Cloud Computing
with
e-Science Applications

EDITED BY OLIVIER TERZO · LORENZO MOSSUCCA

Cloud Computing With E Science Applications

Alexander Lazovik,Stefan Schulte

Cloud Computing With E Science Applications:

   Cloud Computing with e-Science Applications Olivier Terzo,Lorenzo Mossucca,2017-12-19 The amount of data in everyday life has been exploding This data increase has been especially significant in scientific fields where substantial amounts of data must be captured communicated aggregated stored and analyzed Cloud Computing with e Science Applications explains how cloud computing can improve data management in data heavy fields such as bioinformatics earth science and computer science The book begins with an overview of cloud models supplied by the National Institute of Standards and Technology NIST and then Discusses the challenges imposed by big data on scientific data infrastructures including security and trust issues Covers vulnerabilities such as data theft or loss privacy concerns infected applications threats in virtualization and cross virtual machine attack Describes the implementation of workflows in clouds proposing an architecture composed of two layers platform and application Details infrastructure as a service IaaS platform as a service PaaS and software as a service SaaS solutions based on public private and hybrid cloud computing models Demonstrates how cloud computing aids in resource control vertical and horizontal scalability interoperability and adaptive scheduling Featuring significant contributions from research centers universities and industries worldwide Cloud Computing with e Science Applications presents innovative cloud migration methodologies applicable to a variety of fields where large data sets are produced The book provides the scientific community with an essential reference for moving applications to the cloud   **Cloud Computing with e-Science Applications** Olivier Terzo,Lorenzo Mossucca,2017-12-19 The amount of data in everyday life has been exploding This data increase has been especially significant in scientific fields where substantial amounts of data must be captured communicated aggregated stored and analyzed Cloud Computing with e Science Applications explains how cloud computing can improve data management in data heavy fields such as bioinformatics earth science and computer science The book begins with an overview of cloud models supplied by the National Institute of Standards and Technology NIST and then Discusses the challenges imposed by big data on scientific data infrastructures including security and trust issues Covers vulnerabilities such as data theft or loss privacy concerns infected applications threats in virtualization and cross virtual machine attack Describes the implementation of workflows in clouds proposing an architecture composed of two layers platform and application Details infrastructure as a service IaaS platform as a service PaaS and software as a service SaaS solutions based on public private and hybrid cloud computing models Demonstrates how cloud computing aids in resource control vertical and horizontal scalability interoperability and adaptive scheduling Featuring significant contributions from research centers universities and industries worldwide Cloud Computing with e Science Applications presents innovative cloud migration methodologies applicable to a variety of fields where large data sets are produced The book provides the scientific community with an essential reference for moving applications to the cloud   *China's e-Science Blue Book 2018* Chinese Academy of Sciences,Cyberspace Administration of China,Ministry of

Education,Ministry of Science and Technology,Chinese Academy of Social Sciences,National Natural Science Foundation,Chinese Academy of Agricultural Sciences,2019-11-19 This book is jointly compiled by Chinese Academy of Sciences Cyberspace Administration of China Ministry of Education of the People s Republic of China Ministry of Science and Technology of the People s Republic of China Chinese Academy of Social Sciences National Natural Science Foundation of China and Chinese Academy of Agricultural Sciences Over the past several years Chinese scholars have contributed numerous research works on the development of Chinese scientific information and technology and produced a range of outstanding achievements Focusing on the main topic of e Science this book explores the forefront of science and technology around the globe the major demands in China and the main fields in China s economic development Furthermore it reviews the major achievements and the typical cases in China s e Science research It provides a valuable reference source for future technological innovations and will introduce researchers and students in the area of e Science to the latest results in China

