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From cloud computing to data analytics, society stores vast supplies of information through wireless networks and mobile computing. As organizations are becoming increasingly more wireless, ensuring the security and seamless function of electronic gadgets while creating a strong network is imperative. Advanced Methodologies and Technologies in Network Architecture, Mobile Computing, and Data Analytics highlights the challenges associated with creating a strong network architecture in a perpetually online society. Readers will learn various methods in building a seamless mobile computing option and the most effective means of analyzing big data. This book is an important resource for information technology professionals, software developers, data analysts, graduate-level students, researchers, computer engineers, and IT specialists seeking modern information on emerging methods in data mining, information technology, and wireless networks.

A guide to the current technologies related to the delivery process for both live and on-demand services within IPTV delivery networks IPTV Delivery Networks is an important resource that offers an in-depth discussion to the IPTV (Internet Protocol Television) delivery networks for both live and on demand IPTV services. This

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important book also includes a review of the issues and challenges surrounding the delivery of IPTV over various emerging networking and communications technologies. The authors — an international team of experts — introduce a framework for delivery network applicable for live and video-on-demand services. They review the fundamental issues of IPTV delivery networks and explore the QoS (Quality of Service) issue for IPTV delivery networks that highlights the questions of security and anomaly detection as related to quality. IPTV Delivery Networks also contains a discussion of the mobility issues and next-generation delivery networks. This guide captures the latest available and usable technologies in the field and: Explores the technologies related to delivery process for both live (real time) and on demand services in highly accessible terms Includes information on the history, current state and future of IPTV delivery Reviews all the aspects of delivery networks including storage management, resource allocation, broadcasting, video compression, QoS and QoE Contains information on current applications including Netflix (video on demand), BBC iPlayer (time-shifted IPTV) and live (real time) streaming Written for both researchers and industrial experts in the field of IPTV delivery networks. IPTV Delivery Networks is a groundbreaking book that includes the most current information available on live and on demand IPTV services.

Defines the notion of an activity model learned from sensor data and presents key algorithms that form the core of the field Activity Learning: Discovering,

Recognizing and Predicting Human Behavior from Sensor Data provides an in-depth look at computational approaches to activity learning from sensor data. Each chapter is constructed to provide practical, step-by-step information on how to analyze and process sensor data. The book discusses techniques for activity learning that include the following: Discovering activity patterns that emerge from behavior-based sensor data Recognizing occurrences of predefined or discovered activities in real time Predicting the occurrences of activities The techniques covered can be applied to numerous fields, including security, telecommunications, healthcare, smart grids, and home automation. An online companion site enables readers to experiment with the techniques described in the book, and to adapt or enhance the techniques for their own use. With an emphasis on computational approaches, *Activity Learning: Discovering, Recognizing, and Predicting Human Behavior from Sensor Data* provides graduate students and researchers with an algorithmic perspective to activity learning.

Big Data: Principles and Paradigms captures the state-of-the-art research on the architectural aspects, technologies, and applications of Big Data. The book identifies potential future directions and technologies that facilitate insight into numerous scientific, business, and consumer applications. To help realize Big Data's full potential, the book addresses numerous challenges, offering the conceptual and technological solutions for tackling them. These challenges include life-cycle data management, large-scale storage, flexible processing

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infrastructure, data modeling, scalable machine learning, data analysis algorithms, sampling techniques, and privacy and ethical issues. Covers computational platforms supporting Big Data applications Addresses key principles underlying Big Data computing Examines key developments supporting next generation Big Data platforms Explores the challenges in Big Data computing and ways to overcome them Contains expert contributors from both academia and industry

This book introduces the reader to the fundamentals of contemporary, emerging and future technologies and services in Internet computing. It covers essential concepts such as distributed systems architectures and web technologies, contemporary paradigms such as cloud computing and the Internet of things, and emerging technologies like distributed ledger technologies and fog computing. The book also highlights the interconnection and recombination of these Internet-based technologies, which together form a critical information infrastructure with major impacts on individuals, organizations, governments, economies, and society as a whole. Intended as a textbook for upper undergraduate and graduate classes, it features a wealth of examples, learning goals and summaries for every chapter, numerous recommendations for further reading, and questions for checking students' comprehension. A dedicated author website offers additional teaching material and more elaborate examples. Accordingly, the book enables students and young professionals in IT-related fields to familiarize themselves with the Internet's basic mechanisms, and with the most

