

Blockchain Link Springer

This contributed volume discusses diverse topics to demystify the rapidly emerging and evolving blockchain technology, the emergence of integrated platforms and hosted third-party tools, and the development of decentralized applications for various business domains. It presents various applications that are helpful for research scholars and scientists who are working toward identifying and pinpointing the potential of as well as the hindrances to this technology.

This open access book contributes to the creation of a cyber ecosystem supported by blockchain technology in which technology and people can coexist in harmony. Blockchains have shown that trusted records, or ledgers, of permanent data can be stored on the Internet in a decentralized manner. The decentralization of the recording process is expected to significantly economize the cost of transactions. Creating a ledger on data, a blockchain makes it possible to designate the owner of each piece of data, to trade data pieces, and to market them. This book examines the formation of markets for various types of data from the theory of market quality proposed and developed by M. Yano. Blockchains are expected to give data itself the status of a new production factor. Bringing ownership of data to the hands of data producers, blockchains can reduce the possibility of information leakage, enhance the sharing and use of IoT data, and prevent data monopoly and misuse. The industry will have a bright future as soon as better technology is developed and when a healthy infrastructure is created to support the blockchain market.

This book provides extensive insights on blockchain systems, starting from a historical perspective and moving towards building foundational knowledge, with focus on communication networks. It covers blockchain applications, algorithms, architectures, design and implementation, and security and privacy issues, providing the reader with a comprehensive overview. Further, it discusses blockchain systems and its integration to communication networks. The book includes hands-on, practical tutorials, self-assessment exercises, and review questions; tips and sample programs are also provided throughout. Complementary supporting material for instructors, including open source programming code for practical tutorials and exercises, is also available. The target audience includes graduate students, professionals, and researchers working in the areas of blockchain systems, distributed ledger technology, computer networks and communications, artificial intelligence, and cybersecurity.

Handbook of Research on Blockchain Technology presents the latest information on the adaptation and implementation of Blockchain technologies in real world business, scientific, healthcare and biomedical applications. The book's editors present the rapid advancements in existing business models by applying Blockchain techniques. Novel architectural solutions in the deployment of Blockchain comprise the core aspects of this book. Several use cases with IoT, biomedical engineering, and smart cities are also incorporated. As Blockchain is a relatively new technology that exploits decentralized networks and is used in many sectors for reliable, cost-effective and rapid business transactions, this book is a welcomed addition on existing knowledge. Financial services, retail, insurance, logistics, supply chain, public sectors and biomedical industries are now investing in Blockchain research and technologies for their business growth. Blockchain prevents double spending in financial transactions without the need of a trusted authority or central server. It is a decentralized ledger platform that facilitates verifiable transactions between parties in a secure and smart way. Presents the evolution of blockchain, from fundamental theories, to present forms Explains the concepts of blockchain related to cloud/edge computing, smart healthcare, smart cities and Internet of Things (IoT) Provides complete coverage of the various tools, platforms and techniques used in blockchain Explores smart contract tools and consensus algorithms Covers a variety of applications with real world case studies in areas such as biomedical engineering, supply chain management, and tracking of goods and delivery

This book provides a comprehensive analysis of fundamental topics related to blockchain. Throughout, the authors explore different vital issues and specific areas of blockchain. For convenience, the authors present the elementary description, visualize the working procedure of blockchain paradigm, and highlight the areas it can be applied in real life. They explain the blockchain process from a diverse perspective i.e. distributed Internet of Things (IoT), interdependent networks, intelligent mining, etc. They also analyze the interconnection of a blockchain network and such novel research areas to show a pathway towards a new research direction. This book also holds the core challenges and open research issues of blockchain technology, considering existing applications. Chapters include consensus mechanisms of blockchain, blockchain applicability in centralized and decentralized internet of things, blockchain interoperability from the perspective of interdependent networks, and blockchain for resource-constrained devices. Specifies the importance of theoretical methods in dealing with problems in the context of blockchain for interdependent decision making; Provides a comprehensive investigation of blockchain algorithms and the recently developed methods based on this algorithm; Provides basics and mathematical foundations needed to learn and deploy blockchain.