Advances in Service-Oriented and Cloud Computing Alexander Lazovik,Stefan Schulte,2018-01-30 This volume contains the technical papers presented in the workshops associated with the European Conference on Service Oriented and Cloud Computing ESOCC 2016 held in Vienna Austria in September 2016 4th International Workshop on Cloud for IoT CLIoT 2016 Second International Workshop on Cloud Adoption and Migration CloudWays 2016 First International Workshop on Patterns and Pattern Languages for SOCC Use and Discovery PATTWORLD 2016 combined with the First International Workshop on Performance and Conformance of Workflow Engines PEaCE 2016 IFIP WG SOS Workshop 2016 Rethinking Services ResearCH ReSeRCH 2016 Furthermore there is a topical section presenting the results of the PhD Symposium The abstracts of the presentations held at the European Projects Forum EU Projects 2016 are included in the back matter of the volume The 15 full papers included in this volume were carefully reviewed and selected from 49 submissions They focus on specific topics in service oriented and cloud computing domains such as limits and or advantages of existing cloud solutions future internet technologies efficient and adaptive deployment and management of service based applications across multiple clouds novel cloud service migration practices and solutions digitization of enterprises in the cloud computing era federated cloud networking services **Grid and Cloud Computing for E-science Applications** Olivier Terzo,2013 Big Data Rajkumar Buyya,Rodrigo N. Calheiros,Amir Vahid Dastjerdi,2016-06-07 Big Data Principles and Paradigms captures the state of the art research on the architectural aspects technologies and applications of Big Data The book identifies potential future directions and technologies that facilitate insight into numerous scientific business and consumer applications To help realize Big Data s full potential the book addresses numerous challenges offering the conceptual and technological solutions for tackling them These challenges include life cycle data management large scale storage flexible processing infrastructure data modeling scalable machine learning data analysis algorithms sampling techniques and privacy and ethical issues Covers computational platforms supporting Big Data applications Addresses key principles underlying Big Data computing Examines

key developments supporting next generation Big Data platforms Explores the challenges in Big Data computing and ways to overcome them Contains expert contributors from both academia and industry   Cyberinfrastructure Technologies and Applications Junwei Cao,2009 Cyberinfrastructure was proposed in a report of the NSF Blue Ribbon advisory panel in 2003 Cyberinfrastructure will provide a unified environment to access and manage cyber resources e g supercomputers data archives software services scientific instruments and virtual organisations In this book the authors review latest research and development and discuss new technologies and applications involved in building Cyberinfrastructure The purpose of this book is to provide a detailed summary of early experiences practices and lessons leaned in building Cyberinfrastructure from multiple perspectives software development and maintenance resource integration and sharing cyber environment construction operation and management testing and troubleshooting application enabling security and QoS ensuring Consequently this book can serve as a valuable source of reference and indispensable reading for researchers educators engineers graduate students and practitioners in the field of design and implementation of Cyberinfrastructure systems

Cloud Computing in Ocean and Atmospheric Sciences Tiffany C Vance,Nazila Merati,Chaowei Yang,May Yuan,2016-03-24 Cloud Computing in Ocean and Atmospheric Sciences provides the latest information on this relatively new platform for scientific computing which has great possibilities and challenges including pricing and deployments costs and applications that are often presented as primarily business oriented In addition scientific users may be very familiar with these types of models and applications but relatively unfamiliar with the intricacies of the hardware platforms they use The book provides a range of practical examples of cloud applications that are written to be accessible to practitioners researchers and students in affiliated fields By providing general information on the use of the cloud for oceanographic and atmospheric computing as well as examples of specific applications this book encourages and educates potential users of the cloud The chapters provide an introduction to the practical aspects of deploying in the cloud also providing examples of workflows and techniques that can be reused in new projects Provides real examples that help new users quickly understand the cloud and provide guidance for new projects Presents proof of the usability of the techniques and a clear path to adoption of the techniques by other researchers Includes real research and development examples that are ideal for cloud computing adopters in ocean and atmospheric domains   **Cloud Computing for Data-Intensive Applications** Xiaolin Li,Judy Qiu,2014-12-02 This book presents a range of cloud computing platforms for data intensive scientific applications It covers systems that deliver infrastructure as a service including HPC as a service virtual networks as a service scalable and reliable storage algorithms that manage vast cloud resources and applications runtime and programming models that enable pragmatic programming and implementation toolkits for eScience applications Many scientific applications in clouds are also introduced such as bioinformatics biology weather forecasting and social networks Most chapters include case studies Cloud Computing for Data Intensive Applications targets advanced level students and researchers studying computer science and

