

Distributed And Cloud Computing From Parallel Processing To The Internet Of Things

Cloud Computing: Theory and Practice provides students and IT professionals with an in-depth analysis of the cloud from the ground up. Beginning with a discussion of parallel computing and architectures and distributed systems, the book turns to contemporary cloud infrastructures, how they are being deployed at leading companies such as Amazon, Google and Apple, and how they can be applied in fields such as healthcare, banking and science. The volume also examines how to successfully deploy a cloud application across the enterprise using virtualization, resource management and the right amount of networking support, including content delivery networks and storage area networks. Developers will find a complete introduction to application development provided on a variety of platforms. Learn about recent trends in cloud computing in critical areas such as: resource management, security, energy consumption, ethics, and complex systems Get a detailed hands-on set of practical recipes that help simplify the deployment of a cloud based system for practical use of computing clouds along with an in-depth discussion of several projects Understand the evolution of cloud computing and why the cloud computing paradigm has a better chance to succeed than previous efforts in large-scale distributed computing

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This book constitutes the refereed proceedings of the 13th IFIP WG 6.1 International Conference on Distributed Applications and Interoperable Systems, DAIS 2013, held in Florence, Italy, in June 2013, as part of the 8th International Federated Conference on Distributed Computing Techniques, DisCoTec 2013. The 12 revised full papers and 9 short papers presented were carefully reviewed and selected from 42 submissions. The papers present state-of-the-art research results and case studies in the area of distributed applications and interoperable systems focussing on cloud computing, replicated storage, and peer-to-peer computing.

This book represents the combined peer-reviewed proceedings of the Sixth International Symposium on Intelligent Distributed Computing -- IDC~2012, of the International Workshop on Agents for Cloud -- A4C~2012 and of the Fourth International Workshop on Multi-Agent Systems Technology and Semantics -- MASTS~2012. All the events were held in Calabria, Italy during September 24-26, 2012. The 37 contributions published in this book address many topics related to theory and applications of intelligent distributed computing and multi-agent systems, including: adaptive and autonomous distributed systems, agent programming, ambient assisted living systems, business process modeling and verification, cloud computing, coalition formation, decision support systems, distributed optimization and constraint satisfaction, gesture recognition, intelligent energy management in WSNs, intelligent logistics, machine learning, mobile agents, parallel and distributed computational

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intelligence, parallel evolutionary computing, trust metrics and security, scheduling in distributed heterogeneous computing environments, semantic Web service composition, social simulation, and software agents for WSNs.

This book constitutes the refereed proceedings of the 14th International Conference on Distributed Computing and Networking, ICDCN 2013, held in Mumbai, India, during January 3-6, 2013. The 27 revised full papers, 5 short papers presented together with 7 poster papers were carefully reviewed and selected from 149 submissions. The papers cover topics such as distributed algorithms and concurrent data structures; integration of heterogeneous wireless and wired networks; distributed operating systems; internetworking protocols and internet applications; distributed database systems; mobile and pervasive computing, context-aware distributed systems; embedded distributed systems; next generation and converged network architectures; experiments and performance evaluation of distributed systems; overlay and peer-to-peer networks and services; fault-tolerance, reliability, and availability; home networking and services; multiprocessor and multi-core architectures and algorithms; resource management and quality of service; self-organization, self-stabilization, and autonomic computing; network security and privacy; high performance computing, grid computing, and cloud computing; energy-efficient networking and smart grids; security, cryptography, and game theory in distributed systems; sensor, PAN and ad-hoc networks; and traffic engineering, pricing, network management.

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Traditional computing concepts are maturing into a new generation of cloud computing systems with wide-spread global applications. However, even as these systems continue to expand, they are accompanied by overall performance degradation and wasted resources. Emerging Research in Cloud Distributed Computing Systems covers the latest innovations in resource management, control and monitoring applications, and security of cloud technology. Compiling and analyzing current trends, technological concepts, and future directions of computing systems, this publication is a timely resource for practicing engineers, technologists, researchers, and advanced students interested in the domain of cloud computing.