This book presents chapters from diverse range of authors on different aspects of how Blockchain and IoT are converging and the impacts of these developments. The book provides an extensive cross-sectional and multi-disciplinary look into this trend and how it affects artificial intelligence, cyber-physical systems, and robotics with a look at applications in aerospace, agriculture, automotive, critical infrastructures, healthcare, manufacturing, retail, smart transport systems, smart cities, and smart healthcare. Cases include the impact of Blockchain for IoT Security; decentralized access control systems in IoT; Blockchain architecture for scalable access management in IoT; smart and sustainable IoT applications incorporating Blockchain, and more. The book presents contributions from international academics, researchers, and practitioners from diverse perspectives. Presents how Blockchain and IoT are converging and the impacts of these developments on technology and its application; Discusses IoT and Blockchain from cross-sectional and multi-disciplinary perspectives; Includes contributions from researchers, academics, and professionals from around the world.

This book constitutes the refereed conference proceedings of the 12th International Workshop on Data Privacy Management, DPM 2017, on conjunction with the 22nd European Symposium on Research in computer Security, ESORICS 2017 and the First International Workshop on Cryptocurrencies and Blockchain Technology (CBT 2017) held in Oslo, Norway, in September 2017. The DPM Workshop received 51 submissions from which 16 full papers were selected for presentation. The papers focus on challenging problems such as translation of high-level business goals into system level privacy policies, administration of sensitive identifiers, data integration and privacy engineering. From the CBT Workshop six full papers and four short papers out of 27 submissions are included. The selected papers cover aspects of identity management, smart contracts, soft- and hardforks, proof-of-works and proof of stake as well as on network layer aspects and the application of blockchain technology for secure connect event ticketing.

This book analyzes the fundamental issues faced when blockchain technology is applied to real-life applications. These concerns, not only in the realm of computer science, are caused by the nature of technological design. Blockchain is considered the foundation of a wide range of flexible ecosystems; its technology is an excellent mixture of mathematics, cryptography, incentive mechanisms, economics, and pertinent regulations. The book provides an essential understanding of why such fundamental issues arise, by revising the underlying theories. Blockchain theory is thus presented in an easy-to-understand, useful manner. Also explained is the reason why blockchain is hard to adopt for real-life problems but is valuable as a foundation for flexible ecosystems. Included are directions for solving those problems and finding suitable areas for blockchain applications in the future. The authors of this work are experts from a wide range of backgrounds such as cryptography, distributed computing, computer science, trust, identity, regulation, and standardization. Their contributions collected here will appeal to all who are interested in blockchain and the elements surrounding it.

Blockchain and Crypto Currency Building a High Quality Marketplace for Crypto Data Springer Nature

This book constitutes the proceedings of the Third International Conference on Blockchain, ICBC 2020, held as part of SCF 2020, during September 18-20, 2020. The conference was planned to take place in Honolulu, HI, USA and was changed to a virtual format due to the COVID-19 pandemic. The 14 full paper and 1 short paper presented were carefully reviewed and selected from 26 submissions. They deal with all topics regarding blockchain technologies, platforms, solutions and business models, including new blockchain architecture, platform constructions, blockchain development and blockchain services technologies as well as standards, and blockchain services innovation lifecycle including enterprise modeling, business consulting, solution creation, services orchestration, services optimization, services management, services marketing, business process integration and management.

This book presents a general framework analysis of sovereignty in blockchain based on the concept of blockchain technology, and specifically discusses the three theoretical foundations of sovereignty in blockchain: data sovereignty theory, social trust theory, and smart contract theory. It also explores the evolution of laws concerning data and digital rights, how to build trust mechanisms for digital rights transactions, as well as contract signing and the implementation of digital rights transactions.

This volume explores from a legal perspective, how blockchain works. Perhaps more than ever before, this new technology requires us to take a multidisciplinary approach. The contributing authors, which include distinguished academics, public officials from important national authorities, and market operators, discuss and demonstrate how this technology can be a driver of innovation and yield positive effects in our societies, legal systems and economic/financial system. In particular, they present critical analyses of the potential benefits and legal risks of distributed ledger technology, while also assessing the opportunities offered by blockchain, and possible modes of regulating it. Accordingly, the discussions chiefly focus on the law and governance of blockchain, and thus on the paradigm shift that this technology can bring about.

