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A smart choice for the practicing engineers and engineering students alike, this authoritative

book provides a thorough understanding of the fundamental concepts of satellite communications (SATCOM) network design and performance assessments. Readers find discussions on a wide class of SATCOM networks using satellites as core components, as well as coverage key applications in the field. This in-depth resource presents a broad range of critical topics that are important to today's practitioners, from geosynchronous Earth orbiting (GEO) satellites and direct broadcast satellite systems, to low Earth orbiting (LEO) satellites, radio standards and protocols. This invaluable reference explains the many specific uses of satellite networks, including small-terminal wireless and mobile communications systems. Moreover, this book presents advanced topics such as satellite RF link analyses, optimum transponder loading, on-board processing, antenna characteristics, protected systems, information assurance, and spread spectrums. Readers are introduced to current and future SATCOM systems and find details on their performance supportabilities. This cutting-edge book also presents trends in multimedia satellite applications and IP services over satellites. Whether gaming, constant communications and connectivity, or streaming video and audio is the future killer app that keeps consumers reaching for mobile devices, you can turn to this book for the hands-on technology details you need to know to prepare yourself and your organizations for tomorrow's world of wireless multimedia. The books includes in-depth discussions on the hottest topics in this area, including AAA, multiple access protocols, IPv6 and adaptive technologies. Such resource management strategies as power control, user admission techniques, and congestion control are fully explained, helping you design wireless multimedia systems that provide the required degree of quality of service by effectively utilizing limited radio resources. Since the launch of Second-Generation Networks (2G), planning for each future mobile service was initiated many years before its commercial launch. In 2019, 5G Networks begun to be deployed commercially after almost ten years of planning. Similarly, the race for the 6G wireless networks that will be operational in 2030 has already started. To fulfill its potential in the upcoming decade, 6G will undoubtedly require an architectural orchestration based on the amalgamation of existing solutions and innovative technologies. The book will begin by evaluating the state of the art of all current mobile generations' while looking into their core building blocks. 6G implementation will require fundamental support from Artificial Intelligence (AI) and Machine Learning on the network's edge and core, including a new Radio Frequency (RF) spectrum. The 6G use cases will require advanced techniques for enabling the future wireless network to be human-centric, ensuring enhanced quality of experience (QoE) for most of its applications. The concept of Human Bond Communication

Beyond 2050 (Knowledge Home) and Communication, Navigation, Sensing, and Services (CONASENSE) will also profit from future wireless communication. Terahertz domains will exploit the ultra-Massive Multiple Input Multiple Output Antennas (UM-MIMO) technologies to support Terabits' data throughputs. Moreover, optical wireless communications (OWC) will also come into play to support indoor and outdoor high-data rates. Further expansion of 6G core entities will support the novel concept of Society 5.0. Quantum computing processing and communications is also likely to be added into the 6G ecosystem with security managed by blockchain orchestration for a robust network. The focus of this book is on mechanisms that affect the VoIP user satisfaction while not explicitly involved in the media session. The book thus investigates and proposes cross-layer techniques for realizing time-efficient control mechanisms for VoIP. In recent years, socio-political trends toward environmental responsibility and the pressing need to reduce Run-the-Engine (RTE) costs have resulted in the concept of Green IT. Although a significant amount of energy is used to operate routing, switching, and transmission equipment, comparatively less attention has been paid to Green Networking. A clear and concise introduction to green networks and green network operations, *Designing Green Networks and Network Operations: Saving Run-the-Engine Costs* guides you through the techniques available to achieve efficiency goals for corporate and carrier networks, including deploying more efficient hardware, blade form-factor routers and switches, and pursuing consolidation, virtualization, and network and cloud computing. The book: Delineates techniques to minimize network power, cooling, floor space, and online storage while optimizing service performance, capacity, and availability Discusses virtualization, network computing, and Web services as approaches for green data centers and networks Emphasizes best practices and compliance with international standards for green operations Extends the green data center techniques to the networking environment Incorporates green principles in the intranet, extranet, and the entire IT infrastructures Reviews networking, power management, HVAC and CRAC basics Presents methodical steps toward a seamless migration to Green IT and Green Networking Activities on integrated communications, navigation, sensing and services are urgently needed in a wide range of human-centered and/or device-centered system applications. They require a multi-disciplinary approach. It is foreseen that the economic scale of these activities are comparable with the present scale of wireless communications. The area in which systems operate can vary from personal area network to global network. This book covers the following topics; • CONASENSE Architecture • Performance Analyses of Integrated Communication Systems • Cognitive Radio Networks • Brain Computer Interfacing • Quality Improvement of Generic Services • Machine to Machine communications • Chip to Chip Communications Thus, the multi-disciplinary approach get attention in the book. Ignited by the mobile phone's huge success at the end of last century, the demand for wireless services

