

Epc And 4g Packet Networks Second Edition Driving The Le Broadband Revolution 2nd Edition By Olsson Magnus Mulligan Catherine 2012 Hardcover

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LTE Signaling - Ralf Kreher

2010-12-21

A comprehensive reference on the call procedures of 4G RAN and Core networks, LTE Signaling, Troubleshooting and Optimization describes the protocols and procedures of LTE. It explains essential topics from basic performance measurement counters, radio quality and user plane quality to the standards, architecture, objectives and functions of the

different interfaces. The first section gives an overview of LTE/EPC network architecture, reference points, protocol stacks, information elements and elementary procedures. The proceeding parts target more advanced topics to cover LTE/EPC signalling and radio quality analysis. This book supplements the information provided in the 3GPP standards by giving readers access to a universal LTE/EPC protocol

sequence to ensure they have a clear understanding of the issues involved. It describes the normal signaling procedures as well as explaining how to identify and troubleshoot abnormal network behavior and common failure causes. Enables the reader to understand the signaling procedures and parameters that need to be analyzed when monitoring UMTS networks. Covers the essential facts on signaling procedures by providing first hand information taken from real LTE/EPC traces. A useful reference on the topic, also providing sufficient details for test and measurement experts who need to analyze

LTE/EPC signaling procedures and measurements at the most detailed level. Contains a description of LTE air interface monitoring scenarios as well as other key topics up to an advanced level. LTE Signaling, Troubleshooting and Optimization is the Long Term Evolution successor to the previous Wiley books UMTS Signaling and UMTS Performance Measurement. *An Introduction to LTE -* Christopher Cox 2014-05-12. Following on from the successful first edition (March 2012), this book gives a clear explanation of what LTE does and how it works. The content is expressed at a systems level,

offering readers the opportunity to grasp the key factors that make LTE the hot topic amongst vendors and operators across the globe. The book assumes no more than a basic knowledge of mobile telecommunication systems, and the reader is not expected to have any previous knowledge of the complex mathematical operations that underpin LTE. This second edition introduces new material for the current state of the industry, such as the new features of LTE in Releases 11 and 12, notably coordinated multipoint transmission and proximity services; the main short- and long-term solutions for LTE

voice calls, namely circuit switched fallback and the IP multimedia subsystem; and the evolution and current state of the LTE market. It also extends some of the material from the first edition, such as inter-operation with other technologies such as GSM, UMTS, wireless local area networks and cdma2000; additional features of LTE Advanced, notably heterogeneous networks and traffic offloading; data transport in the evolved packet core; coverage and capacity estimation for LTE; and a more rigorous treatment of modulation, demodulation and OFDMA. The author breaks

down the system into logical blocks, by initially introducing the architecture of LTE, explaining the techniques used for radio transmission and reception and the overall operation of the system, and concluding with more specialized topics such as LTE voice calls and the later releases of the specifications. This methodical approach enables readers to move on to tackle the specifications and the more advanced texts with confidence.

Multi-Access Edge Computing in Action - Dario Sabella
2019-09-20

This book provides a complete and strategic overview of Multi-

Access Edge Computing (MEC). It covers network and technology aspects, describes the market scenarios from the different stakeholders' point of view, and analyzes deployment aspects and actions to engage the ecosystem. MEC exists in and supports a highly complex "5G world" in which technologists and non-technology decision makers must act in concert and do so within a large interconnected ecosystem of which MEC is just one, albeit an important, part.

Divided into three sections, with several chapters in each, the book addresses these three key aspects: technology, markets, and ecosystems.

Cloud Mobile Networks -

Mojtaba Vaezi 2017-04-25

This book explores the challenges and opportunities in exploiting cloud technologies for 5G, ranging from radio access network (RAN) to the evolved packet core (EPC). With a specific focus on cloud RAN and EPC, the text carefully explains the influence of recent network technologies such as software defined networking (SDN), virtualization, and cloud technologies in the evolution of architecture for future mobile networks. The book discusses the causes, benefits and challenges of cloud RAN and its interplay with other evolving technologies for future mobile

networks. Researchers and professionals involved in mobile technology or cloud computing will find this book a valuable resource. The text is also suitable for advanced-level students studying all types of networking.

LTE for UMTS - Harri Holma

2011-04-25

Written by experts actively involved in the 3GPP standards and product development, LTE for UMTS, Second Edition gives a complete and up-to-date overview of Long Term Evolution (LTE) in a systematic and clear manner. Building upon on the success of the first edition, LTE for UMTS, Second Edition has been revised to now

contain improved coverage of the Release 8 LTE details, including field performance results, transport network, self optimized networks and also covering the enhancements done in 3GPP Release 9. This new edition also provides an outlook to Release 10, including the overview of Release 10 LTE-Advanced technology components which enable reaching data rates beyond 1 Gbps. Key updates for the second edition of LTE for UMTS are focused on the new topics from Release 9 & 10, and include: LTE-Advanced; Self optimized networks (SON); Transport network dimensioning; Measurement

results.

Networked Life - Mung Chiang
2012-09-10

How does the internet really work? This book explains the technology behind it all, in simple question and answer format.

Fundamentals of LTE -
Arunabha Ghosh 2010-09-09

The Definitive Guide to LTE Technology Long-Term Evolution (LTE) is the next step in the GSM evolutionary path beyond 3G technology, and it is strongly positioned to be the dominant global standard for 4G cellular networks. LTE also represents the first generation of cellular networks to be based on a flat IP architecture and is

designed to seamlessly support a variety of different services, such as broadband data, voice, and multicast video. Its design incorporates many of the key innovations of digital communication, such as MIMO (multiple input multiple output) and OFDMA (orthogonal frequency division multiple access), that mandate new skills to plan, build, and deploy an LTE network. In *Fundamentals of LTE*, four leading experts from academia and industry explain the technical foundations of LTE in a tutorial style—providing a comprehensive overview of the standards. Following the same approach that made their recent

