

Precision Time Protocol Ptp Ieee 1588 Endrun

Time-Triggered Communication helps readers build an understanding of the conceptual foundation, operation, and application of time-triggered communication, which is widely used for embedded systems in a diverse range of industries. This book assembles contributions from experts that examine the differences and commonalities of the most significant protocols including: TTP, FlexRay, TTEthernet, SAFEbus, TTCAN, and LIN. Covering the spectrum, from low-cost time-triggered fieldbus networks to ultra-reliable time-triggered networks used for safety-critical applications, the authors illustrate the inherent benefits of time-triggered communication in terms of predictability, complexity management, fault-tolerance, and analytical dependability modeling, which are key aspects of safety-critical systems. Examples covered include FlexRay in cars, TTP in railway and avionic systems, and TTEthernet in aerospace applications. Illustrating key concepts based on real-world industrial applications, this book: Details the underlying concepts and principles of time-triggered communication Explores the properties of a time-triggered communication system, contrasting its strengths and weaknesses Focuses on the core algorithms applied in many systems, including those used for clock synchronization, startup, membership, and fault isolation Describes the protocols that incorporate presented algorithms Covers tooling requirements and solutions for system integration, including scheduling The information in this book is extremely useful to industry leaders who design and manufacture products with distributed embedded systems based on time-triggered communication. It also benefits suppliers of embedded components or development tools used in this area. As an educational tool, this material can be used to teach students and working professionals in areas including embedded systems, computer networks, system architectures, dependability, real-time systems, and automotive, avionics, and industrial control systems.

All aspects of communications and networking research

Mithilfe des Precision-Time-Protokolls (PTP), das im Standard IEEE 1588 spezifiziert ist, ist es möglich, Uhren über Ethernet auf ein paar Nanosekunden genau zu synchronisieren. Die Nanosekunden-Genauigkeit des Protokolls kann allerdings nur mit einer Hardware/Software-Mischlösung erreicht werden. Die Hardware für die Mischlösung wird auf einer Netzwerkkarte implementiert. Dabei handelt es sich um eine Netzwerkkarte deren Kernstück ein FPGA darstellt. Im FPGA befindet sich der für eine Netzwerkkarte übliche MAC und zusätzliche IEEE-1588-Hardware. Ein Teil der IEEE-1588-Hardware ist der Timestamper, dessen Aufgabe es ist, PTP-Pakete zu erkennen und dabei einen Zeitstempel zu erzeugen. Ziel dieser Arbeit ist es, einen neuen Timestamper zu entwickeln, der weniger Chipfläche benötigt und im Gbit-Ethernet verwendet werden kann. Der alte Timestamper basiert auf festverdrahteter Logik, ist dadurch nur mühsam erweiterbar und kann nur im 10/100-Mbit-Ethernet verwendet werden. Diese Arbeit beschäftigt sich mit der Hypothese, dass die Chipflächen-Reduktion und die Takt-Erhöhung dadurch erreicht werden kann, dass man bei der Entwicklung des neuen Timestampers von einer speicherbasierten-Mikroprogramm-Architektur ausgeht. *****With the Precision Time Protocol (PTP), defined in the IEEE 1588 standard, it is possible to synchronize clocks over ethernet, with an accuracy in the range of nano seconds. To achieve this high accuracy it is necessary to implement parts of the protocol in hardware and keep the rest in software. The hardware for this solution is implemented on a network interface card. The main component of this network interface card is an FPGA. The FPGA consists of the usual network interface card hardware, like the MAC, and additional IEEE 1588 hardware. One component of this IEEE 1588 hardware is the timestamper. The task of the timestamper is to detect PTP packets and create timestamps when one is detected. The goal of this thesis is to design a new timestamper with reduced chip area and an increased clock rate, so it can be used in GBit Ethernet. The old timestamper was based on hard-wired logic and because of that it was tedious to make enhancements to it. Furthermore the old timestamper could only be used in 10/100 Mbit Ethernet. This thesis is based on the hypothesis that, if the new design is based on a memory based microprogram architecture, it is possible to reduce the chip area and increase the clock rate to GBit Ethernet levels.