is constantly growing. To face this demand, wireless systems have been and are deployed at a large scale. These include mobility-oriented technologies such as GPRS, CDMA or UMTS, and Local Area Network-oriented technologies such as WiFi. WiMAX Networks covers aspects of WiMAX quality of service (QoS), security, mobility, radio resource management, multiple input multiple output antenna, planning, cost/revenue optimization, physical layer, medium access control (MAC) layer, network layer, and so on. A broad overview of the home networking field, ranging from wireless technologies to practical applications In the future, it is expected that private networks (e.g., home networks) will become part of the global network ecosystem, participating in sharing their own content, running IP-based services, and possibly becoming service providers themselves. This is already happening in the so-called "social networks" and peer-to-peer file sharing networks on the Internet—making this emerging topic one of the most active research areas in the wireless communications field. This book bridges the gap between wireless networking and service research communities, which, until now, have confined their work to their respective fields. Here, a number of industry professionals and academic experts have contributed chapters on various aspects of the subject to present an overview of home networking technologies with a special emphasis on the user as the center of all activities. Coverage includes: Networked home use cases and scenarios Media format, media exchange, and media interoperability Location-aware device and service discovery Security in smart homes Secure service discovery protocol implementation for wireless ad-hoc networks Multimedia content protection in consumer networks Mobile device connectivity in home networks Unlicensed mobile access/generic access network Wireless sensor networks in the home Ultra-wideband and sensor networking in the home environment With a balanced mix of practice and theory, *Technologies for Home Networking* focuses on the latest technologies for speedier, more reliable wireless networking and explains how to facilitate workable end-to-end solutions from a user's perspective. This book is an ideal resource for practicing engineers, designers, and managers with an interest in home networking and also serves as a valuable text for graduate students. This book offers an accessible introduction and practical guide to Voice over Internet Protocol (VoIP) technology, providing readers with the know-how to solve the problems encountered in applying VoIP technology across all types of network. It incorporates the latest research findings and brings readers up to date with the challenges that are faced by researchers developing novel applications of VoIP. The authors discuss the general architecture of VoIP technology, along with its application and relevance in conventional and emerging wireless communication networks, including Wireless Local Area Networks (WLANs), Worldwide Interoperability for Microwave Access (WiMAX), Long Term Evolution (LTE) and Cognitive Radio Networks. The book also includes Quality of service (QoS) studies under dynamic and unpredictable network conditions, which examine the reliability of both legacy

systems And the upcoming pervasive computing systems. Further, it explains how the heuristic-based learning algorithms that are used in VoIP communications may help develop today's technology in the area of autonomous systems. This book is a valuable source of information for academics and researchers, as it provides state-of-the-art research in VoIP technology. It is also of interest to network designers, application architects, and service providers looking for a coherent understanding of VoIP across a wide range of devices, network applications and user categories. Relay systems have become a subject of intensive research interest over the recent years, as it is recognized that they can improve performances and extend the coverage area of wireless communication systems. Special attention has been dedicated to them since the proposal appeared for their implementation in mobile cellular systems. Numerous researches conducted after that proposal have enabled incorporation of OFDM based relay systems in both accepted standards for IMT-Advanced systems. Nowadays, researches are ongoing with the aim to define new solutions for performance improvement of the standardized OFDM relay systems for cellular networks and one of the interesting solutions is implementation of subcarrier permutation (SCP) at the relay (R) station. The book OFDM based relay systems for future wireless communications presents a comprehensive research results in analyzing behavior and performance of the OFDM based relay systems with SCP. Dual-hop relay scenario with three communication terminals, and no direct link between the source (S) and the destination (D) has been analyzed, as it is compliant with the accepted solutions for IMT-Advanced systems. The book includes performance analysis and performance comparison of OFDM based: • amplify-and-forward (AF) relay systems with fixed gain (FG), • amplify-and-forward (AF) relay systems with variable gain (VG), • decode-and-forward (DF) relay systems, each including two SCP schemes, known to maximize the system capacity and/or improve the bit error rate (BER) performances. Performance comparisons have enabled definition of optimal solutions for the future wireless communication systems in a given conditions, and for the given optimality criteria. OFDM based relay systems for future wireless communications contains recent research results in this area and is ideal for the academic staff and master/research students in area of mobile communication systems, as well as for the personnel in communication industry. This unique book explores the use of cryptographic techniques in authentication and key distribution systems. Systems such as Kerberos, NetSP, SPX, TESS, and SESAME are analyzed and compared. Computer scientists, electrical engineers, networking specialists, and information technology professionals learn valuable cryptographic techniques--and why authentication and key distribution systems are likely to become the primary means for securing networks and distributed systems in the future. Based on cutting-edge research projects in the field, this book (part of a comprehensive 4-volume series) provides the latest details and covers the most impactful aspects of mobile, wireless, and broadband