This book investigates how the Blockchain Technology (BCT) for Supply Chain Finance (SCF) programs allows businesses to come together in partnerships and accelerate cash flows throughout the supply chain. BCT promises to change the way individuals and corporations exchange value and information over the Internet, and is perfectly positioned to enable new levels of collaboration among the supply chain actors. The book reveals new opportunities stemming from the application of BCT to SCF financing solutions, particularly reverse factoring – or approved payables financing. To do so, it first identifies the principal barriers and pain points in delivering financing solutions. Then, a possible blockchain-driven supply chain model is defined. Using this framework, the book subsequently discusses relevant use cases for the technology, which could open up new opportunities in the SCF space. It demonstrates that blockchain and distributed ledgers technologies could deliver substantial benefits for all parties involved in SCF transactions, promising to expedite the processes and lower the overall costs of financing programs. Industry giants such as IBM, Maersk, China-based Dianrong and FnConn (a Foxconn subsidiary) are currently working to digitize the global, cross-border supply chain using blockchain technology, and will likely soon create blockchain platforms for supply chain finance. These solutions aim to reduce complexity and make data sharing more secure, accurate and efficient. This book offers a highly topical resource for stakeholders across the entire supply chain, helping them prepare for the upcoming technological revolution.

This book explores recent advances in the Internet of things (IoT) via advanced technologies and provides an overview of most aspects which are relevant for advance secure, distributed, decentralized blockchain technology in the Internet of things, their applications, and industry IoT. The book provides an in-depth analysis of the step-by-step evolution of IoT to create a change by enhancing the productivity of industries. It introduces how connected things, data, and their communication (data sharing) environment build a transparent, reliable, secure environment for people, processes, systems, and services with the help of blockchain technology.

This book presents state-of-the-art research on artificial intelligence and blockchain for future cybersecurity applications. The accepted book chapters covered many themes,

including artificial intelligence and blockchain challenges, models and applications, cyber threats and intrusions analysis and detection, and many other applications for smart cyber ecosystems. It aspires to provide a relevant reference for students, researchers, engineers, and professionals working in this particular area or those interested in grasping its diverse facets and exploring the latest advances on artificial intelligence and blockchain for future cybersecurity applications.

This book constitutes the revised selected post conference proceedings of the 15th International Workshop on Data Privacy Management, DPM 2020, and the 4th International Workshop on Cryptocurrencies and Blockchain Technology, CBT 2020, held in conjunction with the 25th European Symposium on Research in Computer Security, ESORICS 2020, held in Guildford, UK in September 2020. For the CBT Workshop 8 full and 4 short papers were accepted out of 24 submissions. The selected papers are organized in the following topical headings: Transactions, Mining, Second Layer and Inter-bank Payments. The DPM Workshop received 38 submissions from which 12 full and 5 short papers were selected for presentation. The papers focus on Second Layer, Signature Schemes, Formal Methods, Privacy, SNARKs and Anonymity.

This book focuses on the innovation of blockchain technology and the advantages it offers. It provides a clear and comprehensive overview of blockchain technology and its possibilities, and thereby helps readers to form an opinion and draw their own conclusions about its potential exploitations. The book begins with a chapter on the topic of decentralized networks, which familiarizes readers with their challenges by using the example of an online trading platform. Hereinafter, it is then detailed what blockchain technology is, where it comes from, and how it works. The necessary underlying technologies are explained, and various individual approaches as well as their composition are presented. Using well-known examples such as Bitcoin and Ethereum as an illustration, the book looks at the architecture of blockchain technology and focuses on the challenges such as security and scalability. The options available when introducing blockchain technology are also outlined, and best-practice examples are presented to get a better idea of what areas benefit from this technology. Numerous examples and detailed explanations will accompany the readers throughout the book. By the time they have reached the end, they will be able to decide for themselves what is truly innovative about blockchain technology and what is nothing more than hype.

This book discusses blockchain technology and its potential applications in digital government and the public sector. With its robust infrastructure and append-only record system, blockchain technology is being increasingly employed in the public sector, specifically where trustworthiness and security are of importance. Written by leading scholars and practitioners, this edited volume presents challenges, benefits, regulations, frameworks, taxonomies, and applications of blockchain technology in the public domain. Specifically, the book analyzes the implementation of blockchain technologies in the public sector and the potential reforms it would bring. It discusses emerging technologies and their role in the implementation of blockchain technologies in the public sector. The book details the role of blockchain in the creation of public value in the delivery of public sector services. The book analyzes effects, impacts, and outcomes from the implementation of blockchain technologies in the public sector in select case studies. Providing up-to-date information on important developments regarding blockchain in government around the world, this volume will appeal to academics, researchers, policy-makers, public managers, international organizations, and technical experts looking to understand how blockchain can enhance public service delivery.

