to produce convincing visual communications about the structure of your API designs. Finally, Visual Design of GraphQL Data shows you how to handle GraphQL with legacy data as well as with Neo4j graph databases. Spending time on schema quality means that you will work from sharper definitions, which in turn leads to greater productivity and well-structured applications. What You Will Learn Create quality GraphQL data designs Avoid structural mistakes Draw highly communicative property graph diagrams of your APIs Who This Book Is For Web developers and data architects who work with GraphQL and other APIs to build modern applications.

This book constitutes the refereed post-conference proceedings of the 6th TPC Technology Conference, TPCTC 2014, held in Hangzhou, China, in September 2014. It contains 12 selected peer-reviewed papers, a report from the TPC Public Relations Committee. Many buyers use TPC benchmark results as points of comparison when purchasing new computing systems. The information technology landscape is evolving at a rapid pace, challenging industry experts and researchers to develop innovative techniques for evaluation, measurement and characterization of complex systems. The TPC remains committed to developing new benchmark standards to keep pace and one vehicle for achieving this objective is the sponsorship of the Technology Conference on Performance Evaluation and Benchmarking (TPCTC). Over the last five years TPCTC has been held successfully in conjunction with VLDB.

Graph data modeling and querying arises in many practical application domains such as social and biological networks where the primary focus is on concepts and their relationships and the rich patterns in these complex webs of interconnectivity. In this book, we present a concise unified view on the basic challenges which arise over the complete life cycle of formulating and processing queries on graph databases. To that purpose, we present all major concepts relevant to this life cycle, formulated in terms of a common and unifying ground: the property graph data model—the pre-dominant data model adopted by modern graph database systems. We aim especially to give a coherent and in-depth perspective on current graph querying and an outlook for future developments. Our presentation is self-contained, covering the relevant topics from: graph data models, graph query languages and graph query specification, graph constraints, and graph query processing. We conclude by indicating major open research challenges towards the next generation of graph data management systems.

To start with you will cover the basics of graph analytics, Cypher querying language, components of graph architecture, and more. You will implement Neo4j techniques to understand various graph analytics methods to reveal complex relationships in data. You will understand how machine learning can be used to perform smarter graph analytics.

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