communications development. These books present key systems and enabling technologies in a clear and accessible manner, offering you a detailed roadmap the future evolution of next generation communications. Other volumes cover Networks, Services and Applications; Reconfigurability; and Ad Hoc Networks. Europe's leading experts from industry and academia present the results of the research into advanced mobile technologies and services performed within the scope of the ACTS R& D program in two new book volumes. Invaluable for industry professionals and researchers, the state-of-the-art in European R& D into wireless technologies is detailed in these two works. This book reveals the state-of-the-art in wireless ad-hoc networking. It addresses many complex and open problems for researchers in the field of ad hoc networks. It further discusses some of the key research topics that are expected to promote and accelerate the commercial application of these networks (e.g., MAC, routing, QoS, optimization issues, service discovery, traffic models, mobility, handovers, security). It also presents "killer applications". HereOCOs a unique new book that focuses on the future direction in wireless/mobile telecommunications as a standalone concept for building wireless IP systems, including commercial, campus, local, and global networks. It examines the integration of the Internet and mobile networks, which are merging as a result of global demand for seamless mobile communication." This new book is an introduction to modern communications networks that now rely far less on telephone services and more on cellular and IP networks. The resource is designed to provide answers to the fundamental questions concerning telecommunications networks and services. This includes the structure and main components of a modern telecommunications network; the importance of standardization; and how cellular mobile networks operate; among many others. In addition, you are provided with problems and review questions to work though and help you master the material. Giving a basic overview of the technologies supporting cognitive radio this introductory-level text follows a logical approach, starting with the physical layer and concluding with applications and general issues. It provides a background to advances in the field of cognitive radios and a new exploration of how these radios can work together as a network. Cognitive Radio Networks starts with an introduction to the fundamentals of wireless communications, introducing technologies such as OFDM & MIMO. It moves onto cover software defined radio and explores and contrasts wireless, cooperative and cognitive networks and communications. Spectrum sensing, medium access control and network layer design are examined before the book concludes by covering the topics of trusted cognitive radio networks and spectrum management. Unique in providing a brief but clear tutorial and reference to cognitive radio networks this book is a single reference, written at the appropriate level for newcomers as well as providing an encompassing text for those with more knowledge of the subject. One of the first books to provide a systematic description of cognitive radio networks Provides pervasive background knowledge

