

<<云计算与分布式系统>>

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<<云计算与分布式系统>>

内容概要

随着信息技术的广泛应用和快速发展，云计算作为一种新兴的商业计算模型日益受到人们的广泛关注。

本书是一本完整讲述云计算与分布式系统基本理论及其应用的教材。

书中从现代分布式模型概述开始，介绍了并行、分布式与云计算系统的设计原理、系统体系结构和创新应用，并通过开源应用和商业应用例子，阐述了如何为科研、电子商务、社会网络和超级计算等创建高性能、可扩展的、可靠的系统。

《云计算与分布式系统：从并行处理到物联网（英文版）》特色：

全面覆盖现代分布式计算技术，包括集群、网格、面向服务的体系结构、大规模并行处理器、对等网络和云计算。

提供的案例研究来自主流分布式计算供应商，如亚马逊、微软、谷歌等。

解释如何利用虚拟化来促进管理、调试、迁移和灾难恢复。

专为本科生或研究生的分布式系统课程而设计——每章后都配有习题和进一步阅读建议，并为教师提供配套的PPT等教辅资源。

<<云计算与分布式系统>>

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基于他在超级计算和高性能领域的巨大贡献, 他被评为美国国家工程院院士。

书籍目录

Preface

About the Authors.

PART SYSTEMS MODELING, CLUSTERING
AND VIRTUALIZATION

CHAPTER Distributed System Models and Enabling Technologies

Summary

1.1 Scalable Computing over the Internet

1.1.1 The Age of Internet Computing

1.1.2 Scalable Computing Trends and New Paradigms8

1.1.3 The Internet of Things and Cyber-Physical Systems

1.2 Technologies for Network-Based Systems.13

1.2.1 Multicore CPUs and Multithreading Technologies

1.2.2 GPU Computing to Exascale and Beyond.

1.2.3 Memory, Storage, and Wide-Area Networking.

1.2.4 Virtual Machines and Virtualization Middleware.

1.2.5 Data Center Virtualization for Cloud Computing.

1.3 System Models for Distributed and Cloud Computing.

1.3.1 Clusters of Cooperative Computers.

1.3.2 Grid Computing Infrastructures.

1.3.3 Peer-to-Peer Network Families

1.3.4 Cloud Computing over the Internet.

1.4 Software Environments for Distributed Systems and Clouds.

1.4.1 Service-Oriented Architecture (SOA)

1.4.2 Trends toward Distributed Operating Systems.

1.4.3 Parallel and Distributed Programming Models.

1.5 Performance, Security, and Energy Efficiency

1.5.1 Performance Metrics and Scalability Analysis.

1.5.2 Fault Tolerance and System Availability.

1.5.3 Network Threats and Data Integrity

1.5.4 Energy Efficiency in Distributed Computing.

1.6 Bibliographic Notes and Homework Problems.

Acknowledgments.

References

Homework Problems.

Foreword.

CHAPTER Computer Clusters for Scalable Parallel Computing

Summary.