Welcometothe11thInternationalConferenceonTelecommunications(ICT2004)ho- ed by the city of Fortaleza (Brazil). As with other ICT events in the past, this professional meeting continues to be highly competitive and very well perceived by the international networking community, - tracting excellent contributions and active participation. This year, a total of 430 papers from 36 countries were submitted, from which 188 were accepted. Each paper was - viewed by several members of the ICT2004 Technical Program Committee. We were very pleased to receive a large percentage of top-quality contributions. Thetopicsofsubmittedpaperscoveredawidespectrumfromphotonict echniques,signal processing,cellularnetworks,andwirelessnetworks,toad hocnetworks.We believethe ICT2004papersofferawiderangeofsolutionstokeyproblemsintelecommunications, and describe challenging avenues for industrial research and development. In addition to the conference regular sessions, seven tutorials and a workshop were organized.Thetutorialsfocusedonspecialtopicsdealingwithnext-generationnetworks. The workshop focused on particular problems and solutions in heavily distributed and shareable environments. We would like to thank the ICT 2004 Technical Program Committee members and referees. Without their support, the creation of such a broad conference program would not be possible. We also thank all the authors who made a particular effort to contribute to ICT2004. We truly believe that due to all these efforts the ?nal conference program consisted of top-quality contributions. We are also indebted to many individuals and organizations that made this conference possible. In particular, we would like to thank the members of the ICT2004 Organizing Committee for their help in all aspects of the organization of this professional meeting.

The Handbook includes chapters on all the major industry standards, quick reference tables, helpful appendices, plus a new glossary and list of acronyms. This practical handbook can stand alone or as a companion volume to DeCusatis: Fiber Optic Data Communication: Technological Advances and Trends (February 2002, ISBN: 0-12-207892-6), which was developed in tandem with this book. * Includes emerging technologies such as Infiniband, 10 Gigabit Ethernet, and MPLS Optical Switching * Describes leading edge commercial products, including LEAF and MetroCore fibers, dense wavelength multiplexing, and Small Form Factor transceiver packages * Covers all major industry standards, often written by the same people who designed the standards themselves * Includes an expanded listing of references on the World Wide Web, plus hard-to-find references for international, homologation, and type approval requirements * Convenient tables of key optical datacom parameters and glossary with hundreds of definitions and acronyms * Industry buzzwords explained, including SAN, NAS, and MAN networking * Datacom market analysis and future projections from industry leading forecasters

Thoroughly revised and expanded, this second edition adds sections on MPLS, Security, IPv6, and IP Mobility and presents solutions to the most common configuration problems.

This comprehensive new resource presents applications of MEF's (Metro Ethernet Forum) Carrier Ethernet architecture and provides insight into building end-to-end systems with third network services like MPLS-TP, VPLS, and PBT. This book includes new use cases and explores the new MEF/CEN specifications, services, and applications. While providing a look into lifecycle service orchestration (LSO), virtualization, and cloud series, this book highlights the pros and cons of these technologies for service providers and enterprise network owners.

Pseudowires architectures, control planes, mutisegment architecture, and multise gment pseudowire setup mechanisms are explained. Ethernet protection is explored, including Automatic Protection Switching (APS) entities, linear protection, ring protection, and link aggregations. This book covers Carrier Ethernet Traffic Management, Carrier Ethernet Operation Administration Management and Performance (OAMP), Circuit Emulation Services (CES), and Carrier Ethernet Local Management Interface (E-LIM). Full chapters on Provider Bridges (PB), Provider Backbone Bridges (PBB), Provider Backbone Transport (PBT), and information modeling are also included in this invaluable resource.