The Practice of Cloud System Administration, Volume 2, focuses on 'distributed' or 'cloud' computing and brings a DevOps/SRE sensibility to the practice of system administration. Unsatisfied with books that cover either design or operations in isolation, the authors created this authoritative reference centered on a comprehensive approach. Case studies and examples from Google, Etsy, Twitter, Facebook, Netflix, Amazon, and other industry giants are explained in practical ways that are useful to all enterprises. The new companion to the best-selling first volume, The Practice of System and Network Administration, Second Edition, this guide offers expert coverage of the following and many other crucial topics: Designing and building modern web and distributed systems; Fundamentals of large system design; Understand the new software engineering implications of cloud administration; Make systems that are

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resilient to failure and grow and scale dynamically; Implement DevOps principles and cultural changes; IaaS/PaaS/SaaS and virtual platform selection; Operating and running systems using the latest DevOps/SRE strategies: Upgrade production systems with zero down-time; What and how to automate, how to decide what not to automate; On-call best practices that improve uptime; Why distributed systems require fundamentally different system administration techniques; Identify and resolve resiliency problems before they surprise you; Assessing and evaluating your team's operational effectiveness; Manage the scientific process of continuous improvement; A forty-page, pain-free assessment system you can start using today"--Publisher's description.

Distributed and Cloud Computing: From Parallel Processing to the Internet of Things offers complete coverage of modern distributed computing technology including clusters, the grid, service-oriented architecture, massively parallel processors, peer-to-peer networking, and cloud computing. It is the first modern, up-to-date distributed systems textbook; it explains how to create high-performance, scalable, reliable systems, exposing the design principles, architecture, and innovative applications of parallel, distributed, and cloud computing systems. Topics covered by this book include: facilitating management, debugging, migration, and disaster recovery through virtualization; clustered systems for research or ecommerce applications; designing systems as web services; and social networking systems using peer-to-peer computing.

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The principles of cloud computing are discussed using examples from open-source and commercial applications, along with case studies from the leading distributed computing vendors such as Amazon, Microsoft, and Google. Each chapter includes exercises and further reading, with lecture slides and more available online. This book will be ideal for students taking a distributed systems or distributed computing class, as well as for professional system designers and engineers looking for a reference to the latest distributed technologies including cloud, P2P and grid computing. Complete coverage of modern distributed computing technology including clusters, the grid, service-oriented architecture, massively parallel processors, peer-to-peer networking, and cloud computing Includes case studies from the leading distributed computing vendors: Amazon, Microsoft, Google, and more Explains how to use virtualization to facilitate management, debugging, migration, and disaster recovery Designed for undergraduate or graduate students taking a distributed systems course—each chapter includes exercises and further reading, with lecture slides and more available online Explore the power of distributed computing to write concurrent, scalable applications in Java About This Book Make the best of Java 9 features to write succinct code Handle large amounts of data using HPC Make use of AWS and Google App Engine along with Java to establish a powerful remote computation system Who This Book Is For This book is for basic to intermediate level Java developers who is aware of object-oriented programming and Java basic concepts. What You Will Learn Understand the basic

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concepts of parallel and distributed computing/programming Achieve performance improvement using parallel processing, multithreading, concurrency, memory sharing, and hpc cluster computing Get an in-depth understanding of Enterprise Messaging concepts with Java Messaging Service and Web Services in the context of Enterprise Integration Patterns Work with Distributed Database technologies Understand how to develop and deploy a distributed application on different cloud platforms including Amazon Web Service and Docker CaaS Concepts Explore big data technologies Effectively test and debug distributed systems Gain thorough knowledge of security standards for distributed applications including two-way Secure Socket Layer In Detail Distributed computing is the concept with which a bigger computation process is accomplished by splitting it into multiple smaller logical activities and performed by diverse systems, resulting in maximized performance in lower infrastructure investment. This book will teach you how to improve the performance of traditional applications through the usage of parallelism and optimized resource utilization in Java 9. After a brief introduction to the fundamentals of distributed and parallel computing, the book moves on to explain different ways of communicating with remote systems/objects in a distributed architecture. You will learn about asynchronous messaging with enterprise integration and related patterns, and how to handle large amount of data using HPC and implement distributed computing for databases. Moving on, it explains how to deploy distributed applications on different cloud platforms and self-contained

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application development. You will also learn about big data technologies and understand how they contribute to distributed computing. The book concludes with the detailed coverage of testing, debugging, troubleshooting, and security aspects of distributed applications so the programs you build are robust, efficient, and secure.