2.1 Clustering for Massive Parallelism

2.1.1 Cluster Development Trends

2.1.2 Design Objectives of Computer Clusters.

2.1.3 Fundamental Cluster Design Issues.

2.1.4 Analysis of the Top Supercomputers.

2.2 Computer Clusters and MPP Architectures

2.2.1 Cluster Organization and Resource Sharing

2.2.2 Node Architectures and MPP Packaging.

<<云计算与分布式系统>>

- 2.2.3 Cluster System Interconnects
- 2.2.4 Hardware, Software, and Middleware Support.
- 2.2.5 GPU Clusters for Massive Parallelism
- 2.3 Design Principles of Computer Clusters
 - 2.3.1 Single-System Image Features
 - 2.3.2 High Availability through Redundancy.
 - 2.3.3 Fault-Tolerant Cluster Configurations
 - 2.3.4 Checkpointing and Recovery Techniques
- 2.4 Cluster Job and Resource Management
 - 2.4.1 Cluster Job Scheduling Methods
 - 2.4.2 Cluster Job Management Systems.
 - 2.4.3 Load Sharing Facility (LSF) for Cluster Computing
 - 2.4.4 MOSIX: An OS for Linux Clusters and Clouds.
- 2.5 Case Studies of Top Supercomputer Systems.
 - 2.5.1 Tianhe-1A: The World Fastest Supercomputer in 10
 - 2.5.2 Cray XT5 Jaguar: The Top Supercomputer in 09
 - 2.5.3 IBM Roadrunner: The Top Supercomputer in 08
- 2.6 Bibliographic Notes and Homework Problems
- Acknowledgments. 1
- References.
- Homework Problems.
- CHAPTER Virtual Machines and Virtualization of Clusters and Data Centers.
- Summary
- 3.1 Implementation Levels of Virtualization
 - 3.1.1 Levels of Virtualization Implementation.
 - 3.1.2 VMM Design Requirements and Providers.
 - 3.1.3 Virtualization Support at the OS Level
 - 3.1.4 Middleware Support for Virtualization
- 3.2 Virtualization Structures/Tools and Mechanisms.
 - 3.2.1 Hypervisor and Xen Architecture.
 - 3.2.2 Binary Translation with Full Virtualization.
 - 3.2.3 Para-Virtualization with Compiler Support.
- xii Contents
- 3.3 Virtualization of CPU, Memory, and I/O Devices.
 - 3.3.1 Hardware Support for Virtualization
 - 3.3.2 CPU Virtualization
 - 3.3.3 Memory Virtualization.
 - 3.3.4 I/O Virtualization150
 - 3.3.5 Virtualization in Multi-Core Processors.
- 3.4 Virtual Clusters and Resource Management.
 - 3.4.1 Physical versus Virtual Clusters
 - 3.4.2 Live VM Migration Steps and Performance Effects.
 - 3.4.3 Migration of Memory, Files, and Network Resources.
 - 3.4.4 Dynamic Deployment of Virtual Clusters
- 3.5 Virtualization for Data-Center Automation
 - 3.5.1 Server Consolidation in Data Centers

<<云计算与分布式系统>>

- 3.5.2 Virtual Storage Management. 1
- 3.5.3 Cloud OS for Virtualized Data Centers.
- 3.5.4 Trust Management in Virtualized Data Centers.
- 3.6 Bibliographic Notes and Homework Problems
- Acknowledgments.
- References.
- Homework Problems.
- PART COMPUTING CLOUDS, SERVICE-ORIENTED ARCHITECTURE, AND PROGRAMMING
- CHAPTER Cloud Platform Architecture over Virtualized Data Centers
- Summary
- 4.1 Cloud Computing and Service Models.
- 4.1.1 Public, Private, and Hybrid Clouds.
- 4.1.2 Cloud Ecosystem and Enabling Technologies.
- 4.1.3 Infrastructure-as-a-Service (IaaS)
- 4.1.4 Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS).
- 4.2 Data-Center Design and Interconnection Networks206
- 4.2.1 Warehouse-Scale Data-Center Design206
- 4.2.2 Data-Center Interconnection Networks
- 4.2.3 Modular Data Center in Shipping Containers.
- 4.2.4 Interconnection of Modular Data Centers
- 4.2.5 Data-Center Management Issues
- 4.3 Architectural Design of Compute and Storage Clouds.
- 4.3.1 A Generic Cloud Architecture Design
- 4.3.2 Layered Cloud Architectural Development.
- 4.3.3 Virtualization Support and Disaster Recovery.
- 4.3.4 Architectural Design Challenges
- Contents xiii
- 4.4 Public Cloud Platforms: GAE, AWS, and Azure
- 4.4.1 Public Clouds and Service Offerings.
- 4.4.2 Google App Engine (GAE)229
- 4.4.3 Amazon Web Services (AWS).
- 4.4.4 Microsoft Windows Azure.
- 4.5 Inter-cloud Resource Management
- 4.5.1 Extended Cloud Computing Services.
- 4.5.2 Resource Provisioning and Platform Deployment
- 4.5.3 Virtual Machine Creation and Management.
- 4.5.4 Global Exchange of Cloud Resources
- 4.6 Cloud Security and Trust Management.
- 4.6.1 Cloud Security Defense Strategies.
- 4.6.2 Distributed Intrusion/Anomaly Detection
- 4.6.3 Data and Software Protection Techniques
- 4.6.4 Reputation-Guided Protection of Data Centers
- 4.7 Bibliographic Notes and Homework Problems
- Acknowledgements

<<云计算与分布式系统>>

References.