This book addresses the multiple technical aspects of the distribution of synchronization in new generation telecommunication networks, focusing in particular on synchronous Ethernet and IEEE 1588 technologies. Many packet network engineers struggle with understanding the challenges that precise synchronization distribution can impose on networks. The usual “why”, “when” and particularly “how” can cause problems for many engineers. In parallel to this, some other markets have identical synchronization requirements, but with their own design requirements, generating further questions. This book attempts to respond to the different questions by providing background technical information. Invaluable information on state-of-the-art packet network synchronization and timing architectures is provided, as well as an unbiased view on the synchronization technologies that have been internationally standardized over recent years, with the aim of providing the average reader (who is not skilled in the art) with a better understanding of this topic. The book focuses specifically on synchronous Ethernet and IEEE 1588 PTP-based technologies, both key developments in the world of synchronization over the last 10 years. The authors address the needs of engineers and technical managers who are struggling with the subject of synchronization and provide an engineering reference for those that need to consider synchronization in NGN. The market applications that are driving the development of packet network synchronization and timing architectures are also discussed. This book provides a wide audience with everything they need to know when researching, implementing, buying and deploying packet synchronization architectures in telecommunication networks. Contents 1. Network Evolutions, Applications and Their Synchronization Requirements. 2. Synchronization Technologies. 3. Synchronization Network Architectures in Packet Networks. 4. Synchronization Design and Deployments. 5. Management and Monitoring of Synchronization Networks. 6. Security Aspects Impacting Synchronization. 7. Test and Measurement Aspects of Packet Synchronization Networks. Appendix 1. Standards in Telecom Packet Networks Using Synchronous Ethernet and/or IEEE 1588. Appendix 2. Jitter Estimation by Statistical Study (JESS) Metric Definition. About the Authors Jean-Loup Ferrant worked for Alcatel and Alcatel-Lucent until he retired in 2009, then he continued being Rapporteur of ITU-TSG15Q13 sponsored by Calnex Solutions. Mike Gilson is a Technical Specialist for BT on timing and synchronization based at Aadastral Park, Martlesham Heath, UK. He represents BT on several standards bodies. Sébastien Jobert is an R&D expert on synchronization, QoS and performance of telecom networks at France Télécom Orange Labs, Lannion, France. Michael Mayer is an active contributor to ITU-T standards and a consultant in timing and synchronization. Laurent Montini is a Technical Leader, based in France, and working in the Corporate Consulting Team within the Research and Advanced Development organization at Cisco. Michel Ouellette is V.P. of Engineering at Iometrix in San Francisco, California, USA, specializing in conformance testing of packet network technologies such as Carrier Ethernet 2.0, MPLS, IEEE 1588, SyncE. Silvana Rodrigues is Director of System Engineering at IDT in Ottawa, Canada. She represents IDT on several synchronization standards committees. Stefano Ruffini is the synchronization expert representing Ericsson on various standardization bodies. He works in Pisa, Italy in the Research & Innovation Team within the IP & Broadband Development Unit at Ericsson.

Learn how automotive Ethernet is revolutionizing in-car networking from the experts at the core of its development. Providing an in-depth account of automotive Ethernet, from its background and development, to its future prospects, this book is ideal for industry professionals and academics alike.

This three volume book contains the Proceedings of 5th International Conference on Advanced Computing, Networking and Informatics (ICACNI 2017). The book focuses on the recent advancement of the broad areas of advanced computing, networking and informatics. It also includes novel approaches devised by researchers from across the globe. This book brings together academic scientists, professors, research scholars and students to share and disseminate information on knowledge and scientific research works related to computing, networking, and informatics to discuss the practical challenges encountered and the solutions adopted. The book also promotes translation of basic research into applied investigation and convert applied investigation into practice.

ICCES will provide an outstanding international forum for sharing knowledge and results in all fields of Engineering and Technology ICCES provides quality key experts who provide an opportunity in bringing up innovative ideas Recent updates in the in the field of technology will be a platform for the upcoming researchers The conference will be Complete, Concise, Clear and Cohesive in terms of research related to Communication and Electronics systems