Style and approach This is a step-by-step practical guide with real-world examples. This book is designed for use as a primary textbook for a course in cloud computing or as a resource for professionals in industry seeking to explore cloud services. The book highlights the recent developments in distributed computing and details the architecture, virtualization concepts, and security concerns of cloud computing. It also provides a detailed understanding of the benefits of cloud computing that can encourage enterprises to switch to the cloud.

Features: - Provides a basic understanding of the computing paradigm of cloud computing - Gives a brief introduction to cloud computing, its architecture, and the Hadoop distributed file system - Deals with cloud management concepts like scalable, fault tolerance, resiliency, provisioning, asset management, cloud governance, high availability, disaster recovery, and multi-tenancy - Includes case studies on MS Azure, Google, Amazon Web Services, Aneka, etc.

This authoritative text/reference describes the state of the art of fog computing, presenting insights from an international selection of renowned experts. A particular focus is provided on development approaches, architectural mechanisms, and measurement metrics for building smart adaptable environments. The coverage also includes important related topics such as device connectivity, security and interoperability, and communication methods. Topics and

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features: introduces the core concepts and principles of fog computing, and reviews the latest research and best practice relating to fog/edge environments; discusses the vision for an Internet of Things (IoT) in terms of fog computing and other related distributed computing paradigms, such as cloud computing; presents a survey of the key issues and broader aspects of the fog paradigm, as well as the factors that affect adoption of fog computing; examines frameworks and methodologies for fog-based architecture design, improving performance, and measuring quality of experience; proposes tools and methodologies for analyzing large amounts of sensor data from smart city initiatives; describes approaches for designing robust services, management of data-intensive applications, context-aware data analysis, and vehicular networking; identifies potential future research directions and technological innovations in relation to distributed computing environments such as the IoT. This enlightening volume offers essential perspectives for researchers of distributed computing and computer networking, as well as for advanced undergraduate and graduate students pursuing interests in this area. Professional engineers seeking to enhance security and connectivity in their IoT systems will also find this work to be a valuable reference.

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Guide to Cloud Computing for Business and Technology Managers: From Distributed Computing to Cloudware Applications unravels the mystery of cloud computing and explains how it can transform the operating contexts of business enterprises. It provides a clear understanding of what cloud computing really means, what it can do, and when it is practical to use. Addressing the primary management and operation concerns of cloudware, including performance, measurement, monitoring, and security, this pragmatic book: Introduces the

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enterprise applications integration (EAI) solutions that were a first step toward enabling an integrated enterprise Details service-oriented architecture (SOA) and related technologies that paved the road for cloudware applications Covers delivery models like IaaS, PaaS, and SaaS, and deployment models like public, private, and hybrid clouds Describes Amazon, Google, and Microsoft cloudware solutions and services, as well as those of several other players Demonstrates how cloud computing can reduce costs, achieve business flexibility, and sharpen strategic focus Unlike customary discussions of cloud computing, Guide to Cloud Computing for Business and Technology Managers: From Distributed Computing to Cloudware Applications emphasizes the key differentiator—that cloud computing is able to treat enterprise-level services not merely as discrete stand-alone services, but as Internet-locatable, composable, and repackagable building blocks for generating dynamic real-world enterprise business processes.

A highly accessible reference offering a broad range of topics and insights on large scale network-centric distributed systems Evolving from the fields of high-performance computing and networking, large scale network-centric distributed systems continues to grow as one of the most important topics in computing and communication and many interdisciplinary areas. Dealing with both wired and wireless networks, this book focuses on the design and performance issues of such systems. Large Scale Network-Centric Distributed Systems provides in-depth coverage ranging from ground-level hardware issues (such as buffer organization, router delay, and flow control) to the high-level issues immediately concerning application or system users (including parallel programming, middleware, and OS support for such computing systems). Arranged in five parts, it explains and analyzes complex topics to an

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unprecedented degree: Part 1: Multicore and Many-Core (Mc) Systems-on-Chip Part 2: Pervasive/Ubiquitous Computing and Peer-to-Peer Systems Part 3: Wireless/Mobile Networks Part 4: Grid and Cloud Computing Part 5: Other Topics Related to Network-Centric Computing and Its Applications Large Scale Network-Centric Distributed Systems is an incredibly useful resource for practitioners, postgraduate students, postdocs, and researchers.

"This book focuses on network management and traffic engineering for Internet and distributed computing technologies, as well as present emerging technology trends and advanced platforms"--Provided by publisher.