Fundamentals of WiMAX successful, the authors offer a complete framework for understanding and evaluating LTE. Topics include Cellular wireless history and evolution: Technical advances, market drivers, and foundational networking and communications technologies Multicarrier modulation theory and practice: OFDM system design, peak-to-average power ratios, and SC-FDE solutions Frequency Domain Multiple Access: OFDMA downlinks, SC-FDMA uplinks, resource allocation, and LTE-specific implementation Multiple antenna techniques and tradeoffs: spatial diversity, interference cancellation, spatial

multiplexing, and multiuser/networked MIMO LTE standard overview: air interface protocol, channel structure, and physical layers Downlink and uplink transport channel processing: channel encoding, modulation mapping, Hybrid ARQ, multi-antenna processing, and more Physical/MAC layer procedures and scheduling: channel-aware scheduling, closed/open-loop multi-antenna processing, and more Packet flow, radio resource, and mobility management: RLC, PDCP, RRM, and LTE radio access network mobility/handoff procedures

MOBILE COMMERCE -
BANDYOPADHYAY, KARABI

2022-12-19

Once the treasured piece of the elite class, mobile phones have now become a prerequisite of every commoner. From schoolchildren to pensioners, from bureaucrats to fruit vendors, all depend greatly on their mobile phones now. The reason can be given to its impeccable potential to perform various applications efficiently, within no time. This book on Mobile Commerce gives an in-depth insight on the role of a mobile in revolutionizing various industry verticals, specifically business and commerce. The book, in its second edition, shows the evolution of a mobile phone from a mere gadget

meant for communication to a smarter one performing business transactions. The book is divided into seven parts discussing basic concepts, technologies, key players, new products, security and legal aspects, the future trends and the case studies. The book also discusses various technologically advanced handheld devices, like Smart phones, PDA's, Laptops, Tablets and Portable Gaming Consoles, in detail. Besides, the basic technology and concepts involved in application of mobile commerce is discussed comprehensively. The important concepts, like mobile marketing, mobile ticketing, mobile

computing, mobile payments and mobile banking are discussed vis-a-vis latest technologies, like wireless and mobile communication technology, digital cellular technology, mobile access technology including 5G and 6G systems. The book also throws light on the issues, such as mobile security hazards, and the necessary measures to protect against the same. A chapter is devoted to laws governing the mobile phone usage and its privacy. The Case Studies are provided elucidating the role of mobile commerce in the real-life scenarios. This book is intended for the undergraduate and

postgraduate students of
Computer Applications,
Electronics & Communication
Engineering, Information
Technology and Management.
NEW TO THE SECOND
EDITION • Introduction of 5G &
6G Technologies • Introduction
of New Mobile Payment
Technologies • Implementation
of New Security Technologies •
Development of New Mobile
Commerce Services &
Applications • Various
Advanced Mobile Computing
Systems • Implementation of
New IT Rules TARGET
AUDIENCE • BBA/MBA •
BCA/MCA • B.Tech/M.Tech
(Electronics & Communication
Engineering)

5G Core Networks - Stefan
Rommer 2019-11-14
5G Core Networks: Powering
Digitalization provides an
overview of the 5G Core
network architecture, as well as
giving descriptions of cloud
technologies and the key
concepts in the 3GPP rel-15/16
specifications. Written by the
authors who are heavily
involved in development of the
5G standards and who wrote
the successful book on EPC
and 4G Packet Networks, this
book provides an authoritative
reference on the technologies
and standards of the 3GPP 5G
Core network. Content includes:
An overview of the 5G Core
Architecture The Stand-Alone

and Non-Stand-Alone Architectures Detailed presentation of 5G Core key concepts An overview of 5G Radio and Cloud technologies Learn The differences between the 5G Core network and previous core network generations How the interworking with previous network standards is defined Why certain functionality has been included and what is beyond the scope of 5G Core How the specifications relate to state-of-the-art web-scale concepts and virtualization technologies Details of the protocol and service descriptions Examples of network deployment options

Provides a clear, concise and comprehensive view of 5GS/5GC Written by established experts in the 5GS/5GC standardization process, all of whom have extensive experience and understanding of its goals, history and vision Covers potential service and operator scenarios for each architecture Explains the Service Based Architecture, Network Slicing and support of Edge Computing, describing the benefits they will bring Explains what options and parts of the standards will initially be deployed in real networks, along with their migration paths **Public Safety Networks from**

LTE to 5G - Abdulrahman Yarali
2020-02-03

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. 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.

Fundamentals of Network Planning and Optimisation

2G/3G/4G - Ajay R. Mishra
2018-07-27

Updated new edition covering all aspects of network planning and optimization This welcome new edition provides comprehensive coverage of all aspects of network planning in all the technologies, from 2G to 5G, in radio, transmission and core aspects. Written by leading experts in the field, it serves as a handbook for anyone

engaged in the study, design, deployment and business of cellular networks. It increases basic understanding of the currently deployed, and emerging, technologies, and helps to make evolution plans for future networks. The book also provides an overview of the forthcoming technologies that are expected to make an impact in the future, such as 5G. Fundamentals of Cellular Network Planning and Optimization, Second Edition encompasses all the technologies as well as the planning and implementation details that go with them. It covers 2G (GSM, EGPRS), 3G (WCDMA) and 4G (LTE)

networks and introduces 5G. The book also looks at all the sub-systems of the network, focusing on both the practical and theoretical issues. Provides comprehensive coverage of the planning aspects of the full range of today's mobile network systems, covering radio access network, circuit and packet switching, signaling, control, and backhaul/Core transmission networks. New elements in book include HSPA, Ethernet, 4G/LTE and 5G. Covers areas such as Virtualization, IoT, Artificial Intelligence, Spectrum Management and Cloud. By bringing all these concepts under one cover, *Fundamentals of Cellular Network Planning*

and Optimization becomes essential reading for network design engineers working with cellular service vendors or operators, experts/scientists working on end-to-end issues, and undergraduate/post-graduate students.