Technical Systems-of-Systems (SoS) - in the form of networked, independent constituent computing systems temporarily collaborating to achieve a well-defined objective - form the backbone of most of today's infrastructure. The energy grid, most transportation systems, the global banking industry, the water-supply system, the military equipment, many embedded systems, and a great number more, strongly depend on systems-of-systems. The correct operation and continuous availability of these underlying systems-of-systems are fundamental for the functioning of our modern society. The 8 papers presented in this book document the main insights on Cyber-Physical System of Systems (CPSoSs) that were gained during the work in the FP7-610535 European Research Project AMADEOS (acronym for Architecture for Multi-criticality Agile Dependable Evolutionary Open System-of-Systems). It is the objective of this book to present, in a single consistent body, the foundational concepts and their relationships. These form a conceptual basis for the description and understanding of SoSs and go deeper in what we consider the characterizing and distinguishing elements of SoSs: time, emergence, evolution and dynamicity. This work was published by Saint Philip Street Press pursuant to a Creative Commons license permitting commercial use. All rights not granted by the work's license are retained by the author or authors.

This book provides a comprehensive understanding of the technology architecture, physical facility changes and – most importantly – the new media management workflows and business processes to support the entire lifecycle of the IP broadcast facility from an engineering and workflow perspective. Fully updated, this second edition covers the technological evolutions and changes in the media broadcast industry, including the new standards and specifications for live IP production, the SMPTE ST2110 suite of standards, the necessity of protecting against cyber threats and the expansion of cloud services in opening new possibilities. It provides users with the necessary information for planning, organizing, producing and distributing media for the modern broadcast facility. Key features of this text include: Strategies to implement a cost-effective live and file-based production and distribution system. A cohesive, big-picture viewpoint that helps you identify how to overcome the challenges of upgrading your plant. The impact live production is having on the evolution to IP. Case studies serve as recommendations and examples of use. New considerations in engineering and maintenance of IP and file-based systems. Those in the fields of TV, cable, IT engineering and broadcast engineering will find this book an invaluable resource, as will students learning how to set up modern broadcast facilities and the workflows of contemporary broadcasting.

This book illuminates how synchrophasors achieve the monitoring, protection and control optimizations necessary to expand existing power systems to support increasing amounts of renewable and distributed energy resources. The authors describe synchrophasor techniques that can provide operators with better resolution in capturing dynamic behavior of the power grid. The resulting insights support improved real-time decision making in the face of more generation and load uncertainty, as well as interruptions caused by random acts of nature and malicious attacks. Armed with the information in this cutting-edge resource, grid planners and operators can make optimized, flexible, resilient power systems a reality.

At the Network's Edge will help you understand the evolution of the network interface card and obtain a broader view of the server networking subsystem. This book will instill in you a deeper appreciation for the rich and diverse capabilities offered by the data communications protocol stack manifested by the NIC at the edge of the network. You will get an in-depth insight into the components of the host networking ecosystem that includes the operating system networking stack, the PCI Express host interface, and the local area network.

Provides a definitive resource for those who want to support computer peripherals under the Linux operating system, explaining how to write a driver for a broad spectrum of devices, including character devices, network interfaces, and block devices. Original. (Intermediate).

This edited volume focuses on the intersection of time and globalization, as manifested across a variety of economic, political, cultural, and environmental contexts. Since David Harvey's influential characterization of globalization as "time-space compression", ample research has looked at the spatial aspect of the phenomenon, yet few have focused on globalization's temporal aspects. Meanwhile, other publications have analysed problems of speed, acceleration, and the commodification of time, but while it often serves as the implicit or explicit backdrop for these studies of time, globalization is not investigated as a problem or a question in its own right. In response, this volume develops these conversations to consider how time shapes globalization, and how globalization affects our experience of time. The interplay between varying aspects of the human experiences of time and globalization requires the type of interdisciplinary approach that this volume takes. The contributors advance an understanding of global time(s) as an arena of contestation, with social, political, ecological, and cultural implications for human and other lives. In considering the diverse valences of time and globalization, they illuminate problems as well as possibilities. Topics covered include emerging infectious diseases, temporal sovereignty, worker exploitation and resistance, chronobiology, energy politics, activism and hope, and literary and cinematic representations of counter-temporalities, offering a rich and varied account of global times. This volume will be of great interest to students and researchers from a range of disciplines, including anthropology, cultural studies, globalization, international relations, literary studies, political science, social theory, and sociology.