This SpringerBrief reviews the existing market-oriented strategies for economically managing resource allocation in distributed systems. It describes three new schemes that address cost-efficiency, user incentives, and allocation fairness with regard to different scheduling contexts. The first scheme, taking the Amazon EC2™ market as a case of study, investigates the optimal resource rental planning models based on linear integer programming and stochastic optimization techniques. This model is useful to explore the interaction between the cloud infrastructure provider and the cloud resource customers. The second scheme targets a free-trade resource market, studying the interactions amongst multiple rational resource traders. Leveraging an optimization framework from AI, this scheme examines the spontaneous exchange of resources among multiple resource owners. Finally, the third scheme describes an experimental market-oriented resource sharing platform inspired by eBay's transaction model. The study presented in this book sheds light on economic models and their implication to the utility-oriented scheduling problems.

Cloud computing continues to emerge as a subject of substantial industrial and academic

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interest. Although the meaning and scope of “cloud computing” continues to be debated, the current notion of clouds blurs the distinctions between grid services, web services, and data centers, among other areas. Clouds also bring considerations of lowering the cost for relatively bursty applications to the fore. *Cloud Computing: Principles, Systems and Applications* is an essential reference/guide that provides thorough and timely examination of the services, interfaces and types of applications that can be executed on cloud-based systems. The book identifies and highlights state-of-the-art techniques and methods for designing cloud systems, presents mechanisms and schemes for linking clouds to economic activities, and offers balanced coverage of all related technologies that collectively contribute towards the realization of cloud computing. With an emphasis on the conceptual and systemic links between cloud computing and other distributed computing approaches, this text also addresses the practical importance of efficiency, scalability, robustness and security as the four cornerstones of quality of service. Topics and features: explores the relationship of cloud computing to other distributed computing paradigms, namely peer-to-peer, grids, high performance computing and web services; presents the principles, techniques, protocols and algorithms that can be adapted from other distributed computing paradigms to the development of successful clouds; includes a Foreword by Professor Mark Baker of the University of Reading, UK; examines current cloud-practical applications and highlights early deployment experiences; elaborates the economic schemes needed for clouds to become viable business models. This book will serve as a comprehensive reference for researchers and students engaged in cloud computing. Professional system architects, technical managers, and IT consultants will also find this unique text a practical guide to the application

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and delivery of commercial cloud services. Prof. Nick Antonopoulos is Head of the School of Computing, University of Derby, UK. Dr. Lee Gillam is a Lecturer in the Department of Computing at the University of Surrey, UK.

“Computing Networks” explores the core of the new distributed computing infrastructures we are using today: the networking systems of clusters, grids and clouds. It helps network designers and distributed-application developers and users to better understand the technologies, specificities, constraints and benefits of these different infrastructures’ communications systems. Cloud Computing will give the possibility for millions of users to process data anytime, anywhere, while being eco-friendly. In order to deliver this emerging traffic in a timely, cost-efficient, energy-efficient, and reliable manner over long-distance networks, several issues such as quality of service, security, metrology, network-resource scheduling and virtualization are being investigated since 15 years. “Computing Networks” explores the core of clusters, grids and clouds networks, giving designers, application developers and users the keys to better construct and use these powerful infrastructures.

Global networks, which are the primary pillars of the modern manufacturing industry and supply chains, can only cope with the new challenges, requirements and demands when supported by new computing and Internet-based technologies. Cloud Manufacturing: Distributed Computing Technologies for Global and Sustainable Manufacturing introduces a new paradigm for scalable service-oriented sustainable and

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globally distributed manufacturing systems. The eleven chapters in this book provide an updated overview of the latest technological development and applications in relevant research areas. Following an introduction to the essential features of Cloud Computing, chapters cover a range of methods and applications such as the factors that actually affect adoption of the Cloud Computing technology in manufacturing companies and new geometrical simplification method to stream 3-Dimensional design and manufacturing data via the Internet. This is further supported case studies and real life data for Waste Electrical and Electronic Equipment (WEEE) remanufacturing. This compilation of up to date research and literature can be used as a textbook or reference for mechanical, manufacturing, and computer engineering graduate students and researchers for efficient utilization, deployment and development of distributed and Cloud manufacturing systems, services and applications.