SAE and the Evolved Packet

Core - Magnus Olsson

2009-08-01

This book provides a clear, concise, complete and authoritative introduction to System Architecture Evolution (SAE) standardization work and its main outcome: the Evolved Packet Core (EPC), including potential services and operational scenarios. After providing an insightful overview

of SAE's historical development, the book gives detailed explanations of the EPC architecture and key concepts as an introduction. In-depth technical descriptions of EPC follow, including thorough functional accounts of the different components of EPC, protocols, network entities and procedures. Case studies of deployment scenarios show how the functions described within EPC are placed within a live network context, while a description of the services that are predicted to be used shows what EPC as a core network can enable. This book is an essential resource for professionals and students who

need to understand the latest developments in SAE and EPC, the 'engine' that connects broadband access to the internet. All of the authors have from their positions with Ericsson been actively involved in GPRS, SAE and 3GPP from a business and technical perspective for many years. Several of the authors have also been actively driving the standardization efforts within 3GPP. "There is no doubt that this book, which appears just when the mobile industry starts its transition away from legacy GSM/GPRS and UMTS networks into the future will become the reference work on SAE/LTE. There are no better

qualified persons than the authors of this book to provide both communication professionals and an interested general public with insights into the inner workings of SAE/LTE. Not only are they associated with one of the largest mobile network equipment vendors in the world, they have all actively contributed to and, in some cases, been the driving forces behind the development of SAE/LTE within 3GPP." - from the foreword by Dr. Ulf Nilsson, TeliaSonera R&D, Mobility Core and Connectivity "The authors have done an excellent job in writing this book. Their familiarity with the requirements, concepts and solution

alternatives, as well as the standardization work allows them to present the material in a way that provides easy communication between Architecture and Standards groups and Planning/Operational groups within service provider organizations." - from the foreword by Dr. Kalyani Bogineni, Principal Architect, Verizon Up-to-date coverage of SAE including the latest standards development Easily accessible overview of the architecture and concepts defined by SAE Thorough description of the Evolved Packet Core for LTE, fixed and other wireless accesses Comprehensive explanation of

SAE key concepts, security and Quality-of-Service Covers potential service and operator scenarios including interworking with existing 3GPP and 3GPP2 systems Detailed walkthrough of network entities, protocols and procedures Written by established experts in the SAE standardization process, all of whom have extensive experience and understanding of its goals, history and vision

From GSM to LTE-Advanced -
Martin Sauter 2014-06-23

This revised edition of Communication Systems from GSM to LTE: An Introduction to Mobile Networks and Mobile Broadband Second Edition (Wiley 2010) contains not only a

technical description of the different wireless systems available today, but also explains the rationale behind the different mechanisms and implementations; not only the ‘how’ but also the ‘why’. In this way, the advantages and also limitations of each technology become apparent. Offering a solid introduction to major global wireless standards and comparisons of the different wireless technologies and their applications, this edition has been updated to provide the latest directions and activities in 3GPP standardization up to Release 12, and importantly includes a new chapter on Voice over LTE (VoLTE). There

are new sections on Building Blocks of a Voice Centric Device, Building Blocks of a Smart Phone, Fast Dormancy, IMS and High-Speed Downlink Packet Access, and Wi-Fi-Protected Setup. Other sections have been considerably updated in places reflecting the current state of the technology.

- Describes the different systems based on the standards, their practical implementation and design assumptions, and the performance and capacity of each system in practice is analyzed and explained • Questions at the end of each chapter and answers on the accompanying website make

this book ideal for self-study or as course material

LTE Advanced - Harri Holma
2012-08-20

From the editors of the highly successful LTE for UMTS: Evolution to LTE-Advanced, this new book examines the maintenance enhancements brought by LTE-Advanced, thoroughly covering 3GPP Release 10 specifications and the main items in Release 11. Using illustrations, graphs and real-life scenarios, the authors systematically lead readers through this cutting-edge topic to provide an outlook on existing technologies as well as possible future developments.

The book is structured to follow the main technical areas that will be enhanced by the LTE-Advanced specifications. The main topics covered include: Carrier Aggregation; Multi-antenna MIMO Transmission, Heterogeneous Networks; Coordinated Multipoint Transmission (CoMP); Relay nodes; 3GPP milestones and IMT-Advanced process in ITU-R; and LTE-Advanced Performance Evaluation. Key features: Leading author and editor team bring their expertise to the next generation of LTE technology. Includes tables, figures and plots illustrating the concepts or simulation results, to

aid understanding of the topic, and enabling readers to be ahead of the technological advances

LTE for 4G Mobile Broadband - Farooq Khan 2009-03-26

Understand the new technologies of the LTE standard and their impact on system performance improvements with this practical guide.

Wi-Fi Integration to the 4G Mobile Network - André Pérez
2018-05-08

The adoption of smartphones has had as a corollary the use of services that require streaming, such as video streaming, which is a constraint for the 4G mobile network. The

integration of the network of Wi-Fi hotspots deployed by the operators adds capacity to the 4G mobile network. The use of Wi-Fi technology in carrier networks is the result of developments coordinated by the IEEE, WFA and WBA standardization bodies. For its part, the 3GPP standardization body has been working to integrate Wi-Fi technology into the 4G mobile network. The first part of this book presents the characteristics of the Wi-Fi radio interface. The different IEEE 802.11b / g / n / ac physical layers characterize the implementation in the 2.4 GHz ISM frequency bands and U-NII at 5 GHz. The MAC layer

defines a number of media access procedures such as scanning, associating, or transferring data. The second part of this book deals with the architecture of the 4G network based on the Wi-Fi interface. This architecture defines several models corresponding, on the one hand, to Wi-Fi access controlled or not, On the other hand, to a handover controlled by the network or by the mobile. The integration of Wi-Fi technology resulted in a redefinition of attachment and session set-up procedures. Smartphones have the ability to activate simultaneously the two radio interfaces, LTE and Wi-Fi, which allows to direct certain

services to one and / or the other of the interfaces. The ANDSF and HotSpot 2.0 functions provide the mobile with rules for network selection and traffic control to determine which traffic is to be routed to what type of interface.