The two-volume set LNCS 9206 and LNCS 9207 constitutes the refereed proceedings of the 27th International Conference on Computer Aided Verification, CAV 2015, held in San Francisco, CA, USA, in July 2015. The total of 58 full and 11 short papers presented in the proceedings was carefully reviewed and selected from 252 submissions. The papers were organized in topical sections named: model checking and refinements; quantitative reasoning; software analysis; lightning talks; interpolation, IC3/PDR, and Invariants; SMT techniques and applications; HW verification; synthesis; termination; and concurrency.

Implementing IP and Ethernet on the 4G Mobile Network delves into the 4G mobile network that allows an IP packet transmitted by a mobile to be transported to its gateway, reciprocally using the following networks: MPLS-VPN, VPLS and OTN. The mechanisms for the implementation of quality of service (QoS) on the EPS, IP, Ethernet and MPLS networks are presented, as is the security for the LTE radio interface, the NAS messages and the links of the transport (IPSec). In addition, readers will find discussions of the aspects relating to the synchronization of the eNB entities, including SyncE and IEEE 1588 mechanisms.

Presents the functional architectures of the 4G mobile network, MPLS-VPN, VPLS and OTN Provides mapping of the marks of 4G mobile network (QCI, ARP), IP (DSCP), Ethernet (PCP) and MPLS (EXP) Includes security in 4G mobile network and IP (IPSec) Covers radio base station synchronization with SyncE

A detailed formulation of neural networks from the information-theoretic viewpoint. The authors show how this perspective provides new insights into the design theory of neural networks. In particular they demonstrate how these methods may be applied to the topics of supervised and unsupervised learning, including feature extraction, linear and non-linear independent component analysis, and Boltzmann machines. Readers are assumed to have a basic understanding of neural networks, but all the relevant concepts from information theory are carefully introduced and explained. Consequently, readers from varied scientific disciplines, notably cognitive scientists, engineers, physicists, statisticians, and computer scientists, will find this an extremely valuable introduction to this topic.

Learn about the latest developments in automotive Ethernet technology and implementation with this fully revised second edition. Including approximately twenty-five percent new material and greater technical detail, coverage is expanded to include: · Detailed explanations of how the 100BASE-T1 PHY and 1000 BASE-T1 PHY technologies actually work · A step-by-step description of how the 1000BASE-T1 channel was derived · A summary of the content and uses of the new TSN standards · A framework for security in Automotive Ethernet · Discussion of the interrelation between power supply and automotive Ethernet communication Industry pioneers share the technical and non-technical decisions that have led to the success of automotive Ethernet, covering everything from electromagnetic requirements and physical layer technologies, Quality of Service, the use of VLANs, IP and Service Discovery, and network architecture and testing. This is a guide for engineers, technical managers and researchers designing components for in-car electronics, and those interested in the strategy of introducing a new technology.

We are witnessing a paradigm shift in networking where the end user demands and cloud computing based service paradigms are influencing evolving network architectures, system designs, and service delivery models, around the concept of network function virtualization (NFV) and software defined networking (SDN) Over the Top (OTT) players, consumer electronic vendors, IT providers, and third party software developers have entered the service Delivery value chain fostering an open environment which is challenging the hegemony of traditional network operators IT & telecom, hitherto distinct domains, are now spoken of as ICT (Information and Communications Technologies) symbolizing the close inter working of these disciplines in the emerging service delivery architectures The topics cover various areas of interests in wireline networks, wireless networks and network applications Facilitates both the understanding and adoption of 802.1aq as a networking solution 802.1aq Shortest Path Bridging (SPB) is a technology that greatly simplifies the creation and configuration of carrier, enterprise, and cloud computing networks—by using modern computing power to deprecate signaling, and to integrate multicast, multipath routing, and large-scale virtualization. It is arguably one of the most significant enhancements in Ethernet's history. 802.1aq Shortest Path Bridging Design and Evolution

explains both the "what" and the "why" of the technology standard being set today. It covers which decisions were elective and which were dictated by the design goals by using a multipart approach that first explains what SPB is, before transitioning into narrative form to describe the design processes and decisions behind it. To make SPB accessible to the data networking professional from multiple perspectives, the book: Provides a "Reader's Companion" to the standard Dissects the different elements of SPB Offers applications and potential futures for the technology 802.1aq Shortest Path Bridging Design and Evolution will appeal to system implementers, system and network architects, academics, IT professionals, and general networking professionals.

