

# Distributed and Cloud Computing

K. Hwang, G. Fox and J. Dongarra

## Chapter 2: Computer Clusters for Scalable parallel Computing

Adapted from Kai Hwang  
University of Southern California  
March 30, 2012

# Distributed And Cloud Computing Kai Hwang Ppt

**Prasant Kumar Pattnaik**



## **Distributed And Cloud Computing Kai Hwang Ppt:**

**Distributed and Cloud Computing** Kai Hwang, Jack Dongarra, Geoffrey C. Fox, 2013-12-18 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 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

**Cloud Computing and Distributed Systems** Kai Hwang, Jack Dongarra, Geoffrey C. Fox, 2018-02-01 Cloud Computing and Distributed Systems [Cloud Computing for Machine Learning and Cognitive Applications](#) Kai Hwang, 2017-06-16 The first textbook to teach students how to build data analytic solutions on large data sets using cloud based technologies This is the first textbook to teach students how to build data analytic solutions on large data sets specifically in Internet of Things applications using cloud based technologies for data storage transmission and mashup and AI techniques to analyze this data This textbook is designed to train college students to master modern cloud computing systems in operating principles architecture design machine learning algorithms programming models and software tools for big data mining analytics and cognitive applications The book will be suitable for use in one semester computer science or electrical engineering courses on cloud computing machine learning cloud programming cognitive computing or big data science The book will also be very useful as a reference for professionals who want to work in cloud computing and data science Cloud and Cognitive Computing begins with two introductory chapters on fundamentals of cloud computing data science and adaptive computing that lay the foundation for the rest of the book Subsequent chapters cover

topics including cloud architecture mashup services virtual machines Docker containers mobile clouds IoT and AI inter cloud mashups and cloud performance and benchmarks with a focus on Google s Brain Project DeepMind and X Lab programs IBKai HwangM SyNapse Bluemix programs cognitive initiatives and neurocomputers The book then covers machine learning algorithms and cloud programming software tools and application development applying the tools in machine learning social media deep learning and cognitive applications All cloud systems are illustrated with big data and cognitive application examples

Fundamentals Of Cloud Computing Prasant Kumar Pattnaik, In recent times Cloud Computing has emerged as an important topic in the realm of Information Technology Cloud Computing has gained eminence due to the growing usage of the Internet among people This book is especially intended for readers who have no prior knowledge of the subject Some topics in this book are unique and based on published information that is current and timely and is helpful for research scholars as well as specialists working in areas related to cloud computing This book is suitable as an introductory text for one semester course in Cloud Computing for undergraduate and postgraduate science courses in Computer Science and Information Technology

**Cloud Computing** Sunilkumar Manvi,Gopal Shyam,2021-03-08 Comprehensive and timely Cloud Computing Concepts and Technologies offers a thorough and detailed description of cloud computing concepts architectures and technologies along with guidance on the best ways to understand and implement them It covers the multi core architectures distributed and parallel computing models virtualization cloud developments workload and Service Level Agreements SLA in cloud workload management Further resource management issues in cloud with regard to resource provisioning resource allocation resource mapping and resource adaptation ethical non ethical and security issues in cloud are followed by discussion of open challenges and future directions This book gives students a comprehensive overview of the latest technologies and guidance on cloud computing and is ideal for those studying the subject in specific modules or advanced courses It is designed in twelve chapters followed by laboratory setups and experiments Each chapter has multiple choice questions with answers as well as review questions and critical thinking questions The chapters are practically focused meaning that the information will also be relevant and useful for professionals wanting an overview of the topic

**Cloud Computing** Dan C. Marinescu,2013-05-30 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 *Cloud Computing* Nikos Antonopoulos, Lee Gillam, 2010-07-16 Cloud computing continues to emerge as a subject of substantial industrial and academic 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 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 *Cloud Computing and Big Data: Technologies, Applications and Security* Mostapha Zbakh, Mohammed Essaaidi, Pierre Manneback, Chunming Rong, 2018-07-27 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 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.

**Cloud Computing** Hiran Kamal Kant, 2019-09-20

Unleash the power of cloud computing using Azure, AWS and Apache Hadoop. Key features: Provides a sound understanding of the Cloud computing concepts, architecture and its applications. Explores the practical benefits of Cloud computing services and deployment models in details. Cloud Computing Architecture, Cloud Computing Life Cycle, CCLC, Load balancing approach, Mobile Cloud Computing, MCC, Google App Engine, GAE, Virtualization and Service Oriented Architecture, SOA, Cloud Computing applications, Google Apps, Dropbox, Cloud and Apple iCloud and its uses in various sectors: Education, Healthcare, Politics, Business and Agriculture. Cloud Computing platforms: Microsoft Azure, Amazon Web Services, AWS, Open Nebula, Eucalyptus, Open Stack, Nimbus and The Apache Hadoop Architecture. Adoption of Cloud Computing technology and strategies for migration to the cloud. Cloud computing adoption case studies: Sub Saharan Africa and India. Chapter wise Questions with Summary and Examination Model Question papers. Description: With the advent of internet, there is a complete paradigm shift in the manner we comprehend computing. Need to enable ubiquity, convenient and on demand access to resources in highly scalable and resilient environments that can be remotely accessed gave birth to the concept of Cloud computing. The acceptance is so rapid that the notion influences sophisticated innovations in academia, industry and research world wide and hereby change the landscape of information technology as we thought of. Through this book, the authors tried to incorporate core principles and basic notion of cloud computing in a step by step manner and tried to emphasize on key concepts for clear and thorough insight into the subject. This book begins with the fundamentals of cloud computing, its service and deployment models, architecture as well as applications and platforms. It presents some key enterprise strategies and models for the adoption of and migration to cloud. Privacy and security issues and challenges also form a major part of our discussion in the book as well as case studies of cloud computing adoption in Sub Saharan Africa and India. The book concludes with a discussion of several advanced topics such as Amazon Web Services, AWS, Open Nebula, Microsoft Azure, Apache Hadoop and Google App Engine, GAE.