LTE Security - Günther Horn

2011-06-09

Addressing the security solutions for LTE, a cellular technology from Third Generation Partnership Project (3GPP), this book shows how LTE security substantially extends GSM and 3G security. It also encompasses the architectural aspects, known as SAE, to give a comprehensive resource on the topic. Although

the security for SAE/LTE evolved from the security for GSM and 3G, due to different architectural and business requirements of fourth generation systems the SAE/LTE security architecture is substantially different from its predecessors. This book presents in detail the security mechanisms employed to meet these requirements. Whilst the industry standards inform how to implement systems, they do not provide readers with the underlying principles behind security specifications. LTE Security fills this gap by providing first hand information from 3GPP insiders who explain the rationale for design

decisions. Key features:
Provides a concise guide to the 3GPP/LTE Security Standardization specifications
Authors are leading experts who participated in decisively shaping SAE/LTE security in the relevant standardization body, 3GPP Shows how GSM and 3G security was enhanced and extended to meet the requirements of fourth generation systems Gives the rationale behind the standards specifications enabling readers to have a broader understanding of the context of these specifications Explains why LTE security solutions are designed as they are and how theoretical security mechanisms

can be put to practical use
UMTS Networks - Heikki Kaaranen 2005-07-08
Building on the success of the first edition, UMTS Networks second edition allows readers to continue their journey through UMTS up to the latest 3GPP standardization phase, Release 5. Containing revised, updated and brand new material, it provides a comprehensive view on the UMTS network architecture and its latest developments. Accompanied by numerous illustrations, the practical approach of the book benefits from the authors' pioneering research and training in this field. Provides a broad yet detailed overview of the

latest worldwide developments in UMTS technology. Includes brand new sections on the IP Multimedia Subsystem and High Speed Downlink Packet Access according to 3GPP Release 5 specifications. Contains heavily revised sections on the evolution from GSM to UMTS Multi-access, the UMTS Radio Access Network, the UMTS Core Network and services. Includes updated versions on services in the UMTS environment, security in the UMTS environment and UMTS protocols. Illustrates all points with cutting-edge practical examples gleaned from the authors' research and training at the forefront of UMTS. The

illustrative, hands-on approach will appeal to operators, equipment vendors, systems designers, developers and marketing professionals who require comprehensive, practical information on the latest developments in UMTS.

This second edition will also benefit students and researchers in the field of mobile networking.

EPC and 4G Packet Networks -
Magnus Olsson 2018-11-13

Get a comprehensive and detailed insight into the Evolved Packet Core (EPC) with this clear, concise and authoritative guide - a fully updated second edition that covers the latest standards and industry

developments. The latest additions to the Evolved Packet System (EPS) including e.g. Positioning, User Data Management, eMBMS, SRVCC, VoLTE, CSFB. A detailed description of the nuts and bolts of EPC that are required to really get services up and running on a variety of operator networks. An in-depth overview of the EPC architecture and its connections to the wide variety of network accesses, including LTE, LTE-Advanced, WCDMA/HSPA, GSM, WiFi, etc. The most common operator scenarios of EPS and the common issues faced in their design. The reasoning behind many of the design decisions

taken in EPC, in order to understand the full details and background of the all-IP core
NEW CONTENT TO THIS EDITION . 150+ New pages, new illustrations and call flows . Covers 3GPP Release 9, 10 and 11 in addition to release 8 . Expanded coverage on Diameter protocol, interface and messages . Architecture overview . Positioning . User Data Management . eMBMS (LTE Broadcasting) . H(e)NodeB/Femto Cells . LIPA/SIPTO/Breakout architectures . Deployment Scenarios . WiFi interworking . VoLTE/MMTel, CS fallback and SRVCC SAE is the core network that supports LTE, the

next key stage in development of the UMTS network to provide mobile broadband. It aims to provide an efficient, cost-effective solution for the ever-increasing number of mobile broadband subscribers. There is no other book on the market that covers the entire SAE network architecture; this book summarizes the important parts of the standards, but goes beyond mere description and offers real insight and explanation of the technology. Fully updated with the latest developments since the first edition published, and now including additional material and insights on industry trends and views regarding future potential

applications of SAE

LTE and LTE Advanced - André Pérez 2015-12-07

This book presents the technical characteristics of the two radio network interfaces of mobile 4G, LTE and LTE Advanced, based on Release 8, 9 and 10 of the 3GPP specifications. Points covered include a detailed description of various components of the radio interface. RRC signaling messages used to establish the connection, enabling the security, the paging, the establishment and the release of dedicated and default support and the handover. The PDCP ensures the security of the transmission and allows the

recovery during handover and the compression of the headers. The RLC protocol defines the transmission modes with or without acknowledgment. The MAC protocol determines the random access, the data transfer, the timing advance, the scheduling and the discontinuous reception. The physical layer includes a description of the methods of multiplexing (time, frequency and space) and the various signals and physical channels.

EPC and 4G Packet Networks -

Magnus Olsson 2012-10-03

Get a comprehensive and detailed insight into the Evolved Packet Core (EPC) with this clear, concise and authoritative

guide – a fully updated second edition that covers the latest standards and industry developments. The latest additions to the Evolved Packet System (EPS) including e.g. Positioning, User Data Management, eMBMS, SRVCC, VoLTE, CSFB. A detailed description of the nuts and bolts of EPC that are required to really get services up and running on a variety of operator networks. An in-depth overview of the EPC architecture and its connections to the wide variety of network accesses, including LTE, LTE-Advanced, WCDMA/HSPA, GSM, WiFi, etc. The most common operator scenarios of EPS and the

common issues faced in their design. The reasoning behind many of the design decisions taken in EPC, in order to understand the full details and background of the all-IP core

NEW CONTENT TO THIS EDITION

- 150+ New pages, new illustrations and call flows
- Covers 3GPP Release 9, 10 and 11 in addition to release 8
- Expanded coverage on Diameter protocol, interface and messages
- Architecture overview
- Positioning
- User Data Management
- eMBMS (LTE Broadcasting)
- H(e)NodeB/Femto Cells
- LIPA/SIPTO/Breakout architectures
- Deployment Scenarios
- WiFi interworking

VoLTE/MMTel, CS fallback and SRVCC SAE is the core network that supports LTE, the next key stage in development of the UMTS network to provide mobile broadband. It aims to provide an efficient, cost-effective solution for the ever-increasing number of mobile broadband subscribers There is no other book on the market that covers the entire SAE network architecture; this book summarizes the important parts of the standards, but goes beyond mere description and offers real insight and explanation of the technology Fully updated with the latest developments since the first edition published, and now

including additional material and insights on industry trends and views regarding future potential applications of SAE

5G for the Connected World -

Devaki Chandramouli

2019-04-29

Comprehensive Handbook

Demystifies 5G for Technical and Business Professionals in

Mobile Telecommunication

Fields Much is being said

regarding the possibilities and capabilities of the emerging 5G

technology, as the evolution

towards 5G promises to

transform entire industries and many aspects of our society.

