

<<事务处理>>

图书基本信息

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## 前言

Why We Wrote this Book The purpose of this book is to give you an understanding of how large , distributed , hetero- geneous computer systems can be made to work reliablly . In contrast to the often complex methods of distributed computing , it presents a distributed system application development approach that call be used by mere mortals . WhY then doesn't the title use a term like dis- tributed systems , high reliability , interoperability, or client-server ?

Why use something as prosaic as transaction processing,

a term that for many people denotes old-fashioned , batch- oriented , mainframe-minded data processing ?

The point is—and that'S what makes the book SO long ~ that the design , implementation , and operation of large application systems , with thousands of terminals , employing hundreds of computers,

providing service with absolutely no downtime , cannot be done from a single perspective . An integrated ( and integrating ) perspective and methodology is needed to ap-

proach the distributed systems problem . Our gOal is to demonstrate that ffansactions provide this integrative conceptual framework . and that distributed transaction-oriented operating systems are the enabling technology

. The client-server paradigm provides a good way of structuring the system and of developing applications . but it stiiil needs transactions to con- trol the client . server interactions . In a nutshell : without transactions

. distributed systems cannot be made to work for typical real . life applications . This is not an outrageous claim ; rather it is a lesson many people——system implemen- tors , system owners , and application developers-have

learned the hard way . Of course , the concepts for building lurge systems have been evolving for a long time . In fact , some of the key ideas were developed way back when batch processing was in full swing , but they are far from being obsolete . Transaction processing concepts were conceived to master the corn- plexity in

single-processor online applications . If anything , these concepts are even more critical now for the SUCCESSful implementation of massively distributed systems that work and fail in much more complex ways .

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### 内容概要

本书从系统的角度全面阐述事务处理的概念和技术，其中涉及终端上的表示管理、通信子系统、操作系统、数据库、程序设计语言的运行时系统以及应用开发环境等。

本书重点放在事务处理的基本概念上，主要阐述事务概念是如何用于解决分布式系统问题的，以及利用这些概念如何能够在有限的资金和风险范围内建立高性能、高可用性的应用系统。

全书重点讲述了事务处理基础、容错基础知识、面向事务的计算，并发控制、恢复、事务型文件系统、系统概览等7个主题，介绍了事务的ACID特性、并发的理论和实践、事务管理和恢复技术等方面的内容，最后还介绍了一个非常重要的资源管理器的实现。

本书主要面向计算机及相关专业的高年级本科生和研究生，适合作为事务处理导论、数据库系统、分布式系统、操作系统等课程的辅助教材，需要了解事务处理系统的开发人员也可将其作为基本参考书。

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### 作者简介

Jim Gray (1944-2007) 计算机科学大师，因在数据库和事务处理研究和实现方面的开创性贡献而获得1998年图灵奖。

美国科学院、工程院两院院士，ACM和IEEE两会会士：他25岁成为加州大学伯克利分校计算机科学学院第一位博士。

在IBM工作期间参与和主持了IMS、System R、SQUDS、DB2等项目的开发。

后任职于微软研究院，主要关注应用数据库技术来处理各学科的海量信息。

2007年1月独自驾船出海后失踪。

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## 章节摘录

插图：Key-sequenced placement stores the records sorted in key order . Key sequencing clusters related records together and allows sequential scanning of records in sorted order . Earlier sections of this chapter point out the benefits of this clustering and sequential access to data . When a new record arrives , its key is computed and the record is placed near records with related keys . Record insertion is a little expensive , but there are ingenious algorithms that make it competitive with hashing . Given a key value , it is easy to find the record by using binary search on the file or by using some indexing structure . It is often desirable to associatively access a file via two different keys . For example , it is often convenient to access employees by either name or employee number . Suppose the employee records are stored in an associative file keyed by employee number ( empno ) . Then a second associative file , keyed by employee name ( empname ) , could store a record of the form for each record in the employee file . By first looking in this second file under the empname key to find the empno , and then using this empno to associatively access the employee file , the system can fairly quickly find the desired employee record . Such index files are called secondary indices . It is often convenient to think of the direct address of a record as its key . If this is done , then secondary indices can be defined on direct files as well as on associative files . Most systems allow file designers to define many secondary indices on a base file . The file system automatically maintains the records in the secondary indices as records are inserted into , updated in , and deleted from the primary file . Of course , the definition of the secondary index must be stored in the file descriptor . When a file is first opened , the descriptor is read by the server , and all subsequent record operations on the file cause the relevant secondary indices to be used and maintained .

2 . 5 . 3 Distributed Files Parts of a file may be distributed among servers in a computer network . This distribution can take two forms : The files can be partitioned ( fragments of the file are stored in different nodes ) , or the files can be replicated ( the whole contents of the files are stored at several nodes ) . The definitions of partitioning and replication are fairly simple . A file is broken into fragments by declaring the key boundaries of each fragment : All records within that key range belong to that fragment . For example , if a file is keyed by sales region and customer number , then the file might be fragmented by region , with each region having a separate fragment . These fragments might be partitioned among the computers of the various regions , with each region storing the fragment for that region . In addition , all the fragments might be replicated at central headquarters . The descriptor of each fragment contains a complete description of the entire file .

When a client opens the file , the file system looks at the descriptor and thereby knows about all the fragments . When the client issues a read-by-key , the request is dispatched to one of the servers managing that fragment . When the client issues a record insert , delete , or update Operation , the request is dispatched to all servers managing the fragment that holds the record . Associated secondary index reads and writes are handled similarly .

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### 编辑推荐

事务处理广泛应用于数据库和操作系统等领域，对构建高性能、并发、分布式的可靠现代计算机系统至关重要。

《事务处理概念与技术(英文版)》是被誉为“事务处理圣经”的经典名著，由图灵奖得主Jim Gray和世界数据库权威AndreasReuter合著，是两位大师数十年学术研究和实践经验的结晶。

《事务处理概念与技术(英文版)》的组织和叙述方法独树一帜，作者将事务作为统一的概念框架，由此出发，笔锋所至，纵横开阖，引导读者从系统实现者的角度，全面深入地审视了计算机系统的方方面面，不仅阐述理论，而且针对各种实际问题，详细解释出现的原因，讲述大量已经在成功的商业和研究项目中经过验证、行之有效的事务处理实现技术，并提供了丰富的C语言代码。

书中处处闪烁着作者对计算机系统的渊博学识和真知灼见，无论你是程序员、架构师、数据库管理员，还是科研人员 and 高校师生，都将从《事务处理概念与技术(英文版)》中获益匪浅。

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