Development of software projects is a part of the curriculum of under-graduate and postgraduate courses. The main objective of this book is to expose the students and professionals to the latest technology, relevant theory and software development tools. This book serves as a guide to design and develop the cloud computing-based software projects using distributed architecture. It consolidates the theory, upcoming technologies and development tools for the development of two software projects—Outstation Claim Management System (OCMS) and Retirement Benefit Calculation System (RBCS). Both the projects start with the feasibility study to

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understand and appreciate the problem. After understanding the problem and identifying the suitable software, hardware and network environment, the problem is formally depicted using the entity relationship model and data flow diagrams. This is followed by normali-zation, creation of tables and procedures. In the book, Oracle, PL/SQL, Internet Developer Suite (IDS) and .Net framework are used to develop the full-fledged GUI-based applications. The book elaborates the problem, providing logic and interface screens to design and develop the projects using any other programming language and GUI tool in which the students are comfortable with. The book also includes a CD-ROM, which contains the source codes of OCMS and RBCS. The book is meant for the undergraduate and postgraduate students of Computer Science, Computer Applications and Information Technology. Besides, it would also be useful to the professionals to enhance their technical skills. After going through this book, the students/professionals will be able to: Work on real-life projects. Implement the SDLC in software projects. Design the data flow diagrams and entity relationship diagrams. Use the database and normalization in software projects. Do the corrective, adaptive and perfective maintenance of a software. Learn the concepts related to IaaS, PaaS and SaaS of Cloud Computing.

Distributed systems intertwine with our everyday lives. The benefits and current shortcomings of the underpinning technologies are experienced by a wide range of people and their smart devices. With the rise of large-scale IoT and similar distributed

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systems, cloud bursting technologies, and partial outsourcing solutions, private entities are encouraged to increase their efficiency and offer unparalleled availability and reliability to their users. The Research Anthology on Architectures, Frameworks, and Integration Strategies for Distributed and Cloud Computing is a vital reference source that provides valuable insight into current and emergent research occurring within the field of distributed computing. It also presents architectures and service frameworks to achieve highly integrated distributed systems and solutions to integration and efficient management challenges faced by current and future distributed systems. Highlighting a range of topics such as data sharing, wireless sensor networks, and scalability, this multi-volume book is ideally designed for system administrators, integrators, designers, developers, researchers, academicians, and students.

This book constitutes the thoroughly refereed post-conference proceedings of the First International Workshop on Adaptive Resource Management and Scheduling for Cloud Computing, ARMS-CC 2014, held in Conjunction with ACM Symposium on Principles of Distributed Computing, PODC 2014, in Paris, France, in July 2014. The 14 revised full papers (including 2 invited talks) were carefully reviewed and selected from 29 submissions and cover topics such as scheduling methods and algorithms, services and applications, fundamental models for resource management in the cloud.

This book contains a selection of refereed and revised papers of the Intelligent Distributed Computing Track originally presented at the third International Symposium

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on Intelligent Informatics (ISI-2014), September 24-27, 2014, Delhi, India. The papers selected for this Track cover several Distributed Computing and related topics including Peer-to-Peer Networks, Cloud Computing, Mobile Clouds, Wireless Sensor Networks, and their applications.

This volume constitutes the proceedings of the 11th International Conference on Cloud Computing, CLOUD 2018, held as part of the Services Conference Federation, SCF 2018, in Seattle, WA, USA, in June 2018. The 26 full papers presented together with 3 short papers were carefully reviewed and selected from 108 submissions. They are organized in topical sections such as cloud computing; client-server architectures; distributed systems organizing principles; storage virtualization; virtual machines; cloud based storage; distributed architectures; network services; and computing platforms. The emergence of the Internet of Things (IoT), combined with greater heterogeneity not only online in cloud computing architectures but across the cloud-to-edge continuum, is introducing new challenges for managing applications and infrastructure across this continuum. The scale and complexity is simply so complex that it is no longer realistic for IT teams to manually foresee the potential issues and manage the dynamism and dependencies across an increasing inter-dependent chain of service provision. This Open Access Pivot explores these challenges and offers a solution for the intelligent and reliable management of physical infrastructure and the optimal placement of applications for the provision of services on distributed clouds. This book provides a

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conceptual reference model for reliable capacity provisioning for distributed clouds and discusses how data analytics and machine learning, application and infrastructure optimization, and simulation can deliver quality of service requirements cost-efficiently in this complex feature space. These are illustrated through a series of case studies in cloud computing, telecommunications, big data analytics, and smart cities.