5G for the Connected World

offers a comprehensive

technical overview that

telecommunication professionals need to understand and take advantage of these

developments. The book offers a wide-ranging coverage of the

technical aspects of 5G (with special consideration of the

3GPP Release 15 content), how

it enables new services and

how it differs from LTE. This

includes information on potential

use cases, aspects of radio and core networks, spectrum

considerations and the services

primarily driving 5G

development and deployment.

The text also looks at 5G in

relation to the Internet of

Things, machine to machine

communication and technical

enablers such as LTE-M, NB-

IoT and EC-GSM. Additional chapters discuss new business models for telecommunication service providers and vertical industries as a result of introducing 5G and strategies for staying ahead of the curve. Other topics include: Key features of the new 5G radio such as descriptions of new waveforms, massive MIMO and beamforming technologies as well as spectrum considerations for 5G radio regarding all possible bands Drivers, motivations and overview of the new 5G system – especially RAN architecture and technology enablers (e.g. service-based architecture, compute-storage split and

network exposure) for native cloud deployments Mobile edge computing, Non-3GPP access, Fixed-Mobile Convergence Detailed overview of mobility management, session management and Quality of Service frameworks 5G security vision and architecture Ultra-low latency and high reliability use cases and enablers, challenges and requirements (e.g. remote control, industrial automation, public safety and V2X communication) An outline of the requirements and challenges imposed by massive numbers of devices connected to cellular networks While some familiarity with the basics of 3GPP networks is helpful, 5G

for the Connected World is intended for a variety of readers. It will prove a useful guide for telecommunication professionals, standardization experts, network operators, application developers and business analysts (or students working in these fields) as well as infrastructure and device vendors looking to develop and integrate 5G into their products, and to deploy 5G radio and core networks.

Design, Deployment and

Performance of 4G-LTE

Networks - Ayman EINashar

2014-03-13

This book provides an insight into the key practical aspects and best practice of 4G-LTE

network design, performance, and deployment Design, Deployment and Performance of 4G-LTE Networks addresses the key practical aspects and best practice of 4G networks design, performance, and deployment. In addition, the book focuses on the end-to-end aspects of the LTE network architecture and different deployment scenarios of commercial LTE networks. It describes the air interface of LTE focusing on the access stratum protocol layers: PDCP, RLC, MAC, and Physical Layer. The air interface described in this book covers the concepts of LTE frame structure, downlink and uplink scheduling,

and detailed illustrations of the data flow across the protocol layers. It describes the details of the optimization process including performance measurements and troubleshooting mechanisms in addition to demonstrating common issues and case studies based on actual field results. The book provides detailed performance analysis of key features/enhancements such as C-DRX for Smartphones battery saving, CSFB solution to support voice calls with LTE, and MIMO techniques. The book presents analysis of LTE coverage and link budgets alongside a detailed comparative analysis

with HSPA+. Practical link budget examples are provided for data and VoLTE scenarios. Furthermore, the reader is provided with a detailed explanation of capacity dimensioning of the LTE systems. The LTE capacity analysis in this book is presented in a comparative manner with reference to the HSPA+ network to benchmark the LTE network capacity. The book describes the voice options for LTE including VoIP protocol stack, IMS Single Radio Voice Call Continuity (SRVCC). In addition, key VoLTE features are presented: Semi-persistent scheduling (SPS), TTI bundling, Quality of

Service (QoS), VoIP with C-DRX, Robust Header Compression (RoHC), and VoLTE Vcoders and De-Jitter buffer. The book describes several LTE and LTE-A advanced features in the evolution from Release 8 to 10 including SON, eICIC, CA, CoMP, HetNet, Enhanced MIMO, Relays, and LBS. This book can be used as a reference for best practices in LTE networks design and deployment, performance analysis, and evolution strategy. Conveys the theoretical background of 4G-LTE networks Presents key aspects and best practice of 4G-LTE networks design and

deployment Includes a realistic roadmap for evolution of deployed 3G/4G networks Addresses the practical aspects for designing and deploying commercial LTE networks. Analyzes LTE coverage and link budgets, including a detailed comparative analysis with HSPA+. References the best practices in LTE networks design and deployment, performance analysis, and evolution strategy Covers infrastructure-sharing scenarios for CAPEX and OPEX saving. Provides key practical aspects for supporting voice services over LTE, Written for all 4G engineers/designers working in networks design for operators,

network deployment engineers, R&D engineers, telecom consulting firms, measurement/performance tools firms, deployment subcontractors, senior undergraduate students and graduate students interested in understanding the practical aspects of 4G-LTE networks as part of their classes, research, or projects.

LTE and the Evolution to 4G

Wireless - Agilent Technologies

2013-02-15

A practical guide to LTE design, test and measurement, this new edition has been updated to include the latest developments. This book presents the latest details on LTE from a practical

and technical perspective.

Written by Agilent's

measurement experts, it offers

a valuable insight into LTE

technology and its design and

test challenges. Chapters cover

the upper layer signaling and

system architecture evolution

(SAE). Basic concepts such as

MIMO and SC-FDMA, the new

uplink modulation scheme, are

introduced and explained, and

the authors look into the

challenges of verifying the

designs of the receivers,

transmitters and protocols of

LTE systems. The latest

information on RF and signaling

conformance testing is delivered

by authors participating in the

LTE 3GPP standards

committees. This second edition has been considerably revised to reflect the most recent developments of the technologies and standards. Particularly important updates include an increased focus on LTE-Advanced as well as the latest testing specifications. Fully updated to include the latest information on LTE 3GPP standards Chapters on conformance testing have been majorly revised and there is an increased focus on LTE-Advanced Includes new sections on testing challenges as well as over the air MIMO testing, protocol testing and the most up-to-date test capabilities of instruments Written from both

a technical and practical point of view by leading experts in the field

LTE - The UMTS Long Term Evolution - Stefania Sesia

2011-08-29

"Where this book is exceptional is that the reader will not just learn how LTE works but why it works" Adrian Scrase, ETSI Vice-President, International Partnership Projects Following on the success of the first edition, this book is fully updated, covering the latest additions to LTE and the key features of LTE-Advanced. This book builds on the success of its predecessor, offering the same comprehensive system-level understanding built on

explanations of the underlying theory, now expanded to include complete coverage of Release 9 and the developing specifications for LTE-Advanced. The book is a collaborative effort of more than 40 key experts representing over 20 companies actively participating in the development of LTE, as well as academia. The book highlights practical implications, illustrates the expected performance, and draws comparisons with the well-known WCDMA/HSPA standards. The authors not only pay special attention to the physical layer, giving an insight into the fundamental concepts of OFDMA-FDMA and MIMO,

but also cover the higher protocol layers and system architecture to enable the reader to gain an overall understanding of the system.