This book provides a comprehensive overview of various aspects of the development of smart cities from a secure, trusted, and reliable data transmission perspective. It presents theoretical concepts and empirical studies, as well as examples of smart city programs and their capacity to create value for citizens. The contributions offer a panorama of the most important aspects of smart city evolution and implementation within various frameworks, such as healthcare, education, and transportation. Comparing current advanced applications and best practices, the book subsequently explores how smart environments and programs could help improve the quality of life in urban spaces and promote cultural and economic development.

This book provides basic concepts and deep knowledge about various security mechanisms that can be implemented in IoT through Blockchain technology. This book aids readers in gaining insight and knowledge about providing security and solutions to different challenges in IoT using Blockchain technology. This book primarily focuses on challenges to addressing the integration of the IoT with Blockchain with respect to potential benefits for IoT. This book gives descriptive analysis of Blockchain integrated with IoT applications and platforms for the development of IoT solutions along with possible topologies to that integration. Several application examples are included in a variety of industries.

This volume brings together a multidisciplinary group of scholars from diverse fields including computer science, engineering, archival science, law, business, psychology, economics, medicine and more to discuss the trade-offs between different “layers” in designing the use of blockchain/Distributed Ledger Technology (DLT) for social trust, trust in data and records, and trust in systems. Blockchain technology has emerged as a solution to the problem of trust in data and records, as well as trust in social, political and economic institutions, due to its profound potential as a digital trust infrastructure. Blockchain is a DLT in which confirmed and validated sets of transactions are stored in blocks that are chained together to make tampering more difficult and render records immutable. This book is dedicated to exploring and disseminating the latest findings on the relationships between socio-political and economic data, record-keeping, and technical aspects of blockchain.

?This book provides the reader with the most up-to-date knowledge of blockchain in mainstream areas of security, trust, and privacy in the decentralized domain, which is timely and essential (this is due to the fact that the distributed and P2P applications is increasing day-by-day, and the attackers adopt new mechanisms to threaten the security and privacy of the users in those environments). This book also provides the technical information regarding blockchain-oriented software, applications, and tools required for the researcher and developer experts in both computing and software engineering to provide solutions and automated systems against current security, trust and privacy issues in the cyberspace. Cybersecurity, trust and privacy (CTP) are pressing needs for governments, businesses, and individuals, receiving the utmost priority for enforcement and improvement in almost any societies around the globe. Rapid advances, on the other hand, are being made in emerging blockchain technology with broadly diverse applications that promise to better meet business and individual needs. Blockchain as a promising infrastructural technology seems to have the potential to be leveraged in different aspects of cybersecurity promoting decentralized cyberinfrastructure. Blockchain characteristics such as decentralization, verifiability and immutability may revolve current cybersecurity mechanisms for ensuring the authenticity, reliability, and integrity of data. Almost any article on the blockchain points out that the cybersecurity (and its derivatives) could be revitalized if it is supported by blockchain technology. Yet, little is known about factors related to decisions to adopt this technology, and how it can systemically be put into use to remedy current CTP's issues in the digital world. Topics of interest for this book include but not limited to: Blockchain-based authentication, authorization and accounting mechanisms Applications of blockchain technologies in digital forensic and threat hunting Blockchain-based threat intelligence and threat analytics techniques Formal specification of smart contracts Automated tools for outsmarting smart contracts Security and privacy aspects of blockchain technologies Vulnerabilities of smart contracts Blockchain for securing cyber infrastructure and internet of things networks Blockchain-based cybersecurity education systems This book provides information for security and privacy experts in all the areas of blockchain, cryptocurrency, cybersecurity, forensics, smart contracts, computer systems, computer networks, software engineering, applied artificial intelligence for computer security experts, big data analysts, and decentralized systems. Researchers, scientists and advanced level students working in computer systems, computer networks, artificial intelligence, big data will find this book useful as

well.