promising Internet-based technologies of our time. Addresses innovations in technology relating to the energy efficiency of a wide variety of contemporary computer systems and networks With concerns about global energy consumption at an all-time high, improving computer networks energy efficiency is becoming an increasingly important topic. Large-Scale Distributed Systems and Energy Efficiency: A Holistic View addresses innovations in technology relating to the energy efficiency of a wide variety of contemporary computer systems and networks. After an introductory overview of the energy demands of current Information and Communications Technology (ICT), individual chapters offer in-depth analyses of such topics as cloud computing, green networking (both wired and wireless), mobile computing, power modeling, the rise of green data centers and high-performance computing, resource allocation, and energy efficiency in peer-to-peer (P2P) computing networks. Discusses measurement and modeling of the energy consumption method Includes methods for energy consumption reduction in diverse computing environments Features a variety of case studies and examples of energy reduction and assessment Timely and important, Large-Scale Distributed Systems and Energy Efficiency is an invaluable resource for ways of increasing the energy efficiency of computing systems and networks while simultaneously reducing the carbon footprint. For the past couple of years, network automation techniques that include software-defined networking (SDN) and dynamic resource allocation schemes have

been the subject of a significant research and development effort. Likewise, network functions virtualization (NFV) and the foreseeable usage of a set of artificial intelligence techniques to facilitate the processing of customers' requirements and the subsequent design, delivery, and operation of the corresponding services are very likely to dramatically distort the conception and the management of networking infrastructures. Some of these techniques are being specified within standards developing organizations while others remain perceived as a "buzz" without any concrete deployment plans disclosed by service providers. An in-depth understanding and analysis of these approaches should be conducted to help internet players in making appropriate design choices that would meet their requirements as well as their customers. This is an important area of research as these new developments and approaches will inevitably reshape the internet and the future of technology. Design Innovation and Network Architecture for the Future Internet sheds light on the foreseeable yet dramatic evolution of internet design principles and offers a comprehensive overview on the recent advances in networking techniques that are likely to shape the future internet. The chapters provide a rigorous in-depth analysis of the promises, pitfalls, and other challenges raised by these initiatives, while avoiding any speculation on their expected outcomes and technical benefits. This book covers essential topics such as content delivery networks, network functions virtualization, security, cloud computing, automation, and more. This book will be

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useful for network engineers, software designers, computer networking professionals, practitioners, researchers, academicians, and students looking for a comprehensive research book on the latest advancements in internet design principles and networking techniques.

Written in a tutorial style, this comprehensive guide follows a structured approach explaining cloud techniques, models and platforms. Popular cloud services such as Amazon, Google and Microsoft Azure are explained in the text. The security risks and challenges of cloud computing are discussed in detail with useful examples. Emerging trends including mobile cloud computing and internet of things are discussed in the book for the benefit of the readers. Numerous review questions, multiple choice exercises and case studies facilitate enhanced understanding. This textbook is ideal for undergraduate and graduate students of computer science engineering, and information technology.

Networking for Big Data supplies an unprecedented look at cutting-edge research on the networking and communication aspects of Big Data. Starting with a comprehensive introduction to Big Data and its networking issues, it offers deep technical coverage of both theory and applications. The book is divided into four sections: introduction to Big Data, networking theory and design for Big Data, networking security for Big Data, and platforms and systems for Big Data applications. Focusing on key networking issues in Big Data, the book explains network design and implementation for Big Data. It examines how network

topology impacts data collection and explores Big Data storage and resource management. Addresses the virtual machine placement problem Describes widespread network and information security technologies for Big Data Explores network configuration and flow scheduling for Big Data applications Presents a systematic set of techniques that optimize throughput and improve bandwidth for efficient Big Data transfer on the Internet Tackles the trade-off problem between energy efficiency and service resiliency The book covers distributed Big Data storage and retrieval as well as security, trust, and privacy protection for Big Data collection, storage, and search. It discusses the use of cloud infrastructures and highlights its benefits to overcome the identified issues and to provide new approaches for managing huge volumes of heterogeneous data. The text concludes by proposing an innovative user data profile-aware policy-based network management framework that can help you exploit and differentiate user data profiles to achieve better power efficiency and optimized resource management. "Content Delivery Networks" enables the readers to understand the basics, to identify the underlying technology, to summarize their knowledge on concepts, ideas, principles and various paradigms which span on broad CDNs areas. Therefore, aspects of CDNs in terms of basics, design process, practice, techniques, performances, platforms, applications, and experimental results have been presented in a proper order. Fundamental methods, initiatives, significant research results, as well as references for further study have also

