

# Designing And Deploying 80211 Wireless Networks A Practical Guide To Implementing 80211n And 80211ac Wireless Networks For Enterprise Based Applications Networking Technology

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## **Controller-Based Wireless LAN Fundamentals** - Jeff Smith

2010-10-29

Controller-Based Wireless LAN Fundamentals An end-to-end reference guide to design, deploy, manage, and secure 802.11 wireless networks As wired networks are increasingly replaced with 802.11n wireless connections, enterprise users are shifting to centralized, next-generation architectures built around Wireless LAN Controllers (WLC). These networks will increasingly run business-critical voice, data, and video applications that once required wired Ethernet. In Controller-Based Wireless LAN Fundamentals, three senior Cisco wireless experts bring together all the practical and conceptual knowledge professionals need to confidently design, configure, deploy, manage, and troubleshoot 802.11n networks with Cisco Unified Wireless Network (CUWN) technologies. The authors first introduce the core principles,

components, and advantages of next-generation wireless networks built with Cisco offerings. Drawing on their pioneering experience, the authors present tips, insights, and best practices for network design and implementation as well as detailed configuration examples. Next, they illuminate key technologies ranging from WLCs to Lightweight Access Point Protocol (LWAPP) and Control and Provisioning of Wireless Access Points (CAPWAP), Fixed Mobile Convergence to WiFi Voice. They also show how to take advantage of the CUWN's end-to-end security, automatic configuration, self-healing, and integrated management capabilities. This book serves as a practical, hands-on reference for all network administrators, designers, and engineers through the entire project lifecycle, and an authoritative learning tool for new wireless certification programs. This is the only book that Fully covers the principles and components of next-generation wireless networks built

with Cisco WLCs and Cisco 802.11n AP Brings together real-world tips, insights, and best practices for designing and implementing next-generation wireless networks Presents start-to-finish configuration examples for common deployment scenarios Reflects the extensive first-hand experience of Cisco experts Gain an operational and design-level understanding of WLAN Controller (WLC) architectures, related technologies, and the problems they solve Understand 802.11n, MIMO, and protocols developed to support WLC architecture Use Cisco technologies to enhance wireless network reliability, resilience, and scalability while reducing operating expenses Safeguard your assets using Cisco Unified Wireless Network's advanced security features Design wireless networks capable of serving as an enterprise's primary or only access network and supporting advanced mobility services Utilize Cisco Wireless Control System (WCS) to plan, deploy, monitor, troubleshoot, and report on wireless networks throughout their lifecycles Configure Cisco wireless LANs for multicasting Quickly troubleshoot problems with Cisco controller-based wireless LANs This book is part of the Cisco Press® Fundamentals Series. Books in this series introduce networking professionals to new networking technologies, covering network topologies, sample deployment concepts, protocols, and management techniques. Category: Wireless Covers: Cisco Controller-Based Wireless LANs

Cisco 802.11 Wireless Networking Quick Reference - Toby J. Velte 2005  
A handy resource for network engineers and administrators working with Cisco wireless technologies covers the fundamentals of designing, deploying, managing, optimizing, and troubleshooting a wireless network, furnishing easy-to-understand explanations and guidelines, description and analysis of Cisco wireless LAN devices, configuration essentials, and tuning and performance management. Original. (Intermediate)

*Secure Roaming in 802.11 Networks* - Paul Goransson 2011-04-01  
Secure Roaming in 802.11 Networks offers a comprehensive treatise on Wi-Fi 802.11 roaming by comparing/contrasting it to cellular roaming theory and techniques. The book explores the fundamental concepts,

basic theory, and key principles of 802.11 networks with roaming capabilities. It helps ensure secure and constant connectivity of laptops, PDAs and other emerging mobile devices. Today, we increasingly expect to find public Wide Local Area Network (WLAN) 802.11 access in our airports, public spaces, and hotels, and we want to maintain our connections when we're mobile and using 802.11 WLANs. However, 802.11 was not originally designed with roaming capabilities and can't, in its "pure" form, support seamless roaming between different hotspots and other 802.11 access points. This book details the theory behind various 802.11 extensions to permit roaming and describes how these extensions can be successfully implemented in 802.11 WLANs. It reviews coverage of user authentication in 802.11, as well as roaming between 802.11 and other wireless technologies. It also discusses wireless technologies and application programming interfaces. This book will appeal to RF/wireless engineers and designers, computer/data network engineers, and graduate students. \* Offers a comprehensive treatise on Wi-Fi 802.11 roaming by comparing/contrasting it to cellular roaming theory and techniques \* Emerges as a "one stop" resource for design engineers charged with fulfilling the market need for seamless 802.11 device roaming capabilities \* Builds upon the knowledge base of a professional audience without delving into long discussions of theory long since mastered

*Wireless Network Deployments* - Rajamani Ganesh 2000-06-30  
This work concerns deployment of digital wireless networks. It first includes an overview of systems design and engineering integration. It then addresses deployment of CDMA networks, based on IS-95 standards. It also deals with the deployment of TDMA-based networks and wireless data networks.