Homework Problems.

CHAPTER Service-Oriented Architectures for Distributed Computing

Summary

5.1 Services and Service-Oriented Architecture

5.1.1 REST and Systems of Systems.

5.1.2 Services and Web Services.

5.1.3 Enterprise Multitier Architecture

5.1.4 Grid Services and OGSA.

5.1.5 Other Service-Oriented Architectures and Systems.

5.2 Message-Oriented Middleware

5.2.1 Enterprise Bus.

5.2.2 Publish-Subscribe Model and Notification

5.2.3 Queuing and Messaging Systems.

5.2.4 Cloud or Grid Middleware Applications.

5.3 Portals and Science Gateways

5.3.1 Science Gateway Exemplars

5.3.2 HUBzero Platform for Scientific Collaboration

5.3.3 Open Gateway Computing Environments (OGCE).

5.4 Discovery, Registries, Metadata, and Databases.

5.4.1 UDDI and Service Registries.

5.4.2 Databases and Publish-Subscribe

5.4.3 Metadata Catalogs308

5.4.4 Semantic Web and Grid

5.4.5 Job Execution Environments and Monitoring.

xiv Contents

5.5 Workflow in Service-Oriented Architectures.

5.5.1 Basic Workflow Concepts.315

5.5.2 Workflow Standards316

5.5.3 Workflow Architecture and Specification.

5.5.4 Workflow Execution Engine319

5.5.5 Scripting Workflow System Swift.

5.6 Bibliographic Notes and Homework Problems

Acknowledgements

References.

Homework Problems.

CHAPTER Cloud Programming and Software Environments.

Summary

6.1 Features of Cloud and Grid Platforms

6.1.1 Cloud Capabilities and Platform Features

6.1.2 Traditional Features Common to Grids and Clouds.

6.1.3 Data Features and Databases.

6.1.4 Programming and Runtime Support341

6.2 Parallel and Distributed Programming Paradigms

6.2.1 Parallel Computing and Programming Paradigms

6.2.2 MapReduce, Twister, and Iterative MapReduce.

<<云计算与分布式系统>>

- 6.2.3 Hadoop Library from Apache.355
- 6.2.4 Dryad and DryadLINQ from Microsoft.
- 6.2.5 Sawzall and Pig Latin High-Level Languages.
- 6.2.6 Mapping Applications to Parallel and Distributed Systems
- 6.3 Programming Support of Google App Engine
- 6.3.1 Programming the Google App Engine
- 6.3.2 Google File System (GFS).
- 6.3.3 BigTable, Google ' s NOSQL System
- 6.3.4 Chubby, Google ' s Distributed Lock Service.
- 6.4 Programming on Amazon AWS and Microsoft Azure.
- 6.4.1 Programming on Amazon EC2.
- 6.4.2 Amazon Simple Storage Service (S3).
- 6.4.3 Amazon Elastic Block Store (EBS) and SimpleDB.
- 6.4.4 Microsoft Azure Programming Support.
- 6.5 Emerging Cloud Software Environments.
- 6.5.1 Open Source Eucalyptus and Nimbus.
- 6.5.2 OpenNebula, Sector/Sphere, and OpenStack.
- 6.5.3 Manjrasoft Aneka Cloud and Appliances.
- 6.6 Bibliographic Notes and Homework Problems399
- Acknowledgement
- References.
- Homework Problems.
- Contents xv
- PART GRIDS, P2P, AND THE FUTURE INTERNET
- CHAPTER Grid Computing Systems and Resource Management
- Summary 16
- 7.1 Grid Architecture and Service Modeling.
- 7.1.1 Grid History and Service Families.
- 7.1.2 CPU Scavenging and Virtual Supercomputers419
- 7.1.3 Open Grid Services Architecture (OGSA)
- 7.1.4 Data-Intensive Grid Service Models425
- 7.2 Grid Projects and Grid Systems Built
- 7.2.1 National Grids and International Projects.
- 7.2.2 NSF TeraGrid in the United States.
- 7.2.3 DataGrid in the European Union
- 7.2.4 The ChinaGrid Design Experiences
- 7.3 Grid Resource Management and Brokering
- 7.3.1 Resource Management and Job Scheduling.
- 7.3.2 Grid Resource Monitoring with CGSP
- 7.3.3 Service Accounting and Economy Model
- 7.3.4 Resource Brokering with Gridbus.
- 7.4 Software and Middleware for Grid Computing
- 7.4.1 Open Source Grid Middleware Packages.
- 7.4.2 The Globus Toolkit Architecture (GT4).
- 7.4.3 Containers and Resources/Data Management.
- 7.4.4 The ChinaGrid Support Platform (CGSP)