been provided. Comparison of different design and development approaches are described at the appropriate places so that new researchers as well as advanced practitioners can use the CDNs evaluation as a research roadmap. All the contributions have been reviewed, edited, processed, and placed in the appropriate order to maintain consistency so that any reader irrespective of their level of knowledge and technological skills in CDNs would get the most out of it. The book is organized into three parts, namely, Part I: CDN Fundamentals; Part II: CDN Modeling and Performance; and Part III: Advanced CDN Platforms and Applications. The organization ensures the smooth flow of material as successive chapters build on prior ones. Operators are introducing mobile television and digital video content services globally. The Handbook of Mobile Broadcasting addresses all aspects of these services, providing a comprehensive reference on DVB-H, DMB, ISDB-T, and MediaFLO. Featuring contributions from experts in the field, the text presents technical standards and distribution proto

Programming multi-core and many-core computing systems Sabri Pillana, Linnaeus University, Sweden Fatos Xhafa, Technical University of Catalonia, Spain Provides state-of-the-art methods for programming multi-core and many-core systems The book comprises a selection of twenty two chapters covering: fundamental techniques and algorithms; programming approaches; methodologies and frameworks; scheduling and management; testing and evaluation methodologies; and case studies for programming multi-core and many-core

systems. Program development for multi-core processors, especially for heterogeneous multi-core processors, is significantly more complex than for single-core processors. However, programmers have been traditionally trained for the development of sequential programs, and only a small percentage of them have experience with parallel programming. In the past, only a relatively small group of programmers interested in High Performance Computing (HPC) was concerned with the parallel programming issues, but the situation has changed dramatically with the appearance of multi-core processors on commonly used computing systems. It is expected that with the pervasiveness of multi-core processors, parallel programming will become mainstream. The pervasiveness of multi-core processors affects a large spectrum of systems, from embedded and general-purpose, to high-end computing systems. This book assists programmers in mastering the efficient programming of multi-core systems, which is of paramount importance for the software-intensive industry towards a more effective product-development cycle. Key features: Lessons, challenges, and roadmaps ahead. Contains real world examples and case studies. Helps programmers in mastering the efficient programming of multi-core and many-core systems. The book serves as a reference for a larger audience of practitioners, young researchers and graduate level students. A basic level of programming knowledge is required to use this book.

In the ever-evolving telecommunication industry, technological improvements alone are not able to keep

up with the significant growth of mobile broadband traffic. As such, new research on communications networks is necessary to keep up with rising demand. Convergence of Broadband, Broadcast, and Cellular Network Technologies addresses the problems of broadband, broadcast, and cellular coexistence, including the increasing number of advanced mobile users and their bandwidth demands. This book will serve as a link between academia and industry, serving students, researchers, and industry professionals.

Wireless video communications encompass a broad range of issues and opportunities that serve as the catalyst for technical innovations. To disseminate the most recent advances in this challenging yet exciting field, *Advanced Video Communications over Wireless Networks* provides an in-depth look at the fundamentals, recent technical achievements, challenges, and emerging trends in mobile and wireless video communications. The editors have carefully selected a panel of researchers with expertise in diverse aspects of wireless video communication to cover a wide spectrum of topics, including the underlying theoretical fundamentals associated with wireless video communications, the transmission schemes tailored to mobile and wireless networks, quality metrics, the architectures of practical systems, as well as some novel directions. They address future directions, including Quality-of-Experience in wireless video communications, video communications over future networks, and 3D video communications. The book presents a collection of tutorials, surveys, and original contributions, providing an

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up-to-date, accessible reference for further development of research and applications in mobile and wireless video communication systems. The range of coverage and depth of expertise make this book the go-to resource for facing current and future challenges in this field.

While other books on the market provide limited coverage of advanced CDNs and streaming technologies, concentrating solely on the fundamentals, this book provides an up-to-date comprehensive coverage of the state-of-the-art advancements in CDNs, with a special focus on Cloud-based CDNs. The book includes CDN and media streaming basics, performance models, practical applications, and business analysis. It features industry case studies, CDN applications, and open research issues to aid practitioners and researchers, and a market analysis to provide a reference point for commercial entities. The book covers Adaptive Bitrate Streaming (ABR), Content Delivery Cloud (CDC), Web Acceleration, Front End Optimization (FEO), Transparent Caching, Next Generation CDNs, CDN Business Intelligence and more." Provides an in-depth look at Cloud-based CDNs " Includes CDN and streaming media basics and tutorials " Aimed to instruct systems architects, practitioners, product developers, and researchers " Material is divided into introductory subjects, advanced content, and specialist areas.