Energy Efficiency in Wireless Networks - Oswald Jumira 2013-01-24  
The last decade has witnessed an unprecedented development and growth in global wireless communications systems, technologies and network "traffic" generated over network infrastructures. This book presents state-of-the-art energy-efficient techniques, designs and implementations that pertain to wireless communication networks such

as cellular networks, wireless local area networks(WLANs) and wireless ad hoc networks (WAHNS) including mobile adhoc networks (MANETs), and wireless sensor networks (WSNs) as they are deployed across the world to facilitate “always on”reliable high-speed wireless access from anywhere, at anytime to accommodate the new paradigm of the “Internet of Things” (IoT). The pervasive and exponential growth of Wi-Fi and the impact of bandwidth-intensive applications on the energy consumption of Wi-Fi-enabled devices are discussed along with energy harvesting as an advantageous option to power WAHNS. The book aims to serve as a useful reference for researchers, students, regulatory authorities, and educators.

802.11ac: A Survival Guide - Matthew S. Gast 2013-07-23

The next frontier for wireless LANs is 802.11ac, a standard that increases throughput beyond one gigabit per second. This concise guide provides in-depth information to help you plan for 802.11ac, with technical details on design, network operations, deployment, and monitoring. Author Matthew Gast—an industry expert who led the development of 802.11-2012 and security task groups at the Wi-Fi Alliance—explains how 802.11ac will not only increase the speed of your network, but its capacity as well. Whether you need to serve more clients with your current level of throughput, or serve your existing client load with higher throughput, 802.11ac is the solution. This book gets you started. Understand how the 802.11ac protocol works to improve the speed and capacity of a wireless LAN. Explore how beamforming increases speed capacity by improving link margin, and lays the foundation for multi-user MIMO. Learn how multi-user MIMO increases capacity by enabling an AP to send data to multiple clients simultaneously. Plan when and how to upgrade your network to 802.11ac by evaluating client devices, applications, and network connections.

Deploying License-free Wireless Wide-area Networks - Jack Unger 2003  
Best practices for planning and deployment of broadband WWANs. Learn insider tips from an experienced wireless industry leader. Understand the principles that underlie the operation of all wireless systems. Learn how to provide profitable and reliable wireless Internet access. Select the

most effective equipment and antenna systems for your area. Avoid common pitfalls encountered by new wireless network operators. Minimize the effects of noise and interference on your network. Enjoy the satisfaction of providing wireless Internet access to your community. Practice the business principles used by successful wireless ISPs (WISPs). Use 802.11a, 802.11b, and 802.11g equipment more successfully in your own home, office, or outdoor environment. Choose the right network architecture for your wireless network. Conduct physical site surveys and radio-frequency (RF) site surveys. License-free broadband wireless wide-area networks (WWANs) provide fast deployment of low-cost, high-speed “last-mile” wireless Internet access. License-free wireless technology delivers these benefits without requiring the use of products or services provided by local telephone or cable companies. WWANs enable Internet service providers (ISPs) and corporate IT managers to deploy their own cost-efficient broadband networks that deliver high-speed access for buildings and areas where traditional wired connectivity is either completely unavailable or is cost-prohibitive. **Deploying License-Free Wireless Wide-Area Networks** is the first book that provides complete, real-world “start-to-finish” design, installation, operation, and support information for wireless ISPs and other organizations deploying outdoor wireless WANs—including coverage of 802.11a, 802.11b, 802.11g, and proprietary-protocol networks. This vendor-neutral book covers all brands of broadband wireless equipment and explains the principles upon which all wireless equipment is based. Inside, you’ll find step-by-step instructions and crystal-clear explanations that walk you through initial planning stages and onto full wireless network operation. End-of-chapter review questions reinforce important concepts. Whether you’re an IT director, ISP engineer, network architect, or field technician, **Deploying License-Free Wireless Wide-Area Networks** is your essential reference. With practical, in-depth coverage of the real-world challenges of outdoor, license-free wireless WAN deployment, this book provides a comprehensive, vendor-neutral guide to successful wireless network design and

