<<计算机网络>>

图书基本信息

书名：<<计算机网络>>

13位ISBN编号：9787111359258

10位ISBN编号：7111359259

出版时间：2011-10

出版时间：机械工业出版社

作者：（荷)）Andrew S. Tanenbaum,（美）David J. Wetherall

页数：949

前言

PREFACE This book is now in its fifth edition. Each edition has corresponded to a different phase in the way computer networks were used. When the first edition appearedin 1980, networks were an academic curiosity. When the second edition appeared in 1988, networks were used by universities and large businesses. When the third edition appeared in 1996, computer networks, especially the Internet, had become a daily reality for millions of people. By the fourth edition, in 2003, wireless networks and mobile computers had become commonplace for accessing the Web and the Internet. Now, in the fifth edition, networks are about content distribution(especially videos using CDNs and peer-to-peer networks) and mobile phones are small computers on the Internet. Among the many changes in this book, the most important one is the addition f Prof. David J. Wetheall as a co-author. David brings a rich background in networking,having cut his teeth designing metropolitan-area networks more than 20years ago. He has worked with the Internet and wireless networks ever since and is a professor at the University of Washington, where he has been teaching and doing research on computer networks and related topics for the past decade. Of course, the book also has many changes to keep up with the: ever-changing world of computer networks. Among these are revised and new material on Wireless networks (802.12 and 802.16) The 3G networks used by smart phones RFID and sensor networks Content distribution using CDNs Peer-to-peer networks Real-time media (from stored, streaming, and live sources) Internet telephony (voice over IP) Delay-tolerant networks A more detailed chapter-by-chapter list follows. Chapter 1 has the same introductory function as in the fourth edition, but the contents have been revised and brought up to date. The Internet, mobile phone networks, 802.11, and RFID and sensor networks are discussed as examples of computer networks. Material on the original Ethernet—with its vampire taps—has been removed, along with the material on ATM. Chapter 2, which covers the physical layer, has expanded coverage of digital modulation (including OFDM as widely used in wireless networks) and 3G networks (based on CDMA). New technologies are discussed, including Fiber to the Home and power-line networking. Chapter 3, on point-to-point links, has been improved in two ways. The material on codes for error detection and correction has been updated, and also includes a brief description of the modern codes that are important in practice (e.g., convolutional and LDPC codes). The examples of protocols now use Packet over SONET and ADSL. Sadly, the material on protocol verification has been removed as it is little used. In Chapter 4, on the MAC sublayer, the principles are timeless but the technologies have changed. Sections on the example networks have been redone accordingly, including gigabit Ethernet, 802.11, 802.16, Bluetooth, and RFID. Also updated is the coverage of LAN switching, including VLANs. Chapter 5, on the network layer, covers the same ground as in the fourth edition. . The revisions have been to update material and add depth, particularly for quality of service (relevant for real-time media) and internetworking. The sections on BGP, OSPF and CIDR have been expanded, as has the treatment of multicast routing. Anycast routing is now included. Chapter 6, on the transport layer, has had material added, revised, and removed. New material describes delay-tolerant networking and congestion control in general. The revised material updates and expands the coverage of TCP congestion control. The material removed described connection-oriented network layers, something rarely seen any more. Chapter 7, on applications, has also been updated and enlarged. While material on DNS and email is similar to that in the fourth edition, in the past few years there have been many developments in the use of the Web, streaming media and content delivery. Accordingly, sections on the Web and streaming media have been brought up to date. A new section covers content distribution, including CDNs and peer-to-peer networks. Chapter 8, on security, still covers both symmetric and public-key cryptography for confidentiality and authenticity. Material on the techniques used in practice, including firewalls and VPNs, has been updated, with new material on 802.11 security and Kerberos V5 added. Chapter 9 contains a renewed list of suggested readings and a comprehensive bibliography of over 300 citations to the current literature. More than half of these are to papers and books written in 2000 or later, and the rest are citations to classic papers. Computer books are full of acronyms. This one is no exception. By the time you are finished reading this one, the following should ring a bell: ADSL, AES, AJAX,

