

1. Record Nr.	UNINA9910146401203321
Autore	Akyildiz Ian Fuat
Titolo	Wireless mesh networks // Ian F. Akyildiz, Xudong Wang
Pubbl/distr/stampa	Chichester, U.K. : , : Wiley, , 2009 [Piscataway, New Jersey] : , : IEEE Xplore, , [2009]
ISBN	1-282-34616-4 9786612346163 0-470-05961-3 0-470-05960-5
Descrizione fisica	1 online resource (326 p.)
Collana	Advanced texts in communications and networking ; ; 2
Classificazione	ST 200
Altri autori (Persone)	WangX (Xudong)
Disciplina	621.384
Soggetti	Wireless communication systems Mobile communication systems
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. [285]-300) and index.
Nota di contenuto	Contents -- Preface -- 1 Introduction -- 1.1 Network Architecture -- 1.2 Characteristics -- 1.3 Application Scenarios -- 1.4 Critical Design Factors -- 2 Physical Layer -- 2.1 Adaptive Coding/Modulation and Link Adaptation -- 2.2 Directional Antennas and Multi-Antenna Systems -- 2.2.1 Directional Antenna -- 2.2.2 Antenna Diversity and Smart Antenna -- 2.3 Cooperative Diversity and Cooperative Communications -- 2.4 Multi-Channel Systems -- 2.5 Advanced Radio Technologies -- 2.5.1 Frequency Agile Radios and Cognitive Radios -- 2.5.2 Reconfigurable Radios and Software Radios -- 2.6 Integrating Different Advanced Techniques: IEEE 802.11n -- 2.6.1 The Protocol Reference Model of the Physical Layer -- 2.6.2 PLCP Sublayer -- 2.6.3 PMD Sublayer -- 2.6.4 PLME Sublayer -- 2.7 Open Research Issues -- 3 Medium Access Control Layer -- 3.1 Single Channel MAC Protocols -- 3.1.1 CSMA/CA Improvements -- 3.1.2 IEEE 802.11e -- 3.1.3 WMN MAC Based on IEEE 802.11s -- 3.1.4 TDMA over CSMA/CA -- 3.1.5 IEEE 802.16 MAC in Mesh Mode -- 3.1.6 MAC for UWB WMNs -- 3.1.7 CDMA MAC -- 3.2 Multi-Channel MAC Protocols -- 3.2.1 Single-Radio MAC Protocol -- 3.2.2 Slotted Seeded Channel Hopping (SSCH) MAC -- 3.2.3 Multi-Radio MAC Protocol -- 3.2.4 Multi-Radio 2-Phase Protocol

-- 3.2.5 Channel Assignment in the MAC Layer -- 3.2.6 Dynamic Frequency Selection (DFS) Requirements -- 3.3 Open Research Issues -- 4 Network Layer -- 4.1 Routing Challenges -- 4.2 Design Principles -- 4.3 Topology Discovery for Routing -- 4.4 Performance Parameters -- 4.5 Routing Metrics -- 4.5.1 Hop-Count -- 4.5.2 Per-Hop RTT -- 4.5.3 Per-Hop Packet Pair Delay -- 4.5.4 Expected Transmission Count (ETX) -- 4.5.5 Expected Transmission on a Path (ETOP) -- 4.5.6 Expected Transmission Time (ETT) and Weighted Cumulative ETT -- (WCETT) -- 4.5.7 Effective Number of Transmissions (ENT) -- 4.5.8 Metric of Interference and Channel-Switching (MIC) -- 4.5.9 Bottleneck Link Capacity (BLC) -- 4.5.10 Expected Data Rate (EDR) -- 4.5.11 Low Overhead Routing Metric. 4.5.12 Airtime Cost Routing Metric -- 4.5.13 Remaining Issues -- 4.6 Categories of Routing Protocols -- 4.6.1 Hop-count based routing -- 4.6.2 Link-level QoS routing -- 4.6.3 End-to-end QoS routing -- 4.6.4 Reliability-aware routing -- 4.6.5 Stability-aware routing -- 4.6.6 Power-efficient routing -- 4.6.7 Scalable routing -- 4.7 Hop-Count Based Routing Protocols -- 4.7.1 Light client management routing (LCMR) protocol -- 4.7.2 Orthogonal rendezvous routing (ORR) protocol -- 4.7.3 HEAT Protocol -- 4.8 Link-Level QoS Based Routing Protocols -- 4.8.1 Link Quality Source Routing (LQSR) Protocol -- 4.8.2 Multi-radio LQSR (MR-LQSR) Routing Protocol -- 4.8.3 ExOR Routing Protocol -- 4.8.4 AODV-spanning tree (AODV-ST) protocol -- 4.9 Interference Based Routing: IRMA -- 4.10 Routing with Load Balancing -- 4.11 Routing Based on Residual Link Capacity -- 4.12 End-to-End QoS Routing -- 4.12.1 Quality aware routing protocol -- 4.12.2 RingMesh Routing Protocol -- 4.12.3 Bandwidth reservation routing protocol -- 4.13 Reliability Based Routing: Multi-Path Routing -- 4.13.1 Resilient OpportunisticMesh Routing(ROMER) protocol -- 4.13.2 Simple Two-Path Routing Protocol -- 4.13.3 Multi-Path Mesh (MMESH) Routing protocol -- 4.14 Stability Based Routing -- 4.15 Scalable Routing -- 4.15.1 Hierarchical Routing -- 4.15.2 Geographic Routing -- 4.16 Multi-Channel Routing Protocols -- 4.16.1 Joint Channel Assignment and Routing -- 4.16.2 Distributed Joint Channel and Routing Protocol -- 4.17 Open Research Issues -- 5 Transport Layer -- 5.1 Challenges of a Transport Layer Protocol in Wireless Environments -- 5.2 Transport Layer Protocols for Multihop Ad Hoc Networks -- 5.2.1 Protocols for Reliable Data Transport -- 5.2.2 Protocols for Real-Time Delivery -- 5.3 Transport Layer Protocols for WMNs -- 5.3.1 Transport Protocols Based on Hop-by-Hop Control -- 5.3.2 DCCP for WMNs -- 5.4 Open Research Issues -- 6 Network Security -- 6.1 Security Attacks in WMNs -- 6.2 Counter-Attack Measures -- 6.3 Security Schemes in Related Wireless Networks. 6.3.1 Security of IEEE 802.11Wireless LANs -- 6.3.2 Security of IEEE 802.16Wireless MANs -- 6.3.3 Security of Mobile Ad Hoc Networks -- 6.4 Security Mechanisms forWMNs -- 6.4.1 Features and Challenges of A SecureWMN -- 6.4.2 Security of IEEE 802.11sWMN -- 6.4.3 Future Directions -- 6.5 Multi-Layer Design for WMN Security -- 6.5.1 Research Issues in the Multi-Layer Security -- 7 Network Control and Management -- 7.1 Mobility Management -- 7.1.1 Mobility Management in Related Wireless Networks -- 7.1.2 Mobility Management in WMNs -- 7.1.3 Open Research Issues -- 7.2 Power Management -- 7.2.1 Power Management in Related Wireless Networks -- 7.2.2 Power Management in WMNs -- 7.2.3 Open Research Issues -- 7.3 Topology Control and Management -- 7.3.1 Topology Control and Management in Related Wireless Networks -- 7.3.2 Topology Control and Management in WMNs -- 7.4 Timing Synchronization -- 7.5 Traditional Network Management Functions -- 8 Network Capacity --