"This book is a vital compendium of chapters on the latest research within the field of distributed computing, capturing trends in the design and development of Internet and distributed computing systems that leverage autonomic principles and techniques"--Provided by publisher.

"Key Features: Explains how to make design choices and tradeoffs to consider when building applications to run in a virtual cloud environment; Test and experiment with a live cloud system on the Aneka platform; Real-world case studies include scientific, business, and energy-efficiency considerations; Download examples and instructor support materials on the book's companion page. Cloud computing is a technological advancement that focuses on the way in which we design computing systems, develop applications, and leverage existing services for building software. It is based on the concept of dynamic provisioning, which is applied not only to services, but also to compute capability, storage, networking, and IT (Information Technology) infrastructure in general.

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Resources are made available through the Internet and offered on a pay-per-use basis from Cloud computing vendors. Today, anyone with a credit card can subscribe to Cloud services and deploy and configure servers for an application in hours, growing and shrinking the infrastructure serving its application according to the demand, and paying only for the time these resources have been used"--

This book introduces the reader to the fundamentals of contemporary, emerging and future technologies and services in Internet computing. It covers essential concepts such as distributed systems architectures and web technologies, contemporary paradigms such as cloud computing and the Internet of things, and emerging technologies like distributed ledger technologies and fog computing. The book also highlights the interconnection and recombination of these Internet-based technologies, which together form a critical information infrastructure with major impacts on individuals, organizations, governments, economies, and society as a whole. Intended as a textbook for upper undergraduate and graduate classes, it features a wealth of examples, learning goals and summaries for every chapter, numerous recommendations for further reading, and questions for checking students' comprehension. A dedicated author website offers additional teaching material and more elaborate examples.

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Accordingly, the book enables students and young professionals in IT-related fields to familiarize themselves with the Internet's basic mechanisms, and with the most promising Internet-based technologies of our time.

Explores key challenges and solutions to assured cloud computing today and provides a provocative look at the face of cloud computing tomorrow This book offers readers a comprehensive suite of solutions for resolving many of the key challenges to achieving high levels of assurance in cloud computing. The distillation of critical research findings generated by the Assured Cloud Computing Center of Excellence (ACC-UCoE) of the University of Illinois, Urbana-Champaign, it provides unique insights into the current and future shape of robust, dependable, and secure cloud-based computing and data cyberinfrastructures. A survivable and distributed cloud-computing-based infrastructure can enable the configuration of any dynamic systems-of-systems that contain both trusted and partially trusted resources and services sourced from multiple organizations. To assure mission-critical computations and workflows that rely on such systems-of-systems it is necessary to ensure that a given configuration does not violate any security or reliability requirements. Furthermore, it is necessary to model the trustworthiness of a workflow or computation fulfillment to a high level of assurance. In presenting the substance

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of the work done by the ACC-UCoE, this book provides a vision for assured cloud computing illustrating how individual research contributions relate to each other and to the big picture of assured cloud computing. In addition, the book: Explores dominant themes in cloud-based systems, including design correctness, support for big data and analytics, monitoring and detection, network considerations, and performance Synthesizes heavily cited earlier work on topics such as DARE, trust mechanisms, and elastic graphs, as well as newer research findings on topics, including R-Storm, and RAMP transactions Addresses assured cloud computing concerns such as game theory, stream processing, storage, algorithms, workflow, scheduling, access control, formal analysis of safety, and streaming Bringing together the freshest thinking and applications in one of today's most important topics, Assured Cloud Computing is a must-read for researchers and professionals in the fields of computer science and engineering, especially those working within industrial, military, and governmental contexts. It is also a valuable reference for advanced students of computer science.

The primary purpose of this book is to capture the state-of-the-art in Cloud Computing technologies and applications. The book will also aim to identify potential research directions and technologies that will facilitate creation a global market-place of cloud computing services supporting scientific, industrial,

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business, and consumer applications. We expect the book to serve as a reference for larger audience such as systems architects, practitioners, developers, new researchers and graduate level students. This area of research is relatively recent, and as such has no existing reference book that addresses it. This book will be a timely contribution to a field that is gaining considerable research interest, momentum, and is expected to be of increasing interest to commercial developers. The book is targeted for professional computer science developers and graduate students especially at Masters level. As Cloud Computing is recognized as one of the top five emerging technologies that will have a major impact on the quality of science and society over the next 20 years, its knowledge will help position our readers at the forefront of the field. This unique volume explores cutting-edge management approaches to developing complex software that is efficient, scalable, sustainable, and suitable for distributed environments. Practical insights are offered by an international selection of pre-eminent authorities, including case studies, best practices, and balanced corporate analyses. Emphasis is placed on the use of the latest software technologies and frameworks for life-cycle methods, including the design, implementation and testing stages of software development. Topics and features:

- Reviews approaches for reusability, cost and time estimation, and for

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functional size measurement of distributed software applications · Discusses the core characteristics of a large-scale defense system, and the design of software project management (SPM) as a service · Introduces the 3PR framework, research on crowdsourcing software development, and an innovative approach to modeling large-scale multi-agent software systems · Examines a system architecture for ambient assisted living, and an approach to cloud migration and management assessment · Describes a software error proneness mechanism, a novel Scrum process for use in the defense domain, and an ontology annotation for SPM in distributed environments · Investigates the benefits of agile project management for higher education institutions, and SPM that combines software and data engineering This important text/reference is essential reading for project managers and software engineers involved in developing software for distributed computing environments. Students and researchers interested in SPM technologies and frameworks will also find the work to be an invaluable resource. Prof. Zaigham Mahmood is a Senior Technology Consultant at Debasis Education UK and an Associate Lecturer (Research) at the University of Derby, UK. He also holds positions as Foreign Professor at NUST and IIU in Islamabad, Pakistan, and Professor Extraordinaire at the North West University Potchefstroom, South Africa.

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Cloud Computing and Distributed Systems

This book presents the latest research findings, innovative research results, methods and development techniques related to P2P, grid, cloud and Internet computing from both theoretical and practical perspectives. It also reveals the synergies among such large-scale computing paradigms. P2P, grid, cloud and Internet computing technologies have rapidly become established as breakthrough paradigms for solving complex problems by enabling aggregation and sharing of an increasing variety of distributed computational resources at large scale. Grid computing originated as a paradigm for high-performance computing, as an alternative to expensive supercomputers through different forms of large-scale distributed computing. P2P computing emerged as a new paradigm after client–server and web-based computing and has proved useful in the development of social networking, B2B (business to business), B2C (business to consumer), B2G (business to government), and B2E (business to employee). Cloud computing has been defined as a “computing paradigm where the boundaries of computing are determined by economic rationale rather than technical limits,” and it has fast become a computing paradigm with applicability and adoption in all application domains and which provides utility computing at a large scale. Lastly, Internet computing is the basis of any large-scale distributed

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computing paradigms; it has developed into a vast area of flourishing fields with enormous impact on today's information societies, and serving as a universal platform comprising a large variety of computing forms such as grid, P2P, cloud and mobile computing.

Cloud computing is an emerging field in computer science. Users are utilizing less of their own existing resources, while increasing usage of cloud resources. There are many advantages of distributed computing over centralized architecture. With increase in number of unused storage and computing resources and advantages of distributed computing resulted in distributed cloud computing. In the distributed cloud environment that we propose, resource providers (RP) compete to provide resources to the users. In the distributed cloud all the cloud computing and storage services are offered by distributed resources. In this architecture resources are used and provided by the users in a peer to peer fashion. We propose using multi-valued distributed hash tables for efficient resource discovery. Leveraging the fact that there are many users providing resources such as CPU and memory, we define these resources under one key to easily locate devices with equivalent resources. We then propose a new auction mechanism, using a reserve bid formulated rationally by each user for the optimal allocation of discovered resources. We have evaluated the performance of resource discovery mechanisms for the distributed cloud and distributed cloud storage and compared the results with existing DHTs, peer to peer clients such as VUZE and

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explored the feasibility and efficiency of the proposed schemes in terms of resource/service discovery and allocation. We use a simultaneous Auction mechanism and select a set of winners once we receive all contributions or bids. In a real world scenario, users request resources with multiple capabilities, and in order to find such resources we use a contribution mechanism where service providers will provide a contribution price to users for providing a resource. Users use our proposed auction mechanism to select the resources from the set of resource providers. We show that Nash equilibrium can be achieved and how we can avoid the problem of free riders in the distributed cloud. Network latency is an important factor when deciding which resource provider to select. We used treeple a secure latency estimation scheme to obtain network measurements in distributed systems. We developed a mobile application using distributed cloud which preserves privacy and provides security for a user. Distributed cloud is used for developing such an application where all the data needs to be close to the users and avoids single point of failure, which is the problem with existing cloud.