Key New Features:

Comprehensively updated with the latest changes of the LTE Release 8 specifications, including improved coverage of Radio Resource Management RF aspects and performance requirements Provides detailed coverage of the new LTE Release 9 features, including: eMBMS, dual-layer beamforming, user equipment positioning, home eNodeBs / femtocells and pico cells and self-optimizing networks Evaluates the LTE system

performance Introduces LTE-Advanced, explaining its context and motivation, as well as the key new features including: carrier aggregation, relaying, high-order MIMO, and Cooperative Multi-Point transmission (CoMP). Includes an accompanying website containing a complete list of acronyms related to LTE and LTE-Advanced, with a brief description of each (http://www.wiley.com/go/sesia_theumts) This book is an invaluable reference for all research and development engineers involved in implementation of LTE or LTE-Advanced, as well as graduate and PhD students in wireless

communications. Network operators, service providers and R&D managers will also find this book insightful.

EPC and 4G Packet Networks - Magnus Olsson 2012-11-28

Offers detailed insight into the Evolved Packet Core (EPC) that covers the standards and industry developments. This book describes and explains the entire EPC including architecture, features and protocols, giving you the knowledge and insight to see the potential in EPC, develop EPC products and deploy LTE/EPC mobile broadband Networks.

[Algorithms and Architectures for Parallel Processing - Xiang-he](#)

Sun 2014-08-13

This two volume set LNCS 8630 and 8631 constitutes the proceedings of the 14th International Conference on Algorithms and Architectures for Parallel Processing, ICA3PP 2014, held in Dalian, China, in August 2014. The 70 revised papers presented in the two volumes were selected from 285 submissions. The first volume comprises selected papers of the main conference and papers of the 1st International Workshop on Emerging Topics in Wireless and Mobile Computing, ETWMC 2014, the 5th International Workshop on Intelligent Communication Networks,

IntelNet 2014, and the 5th International Workshop on Wireless Networks and Multimedia, WNM 2014. The second volume comprises selected papers of the main conference and papers of the Workshop on Computing, Communication and Control Technologies in Intelligent Transportation System, 3C in ITS 2014, and the Workshop on Security and Privacy in Computer and Network Systems, SPCNS 2014.

The SAGE Encyclopedia of Educational Technology - J.

Michael Spector 2015-01-29

The SAGE Encyclopedia of Educational Technology examines information on

leveraging the power of technology to support teaching and learning. While using innovative technology to educate individuals is certainly not a new topic, how it is approached, adapted, and used toward the services of achieving real gains in student performance is extremely pertinent. This two-volume encyclopedia explores such issues, focusing on core topics and issues that will retain relevance in the face of perpetually evolving devices, services, and specific techniques. As technology evolves and becomes even more low-cost, easy-to-use, and more accessible, the education

sector will evolve alongside it.

For instance, issues surrounding reasoning behind how one study has shown students retain information better in traditional print formats are a topic explored within the pages of this new encyclopedia.

Features: A collection of 300-350 entries are organized in A-to-Z fashion in 2 volumes available in a choice of print or electronic formats. Entries, authored by key figures in the field, conclude with cross references and further readings. A detailed index, the Reader's Guide themes, and cross references combine for search-and-browse in the electronic version. This reference

encyclopedia is a reliable and precise source on educational technology and a must-have reference for all academic libraries.

LTE Advanced Pro - Frédéric Launay 2019-06-18

This book presents LTE evolution towards 5G mobile communication and the emergence of new requirements for MBB, MTC and LLC services. As LTE technologies evolve, LTE Advanced Pro dramatically increases cell capacity and user data rates for the MBB unicast service. Such requirements are obtained using full-dimension MIMO, carrier aggregation (on either licensed or unlicensed frequency bands)

and dual connectivity. To improve the efficiency of same-content delivery to multiple users, 3GPP proposes a group communications service over LTE and defines mission critical push-to-talk (MCPTT) for dedicated public safety services. Complementary low-cost and low-power modems with enhanced coverage and massive connectivity are emerging. Thus, this book also discusses the need for LTE to support low-rate transmission and high-latency communication for MTC services.

Evolved Packet System (EPS) - Pierre Lescuyer 2008-02-28
2G/GSM and 3G/UMTS are key mobile communication

technologies, chosen by more than 2 billion people around the world. In order to adapt to new services, increasing demand for user bandwidth, quality of service and requirements for network convergence, major evolutions are introduced in 3G network standard. Evolved Packet System (EPS) presents the EPS evolution of the 3G/UMTS standard introduced by the 3rd Generation Partnership Project (3GPP) standard committee. This new topic is looked at from a system perspective, from the radio interface to network and service architecture. Hundreds of documents being issued by Standard organisations are

summarised in one book to allow the reader to get an accessible comprehensive view of EPS evolution. Proposes a system view of Evolved UMTS, from the radio to Core and service architecture Gives a comprehensive and global view of the system that technical specifications do not provide Describes the new system as well as the inheritance and migration from 2G/GSM and 3G/UMTS Written by experts in the field who specialise in two complementary but very different technical domains (i.e. "radio interface" and "network architecture") Contains many figures and examples for better understanding. This book is

essential for industry professionals in the telecommunication business, telecommunication system architects and designers, product manufacturers and operators and postgraduate students.