Like the popular guides *The MX Series* and *Juniper QFX5100 Series*, this practical book—written by the same author—introduces new QFX10000 concepts in switching and virtualization, specifically in the core of the data center network. The rise of cloud computing with service providers and the need to create private clouds for enterprise, government agencies, and research institutions of all shapes and sizes is creating a high demand for high-density 40GbE and 100GbE in the core of the data center network. The Juniper QFX10000 Series was introduced by Juniper Networks to solve these challenges, and it is a game-changer. This new book by Douglas Hanks is the authoritative guide. Topics include: Device Architecture Flexible Deployment Scenarios Performance and Scaling Disaggregation of Software and Hardware Data Center API Next Generation QFabric Network-Based Overlay Fabric Network Analytics

1. Purpose of Protective Relays and Relaying. Causes of Faults. Definitions. Functions of Protective Relays. Application to a Power System.- 2. Relay Design and Construction. Characteristics. Choice of Measuring Units. Construction of Measuring Units. Construction of Timing Units. Details of Design. Cases. Panel Mounting. Operation Indicators. Finishes.- 3. The Main Characteristics of Protective Relays. Phase and Amplitude Comparators. Relay Characteristics. General Equation for Characteristics. Inversion Chart. Resonance. Appendix.- 4. Overcurrent Protection. Time-Current Characteristics. App.

Abstract: A common profile for the use of Precision Time Protocol (PTP) of IEEE Std 1588-2008 in power system protection, control, automation, and data communication applications utilizing an Ethernet communications architecture is specified.

Keywords: grandmaster clock, IEEE 1588, power substation, precise time synchronization, Precision Time Protocol (PTP), sample synchronization, slave-only clock, synchrophasors, transparent clock.

Bachelor Thesis from the year 2007 in the subject Computer Science - Technical Computer Science, grade: 1,0, University of Applied Sciences Technikum Vienna (Informations- und Kommunikationssysteme), 29 entries in the bibliography, language: English, abstract: Clock synchronization is a necessary and critical part in most distributed systems. For many years NTP was the state-of-the-art way of synchronizing computer clocks distributed in space. However, as recent advances in miniaturization lead to the construction of smaller, more powerful and less power consuming computers, embedded devices, sensors and actuators, the need for more precise time synchronization grew. This work thus sets out to compare selected approaches to clock synchronization in distributed systems. The well known Global Positioning System is disseminating accurate time and frequency information from the International Institutes that keep the time, NTP can still do the same, but at different levels of accuracy as well as cost. Clock synchronization protocols like IEEE1588 or TTP and bus architectures like FlexRay evolved from the need to further propagate the timing information within small networks and therefore staying within the specified limits of preciseness.

This monograph discusses lock synchronization for providing a standard reference time to various devices across a distributed network. It focuses on Network Time Distribution and describes applications in the context of IEEE 1588 PTP standard applied to telecommunication networks.

IEC 61850-Based Smart Substations: Principles, Testing, Operation and Maintenance systematically presents principles, testing approaches, and the operation and maintenance technologies of such substations from the perspective of real-world application. The book consists of chapters that cover a review of IEC 61850 based smart substations, substation configuration technology, principles and testing technologies for the smart substation, process bus, substation level, time setting and synchronization, and cybersecurity. It gives detailed information on testing processes and approaches, operation and maintenance technologies, and insights gained through practical experience. As IEC 61850 based smart substations have played a significant role in smart grids, realizing information sharing and device interoperation, this book provides a timely resource on the topics at hand. Contributes to the overall understanding of standard IEC 61850, analyzing principles and features Introduces best practices derived from hundreds of smart substation engineering applications Summarizes current research and insights gained from practical experience in the testing, operation and maintenance of smart substation projects in China Gives systematic and detailed information on testing technology Introduces novel technologies for next-generation substations

This book presents selected articles from India Smart Grid Week (ISGW 2018), held on March 5 to 9, 2018, at the Manekshaw Centre, New Delhi, India. It was the fourth conference and exhibition on smart grids and smart cities organized by the India Smart Grid Forum (ISGF), a Government of India public-private partnership, tasked with accelerating smart grid deployment across the country. Providing current-scenario-based updates on the Indian power sector, the book also highlights various disruptive technologies.