This book explores blockchain technology's impact on banks, particularly how blockchain technology can create new opportunities for banks and poses new threats to their business. The digital revolution in the banking industry, whose customers are increasingly adapting to new technologies and new types of competitors and solutions arising in the space, has had a significant impact on the banking industry over the past few years, requiring banks to substantially rethink their business models and strategies in order to cope with these developments. The rise of blockchain's distributed ledger technology (DLT) has also played an important role since it has the potential to change the whole banking industry in faster and more disruptive ways than ever before. Born as the technology underlying Bitcoin, which has been used to allow the recording of cryptocurrencies transactions, blockchain can facilitate the process of recording any transaction type and track the movement of any asset, finding application in many different areas. Specifically, it has been acknowledged as a disruptive force in the financial sector and a key source of future financial market innovation with the potential to reshape existing business models in the financial services industry. Regarding the banking industry in particular, existing literature suggests that blockchain poses new challenges and generates opportunities as well as threats. This is pushing banks to rethink their operations, business models and strategies. However, literature in this regard is still in its infancy, and we do not yet have a clear understanding of blockchain technology's potential implications for banks. This book expands the literature on blockchain technology in banking by providing new insights into the developments, trends and challenges of blockchain in the banking industry. In particular, sheds more light on the implications of blockchain technology for banks by discussing the advantages and disadvantages related to this technology and exploring its potential impact on traditional banking business models.

This book provides a comprehensive introduction to blockchain and distributed ledger technology. Intended as an applied guide for hands-on practitioners, the book includes detailed examples and in-depth explanations of how to build and run a blockchain from scratch. Through its conceptual background and hands-on exercises, this book allows students, teachers and crypto enthusiasts to launch their first blockchain while assuming prior knowledge of the underlying technology. How do I build a blockchain? How do I mint a cryptocurrency? How do I write a smart contract? How do I launch an initial coin offering (ICO)? These are some of questions this book answers. Starting by outlining the beginnings and development of early cryptocurrencies, it provides the conceptual foundations required to engineer secure software that interacts with both public and private ledgers. The topics covered include consensus algorithms, mining and decentralization, and many more. "This is a one-of-a-kind book on Blockchain technology. The authors achieved the perfect balance between the breadth of topics and the depth of technical discussion. But the real gem is the set of carefully curated hands-on exercises that guide the reader through the process of building a Blockchain right from Chapter 1." Volodymyr Babich, Professor of Operations and Information Management, McDonough School of Business, Georgetown University "An excellent introduction of DLT technology for a non-technical audience. The book is replete with examples and exercises, which greatly facilitate the learning of the underlying processes of blockchain technology for all, from students to entrepreneurs." Serguei Netessine, Dhirubhai Ambani Professor of Innovation and Entrepreneurship, The Wharton School, University of Pennsylvania "Whether you want to start from scratch or deepen your blockchain knowledge about the latest developments, this book is an essential reference. Through clear explanations and practical code examples, the authors take you on a progressive journey to discover the technology foundations and build your own blockchain. From an operations perspective, you can learn the principles behind the distributed ledger technology relevant for transitioning towards blockchain-enabled supply chains. Reading this book, you'll get inspired, be able to assess the applicability of blockchain to supply chain operations, and learn from best practices recognized in real-world examples." Ralf W. Seifert, Professor of Technology and Operations Management at EPFL and Professor of Operations Management at IMD

This book explores recent advances in blockchain technology and its impact on Industry 4.0 via advanced technologies. It provides an in-depth analysis of the step by step evolution of Industry 4.0 and blockchain technologies for creating the next-generation, secure, decentralized, distributed and trusted industry environment and enhancing the productivity of industries. The book describes how blockchain technology makes the industrial internet (Industry 4.0) a transparent, reliable and secure environment for people, processes, systems, and services, presenting a strong, technological and conceptual framework and roadmap for decision-makers involved in the transformation of any area of industry.

This book constitutes the refereed proceedings of the 3rd International Congress on Blockchain and Applications 2021, held in Salamanca, Spain, in October 2021. Among the scientific community, blockchain and artificial intelligence are a promising combination that will transform the production and manufacturing industry, media, finance, insurance, e-government, etc. Nevertheless, there is no consensus with schemes or best practices that would specify how blockchain and artificial intelligence should be used together. The 38 full papers presented were carefully reviewed and selected from over 44 submissions. They contain the latest advances on blockchain and artificial intelligence and on their application domains, exploring innovative ideas, guidelines, theories, models, technologies, and tools and identifying critical issues and challenges that researchers and practitioners must deal with in future research.