<<云计算与分布式系统>>

7.5 Grid Application Trends and Security Measures

- 7.5.1 Grid Applications and Technology Fusion
- 7.5.2 Grid Workload and Performance Prediction.
- 7.5.3 Trust Models for Grid Security Enforcement
- 7.5.4 Authentication and Authorization Methods
- 7.5.5 Grid Security Infrastructure (GSI).

7.6 Bibliographic Notes and Homework Problems

Acknowledgments

References471

Homework Problems

CHAPTER Peer-to-Peer Computing and Overlay Networks

Summary

8.1 Peer-to-Peer Computing Systems.

- 8.1.1 Basic Concepts of P2P Computing Systems.
- 8.1.2 Fundamental Challenges in P2P Computing.
- 8.1.3 Taxonomy of P2P Network Systems.

8.2 P2P Overlay Networks and Properties

8.2.1 Unstructured P2P Overlay Networks

xvi Contents

8.2.2 Distributed Hash Tables (DHTs)

8.2.3 Structured P2P Overlay Networks.

8.2.4 Hierarchically Structured Overlay Networks

8.3 Routing, Proximity, and Fault Tolerance

- 8.3.1 Routing in P2P Overlay Networks.
 - 8.3.2 Network Proximity in P2P Overlays
 - 8.3.3 Fault Tolerance and Failure Recovery
 - 8.3.4 Churn Resilience against Failures.
- 8.4 Trust, Reputation, and Security Management
- 8.4.1 Peer Trust and Reputation Systems
 - 8.4.2 Trust Overlay and DHT Implementation
 - 8.4.3 PowerTrust: A Scalable Reputation System.
 - 8.4.4 Securing Overlays to Prevent DDoS Attacks.

8.5 P2P File Sharing and Copyright Protection

- 8.5.1 Fast Search, Replica, and Consistency
- 8.5.2 P2P Content Delivery Networks
- 8.5.3 Copyright Protection Issues and Solutions
- 8.5.4 Collusive Piracy Prevention in P2P Networks

8.6 Bibliographic Notes and Homework Problems

Acknowledgements

References

Homework Problems.

CHAPTER Ubiquitous Clouds and the Internet of Things

Summary

- 9.1 Cloud Trends in Supporting Ubiquitous Computing
 - 9.1.1 Use of Clouds for HPC/HTC and Ubiquitous Computing
 - 9.1.2 Large-Scale Private Clouds at NASA and CERN
 - 9.1.3 Cloud Mashups for Agility and Scalability

<<云计算与分布式系统>>

- 9.1.4 Cloudlets for Mobile Cloud Computing
- 9.2 Performance of Distributed Systems and the Cloud
 - 9.2.1 Review of Science and Research Clouds
 - 9.2.2 Data-Intensive Scalable Computing (DISC)
 - 9.2.3 Performance Metrics for HPC/HTC Systems
 - 9.2.4 Quality of Service in Cloud Computing
 - 9.2.5 Benchmarking MPI, Azure, EC2, MapReduce, and Hadoop
- 9.3 Enabling Technologies for the Internet of Things
 - 9.3.1 The Internet of Things for Ubiquitous Computing
 - 9.3.2 Radio-Frequency Identification (RFID)
 - 9.3.3 Sensor Networks and ZigBee Technology
 - 9.3.4 Global Positioning System (GPS)
- 9.4 Innovative Applications of the Internet of Things
 - 9.4.1 Applications of the Internet of Things
 - Contents xvii
 - 9.4.2 Retailing and Supply-Chain Management
 - 9.4.3 Smart Power Grid and Smart Buildings
 - 9.4.4 Cyber-Physical System (CPS)
- 9.5 Online Social and Professional Networking
 - 9.5.1 Online Social Networking Characteristics
 - 9.5.2 Graph-Theoretic Analysis of Social Networks
 - 9.5.3 Communities and Applications of Social Networks
 - 9.5.4 Facebook: The World ' s Largest Social Network
 - 9.5.5 Twitter for Microblogging, News, and Alert Services
- 9.6 Bibliographic Notes and Homework Problems
- Acknowledgements
- References.
- Homework Problems
- Index