AODV, AP, ARP, ARQ, AS, BGP, BOC, CDMA, CDN, CGI, CIDR, CRL, CSMA, CSS, DCT, DES, DHCP, DHT, DIFS, DMCA, DMT, DMZ, DNS,DOCSIS, DOM, DSLAM, DTN, FCFS, FDD, FDDI, FDM, FEC, FIFO, FSK,FTP, GPRS, GSM, HDTV, HFC, HMAC, HTTP, IAB, ICANN, ICMP, IDEA,IETF, IMAP, IMP, IP, IPTV, IRTF, ISO, ISP, ITU, JPEG, JSP, JVM, LAN,LATA, LEC, LEO, LLC, LSR, LTE, MAN, MFJ, MIME, MPEG, MPLS, MSC,MTSO, MTU, NAP, NAT, NRZ, NSAP, OFDM, OSI, OSPF, PAWS, PCM, PGP,PIM, PKI, POP, POTS, PPP, PSTN, QAM, QPSK, RED, RFC, RFID, RPC, RSA,RTSP, SHA, SIP, SMTP, SNR, SOAP, SONET, SPE, SSL, TCP, TDD, TDM,TSAP, UDP, UMTS, URL, VLAN, VSAT, WAN, WDM, and XML. But don’t worry. Each will appear in and be carefully defined before it is used. As a fun test, see how many you can identify before reading the book, write the number in the margin, then try again after reading the book. To help instructors use this book as a text for courses ranging in length from quarters to semesters, we have structured the chapters into core and optional material. The sections marked with a ‘‘*’’ in the table of contents are the optional ones. If a major section (e.g., 2.7) is so marked, all of its subsections are optional. They provide material on network technologies that is useful but can be omitted from a short course without loss of continuity. Of course, students should be encouraged to read those sections as well, to the extent they have time, as all the material is up to date and of value. The following protected instructors’ resource materials are available on the publisher’s Web site at www.pearsonhighered.com/tanenbaum. For a username and password, please contact your local Pearson representative. Solutions manual PowerPoint lecture slides Resources for students are available through the open-access Companion Web site link on www.pearsonhighered.com/tanenbaum, including Web resources, links to tutorials, organizations, FAQs, and more Figures, tables, and programs from the book Steganography demo Protocol simulators Many people helped us during the course of the fifth edition. We would especially like to thank Emmanuel Agu (Worcester Polytechnic Institute), Yoris Au (University of Texas at Antonio), Nikhil Bhargava (Aircom International, Inc.),Michael Buettner (University of Washington), John Day (Boston University),Kevin Fall (Intel Labs), Ronald Fulle (Rochester Institute of Technology), Ben Greenstein (Intel Labs), Daniel Halperin (University of Washington), Bob Kinicki (Worcester Polytechnic Institute), Tadayoshi Kohno (University of Washington),Sarvish Kulkarni (Villanova University), Hank Levy (University of Washington),Ratul Mahajan (Microsoft Research), Craig Partridge (BBN), Michael Piatek (University of Washington), Joshua Smith (Intel Labs), Neil Spring (University of Maryland), David Teneyuca (University of Texas at Antonio), Tammy VanDegrift (University of Portland), and Bo Yuan (Rochester Institute of Technology),for providing ideas and feedback. Melody Kadenko and Julie Svendsen provided administrative support to David. Shivakant Mishra (University of Colorado at Boulder) and Paul Nagin (Chimborazo Publishing, Inc.) thought of many new and challenging end-of-chapter problems. Our editor at Pearson, Tracy Dunkelberger, was her usual helpful self in many ways large and small. Melinda Haggerty and Jeff Holcomb did a good job of keeping things running smoothly. Steve Armstrong (LeTourneau University) prepared the PowerPoint slides. Stephen Turner (University of Michigan at Flint) artfully revised the Web resources and the simulators that accompany the text. Our copyeditor, Rachel Head, is an odd hybrid: she has the eye of an eagle and the memory of an elephant. After reading all her corrections, both of us wondered how we ever made it past third grade. Finally, we come to the most important people. Suzanne has been through this 19 times now and still has endless patience and love. Barbara and Marvin now know the difference between good textbooks and bad ones and are always an inspiration to produce good ones. Daniel and Matilde are welcome additions to our family. Aron is unlikely to read this book soon, but he likes the nice pictures on page 884 (AST). Katrin and Lucy provided endless support and always managed to keep a smile on my face. Thank you (DJW). ANDREW S. TANENBAUM DAVID J.WETHERALL

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内容概要

本书是全球最具有权威性和经典性的计算机网络教材，我国各大专院校也广泛采用此书作为计算机网络课程的基本教材。
作者tanenbaum
教授以高深的理论造诣和丰富的实践经验，在书中对计算机网络的原理、结构、协议标准与应用等做了深入的分析与研究。

全书按照网络协议模型（物理层、数据链路层、介质访问控制子层、网络层、传输层和应用层），自底向上逐层讲述每一层所用的技术与协议标准，并给出大量实例。
全书内容全面详实，体系清晰合理，叙述由简入繁、层层深入，自底向上方法也符合人类从底层到高层的认识规律，因此是公认的最适合网络入门的教材。

随着计算机网络的发展，本版对相关内容进行了大量修订、更新和补充，具体更新内容如下：
· 无线网络（802.12和802.16）。

· 智能手机使用的3g网络。

· rfid和传感器网络。

· 使用cdns进行内容分发。

· 对等网络。

· 实时媒体。

· 网络电话。

· 延迟容忍网络。

作者简介

Andrew S. Tanenbaum
国际知名的计算机科学家，著名的技术作家、教育家和研究者，ACM和IEEE两会高级会员，荷兰皇家艺术和科学院院士，荷兰阿姆斯特丹Vrije大学计算机科学系教授。
他讲授计算机网络、操作系统和计算机组成等课程30多年，教学成果卓著，其所著的多部计算机科学方面的教材已成为该领域内的范本，得到学术界和教育界的广泛认可，多次获得ACM及其他学术组织颁发的各项荣誉，包括1994年ACM
Karl V.
Karlstrom杰出教育奖、1997年ACM计算机科学教育杰出贡献奖、2002年Texty****教材奖、第10届ACM操作系统原理研讨会杰出论文奖等，他还入选了《世界名人录》。

David J. Wetherall
拥有美国麻省理工学院计算机科学博士学位，现为华盛顿大学西雅图分校计算机科学与工程系副教授。
他的研究领域是网络系统，尤其是无线网络和移动计算、网络测量和Internet协议的设计、隐私和安全。

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书籍目录

章节摘录

版权页：插图：Before we start to examine the technical issues in detail, it is worth devotingsome time to pointing out why people are interested in computer networks andwhat they can be used for.After all, if nobody were interested in computer net-works,few of them would be built. We will start with traditional uses at com-panies,then move on to home networking and recent developments regardingmobile users, and finish with social issues.1.1.1 usiness Applications Most companies have a substantial number of computers. For example, acompany may have a computer for each worker and use them to design products,write brochures, and do the payroll.Initially, some of these computers may haveworked in isolation from the others, but at some point, management may havedecided to connect them to be able to distribute information throughout the com-pany.

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