This book addresses topics related to cloud and Big Data technologies, architecture and applications including distributed computing and data centers, cloud infrastructure and security, and end-user services. The majority of the book is devoted to the security aspects of cloud computing and Big Data. Cloud computing, which can be seen as any subscription-based or pay-per-use service that extends the Internet's existing

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capabilities, has gained considerable attention from both academia and the IT industry as a new infrastructure requiring smaller investments in hardware platforms, staff training, or licensing software tools. It is a new paradigm that has ushered in a revolution in both data storage and computation. In parallel to this progress, Big Data technologies, which rely heavily on cloud computing platforms for both data storage and processing, have been developed and deployed at breathtaking speed. They are among the most frequently used technologies for developing applications and services in many fields, such as the web, health, and energy. Accordingly, cloud computing and Big Data technologies are two of the most central current and future research mainstreams. They involve and impact a host of fields, including business, scientific research, and public and private administration. Gathering extended versions of the best papers presented at the Third International Conference on Cloud Computing Technologies and Applications (CloudTech'17), this book offers a valuable resource for all Information System managers, researchers, students, developers, and policymakers involved in the technological and application aspects of cloud computing and Big Data. This book constitutes the thoroughly refereed post-conference proceedings of the Second International Workshop on Adaptive Resource Management and Scheduling for Cloud Computing, ARMS-CC 2015, held in Conjunction with ACM Symposium on Principles of Distributed Computing, PODC 2015, in Donostia-San Sebastián, Spain, in July 2015. The 12 revised full papers, including 1 invited paper, were carefully reviewed

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and selected from 24 submissions. The papers have identified several important aspects of the problem addressed by ARMS-CC: self-* and autonomous cloud systems, cloud quality management and service level agreement (SLA), scalable computing, mobile cloud computing, cloud computing techniques for big data, high performance cloud computing, resource management in big data platforms, scheduling algorithms for big data processing, cloud composition, federation, bridging, and bursting, cloud resource virtualization and composition, load-balancing and co-allocation, fault tolerance, reliability, and availability of cloud systems.

Distributed and Cloud Computing: From Parallel Processing to the Internet of Things offers complete coverage of modern distributed computing technology including clusters, the grid, service-oriented architecture, massively parallel processors, peer-to-peer networking, and cloud computing. It is the first modern, up-to-date distributed systems textbook; it explains how to create high-performance, scalable, reliable systems, exposing the design principles, architecture, and innovative applications of parallel, distributed, and cloud computing systems. Topics covered by this book include: facilitating management, debugging, migration, and disaster recovery through virtualization; clustered systems for research or ecommerce applications; designing systems as web services; and social networking systems using peer-to-peer computing. The principles of cloud computing are discussed using examples from open-source and commercial applications, along with case studies from the leading distributed computing

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vendors such as Amazon, Microsoft, and Google. Each chapter includes exercises and further reading, with lecture slides and more available online. This book will be ideal for students taking a distributed systems or distributed computing class, as well as for professional system designers and engineers looking for a reference to the latest distributed technologies including cloud, P2P and grid computing. Complete coverage of modern distributed computing technology including clusters, the grid, service-oriented architecture, massively parallel processors, peer-to-peer networking, and cloud computing Includes case studies from the leading distributed computing vendors: Amazon, Microsoft, Google, and more Explains how to use virtualization to facilitate management, debugging, migration, and disaster recovery Designed for undergraduate or graduate students taking a distributed systems course--each chapter includes exercises and further reading, with lecture slides and more available online. This book describes the key concepts, principles and implementation options for creating high-assurance cloud computing solutions. The guide starts with a broad technical overview and basic introduction to cloud computing, looking at the overall architecture of the cloud, client systems, the modern Internet and cloud computing data centers. It then delves into the core challenges of showing how reliability and fault-tolerance can be abstracted, how the resulting questions can be solved, and how the solutions can be leveraged to create a wide range of practical cloud applications. The author's style is practical, and the guide should be readily understandable without any

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special background. Concrete examples are often drawn from real-world settings to illustrate key insights. Appendices show how the most important reliability models can be formalized, describe the API of the Isis2 platform, and offer more than 80 problems at varying levels of difficulty.

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