including both wireless communications and wireless networks Written by leading experts in the field Full network stack investigation Today's computers and networks offer you greater capabilities and competitive advantages than ever before -- if you're not slowed down and confused by technical acronyms and terms that can even boggle industry specialists at times! This new edition of Understanding Networking Technology solves that problem by clearly and concisely explaining thousands of computing and telecommunications terms. What's more, this unique reference helps you "put all the pieces together" and acquire a practical understanding of the current state of communications and Information Technology through sections describing how networking technology has evolved and where it is likely to go in the years ahead. A highly useful resource for professionals and students alike, this cutting-edge, first-of-its-kind book provides a thorough introduction to nanoscale communication networks. Written in a clear tutorial style, this volume covers a wide range of the most important topics in the area, from molecular communication and carbon nanotube nano-networks, to nanoscale quantum networking and the future direction of nano networks. Moreover, the book features numerous exercise problems at the end of each chapter to ensure a solid understanding of the material. Gain the knowledge needed to execute end-to-end performance analysis over satellite links and networks, evaluate throughput and capacity over satellite systems, and understand IP/ATM over SATCOM issues and limitations with this in-depth, practical resource. The book examines current and future land mobile satellite (LMS) communication systems, and the techniques necessary to support reliable and efficient communication. Tackles the many issues surrounding one of the most important assets in any company: its network. Modern networks need to be fast and effective to meet the ever-increasing need to for more information and faster communication. This text offers a clear and concise presentation of the key issues for those involved in the purchase, management, planning and implementation of communication networks. It provides the broad technical understanding required to ask the right questions, set viable plans and avoid expensive investment and deployment mistakes. \* Explains effective and practical design techniques for communication networks \* Advises how to avoid the common pitfalls associated with setting up and running a network \* Focuses on the techniques for planning and assembling network technology \* Presents numerous real examples This is essential reading for network designers and will be recommended reading for students in computer science, electrical and electronic engineering and telecommunications courses. Norris and Pretty tackle the many issues surrounding the design of one of the most important communication infrastructures in a company. The enterprise network needs to be fast and effective to meet an ever increasing demand for more information and communication. It provides broad technical understanding to aid those involved in the purchase, management, planning and implementation of enterprise networks.

Effective and practical design techniques are explained in detail and are illustrated with real examples. It also discusses the associated pitfalls which often occur to show the reader what not to do when setting up a network. This timely book provides an overview of technologies for Public Safety Networks (PSNs). Including real-life examples of network application and services, it introduces readers to the many public safety network technologies and covers the historical developments as well as emerging trends in PSNs such as today's 4G and tomorrow's 5G cellular network related solutions. em style="mso-bidi-font-style: normal;"Public Safety Networks from LTE to 5G explores the gradual changes and transformation in the PSNs from the traditional approaches in communications, and examines the new technologies that have permeated this realm, as well as their advantages. It gives readers a look at the challenges public safety networks face by developing solutions for data rates such as introducing broadband data services into safer communication. Topics covered include: TETRA and TETRAPOL; Digital Mobile Radio (DMR), Next-Generation Digital Narrowband (NXDN), Digital Private Mobile Radio (dPMR); and Professional Digital Trunking (PDT). The book also presents information on FirstNet, ESN, and Safenet; Satellite Communications in EMS (Emergency Management) and Public Protection and Disaster Relief (PPDR); Wi-Fi in Ambulances; Technology in Patrol Communications; and more. This book gives managers a view of a wide range of networking systems issues, putting them into context and explaining what they evolved, how they relate to one another, and what knowledge is needed to get the most out of the technology to avoid expensive mistakes. This cutting-edge resource provides a comprehensive treatment of applying delay-tolerant networking (DTN) principles to satellite-based network communications. Detailed models and analytical tools are used to evaluate performance and provide guidance in the field. This book presents the state-of-the-art in existing on-board and ground technologies that support satellite applications, such as communications protocols, algorithms, and security procedures. Readers gain key insight into the fundamental concepts of DTN applied to satellite networks (DTSNs) and case studies are provided. This book presents an authoritative introduction to the methods for computing metrics for satellite network modeling. Satellite communications are examined, including satellite links, communication protocols, and distributed multiple access schemes, such as time division, code division, and frequency division. This book focuses on ways in which DTN might make terrestrial communication and observation via earth orbiting satellites less expensive and more robust. The fundamental concepts and analysis of the Ring Road Architecture are explored. Unique analyses on the motivating factors of using Inter-Satellite Links (ISL) to form networks in disruptive environments in space are discussed. This book explores the limits of larger and complex DTSNs as the number of satellites increase and different orbital formations become possible. As satellite networks become larger in upcoming years this book provides a guide for readers to stay