electrical engineering Professionals working in cloud computing networks databases and more will also find this book useful as a reference   Handbook of Cloud Computing Nayyar Dr. Anand,2019-09-20 Great POSSIBILITIES and high future prospects to become ten times folds in the near FUTUREKey features Comprehensively gives clear picture of current state of the art aspect of cloud computing by elaborating terminologies models and other related terms Enlightens all major players in Cloud Computing industry providing services in terms of SaaS PaaS and IaaS Highlights Cloud Computing Simulators Security Aspect and Resource Allocation In depth presentation with well illustrated diagrams and simple to understand technical concepts of cloud Description The book e Handbook of Cloud Computinge provides the latest and in depth information of this relatively new and another platform for scientific computing which has great possibilities and high future prospects to become ten folds in near future The book covers in comprehensive manner all aspects and terminologies associated with cloud computing like SaaS PaaS and IaaS and also elaborates almost every cloud computing service model The book highlights several other aspects of cloud computing like Security Resource allocation Simulation Platforms and futuristic trend i e Mobile cloud computing The book will benefit all the readers with all in depth technical information which is required to understand current and futuristic concepts of cloud computing No prior knowledge of cloud computing or any of its related technology is required in reading this book What will you learn Cloud Computing Virtualisation Software as a Service Platform as a Service Infrastructure as a Service Data in Cloud and its Security Cloud Computing Simulation Mobile Cloud Computing Specific Cloud Service Models Resource Allocation in Cloud Computing Who this book is for Students of Polytechnic Diploma Classes Computer Science Information Technology Graduate Students Computer Science CSE IT Computer Applications Master Class Students Msc CS IT MCA M Phil M Tech M S Researcher s Ph D Research Scholars doing work in Virtualization Cloud Computing and Cloud Security Industry Professionals Preparing for Certifications Implementing Cloud Computing and even working on Cloud Security Table of contents1 Introduction to Cloud Computing2 Virtualisation3 Software as a Service4 Platform as a Service5 Infrastructure as a Service6 Data in Cloud7 Cloud Security 8 Cloud Computing Simulation9 Specific Cloud Service Models10 Resource Allocation in Cloud Computing11 Mobile Cloud Computing About the authorDr Anand Nayyar received Ph D Computer Science in Wireless Sensor Networks and Swarm Intelligence Presently he is working in Graduate School Duy Tan University Da Nang Vietnam He has total of fourteen Years of Teaching Research and Consultancy experience with more than 250 Research Papers in various International Conferences and highly reputed journals He is certified Professional with more than 75 certificates and member of 50 Professional Organizations He is acting as e ACM DISTINGUISHED SPEAKERe   **Computers and Information Processing Technologies I** Prasad Yarlagadda,Yun Hae Kim,2014-06-10 Selected peer reviewed papers from the International Conference on Computers and Information Processing Technologies ICCIPT 2014 April 23 24 2014 Shanghai China   **Proceedings of the ... International Symposium on Remote Sensing of Environment** ,2009   *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 **Issues in Science and Technology** ,2008 Progress in Applied Sciences, Engineering and Technology Pei Long Xu,Hong Zong Si,Yi Qian Wang,Pin Wang,2014-05-23 Selected peer reviewed papers from the 2014 International Conference on Materials Science and Computational Engineering ICMSCE 2014 May 20 21 2014 Qingdao China Data Driven e-Science Simon C. Lin,Eric Yen,2011-02-04 ISGC 2010 The International Symposium on Grid Computing was held at Academia Sinica Taipei Taiwan March 2010 The 2010 symposium brought together prestigious scientists and engineers worldwide to exchange ideas present challenges solutions and to discuss new topics in the field of Grid Computing Data Driven e Science Use Cases and Successful Applications of Distributed Computing Infrastructures ISGC 2010 an edited volume introduces the latest achievements in grid technology for Biomedicine Life Sciences Middleware Security Networking Digital Library Cloud Computing and more This book provides Grid developers and end users with invaluable information for developing grid technology and applications The last section of this book presents future development in the field of Grid Computing This book is designed for a professional audience composed of grid users developers and researchers working in