Answering the need for an accessible overview of the field, this text/reference presents a manageable introduction to both the theoretical and practical aspects of computer networks and network programming. Clearly structured and easy to follow, the book describes cutting-

edge developments in network architectures, communication protocols, and programming techniques and models, supported by code examples for hands-on practice with creating network-based applications.

Features: presents detailed coverage of network architectures; gently introduces the reader to the basic ideas underpinning computer networking, before gradually building up to more advanced concepts; provides numerous step-by-step descriptions of practical examples; examines a range of network programming techniques; reviews network-based data storage and multimedia transfer; includes an extensive set of practical code examples, together with detailed comments and explanations.

A comprehensive guide to Fog and Edge applications, architectures, and technologies Recent years have seen the explosive growth of the Internet of Things (IoT): the internet-connected network of devices that includes everything from personal electronics and home appliances to automobiles and industrial machinery. Responding to the ever-increasing bandwidth demands of the IoT, Fog and Edge computing concepts have developed to collect, analyze, and process data more efficiently than traditional cloud architecture. Fog and Edge Computing: Principles and Paradigms provides a comprehensive overview of the state-of-the-art applications and architectures driving this dynamic field of computing while highlighting potential research directions and emerging technologies. Exploring topics such as developing scalable architectures, moving from closed systems to open systems, and ethical issues

rising from data sensing, this timely book addresses both the challenges and opportunities that Fog and Edge computing presents. Contributions from leading IoT experts discuss federating Edge resources, middleware design issues, data management and predictive analysis, smart transportation and surveillance applications, and more. A coordinated and integrated presentation of topics helps readers gain thorough knowledge of the foundations, applications, and issues that are central to Fog and Edge computing. This valuable resource:

- Provides insights on transitioning from current Cloud-centric and 4G/5G wireless environments to Fog Computing
- Examines methods to optimize virtualized, pooled, and shared resources
- Identifies potential technical challenges and offers suggestions for possible solutions
- Discusses major components of Fog and Edge computing architectures such as middleware, interaction protocols, and autonomic management
- Includes access to a website portal for advanced online resources

Fog and Edge Computing: Principles and Paradigms is an essential source of up-to-date information for systems architects, developers, researchers, and advanced undergraduate and graduate students in fields of computer science and engineering.

In recent years, our world has experienced a profound shift and progression in available computing and knowledge sharing innovations. These emerging advancements have developed at a rapid pace, disseminating into and affecting numerous aspects of contemporary society. This has created a pivotal need

for an innovative compendium encompassing the latest trends, concepts, and issues surrounding this relevant discipline area. During the past 15 years, the Encyclopedia of Information Science and Technology has become recognized as one of the landmark sources of the latest knowledge and discoveries in this discipline. The Encyclopedia of Information Science and Technology, Fourth Edition is a 10-volume set which includes 705 original and previously unpublished research articles covering a full range of perspectives, applications, and techniques contributed by thousands of experts and researchers from around the globe. This authoritative encyclopedia is an all-encompassing, well-established reference source that is ideally designed to disseminate the most forward-thinking and diverse research findings. With critical perspectives on the impact of information science management and new technologies in modern settings, including but not limited to computer science, education, healthcare, government, engineering, business, and natural and physical sciences, it is a pivotal and relevant source of knowledge that will benefit every professional within the field of information science and technology and is an invaluable addition to every academic and corporate library. The transportation of multimedia over the network requires timely and errorless transmission much more strictly than other data. This had led to special protocols and to special treatment in multimedia applications (telephony, IP-TV, streaming) to overcome network issues. This book begins with an overview of the vast market combined with the user's expectations. The base

mechanisms of the audio/video coding (H.26x etc.) are explained to understand characteristics of the generated network traffic. Further chapters treat common specialized underlying IP network functions which cope with multimedia data in conjunction with special time adaption measures. Based on those standard functions these chapters can treat uniformly SIP, H.248, High-End IP-TV, Webcast, Signage etc. A special section is devoted to home networks which challenge high-end service delivery due to possibly unreliable management. The whole book treats concepts described in accessible IP-based standards and which are implemented broadly. The book is aimed at graduate students/practitioners with good basic knowledge in computer networking. It provides the reader with all concepts of currently used IP technologies of how to deliver multimedia efficiently to the end user.