informed about standard protocols such as DTN that will allow seamless interoperation, cost reduction, and risk mitigation. This one-stop resource offers you complete, state-of-the-art coverage of wireless personal area networks, including critical discussions on current standards, important research, and applications in the field. The book gives you a solid overview of Bluetooth and IEEE 802.15, the foundations of WPAN technology, and explains how the Personal Operating Space (POS) concept is ushering in the WPAN revolution. It details how invisibility, automatic connection, service discovery, and security form the POS and how the POS is the universal interface in WPANs. This practical new resource gives you a comprehensive understanding of the design and deployment of transmission networks for wireless applications. From principles and design, to equipment procurement, project management, testing, and operation, it's a practical, hands-on engineering guide with numerous real-life examples of turn-key operations in the wireless networking industry. This book, written for both technical and non-technical professionals, helps you deal with the costs and difficulties involved in setting up the local access with technologies that are still in the evolutionary stage. Issues involved in the deployment of various transmission technologies, and their impact on the overall wireless network topology are discussed. Strategy and approach to transmission network planning, design and deployment are explored. The book offers practical guidelines and advice derived from the author's own experience on projects worldwide. You gain a solid grounding in third generation wireless networks with increased capacity requirements, while learning all about packet data architecture, and how it will impact future transmission network design and deployment. Annotation "Covering the vast majority of current and emerging home networking technologies, standards, and trends, this practical resource offers a comprehensive understanding of this developing area. Home Networking Technologies and Standards presents an "end-to-end reference architecture," in which the main residential services are identified and their network requirements are fully analyzed. Professionals find detailed coverage of both wireless and wireline technologies, including IEEE 802.11, Firewire, USB, HiperLAN, Bluetooth, IrDA, DECT, X10, and HomePNA, along with higher-layer technologies like OSGi, UPnP, HAVI, and VHN. The book explains how the technologies work, how they have evolved, what their capabilities are, and what markets they target. It also discusses xDSL, cable, fiber, fixed-wireless, and satellite access network alternatives." "Moreover, this forward-looking reference presents the scope, potential applications, operational concept, architecture, and protocol stack of higher-layer technologies that aim to provide convergence between multiple in-home and access networks. The book introduces the concept of the residential gateway (RG) as a single point of network convergence, and explores important considerations for future digital-smart networked homes."--BOOK JACKET. Title Summary field provided by Blackwell North America, Inc. All Rights Reserved. This practical book provides an extremely

comprehensive, up-to-date, and easy-to-understand treatment of the entire GSM network and the signaling methods of its terrestrial interfaces. You learn how to analyze network problems, what measurements you have to take to solve them, and where in a scenario you will find the desired information or parameter. The book introduces you to all the interfaces between the GSM subsystems, starting with the Abis- and Air- Interface and continuing on to VLR's, HLR's and MSC's within the Network Switching Subsystem (NSS). You learn about the various signaling standards or methods used in GSM, including TCAP and MAP and how to apply this knowledge when working with GSM networks. Based on cutting-edge research projects in the field, this comprehensive 4-volume book series provides the latest details and covers the most impactful aspects of mobile, wireless, and broadband communications development. These books present key systems and enabling technologies in a clear and accessible manner, offering you a detailed roadmap the future evolution of next generation communications. Drawing upon the insights of leading experts in the field, each of the four volumes is dedicated to an area of critical importance, including Radio Interfaces; Networks, Services and Applications; Reconfigurability; and Ad Hoc Networks. An introduction to theories and applications in wireless broadband networks As wireless broadband networks evolve into future generation wireless networks, it's important for students, researchers, and professionals to have a solid understanding of their underlying theories and practical applications. Divided into two parts, the book presents: Enabling Technologies for Wireless Broadband Networks—orthogonal frequency-division multiplexing and other block-based transmissions; multi-input/multi-output antenna systems; ultra-wideband; medium access control; mobility resource management; routing protocols for multi-hop wireless broadband networks; radio resource management for wireless broadband networks; and quality of service for multimedia services Systems for Wireless Broadband Networks—long-term evolution cellular networks; wireless broadband networking with WiMax; wireless local area networks; wireless personal area networks; and convergence of networks Each chapter begins with an introduction and ends with a summary, appendix, and a list of resources for readers who would like to explore the subjects in greater depth. The book is an ideal resource for researchers in electrical engineering and computer science and an excellent textbook for electrical engineering and computer science courses at the advanced undergraduate and graduate levels. Accompanying DVD-ROM contains further details on critical topics related to the research discussed in the book. To take advantage of explosive developments in the generation, storage, transmittal, and processing of information requires a knowledge of the complex infrastructure behind the new systems. This book offers that knowledge with a comparative look at the new high-speed communications technologies. Includes many practical applications. The sixth generation of wireless communication (6G), succeeding 5G cellular technology, opens up several possibilities in terms of technology and its