What will you learn: Learn about the Importance of Cloud Computing in Current Digital Era. Understand the Core concepts and Principles of Cloud Computing with practical benefits. Learn about the Cloud Deployment models and Services. Discover how Cloud Computing Architecture works. Learn about the Load balancing

approach and Mobile Cloud Computing MCC Learn about the Virtualization and Service Oriented Architecture SOA concepts Learn about the various Cloud Computing applications Platforms and Security concepts Understand the adoption Cloud Computing technology and strategies for migration to the cloud Case Studies for Cloud computing adoption Sub Saharan Africa and India Who this book is for This book is intended for students of B E B Tech B Sc M Sc M E and M Tech as a text book The content is designed keeping in mind the bench marked curriculum of various universities both National and International The book covers not only the technical details of how cloud works but also exhibits the strategy technical design and in depth knowledge required to migrate existing applications to the cloud Therefore it makes it relevant for the beginners who wants to learn cloud computing right from the foundation Aspiring Cloud Computing Researchers Instructors Academicians and Professionals if they are familiar with cloud can use this book to learn various open source cloud computing tools applications technologies They will also get a flavor of various international certification exams available

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About the author Kamal Kant Hiran is working as Associate Professor Amity University India the second major research theme is focused on the emerging capabilities of cloud computing Mr Mahrishi is rewarded at number of occasions in various domains including Recognition as an active reviewer by Journal of Parallel and Distributed Computing JPDC Elsevier SCI Cloud Computing Enable Technologies and Recognition for outstanding performance in Campus Connect Program by Infosys India His LinkedIn profile <https://www.linkedin.com/in/mehuk-mahrishi-30979026>

**Cloud Computing** Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, 2010-12-17 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 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

**Basics Of Distributed And Cloud Computing** Dr. K. Vimala Devi, Dr. N. Narayanan Prasanth, 2024-02-06 In a time characterized by digital revolution and interconnected systems it is imperative for both

professionals and enthusiasts to possess a fundamental comprehension of distributed and cloud computing The book Basics of Distributed and Cloud Computing functions as an all encompassing manual for these ever evolving domains providing readers with a succinct and unambiguous examination of fundamental protocols structures and technologies The book commences by establishing the foundational principles of distributed computing through an introductory section that clarifies key concepts including parallelism concurrency and the architectural models of distributed systems Insights regarding the opportunities and challenges posed by distributed environments as well as techniques for developing scalable and fault tolerant systems will be imparted to the audience Subsequently the book explores the comprehensive realm of cloud computing elucidating the complexities inherent in cloud architectures deployment models and service paradigms Readers will gain an understanding of how cloud technologies encompassing Infrastructure as a Service IaaS Platform as a Service PaaS and Software as a Service SaaS are fundamentally transforming the manner in which organizations allocate administer and utilize computing resources Practical illustrations case studies and real life situations are interspersed throughout the book to furnish readers with concrete comprehension of the implementation of distributed and cloud computing principles Practical advice is provided to readers on how to efficiently implement their newly acquired knowledge including devising distributed algorithms deploying applications on cloud platforms and optimizing resource utilization

*Cloud Computing: Principles, Design and Applications* David Fisher, 2021-11-16 The delivery of various computing services such as servers databases storage and analytics in the absence of any direct active management by the user is known as cloud computing These are usually provided by large centers which are situated over multiple locations Some of the important characteristics of cloud computing are agility device and location independence performance productivity and security Deployment models refer to the environmental parameters affecting the location and ownership of the infrastructure A few of the various deployment models are private cloud public cloud community cloud and distributed cloud Cloud computing finds extensive application in the fields of data analysis audio video streaming embedded intelligence application testing etc This book is a compilation of chapters that discuss the most vital concepts in the field of cloud computing While understanding the long term perspectives of the topics it makes an effort in highlighting their impact as a modern tool for the growth of the discipline This book is a complete source of knowledge on the present status of this important field

**Towards an Efficient Distributed Cloud Architecture** Praveen Khethavath, 2014 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 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

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8 miles and is an out and back trail the mescal trailhead and chuckwagon trail are our top pics for experiencing the devil s bridge trail both are quite scenic and lengthy

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web sep 12 2023 the devil s bridge hike the hike to devil s bridge is a moderately challenging route with an elevation gain of about 4 600 feet although relatively short the devil s bridge hike takes about an hour and requires a thigh burning climb the scenic views atop the natural arch are certainly worth it

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