Multimedia over IP and Wireless Networks is an indispensable guide for professionals or researchers working in areas such as networking, communications, data compression, multimedia processing, streaming architectures, and computer graphics. Beginning with a concise overview of the fundamental principles and challenges of multimedia communication and networking, this book then branches off organically to tackle compression and networking next before moving on to systems, wireless multimedia and more advanced topics. The Compression section advises on the best means and methodology to ensure multimedia signal (images, text, audio and data) integrity for transmissions on wireless and wired systems. The Networking section

addresses channel protection and performance. In the Systems section, the focus is on streaming media on demand, live broadcast and video and voice's role in real-time communication. Wireless multimedia transmission and Quality of Service issues are discussed in the Wireless Multimedia section. An Advanced Topics section concludes the book with an assortment of topics including Peer-to-Peer multimedia communication and multipath networks. Up-to-date coverage of existing standards for multimedia networking Synergistic tutorial approach reinforces knowledge gained in previous chapters Balanced treatment of audio and video with coverage of end-to-end systems

This book constitutes the refereed proceedings of the 6th International Conference on Internet and Distributed Computing Systems, IDCS 2013, held in Hangzhou, China, in October 2013. The 20 revised full papers and 13 invited papers presented were carefully reviewed and selected from numerous submissions. The papers cover the following topics: ad-hoc and sensor networks, internet and Web technologies, network operations and management, information infrastructure; resilience, as well as fault tolerance and availability.

Developing Advanced Web Services through P2P Computing and Autonomous Agents: Trends and Innovations establishes an understanding of autonomous peer-to-peer Web Service models and developments as well as extends growing literature on emerging technologies. This scholarly publication is an important reference for researchers and academics working in the fields of peer-to-peer computing, Web and grid services,

Access PDF Advanced Content Delivery Streaming And Cloud Services Wiley Series On Parallel And Distributed Computing and agent technologies.

It's time to get your head in the cloud! In today's business environment, more and more people are requesting cloud-based solutions to help solve their business challenges. So how can you not only anticipate your clients' needs but also keep ahead of the curve to ensure their goals stay on track? With the help of this accessible book, you'll get a clear sense of cloud computing and understand how to communicate the benefits, drawbacks, and options to your clients so they can make the best choices for their unique needs. Plus, case studies give you the opportunity to relate real-life examples of how the latest technologies are giving organizations worldwide the opportunity to thrive as supply chain solutions in the cloud. Demonstrates how improvements in forecasting, collaboration, and inventory optimization can lead to cost savings Explores why cloud computing is becoming increasingly important Takes a close look at the types of cloud computing Makes sense of demand-driven forecasting using Amazon's cloud Whether you work in management, business, or IT, this is the dog-eared reference you'll want to keep close by as you continue making sense of the cloud.

Radio-frequency (RF) integrated circuits in CMOS technology are gaining increasing popularity in the commercial world, and CMOS technology has become the dominant technology for applications such as GPS receivers, GSM cellular transceivers, wireless LAN, and wireless short-range personal area networks based on IEEE 802.15.1 (Bluetooth) or IEEE 802.15.4 (ZigBee) standards. Furthermore, the increasing interest in

wireless technologies and the widespread of wireless communications has prompted an ever increasing demand for radio frequency transceivers. *Wireless Radio-Frequency Standards and System Design: Advanced Techniques* provides perspectives on radio-frequency circuit and systems design, covering recent topics and developments in the RF area. Exploring topics such as LNA linearization, behavioral modeling and co-simulation of analog and mixed-signal complex blocks for RF applications, integrated passive devices for RF-ICs and baseband design techniques and wireless standards, this is a comprehensive reference for students as well as practicing professionals.

Modern optimization approaches have attracted an increasing number of scientists, decision makers, and researchers. As new issues in this field emerge, different optimization methodologies must be developed and implemented. *The Handbook of Research on Emergent Applications of Optimization Algorithms* is an authoritative reference source for the latest scholarly research on modern optimization techniques for solving complex problems of global optimization and their applications in economics and engineering. Featuring coverage on a broad range of topics and perspectives such as hybrid systems, non-cooperative games, and cryptography, this publication is ideally designed for students, researchers, and engineers interested in emerging developments in optimization algorithms.