offered services. 6G is expected to allow usage of available higher frequency spectrums to cater to increased capacity, throughput, and low latency ( To make this book a fundamental resource, we have invited world-renowned experts in 6G from the industry and academia to pen down their ideas on different aspects of 6G research. The chapters in this book cover a broader scope and various related and unrelated verticals. Specifically, this book covers the following topics: 6G use cases, requirements, and enabling technologies new spectrums and their challenges for 6G privacy preservation in 6G networks aerial infrastructure for 6G networks economic challenges associated with 6G wireless networks. The encompassing intent of this book is to explore the evolution from current 5G networks towards the future 6G networks from a service, air interface, and network perspective, thereby laying out a vision for 6G networks. The convergence of legacy telecommunications towards the Internet and Internet technologies is an ongoing process, resulting in converged Telecom and Internet worlds. Based on current and developing industry practice, this book focuses on the Internet technologies, in particular, on Internet principles, protocols, and services for fixed and mobile networks, including technologies, regulation, and business aspects. Explore the present and future trends of WLANs and WPANs with this new, forwarding looking resource. You discover the path that these infrastructures are following from a perspective of synergies with 3G systems, and how they will pave the way for future 4G systems. The book presents a thorough overview of 3G networks and standards, and discusses interworking and handover mechanisms between WLANs and UMTS. You learn what performance can be expected from WLANs and WPANs when they support the TCP/IP stack. Several critical issues are examined in depth, including IP routing and mobility, , PHY and MAC layers for the main WLAN specifications, the TCP-UDP/IP protocol stack, and performance of TCP/IP over IEEE 802.11b. Based on cutting-edge research projects in the field, this book (part of a comprehensive 4-volume series) provides the latest details and covers the most impactful aspects of mobile, wireless, and broadband communications development. These books present key systems and enabling technologies in a clear and accessible manner, offering you a detailed roadmap the future evolution of next generation communications. Other volumes cover Radio Interfaces; Networks, Services and Applications; and Ad Hoc Networks. Whether you are an executive or sales manager in a networking company, a data communications engineer, or a telecommunications professional, you must have a thorough working knowledge of the ever growing and interrelated array of telecom and data communications technologies. From protocols and operation of the Internet (IP, TCP, HTTP, ...) and its access systems such as ADSL, and GSM... to the basics of transmission and switching, this newly revised resource delivers an up-to-date introduction to a broad range of networking technologies, clearly explaining the networking essentials you need to know to be a successful networking professional. Moreover, the book explores the future developments in optical, wireless and

digital broadcast communications. Based on cutting-edge research projects in the field, this comprehensive 4-volume book series provides the latest details and covers the most impactful aspects of mobile, wireless, and broadband communications development. These books present key systems and enabling technologies in a clear and accessible manner, offering you a detailed roadmap the future evolution of next generation communications. Drawing upon the insights of leading experts in the field, each of the four volumes is dedicated to an area of critical importance, including Radio Interfaces; Networks, Services and Applications; Reconfigurability; and Ad Hoc Networks. Here are the comprehensive details on cutting edge technologies employing neural networks for speech recognition and speech processing in modern communications. Going far beyond the simple speech recognition technologies on the market today, this new book, written by and for speech and signal processing engineers in industry, R&D, and academia, takes you to the forefront of the hottest emergent neural net-based speech processing techniques. This comprehensive new resource presents the latest developments in key Software-Defined Network (SDN) technologies including SDN controllers, network control and management applications, southbound protocols, and northbound interfaces. NFV technologies are reviewed, including network function virtualization infrastructure, virtualized network functions, virtual network management and orchestration. Professionals

find comprehensive discussions on the relationship between SDN and NFV and how they may integrate into unified future network architecture. Virtualization network services including, cloud, carrier Ethernet services, and IP VPN services are also covered.

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