This book brings together two major trends: data science and blockchains. It is one of the first books to systematically cover the analytics aspects of blockchains, with the goal of linking traditional data mining research communities with novel data sources. Data science and big data technologies can be considered cornerstones of the data-driven digital transformation of organizations and society. The concept of blockchain is predicted to enable and spark transformation on par with that associated with the invention of the Internet. Cryptocurrencies are the first successful use case of highly distributed blockchains, like the world wide web was to the Internet.

Create applications using Industry 4.0. Discover how artificial intelligence (AI) and machine learning (ML) capabilities can be enhanced using the Internet of things (IoT) and secured using Blockchain, so your latest app can be not just smarter but also more connected and more secure than ever before. This book covers the latest easy-to-use APIs and services from Microsoft, including Azure IoT, Cognitive Services APIs, Blockchain as a Service (BaaS), and Machine Learning Studio. As you work through the book, you'll get hands-on experience building an example solution that uses all of these technologies—an IoT suite for a smart healthcare facility. Hosted on Azure and networked using Azure IoT, the solution includes centralized patient monitoring, using Cognitive Services APIs for face detection, recognition, and tracking. Blockchain is used to create trust-based security and inventory management. Machine learning is used to create predictive solutions to proactively improve quality of life. By the end of the book, you'll be confident creating richer and smarter applications using these technologies. What You'll Learn Know the technologies underpinning Industry 4.0 and AI 2.0 Develop real-time solutions using IoT in Azure Bring the smart capabilities of AI 2.0 into your application using a simple API call Host and manage your solution on Azure Understand Blockchain as a Service Capture and analyze data on the fly Make predictions using existing data Who This Book Is For Novice and intermediate .NET developers and architects who want to learn what it takes to create a modern or next-generation application

This book explores the concepts and techniques of IoT, AI, and blockchain. Also discussed is the possibility of applying blockchain for providing security in various domains. The specific

highlight of this book is focused on the application of integrated technologies in enhancing data models, better insights and discovery, intelligent predictions, smarter finance, smart retail, global verification, transparent governance, and innovative audit systems. The book allows both practitioners and researchers to share their opinions and recent research in the convergence of these technologies among academicians and industry people. The contributors present their technical evaluation and compare it with existing technologies. Theoretical explanation and experimental case studies related to real-time scenarios are also included. This book pertains to IT professionals, researchers and academicians working on fourth revolution technologies. Explains how blockchain can significantly increase data privacy and security while boosting accuracy and integrity in IoT generated data and AI processed information; Gives insight into blockchain's numerous potential applications, starting with recent technologies that give users control over sharing and privacy; Shows readers how to employ blockchain in IoT and AI, helping them to understand what they can and cannot do with blockchain.

This book addresses one of the most overlooked practical, methodological, and moral questions in the journey to secure and handle the massive amount of data being generated from smart devices interactions: the integration of Blockchain with 5G-enabled IoT. After an overview, this book discusses open issues and challenges, which may hinder the growth of Blockchain technology. Then, this book presents a variety of perspectives on the most pressing questions in the field, such as: how IoT can connect billions of objects together; how the access control mechanisms in 5G-enabled industrial environment works; how to address the real-time and quality-of-service requirements for industrial applications; and how to ensure scalability and computing efficiency. Also, it includes a detailed discussions on the complexity of adoption of Blockchain for 5G-Enabled IoT and presents comparative case studies with respect to various performance evaluation metrics such as scalability, data management, standardization, interoperability and regulations, accessibility, human-factors engineering and interfaces, reliability, heterogeneity, and QoS requirements. This book acts as a professional guide for the practitioners in information security and related topics. Presents a professional guide to the interaction and promise of Blockchain, 5G, and IoT; Includes discussion of applications such as-Smart city, Smart home, Healthcare 4.0, Smart agriculture, Autonomous vehicles, and Supply chain management; Features a host of case studies to demonstrate the adoption of Blockchain for 5G-enabled IoT.