Examines the design and use of Intrusion Detection Systems (IDS) to secure Supervisory Control and Data Acquisition (SCADA) systems Cyber-attacks on SCADA systems—the control system architecture that uses computers, networked data communications, and graphical user interfaces for high-

level process supervisory management—can lead to costly financial consequences or even result in loss of life.

Minimizing potential risks and responding to malicious actions requires innovative approaches for monitoring SCADA systems and protecting them from targeted attacks. SCADA Security: Machine Learning Concepts for Intrusion Detection and Prevention is designed to help security and networking professionals develop and deploy accurate and effective Intrusion Detection Systems (IDS) for SCADA systems that leverage autonomous machine learning. Providing expert insights, practical advice, and up-to-date coverage of developments in SCADA security, this authoritative guide presents a new approach for efficient unsupervised IDS driven by SCADA-specific data. Organized into eight in-depth chapters, the text first discusses how traditional IT attacks can also be possible against SCADA, and describes essential SCADA concepts, systems, architectures, and main components. Following chapters introduce various SCADA security frameworks and approaches, including evaluating security with virtualization-based SCADAVT, using SDAD to extract proximity-based detection, finding a global and efficient anomaly threshold with GATUD, and more. This important book: Provides diverse perspectives on establishing an efficient IDS approach that can be implemented in SCADA systems Describes the relationship between main components and three generations of SCADA systems Explains the classification of a SCADA IDS based on its architecture and implementation Surveys the current literature in the field and suggests possible directions for future research SCADA Security: Machine Learning Concepts for Intrusion Detection and Prevention is a must-read for all SCADA security and networking researchers, engineers, system architects, developers, managers, lecturers, and other SCADA security industry practitioners.

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"This book delivers state-of-the-art research on current and future Internet-based content delivery networking topics, bringing to the forefront novel problems that demand investigation"--

"This book spans a number of interdependent and emerging topics in streaming media, offering a comprehensive collection of topics including media coding, wireless/mobile video, P2P media streaming, and applications of streaming media"--Provided by publisher.

"Provides market analysis as a valuable reference point for commercial entities interested in investing in the CDN business"--

Reviews the new High Efficiency Video Coding (HEVC) standard and advancements in adaptive streaming technologies for use in broadband networks and the Internet This book describes next-generation video coding and streaming technologies with a comparative assessment of the strengths and weaknesses. Specific emphasis is placed on the H.265/HEVC video coding standard and adaptive bit rate video streaming. In addition to evaluating the impact of different types of video content and powerful feature sets on HEVC coding efficiency, the text provides an in-depth study on the practical performance of popular adaptive streaming platforms and useful tips for streaming optimization. Readers will learn of new over-the-top (OTT) online TV advancements, the direction of the broadband telecommunications industry, and the latest developments that will help keep implementation costs down and maximize return on infrastructure investment. Reviews the emerging High Efficiency Video Coding (HEVC) standard and compares its coding performance with the MPEG-4 Advanced Video Coding (AVC) and MPEG-2 standards Provides invaluable insights into the intra and inter coding efficiencies of HEVC, such as the impact of hierarchical block partitioning and new

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prediction modes Evaluates the performance of the Apple and Microsoft adaptive streaming platforms and presents innovative techniques related to aggregate stream bandwidth prediction, duplicate chunk Includes end-of-chapter homework problems and access to instructor slides Next-Generation Video Coding and Streaming is written for students, researchers, and industry professionals working in the field of video communications. Benny Bing has worked in academia for over 20 years. He has published over 80 research papers and 12 books, and has 6 video patents licensed to industry. He has served as a technical editor for several IEEE journals and an IEEE Communications Society Distinguished lecturer. He also received the National Association of Broadcasters (NAB) Technology Innovation Award for demonstrations of advanced media technologies. Advanced Content Delivery, Streaming, and Cloud Services John Wiley & Sons