Distributed Computer and Communication Networks -

Vladimir M. Vishnevskiy
2021-01-01

This book constitutes the refereed post-conference proceedings of the 23rd International Conference on Distributed and Computer and Communication Networks, DCCN 2020, held in Moscow, Russia, in September 2020. The 54 revised full papers and

1 revised short paper were carefully reviewed and selected from 167 submissions. The papers cover the following topics: computer and communication networks; analytical modeling of distributed systems; and distributed systems applications.

5G New Radio: Beyond Mobile Broadband - Amitav Mukherjee
2019-10-31

Fifth-generation cellular radio access networks are currently being standardized as 5G New Radio (NR). The primary objectives of 5G NR are to provide enhanced mobile broadband (eMBB) and ultra-reliable low latency communication (URLLC)

capabilities. This innovative resource analyzes these applications in detail to help readers understand how the flexible design of NR makes it suitable for a wide range of use cases and applications. The rationale behind the design decisions made during the NR standardization process are explored. Readers will be able to understand the performance limits of NR when applied to non-eMBB scenarios and how NR compares to 4G and IEEE 802.x connectivity solutions for such scenarios. The main features of 5G phase 2 are explored, as well as the use cases that can be addressed by 5G phase 2. The mathematical

models are included to help explain the future evolution of NR in Release 16 and beyond.

This is the only book that describes both the standards features of NR and the mathematical models/open research issues for 5G, appealing to both industry practitioners and academic researchers.

Software Defined Mobile Networks (SDMN) -

Madhusanka Liyanage
2015-06-17

This book describes the concept of a Software Defined Mobile Network (SDMN), which will impact the network architecture of current LTE (3GPP) networks. SDN will also

open up new opportunities for traffic, resource and mobility management, as well as impose new challenges on network security. Therefore, the book addresses the main affected areas such as traffic, resource and mobility management, virtualized traffics transportation, network management, network security and techno economic concepts. Moreover, a complete introduction to SDN and SDMN concepts. Furthermore, the reader will be introduced to cutting-edge knowledge in areas such as network virtualization, as well as SDN concepts relevant to next generation mobile networks. Finally, by the end of the book

the reader will be familiar with the feasibility and opportunities of SDMN concepts, and will be able to evaluate the limits of performance and scalability of these new technologies while applying them to mobile broadband networks.

Cloud Computing - Igor

Faynberg 2016-01-19

Cloud Computing: Business

Trends and Technologies

provides a broad introduction to

Cloud computing technologies

and their applications to IT and

telecommunications businesses

(i.e., the network function

virtualization, NFV). To this end,

the book is expected to serve

as a textbook in a graduate

course on Cloud computing.

The book examines the business cases and then concentrates on the technologies necessary for supporting them. In the process, the book addresses the principles of – as well as the known problems with – the underlying technologies, such as virtualization, data communications, network and operations management, security and identity management. It introduces, through open-source case studies (based on OpenStack), an extensive illustration of lifecycle management. The book also looks at the existing and emerging standards, demonstrating their respective

relation to each topic. Overall, this is an authoritative textbook on this emerging and still-developing discipline, which

- Guides the reader through basic concepts, to current practices, to state-of-the-art applications.
- Considers technical standards bodies involved in Cloud computing standardization.
- Is written by innovation experts in operating systems and data communications, each with over 20 years' experience in business, research, and teaching.

Fundamentals of Network Planning and Optimisation
2G/3G/4G - Ajay R. Mishra
2018-11-05

Updated new edition covering all aspects of network planning and optimization This welcome new edition provides comprehensive coverage of all aspects of network planning in all the technologies, from 2G to 5G, in radio, transmission and core aspects. Written by leading experts in the field, it serves as a handbook for anyone engaged in the study, design, deployment and business of cellular networks. It increases basic understanding of the currently deployed, and emerging, technologies, and helps to make evolution plans for future networks. The book also provides an overview of the forthcoming technologies

that are expected to make an impact in the future, such as 5G. Fundamentals of Cellular Network Planning and Optimization, Second Edition encompasses all the technologies as well as the planning and implementation details that go with them. It covers 2G (GSM, EGPRS), 3G (WCDMA) and 4G (LTE) networks and introduces 5G. The book also looks at all the sub-systems of the network, focusing on both the practical and theoretical issues. Provides comprehensive coverage of the planning aspects of the full range of today's mobile network systems, covering radio access network, circuit and packet

switching, signaling, control, and backhaul/Core transmission networks New elements in book include HSPA, Ethernet, 4G/LTE and 5G Covers areas such as Virtualization, IoT, Artificial Intelligence, Spectrum Management and Cloud By bringing all these concepts under one cover, Fundamentals of Cellular Network Planning and Optimization becomes essential reading for network design engineers working with cellular service vendors or operators, experts/scientists working on end-to-end issues, and undergraduate/post-graduate students.

The LTE / SAE Deployment Handbook - Jyrki T. J. Penttinen

2011-11-30

Describing the essential aspects that need to be considered during the deployment and operational phases of 3GPP LTE/SAE networks, this book gives a complete picture of LTE systems, as well as providing many examples from operational networks. It demystifies the structure, functioning, planning and measurements of both the radio and core aspects of the evolved 3G system. The content includes an overview of the LTE/SAE environment, architectural and functional descriptions of the radio and core network, functionality of the LTE applications,

international roaming principles, security solutions and network measurement methods. In addition, this book gives essential guidelines and recommendations about the transition from earlier mobile communications systems towards the LTE/SAE era and the next generation of LTE, LTE-Advanced. The book is especially suitable for the operators that face new challenges in the planning and deployment phases of LTE/SAE, and is also useful for network vendors, service providers, telecommunications consultancy companies and technical institutes as it provides practical information

about the realities of the system. Presents the complete end-to-end planning and measurement guidelines for the realistic deployment of networks Explains the essential and realistic aspects of commercial LTE systems as well as the future possibilities An essential tool during the development of transition strategies from other network solutions towards LTE/SAE Contains real-world case studies and examples to help readers understand the practical side of the system
5G Radio Access Network Architecture - Sasha Sirotkin
2020-11-13
Written by an industry insider with state of the art research at

their fingertips, this book describes the Radio Access Network (RAN) architecture, starting with currently deployed 4G, followed by the description of 5G requirements and why re-thinking of the RAN architecture is needed to support these. Based on these considerations, it explains how 5G network architecture, which is currently being defined, is likely to evolve. The aim is not merely to cover relevant standards and technologies as a purely academic exercise (although a significant part of the book will be dedicated to these), but to augment these by practical deployment, to illustrate why the RAN architecture is changing

and where it is going. With 5G deployments on the horizon, there is a desire within companies to both re-think the RAN architecture and to change the proprietary nature of the RAN. Correspondingly, there is increased interest in academia, standards bodies and commercial entities involved in the area.