A common sense of time among the elements of a distributed measurement and control system allows the use of new techniques in solving problems with complex synchronization requirements or arising from the interaction of many sensors and actuators. Such a common sense of time may be accomplished using the standard IEEE 1588-2002 to synchronize real-time clocks integral to each component of the system. IEEE 1588, expands the performance capabilities of Ethernet networks so that they become relevant for measurement and control; this monograph embodies the first unified treatment of the associated technology, standards and applications. Readers will gain understanding of the technological context of IEEE 1588 and its role in a variety of application settings. To engineers this monograph provides detailed discussion of the complex features of the standard. Together with the essential material on best practice and implementation issues, these provide invaluable assistance in the design of new applications.

As the cellular world and the Internet converge, mobile networks are transitioning from circuit to packet and the Internet Protocol (IP) is now recognized as the fundamental building block for all next-generation communication networks. The

all-IP vision provides the flexibility to deliver cost-effective services and applications that meet the evolving needs of mobile users. RF engineers, mobile network designers, and system architects will be expected to have an understanding of IP fundamentals and how their role in delivering the end-to-end system is crucial for delivering the all-IP vision that makes the Internet accessible anytime, anywhere. IP Design for Mobile Networks discusses proper IP design theory to effectively plan and implement your next-generation mobile network so that IP integrates all aspects of the network. The book outlines, from both a standards and a design theory perspective, both the current and target state of mobile networks, and the technology enablers that will assist the migration. This IP transition begins with function-specific migrations of specific network domains and ends with an end-to-end IP network for radio, transport, and service delivery. The book introduces many concepts to give you exposure to the key technology trends and decision points affecting today's mobile operators. The book is divided into three parts: Part I provides an overview of how IP is being integrated into mobile systems, including radio systems and cellular networks. Part II provides an overview of IP, the technologies used for transport and connectivity of today's cellular networks, and how the mobile core is evolving to encompass IP technologies. Part III provides an overview of the end-to-end services network based on IP, including context awareness and services. Presents an overview of what mobile networks look like today—including protocols used, transport technologies, and how IP is being used for specific functions in mobile networks Provides an all-inclusive reference manual for IP design theory as related to the broader application of IP for mobile networks Imparts a view of upcoming trends in mobility standards to better prepare a network evolution plan for IP-based mobile networks This book is part of the Networking Technology Series from Cisco Press®, which offers networking professionals valuable information for constructing efficient networks, understanding new technologies, and building successful careers. ciscopress.com This book constitutes revised selected papers from the thoroughly refereed proceedings of the Second International Human Centered Computing Conference, HCC 2016, that consolidated and further develops the successful ICPCA/SWS conferences on Pervasive Computing and the Networked World, and which was held in Colombo, Sri Lanka, in January 2016. The 58 full papers and 30 short papers presented in this volume together with one keynote talk were carefully reviewed and selected from 211 submissions. These proceedings present research papers investigating into a variety of aspects towards human centric intelligent societies. They cover the categories: infrastructure and devices; service and solution; data and knowledge; and community.

Computer Network Time SynchronizationThe Network Time ProtocolCRC Press

What started with the sundial has, thus far, been refined to a level of precision based on atomic resonance: Time. Our obsession with time is evident in this continued scaling down to nanosecond resolution and beyond. But this obsession is not without warrant. Precision and time synchronization are critical in many applications, such as air traffic

[Copyright: 19f831ab347372a0c2a03eb87140d246](https://doi.org/10.1002/9781119831ab347372a0c2a03eb87140d246)