Advances in Computers, Volume 123 presents innovations in computer hardware, software, theory, design and applications, with this updated volume including new chapters on Downlink Resource Allocations of Satellite-Airborne-Terrestrial Networks Integration, Evaluating Software Testing Techniques: A Systematic Mapping Study, The Screening Phase in Systematic Reviews: Can we speed up the process?, A Survey on Cloud-Based Video Streaming Services, and User Behavior-Ensemble Learning based Improving QoE Fairness in HTTP Adaptive Streaming over SDN approach. Contains novel subject matter that is relevant to computer science Includes the expertise of contributing authors Presents an easy to comprehend writing style The definitive guide to developing robust content delivery networks This book examines the real-world engineering challenges of developing robust content delivery networks (CDNs) and provides the tools required to overcome those

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challenges and to ensure high-quality content delivery that fully satisfies operators' and consumers' commercial objectives. It is informed by the author's two decades of experience building and delivering large, mission-critical live video, webcasts, and radio streaming, online and over private IP networks. Following an overview of the field, the book cuts to the chase with in-depth discussions—laced with good-natured humor—of a wide range of design considerations for different network topologies. It begins with a description of the author's own requirement filtration processes. From there it moves on to initial sketches, through considerations of stakeholder roles and responsibilities, to the complex challenges of managing change in established teams. Agile versus waterfall considerations within large blue chip companies, security, commercial models, and value chain alignment are explored in detail. Featured throughout the book are numerous "what if" scenarios that help provide a clear picture of the wide spectrum of practical contexts for which readers may be tasked with building and implementing a CDN. In addition, the book:

- Discusses delivery of live, catch-up, scheduled on-demand, TVOD and SVOD
- Offers insights into the decisions that can be made when architecting a content distribution system over IP-based networks
- Covers CDN topologies, including Edge-Caching, Streaming-Splitting, Pure-Play, Operator, Satellite, and Hybrid
- Examines computer hosting and orchestration for dedicated appliances and virtualization
- Includes real-world cases covering everything from IETF, regulatory considerations, and policy formation, to coding, hardware vendors, and network operators
- Considers the future of CDN technologies and the market forces driving its evolution

Written by a back-room engineer for back-room engineers, Content Delivery Networks gets readers up to speed on the real-world challenges they can face as well as tried-and-true strategies for addressing

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those challenges in order to ensure the delivery of the high-quality content delivery networks that clients demand and users expect.

While other books on the market provide limited coverage of advanced CDNs and streaming technologies, concentrating solely on the fundamentals, this book provides an up-to-date comprehensive coverage of the state-of-the-art advancements in CDNs, with a special focus on Cloud-based CDNs. The book includes CDN and media streaming basics, performance models, practical applications, and business analysis. It features industry case studies, CDN applications, and open research issues to aid practitioners and researchers, and a market analysis to provide a reference point for commercial entities. The book covers Adaptive Bitrate Streaming (ABR), Content Delivery Cloud (CDC), Web Acceleration, Front End Optimization (FEO), Transparent Caching, Next Generation CDNs, CDN Business Intelligence and more. Provides an in-depth look at Cloud-based CDNs Includes CDN and streaming media basics and tutorials Aimed to instruct systems architects, practitioners, product developers, and researchers Material is divided into introductory subjects, advanced content, and specialist areas The concept of content delivery has become increasingly more important due to rapidly growing demands for efficient distribution and fast access of information from the Internet. The content can be diverse and broad-ranging, and the desire to facilitate ubiquitous information access demands varied network architectures and hardware devices. The need to deliver quality information – given the nature of the content, network connections and client devices – introduces various challenges for content delivery technologies. Web Content Delivery offers the most comprehensive coverage of state-of-the-art research, providing insightful and thought-provoking possibilities for the future of web applications. Written by

leading international researchers, the book focuses on web content delivery, dynamic web content, streaming media delivery and ubiquitous web access. Web Content Delivery is an essential reference for both academic researchers and industrial practitioners.

The Internet of Things (IoT) should be able to react with minimal human intervention and contribute to the Artificial Intelligence (AI) era requiring real-time and scalable operation under heterogeneous network infrastructures. This thesis investigates how cooperation and allocation of resources can contribute to the evolution of future wireless networks supporting the IoT. First, we examine how to allocate resources to IoT services which run on devices equipped with multiple network interfaces. The resources are heterogeneous and not interchangeable, and their allocation to a service can be split among different interfaces. We formulate an optimization model for this allocation problem, prove its complexity, and derive two heuristic algorithms to approximate the solution in large instances of the problem. The concept of virtualization is promising towards addressing the heterogeneity of IoT resources by providing an abstraction layer between software and hardware. Network function virtualization (NFV) decouples traditional network operations such as routing from proprietary hardware platforms and implements them as software entities known as virtualized network functions (VNFs). In the second paper, we study how VNF demands can be allocated to Virtual Machines (VMs) by considering the completion-time tolerance of the VNFs. We prove that the problem is NP-complete and devise a subgradient optimization algorithm to provide near-optimal solutions. Our numerical results demonstrate the effectiveness of our algorithm compared to two benchmark algorithms. Furthermore, we explore the potential of using intermediate nodes, the so-called relays, in IoT networks. In

