

<<云计算与分布式系统>>

图书基本信息

书名：<<云计算与分布式系统>>

13位ISBN编号：9787111382270

10位ISBN编号：7111382277

出版时间：2012-5

出版时间：机械工业出版社

作者：(美) Kai Hwang,(美) Geoffrey C. Fox,(美) Jack J. Dongarra

页数：648

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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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## 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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### 媒体关注与评论

“ 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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### 编辑推荐

《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。

《云计算与分布式系统:从并行处理到物联网(英文版)》的目的是将传统的多处理器和多计算机集群转换成Web规模网格和云。

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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### 名人推荐

“ 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。

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