This book addresses what software architects and developers need to know in order to build applications based on blockchain technology, by offering an architectural view of software systems that make beneficial use of blockchains. It provides guidance on assessing the suitability of blockchain, on the roles blockchain can play in an architecture, on designing blockchain applications, and on assessing different architecture designs and tradeoffs. It also serves as a reference on blockchain design patterns and design analysis, and refers to practical examples of blockchain-based applications. The book is divided into four parts: Part I provides a general introduction to the topic and to existing blockchain platforms including Bitcoin, Ethereum, and Hyperledger Fabric, and offers examples of blockchain-based applications. Part II focuses on the functional aspects of software architecture, describing the main roles blockchain can play in an architecture, as well as its potential suitability and design process. It includes a catalogue of 15 design patterns and details how to use model-driven engineering to build blockchain-based applications. Part III covers the non-functional aspects of blockchain applications, which are cross-cutting concerns including cost, performance, security, and availability. Part IV then presents three detailed real-world use cases, offering additional insights from a practical perspective. An epilogue summarizes the book and speculates on the role blockchain and its applications can play in the future. This book focusses on the bigger picture for blockchain, covering the concepts and technical considerations in the design of blockchain-based applications. The use of mathematical formulas is limited to where they are critical. This book is primarily intended for developers, software architects and chief information officers who need to understand the basic technology, tools and methodologies to build blockchain applications. It also provides students and researchers new to this field an introduction to this hot topic.

This book provides a picture of food traceability for all aspects of the food system, recognizing the unique differences, challenges, and “states of the industry” in different types of food products, as well as the different pressures and opportunities at different points in the supply chain and the research that has already been done. It also provides some historical context, along with the types of solutions available to the food industry, and the benefits associated with better recordkeeping that go beyond the public good and impact the bottom line. Whenever a food related outbreak occurs, traceability is called into question. When lives are at stake, it is critical that the root of the problem is quickly identified to prevent further illness. Once the problem is found, it's just as important to contain it quickly. Too often, recalls expand because implicated product is not readily accounted for. Mention of traceability stirs fear for many in the food industry for several reasons: within a company, it's not clear if responsibility for traceability lies with food safety professionals involved in recalls, supply chain professionals who understand product movement, IT professionals who build and maintain the recordkeeping systems, or regulatory professionals who need to respond to government requests for information. There is also a sense that traceability is someone else's problem. Few firms admit that they are the weak link and instead tout how quickly they can perform mock recalls. But traceability is about more than just recalls. It is about the connectivity of the supply chain as a product and its constituents travel from the farm to the consumer. Because it is a systems issue, there is a sense that the investment by a single firm will be meaningless if supply chain partners don't have comparable abilities. This book will address both these surrounding issues and solutions.

This book shows that research contributions from different fields—finance, economics, computer sciences, and physics—can provide useful insights into key issues in financial and cryptocurrency markets. Presenting the latest empirical and theoretical advances, it helps readers gain a better understanding of financial markets and cryptocurrencies. Bitcoin was the first cryptocurrency to use a peer-to-peer network to prevent double-spending and to control its issue without the need for a central authority, and it has attracted wide public attention since its introduction. In recent years, the academic community has also started gaining interest in cyptocurrencies, and research in the field has grown rapidly. This book presents is a collection of the latest work on cryptocurrency markets and the properties of those markets. This book will appeal to graduate students and researchers from disciplines such as finance, economics, financial engineering, computer science, physics and applied mathematics working in the field of financial markets, including cryptocurrency markets.

This book describes how the rapid advancement in encryption and network computing gave birth to new tools and products that have influenced the local and global economy

alike. One recent and notable example is the emergence of virtual currencies (such as Bitcoin) also known as cryptocurrencies. Virtual currencies introduced a fundamental transformation that affected the way goods, services and assets are exchanged. As a result of its distributed ledgers based on blockchain, cryptocurrencies not only offer some unique advantages to the economy, investors, and consumers, but also pose considerable risks to users and challenges for regulators when fitting the new technology into the old legal framework. The core of this proposed book is to present and discuss the evidence on financial asset capabilities of virtual currencies. The contributors of this volume analyze several interesting and timely issues such as the particularities of virtual currencies and their statistical characteristics; the diversification benefits of virtual currencies; the behavior and dependence structure between virtual currencies and the financial markets; the economic implications of virtual currencies, their effects, their price risk, and contagion spillovers in a unified and comprehensive framework; the future of virtual currencies and their distributed ledgers technology.