**Hackproofing Your Wireless Network** - Syngress 2002-03-22

The only way to stop a hacker is to think like one! Wireless technology is a new and rapidly growing field of concentration for network engineers and administrators. Innovative technology is now making the communication between computers a cordless affair. Wireless devices and networks are vulnerable to additional security risks because of their presence in the mobile environment. Hack Proofing Your Wireless Network is the only book written specifically for architects, engineers, and administrators responsible for securing their wireless networks. From making sense of the various acronyms (WAP, WEP, SSL, PKE, PKI, SSL, SSH, IPSEC) to the implementation of security policies, plans, and recovery protocols, this book will help users secure their wireless network before its security is compromised. The only way to stop a hacker is to think like one...this book details the multiple ways a hacker can attack a wireless network - and then provides users with the knowledge they need to prevent said attacks. Uses forensic-based analysis to give the reader an insight into the mind of a hacker With the growth of wireless networks architects, engineers and administrators will need this book Up to the minute Web based support at [www.solutions@syngress.com](http://www.solutions@syngress.com)

**Building Wireless Community Networks** - Rob Flickenger 2003 Building Wireless Community Networks is about getting people online using wireless network technology. The 802.11b standard (also known as WiFi) makes it possible to network towns, schools, neighborhoods, small business, and almost any kind of organization. All that's required is a willingness to cooperate and share resources. The first edition of this book helped thousands of people engage in community networking activities. At the time, it was impossible to predict how quickly and thoroughly WiFi would penetrate the marketplace. Today, with WiFi-enabled computers almost as common as Ethernet, it makes even more sense to take the next step and network your community using nothing but freely available radio spectrum. This book has showed many people how to make their network available, even from the park bench, how to extend high-speed Internet access into the many areas not served by DSL and cable providers, and how to build working communities and a shared

though intangible network. All that's required to create an access point for high-speed Internet connection is a gateway or base station. Once that is set up, any computer with a wireless card can log onto the network and share its resources. Rob Flickenger built such a network in northern California, and continues to participate in network-building efforts. His nuts-and-bolts guide covers: Selecting the appropriate equipment Finding antenna sites, and building and installing antennas Protecting your network from inappropriate access New network monitoring tools and techniques (new) Regulations affecting wireless deployment (new) IP network administration, including DNS and IP Tunneling (new) His expertise, as well as his sense of humor and enthusiasm for the topic, makes Building Wireless Community Networks a very useful and readable book for anyone interested in wireless connectivity.

*Designing A Wireless Network* - Syngress 2001-07-22

Business is on the move - mobile computing must keep up! Innovative technology is making the communication between computers a cordless affair. Mobile computing with laptops, hand helds and mobile phones is increasing the demand for reliable and secure wireless networks. Network engineers and consultants need to create and build cutting-edge wireless networks in both the small business and multi-million dollar corporations. Designing Wireless Networks provides the necessary information on how to design and implement a wireless network. Beginning with detailed descriptions of the various implementations and architectures of wireless technologies and moving to the step-by-step instructions on how to install and deploy a fixed wireless network; this book will teach users with no previous wireless networking experience how to design and build their own wireless network based on the best practices of the Enhanced Services from Lucent Technologies. \* Timely coverage of new technologies: Communication without cables is the future of networking \* Advocates wireless networking solutions for any user, regardless of location, device or connection. \* Written by Experts. The authors are leading WAN authorities at Lucent Technologies. \* No previous wireless experience is assumed, however, readers should have a

basic understanding of networking and TCP/IP protocols

**802.11 Security** - Bruce Potter 2002-12-17

Discusses the fundamentals of wireless security and of the popular wireless LAN protocol 802.11, covering topics including station security configurations, network weaknesses, access points, and client security.

**802.11 Wireless LAN Fundamentals** - Pejman Roshan 2004

802.11 Wireless LAN Fundamentals gives you the background and practical details you need to select, design, install, and run your own WLAN. This book begins with an overview of Ethernet technologies, 802.11 standards, and physical layer technologies, providing you with a frame of reference for the rest of the book. Subsequent chapters address challenges and solutions associated with security, mobility, and QoS. Radio frequency fundamentals are reviewed in detail, as are site-surveying methods. A series of case studies that highlight WLAN design considerations in various business environments helps place all the concepts covered in this book in the context of real-world applications.