章节摘录

版权页：插图：SUMMARY This chapter presents the evolutionary changes that have occurred in parallel, distributed, and cloud computing over the past 30 years, driven by applications with variable workloads and large datasets. We study both high-performance and high-throughput computing systems in parallel computers appearing as computer clusters, service-oriented architecture, computational grids, peer-to-peer networks, Internet clouds, and the Internet of Things. These systems are distinguished by their hardware architectures, OS platforms, processing algorithms, communication protocols, and service models applied. We also introduce essential issues on the scalability, performance, availability, security, and energy efficiency in distributed systems.

1.1 SCALABLE COMPUTING OVER THE INTERNET

Over the past 60 years, computing technology has undergone a series of platform and environment changes. In this section, we assess evolutionary changes in machine architecture, operating system platform, network connectivity, and application workload. Instead of using a centralized computer to solve computational problems, a parallel and distributed computing system uses multiple computers to solve large-scale problems over the Internet. Thus, distributed computing becomes data-intensive and network-centric. This section identifies the applications of modern computer systems that practice parallel and distributed computing. These large-scale Internet applications have significantly enhanced the quality of life and information services in society today.

1.1.1 The Age of Internet Computing

Billions of people use the Internet every day. As a result, supercomputer sites and large data centers must provide high-performance computing services to huge numbers of Internet users concurrently. Because of this high demand, the Linpack Benchmark for high-performance computing (HPC) applications is no longer optimal for measuring system performance. The emergence of computing clouds instead demands high-throughput computing (HTC) systems built with parallel and distributed computing technologies [5, 6, 19, 25]. We have to upgrade data centers using fast servers, storage systems, and high-bandwidth networks. The purpose is to advance network-based computing and web services with the emerging new technologies.

1.1.1.1 The Platform Evolution

Computer technology has gone through five generations of development, with each generation lasting from 10 to 20 years. Successive generations are overlapped in about 10 years. For instance, from 1950 to 1970, a handful of mainframes, including the IBM 360 and CDC 6400, were built to satisfy the demands of large businesses and government organizations. From 1960 to 1980, lower-cost mini-computers such as the DEC PDP 11 and VAX Series became popular among small businesses and on college campuses.

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“ 网格计算、对等计算、云计算这些新兴领域近几年日益受到学术界和工业界的关注。预计这些新技术将对商业、科学和工程及社会等众多方面产生巨大影响。

本书的及时出版将会帮助读者了解分布式计算领域的最新技术。

” —— Yi Pan, 佐治亚州立大学 “ 本书是一本全面而新颖的教材，内容覆盖高性能计算、分布式与云计算、虚拟化和网格计算。

作者将应用与技术趋势相结合，揭示了计算的未来发展。

无论是对在校学生还是经验丰富的实践者，本书都是一本优秀的读物。

” —— Thomas J. Hacker, 普度大学

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《云计算与分布式系统:从并行处理到物联网(英文版)》编辑推荐：你是学习分布式系统或分布式计算课程的学生吗？

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《云计算与分布式系统:从并行处理到物联网(英文版)》作者做了一项杰出的工作，《云计算与分布式系统:从并行处理到物联网(英文版)》中讲述了硬件和软件、系统体系结构、新的编程范式和生态系统方面的最新进展，既关注速度和性能优化，又考虑能源效率与节能。

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也许更重要的是。

《云计算与分布式系统:从并行处理到物联网(英文版)》关注未来互联网中泛在使用的对等网络，包括近年来快速发展的大型社会网络和物联网。

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本书的及时出版将会帮助读者了解分布式计算领域的最新技术。

” ——Yi Pan 佐治亚州立大学 “ 本书是一本全面而新颖的教材，内容覆盖高性能计算、分布式与云计算、虚拟化和网格计算。

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