This book focuses on picturing B-IoT techniques from a few perspectives, which are architecture, key technologies, security and privacy, service models and framework, practical use cases and more. Main contents of this book derive from most updated technical achievements or breakthroughs in the field. A number of representative IoT service offerings will be covered by this book, such as vehicular networks, document sharing system, and telehealth. Both theoretical and practical contents will be involved in this book in order to assist readers to have a comprehensive and deep understanding the mechanism of using blockchain for powering up IoT systems. The blockchain-enabled Internet of Things (B-IoT) is deemed to be a novel technical alternative that provides network-based services with additional functionalities, benefits, and implementations in terms of decentralization, immutability, and auditability. Towards the enhanced secure and privacy-preserving Internet of Things (IoT), this book introduces a few significant aspects of B-IoT, which includes fundamental knowledge of both blockchain and IoT, state-of-the-art reviews of B-IoT applications, crucial components in the B-IoT system and the model design, and future development potentials and trends. IoT technologies and services, e.g. cloud data storage technologies and vehicular services, play important roles in wireless technology developments. On the other side, blockchain technologies are being adopted in a variety of academic societies and professional realms due to its promising characteristics. It is observable that the research and development on integrating these two technologies will provide critical thinking and solid references for contemporary and future network-relevant solutions. This book targets researchers and advanced level students in computer science, who are focused on cryptography, cloud computing and internet of things, as well as electrical engineering students and researchers focused on vehicular networks and more. Professionals working in these fields will also find this book to be a valuable resource.

Blockchain and other trustless systems have gone from being relatively obscure technologies, which were only known to a small community of computer scientists and cryptologists, to mainstream phenomena that are now considered powerful game changers for many industries. This book explores and assesses real-world use cases and case studies on blockchain and related technologies. The studies describe the respective applications and address how these technologies have been deployed, the rationale behind their application, and finally, their outcomes. The book shares a wealth of experiences and lessons learned regarding financial markets, energy, SCM, healthcare, law and compliance. Given its scope, it is chiefly intended for academics and practitioners who want to learn more about blockchain applications.

This book constitutes the refereed conference proceedings of the 14th International Workshop on Data Privacy Management, DPM 2019, and the Third International Workshop on Cryptocurrencies and Blockchain Technology, CBT 2019, held in conjunction with the 24th European Symposium on Research in Computer Security, ESORICS 2019, held in Luxembourg in September 2019. For the CBT Workshop 10 full and 8 short papers were accepted out of 39 submissions. The selected papers are organized in the following topical headings: lightning networks and level 2; smart contracts and applications; and payment systems, privacy and mining. The DPM Workshop received 26 submissions from which 8 full and 2 short papers were selected for presentation. The papers focus on privacy preserving data analysis; field/lab studies; and privacy by design and data anonymization. Chapter 2, "Integral Privacy Compliant Statistics Computation," and Chapter 8, "Graph Perturbation as Noise Graph Addition: a New Perspective for Graph Anonymization," of this book are available open access under a CC BY 4.0 license at link.springer.com.

This book explores the concepts and techniques of cloud security using blockchain. Also discussed is the possibility of applying blockchain to provide security in various domains. The authors discuss how blockchain holds the potential to significantly increase data privacy and security while boosting accuracy and integrity in cloud data. The specific highlight of this book is focused on the application of integrated technologies in enhancing cloud security models, use cases, and its challenges. The contributors, both from academia and industry, present their technical evaluation and comparison with existing technologies. This book pertains to IT professionals, researchers, and academicians towards fourth revolution technologies. Analyzes the current research and development in the convergence of blockchain in cloud computing; Provides an overview to the recent emerging advanced trends and technologies in cloud security algorithms; Presents an in depth analysis of implementation, challenges, use cases and issues in the society related to cloud security.

This book gives a comprehensive overview of blockchain programming and its implementation in the wide range of blockchain-based applications such as cross-border payment, digital banking, and digital identities. The consistent thrive of the blockchain phenomenon and the ecosystem of e-business use cases have led to the Industrial Revolution in the e-business world, and it is demonstrated in this book. The digital advancement, interference, and transformation being brought through the influence of the blockchain advancements are creating waves across e-business verticals. The book caters to academics, industrial practitioners, and entrepreneurs working in the field of blockchain

technology and programming.

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