4G: LTE/LTE-Advanced for Mobile Broadband - Erik Dahlman 2013-10-07

This book focuses on LTE with full updates including LTE-Advanced (Release-11) to provide a complete picture of the LTE system. Detailed explanations are given for the latest LTE standards for radio

interface architecture, the physical layer, access procedures, broadcast, relaying, spectrum and RF characteristics, and system performance. Key technologies presented include multi-carrier transmission, advanced single-carrier transmission, advanced receivers, OFDM, MIMO and adaptive antenna solutions, radio resource management and protocols, and different radio network architectures. Their role and use in the context of mobile broadband access in general is explained, giving both a high-level overview and more detailed step-by-step explanations. This book is a must-have resource

for engineers and other professionals in the telecommunications industry, working with cellular or wireless broadband technologies, giving an understanding of how to utilize the new technology in order to stay ahead of the competition. New to this edition: In-depth description of CoMP and enhanced multi-antenna transmission including new reference-signal structures and feedback mechanisms Detailed description of the support for heterogeneous deployments provided by the latest 3GPP release Detailed description of new enhanced downlink control-channel structure (EPDDCH) New RF configurations including

operation in non-contiguous spectrum, multi-bands base stations and new frequency bands Overview of 5G as a set of well-integrated radio-access technologies, including support for higher frequency bands and flexible spectrum management, massive antenna configurations, and ultra-dense deployments Covers a complete update to the latest 3GPP Release-11 Two new chapters on HetNet, covering small cells/heterogeneous deployments, and CoMP, including Inter-site coordination Overview of current status of LTE release 12 including further enhancements of local-area, CoMP and multi-antenna

transmission, Machine-type-communication, Device-to-device communication
LTE-Advanced - Sassan Ahmadi
2013-10-10
This book is an in-depth, systematic and structured technical reference on 3GPP's LTE-Advanced (Releases 10 and 11), covering theory, technology and implementation, written by an author who has been involved in the inception and development of these technologies for over 20 years. The book not only describes the operation of individual components, but also shows how they fit into the overall system and operate from a systems perspective. Uniquely,

this book gives in-depth information on upper protocol layers, implementation and deployment issues, and services, making it suitable for engineers who are implementing the technology into future products and services. Reflecting the author's 25 plus years of experience in signal processing and communication system design, this book is ideal for professional engineers, researchers, and graduate students working in cellular communication systems, radio air-interface technologies, cellular communications protocols, advanced radio access technologies for beyond

4G systems, and broadband cellular standards. An end-to-end description of LTE/LTE-Advanced technologies using a top-down systems approach, providing an in-depth understanding of how the overall system works Detailed algorithmic descriptions of the individual components' operation and inter-connection Strong emphasis on implementation and deployment scenarios, making this a very practical book An in-depth coverage of theoretical and practical aspects of LTE Releases 10 and 11 Clear and concise descriptions of the underlying principles and theoretical concepts to provide

a better understanding of the operation of the system's components Covers all essential system functionalities, features, and their inter-connections based on a clear protocol structure, including detailed signal flow graphs and block diagrams Includes methodologies and results related to link-level and system-level evaluations of LTE-Advanced Provides understanding and insight into the advanced underlying technologies in LTE-Advanced up to and including Release 11: multi-antenna signal processing, OFDM, carrier aggregation, coordinated multi-point transmission and reception,

eICIC, multi-radio coexistence, E-MBMS, positioning methods, real-time and non-real-time wireless multimedia applications *EPC and 4G Packet Networks, 2nd Edition* - Magnus Olsson 2012
Get a comprehensive and detailed insight into the Evolved Packet Core (EPC) with this clear, concise and authoritative guide - a fully updated second edition that covers the latest standards and industry developments **KEY FEATURES**
" The only book to describe and explain the entire EPC including architecture, features and protocols, giving you the knowledge and insight to see the potential in EPC, develop

EPC products and deploy
LTE/EPC mobile broadband
Networks " The Second Edition
includes 150+ new pages and
numerous new illustrations. The
content has also been focused
towards the mainstream
deployment scenarios " Written
by established experts in the
3GPP standardization process,
with extensive, in-depth
experience of its goals,
development and future
direction " Case studies of
deployment scenarios show
how the functions described
within EPC are placed within a
live network context "

Forewords written by Dr.
Kalyani Bogineni and Dr. Ulf
Nilsson DESCRIPTION " The

latest additions to the Evolved
Packet System (EPS) including
e.g. Positioning, User Data
Management, eMBMS, SRVCC,
VoLTE, CSFB " A detailed
description of the nuts and bolts
of EPC that are required to
really get services up and
running on a variety of operator
networks " An in-depth overview
of the EPC architecture and its
connections to the wide variety
of network accesses, including
LTE, LTE-Advanced,
WCDMA/HSPA, GSM, WiFi,
etc." The most common
operator scenarios of EPS and
the common issues faced in
their design " The reasoning
behind many of the design
decisions taken in EPC, in order

to understand the full details and background of the all-IP core NEW CONTENT TO THIS EDITION " 150+ New pages, new illustrations and call flows " Covers 3GPP Release 9, 10 and 11 in addition to release 8 " Expanded coverage on Diameter protocol, interface and messages " Architecture overview " Positioning " User Data Management " eMBMS (LTE Broadcasting) " H(e)NodeB/Femto Cells " LIPA/SIPTO/Breakout architectures " Deployment

Scenarios " WiFi interworking " VoLTE/MMTel, CS fallback and SRVCC SAE is the core network that supports LTE, the next key stage in development of the UMTS network to provide mobile broadband. It aims to provide an efficient, cost-effective solution for the ever-increasing number of mobile broadband subscribers There is no other book on the market that covers the entire SAE network architecture; this book summarizes the important parts of the standards, but goes be ...