8.1 Capacity Analysis -- 8.1.1 Notations and Terms -- 8.1.2 Capacity of Ad Hoc Networks without Mobility -- 8.1.3 Capacity of Mobile Ad Hoc Networks -- 8.1.4 Capacity of Ad Hoc Networks with Infrastructure Support -- 8.2 Capacity and Delay Tradeoff -- 8.2.1 The need of capacity-delay tradeoff -- 8.2.2 Analytical Models and Definitions -- 8.2.3 Definitions of Throughput-Delay Optimality -- 8.2.4 Throughput-Delay Tradeoff in Static Networks -- 8.2.5 Throughput-Delay Tradeoff in Mobile Networks -- 8.2.6 Open Research Issues -- 8.3 Applicability of Asymptotic Capacity Analysis to WMNs -- 9 Cross-Layer Design -- 9.1 Motivations of Cross-Layer Design -- 9.1.1 Layered Design versus Cross-Layer Design -- 9.1.2 Cross-Layer Design in WMNs -- 9.2 Cross-Layer Design Protocols and Optimization Algorithms -- 9.2.1 General Methodology of Cross-Layer Design -- 9.2.2 MAC/Physical Cross-Layer Design -- 9.2.3 Routing/MAC Cross-Layer Design -- 9.2.4 Transport/Physical Cross-Layer Design -- 9.2.5 Joint Optimization Algorithms Across Multiple Protocol Layers. 9.3 Prudent Use of Cross-Layer Design -- 10 Standards on Wireless Mesh Networks -- 10.1 Overview of IEEE 802 Working Groups for Wireless Networks -- 10.2 Overview of Industry Alliance/Forum for Different Wireless Technologies -- 10.3 Standards for Meshed Wireless LANs -- 10.3.1 Overview of IEEE 802.11 Standard Activities -- 10.3.2 IEEE 802.11s -- 10.4 Standards for Meshed Wireless PANs -- 10.4.1 Overview of IEEE 802.15 Standard Activities -- 10.4.2 IEEE 802.15.5 -- 10.4.3 UWB-Based Meshed Wireless PANs -- 10.4.4 Remaining Issues in Standards for Meshed Wireless PANs -- 10.5 Standards for Meshed Wireless MANs -- 10.5.1 Overview of IEEE 802.16 Standard Activities -- 10.5.2 IEEE 802.16 Mesh Mode -- 10.5.3 IEEE 802.16j -- Bibliography.

Sommario/riassunto

Going beyond classic networking principles and architectures for better wireless performance Written by authors with vast experience in academia and industry, *Wireless Mesh Networks* provides its readers with a thorough overview and in-depth understanding of the state-of-the-art in wireless mesh networking. It offers guidance on how to develop new ideas to advance this technology, and how to support emerging applications and services. The contents of the book follow the TCP/IP protocol stack, starting from the physical layer. Functionalities and existing protocols and algorithms for each protocol layer are covered in depth. The book is written in an accessible textbook style, and contains supporting materials such as problems and exercises to assist learning. Key Features: *Presents an in-depth explanation of recent advances and open research issues in wireless mesh networking, and offers concrete and comprehensive material to guide deployment and product development *Describes system architectures and applications of wireless mesh networks (WMNs), and discusses the critical factors influencing protocol design *Explores theoretical network capacity and the state-of-the-art protocols related to WMNs *Surveys standards that have been specified and standard drafts that are being specified for WMNs, in particular the latest standardization results in IEEE 802.11s, 802.15.5, 802.16 mesh mode, and 802.16 relay mode *Includes an accompanying website with PPT-slides, further reading, tutorial material, exercises, and solutions Advanced students on networking, computer science, and electrical engineering courses will find *Wireless Mesh Networks* an essential read. It will also be of interest to wireless networking academics, researchers, and engineers at universities and in industry.