the third paper, we study a multi-user random-access network with a relay node assisting users in transmitting their packets to a destination node. We provide analytical expressions for the performance of the relay's queue and the system throughput. We optimize the relay's operation parameters to maximize the network-wide throughput while maintaining the relay's queue stability. A stable queue at relay guarantees finite delay for the packets. Furthermore, we study the effect of the wireless links' signal-to-interference-plus-noise ratio (SINR) threshold and the self-interference (SI) cancellation on the per-user and network-wide throughput. Additionally, caching at the network edge has recently emerged as an encouraging solution to offload cellular traffic and improve several performance metrics of the network such as throughput, delay and energy efficiency. In the fourth paper, we study a wireless network that serves two types of traffic: cacheable and non-cacheable traffic. In the considered system, a wireless user with cache storage requests cacheable content from a data center connected with a wireless base station. The user can be assisted by a pair of wireless helpers that exchange non-cacheable content as well. We devise the system throughput and the delay experienced by the user and provide numerical results that demonstrate how they are affected by the non-cacheable packet arrivals, the availability of caching helpers, the parameters of the caches, and the request rate of the user. Finally, in the last paper, we consider a time-slotted wireless system that serves both cacheable and non-cacheable traffic with the assistance of a relay node. The latter has storage capabilities to serve both types of traffic. We investigate how allocating the storage capacity to cacheable and non-cacheable traffic affects the system throughput. Our numerical results provide useful insights into the system throughput e.g., that it is not necessarily beneficial to increase

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the storage capacity for the non-cacheable traffic to realize better throughput at the non-cacheable destination node.

* Learn the end-to-end process, starting with capture from a video or audio source through to the consumer's media player

* A quick-start guide to streaming media technologies * How

to monetize content and protect revenue with digital rights management For broadcasters, web developers, project managers implementing streaming media systems, David Austerberry shows how to deploy the technology on your site, from video and audio capture through to the consumer's media player. The book first deals with Internet basics and gives a thorough coverage of telecommunications networks and the last mile to the home. Video and audio formats are covered, as well as compression standards including Windows Media and MPEG-4. The book then guides you through the streaming process, showing in-depth how to encode audio and video. The deployment of media servers, live webcasting and how the stream is displayed by the consumer's media player are also covered. A final section on associated technologies illustrates how you can protect your revenue sources with digital rights management, looks at content delivery networks and provides examples of successful streaming applications. The supporting website, www.davidausterberry.com/streaming.html, offers updated links to sources of information, manufacturers and suppliers. David Austerberry is co-owner of the new media communications consultancy, Informed Sauce. He has worked with streaming media since the late nineties. Before that, he has been product manager for a number of broadcast equipment manufacturers, and formerly had many years with a leading broadcaster.

It is our pleasure to present the papers accepted and presented at the 5th International School and Symposium on Advanced Distributed Systems (ISSADS) in this LNCS

volume. The symposium was held in the city of Guadalajara, Mexico from January 24 to 28, 2005. The organization team was composed of members of CINVESTAV Guadalajara, Rostock University in Germany, the CUCEI and CUCEA campuses of Guadalajara University, and Instituto Tecnol ? ogico y de Estudios Superiores de Occidente, ITESO. The symposium is already a well-established annual meeting, at which scientists and people from the industrial ? eld meet and discuss the progress of applications and the theory of distributed systems in a forum during the last week of January. This year, more than 250 people from 3 continents attended the conference. Most of them are scientists, teachers, students and engineers from the local industry. The papers presented in the sessions of the symposium cover not only the subjects of distributed systems from the system level and applications, but also contributions from the area of theory and arti? cial intelligence concepts. These papers were selected out of more than 100 submissions. There was a selection ? lter in which each paper was evaluated by at least three members of the - ternational Program Committee, who came from research institutions of good reputation all over the world.

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