the field of grid computing Advanced level students focused on computer science and engineering will also find this book valuable as a reference or secondary text book   *Fault Tolerance and Scaling in E-Science Cloud Applications* ,2010 It can be natural to believe that many of the traditional issues of scale have been eliminated or at least greatly reduced via cloud computing That is if one can create a seemingly wellfunctioning cloud application that operates correctly on small or moderate sized problems then the very nature of cloud programming abstractions means that the same application will run as well on potentially significantly larger problems In this paper we present our experiences taking MODISAzure our satellite data processing system built on the Windows Azure cloud computing platform from the proof of concept stage to a point of being able to run on significantly larger problem sizes e g from national scale data sizes to global scale data sizes To our knowledge this is the longest running eScience application on the nascent Windows Azure platform We found that while many infrastructure level issues were thankfully masked from us by the cloud infrastructure it was valuable to design additional redundancy and fault tolerance capabilities such as transparent idempotent task retry and logging to support debugging of user code encountering unanticipated data issues Further we found that using a commercial cloud means anticipating inconsistent performance and black box behavior of virtualized compute instances as well as leveraging changing platform capabilities over time We believe that the experiences presented in this paper can help future eScience cloud application developers on Windows Azure and other commercial cloud providers   Proceedings for the ... International Symposium on Remote Sensing of Environment, the ... Symposium of the Canadian Remote Sensing Society ,1996   **Deploying Secure Data Science Applications in the Cloud** Lucas H. Benevides e Braga,2025-10-21 This step by step guide is for Data Scientists ML engineers and DevOps practitioners who need to turn prototypes into secure scalable production services on AWS and Google Cloud With step by step instructions and practical examples this book bridges the gap between building Data Science applications and Machine Learning models and deploying them effectively in real world scenarios The book begins with an introduction to essential cloud concepts providing detailed guidance on setting up a virtual machine VM on AWS and later on Google Cloud to serve applications This includes configuring security groups and establishing secure SSH Secure Shell connections using VSCode Visual Studio Code You will learn how to deploy a dummy HTTP Streamlit application as a foundational exercise before advancing to more complex setups Subsequent chapters dive deeper into key deployment practices such as configuring load balancers setting up domain and subdomain names and securing applications with SSL Secure Sockets Layer certificates The book introduces more advanced deployment strategies using Docker containers and Nginx as a reverse proxy as well as secure serverless deployments of Jenkins Flask and Streamlit You ll also learn how to train machine learning models and use Flask to build APIs that serve those models in production In addition the book offers hands on demonstrations for using Jenkins as an ETL platform Streamlit as a dashboard service and Flask for API development For those interested in serverless architectures it provides detailed

guidance on using AWS ECS Elastic Container Service Fargate and Google Cloud Run to build scalable and cost effective solutions By the end of this book you will possess the skills to deploy and manage data science applications on the cloud with confidence Whether you are scaling a personal project or deploying enterprise level solutions this book is your go to resource for secure and seamless cloud deployments What You Will Learn Deploy end to end data science applications with a strong foundation in cloud infrastructure setup including VM provisioning SSH access security groups SSL configuration load balancers and domain management for secure real world deployments Use industry known tools such as Docker Nginx Flask Streamlit and Jenkins to build secure scalable services Understand how to structure and expose machine learning models via APIs for production use Explore modern serverless architectures with AWS Fargate and Google Cloud Run to scale efficiently with minimal overhead Develop a cloud deployment mindset grounded in doing things from scratch before adopting abstracted solutions Who This Book Is For Beginning to intermediate professionals with a basic understanding of Python including Data Scientists ML Engineers Data Engineers and Data Analysts who aim to securely deploy their projects in production environments and individuals working on both personal projects and enterprise level solutions leveraging AWS and Google Cloud setups   Guide to e-Science Xiaoyu Yang,Lizhe Wang,Wei Jie,2011-05-26 This guidebook on e science presents real world examples of practices and applications demonstrating how a range of computational technologies and tools can be employed to build essential infrastructures supporting next generation scientific research Each chapter provides introductory material on core concepts and principles as well as descriptions and discussions of relevant e science methodologies architectures tools systems services and frameworks Features includes contributions from an international selection of preeminent e science experts and practitioners discusses use of mainstream grid computing and peer to peer grid technology for open research and resource sharing in scientific research presents varied methods for data management in data intensive research investigates issues of e infrastructure interoperability security trust and privacy for collaborative research examines workflow technology for the automation of scientific processes describes applications of e science

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