**Building Secure Wireless Networks with 802.11** - Jahanzeb Khan 2003-02-03

Provides a step-by-step approach for planning and implementing a wireless LAN based on 802.11 Wireless Fidelity (Wi-Fi) technology. Authors are Wi-Fi security experts who are able to address the firestorm of concerns about security for 802.11b networks. Offers a clear perspective of interoperability with related wireless standards like 802.11a, HomeRF, and Bluetooth. Explains how to achieve the same performance as a wired Ethernet connection and deliver flexibility and high speed.

**Designing and Deploying 802.11n Wireless Networks** - Jim Geier 2010-06-01

Gain a practical understanding of the underlying concepts of the 802.11n standard and the methodologies for completing a successful wireless network installation. Practical, start-to-finish guidance for successful deployment of 802.11n wireless LANs. With the ratification of the 802.11n wireless LAN standard, thousands of companies are moving rapidly toward implementation. However, 802.11n is very different from

legacy 802.11a, 802.11b, and 802.11g wireless standards, and successful deployment requires new knowledge and techniques. In this book, leading wireless expert Jim Geier systematically presents all the information and guidance that network architects, engineers, administrators, and managers need to maximize the performance and business value of new 802.11n networks. Drawing on extensive experience with real-world 802.11n deployments, Geier guides you through the entire project lifecycle: planning, design, installation, testing, monitoring, and support. Each phase of wireless LAN deployment is organized into clearly defined steps, and multiple case studies and hands-on exercises show how to apply each technique. You'll find practical guidance for deploying in enterprises without existing wireless infrastructure, as well as migrating from legacy 802.11a, 802.11b, or 802.11g networks. For convenient reference, Geier also provides an extensive, up-to-date wireless networking glossary.

Understanding 802.11n MAC, physical layer, and related standards. Designing 802.11n wireless networks for diverse scenarios: considering architecture, range, performance, roaming, and RF issues. Migrating from 802.11a, 802.11b, and 802.11g wireless networks. Choosing the right tools and equipment, and using them effectively. Planning effectively: scoping projects; creating work breakdown structures; organizing teams, schedules, and budgets; defining requirements, and more. Securing WLANs via encryption, authentication, rogue access point detection, RF shielding, and policies. Performing site surveys and identifying optimum access point locations. Installing and configuring wireless LANs: planning, staging, deployment, documentation, and more. Systematic testing to improve signal coverage, performance, and security. Managing wireless LANs: help desk support, network monitoring, maintenance, engineering, configuration management, security, tools, and more. Troubleshooting 802.11n networks: identifying issues with connectivity, performance, and more.

**Wireless Network Deployments** - Rajamani Ganesh 2006-04-18

An important aspect of wireless networks is the deployment of their infrastructure. In this book, the Editors have invited a number of experts

from industry to write on a variety of topics associated with deployment of digital wireless networks. The first part of the book consists of an overview of systems design and engineering integration, comparison of polarization and space diversity antenna systems, and the performance of deploying smart antenna architectures in cellular and PCS networks. The second part addresses deployment of CDMA networks, based on IS-95 standards. Here the authors discuss issues related to optimization of overlaid dual model CDMA networks, embedding microcells to improve hot-spot capacity, and mitigation of intermodulation distortion in handsets. Part III deals with deployment of TDMA-based networks. The issues presented include developing hierarchical systems, reconfigurable transceivers, and deploying the GSM frequency hopping feature for enhancing existing traffic capacity. The last part, on Wireless Data Networks, is comprised of issues related to the performance of GPRS systems deployed as an upgrade on current networks and deployment of wireless LANs. Critical issues for deploying an IEEE 802.11-based WLAN are examined. Wireless Network Deployments provides practical engineering guidance for wireless and cellular engineers, researchers, technicians, and managers working in second and third generation digital wireless networks.

**Wireless Networking Handbook** - Jim Geier 1996

Wireless network technologies and standards. Analyzing the need for wireless networks. Implementing and supporting wireless networks. Appendixes.

**802.11 Wireless Networks: The Definitive Guide** - Matthew S. Gast 2005-04-25

As we all know by now, wireless networks offer many advantages over fixed (or wired) networks. Foremost on that list is mobility, since going wireless frees you from the tether of an Ethernet cable at a desk. But that's just the tip of the cable-free iceberg. Wireless networks are also more flexible, faster and easier for you to use, and more affordable to deploy and maintain. The de facto standard for wireless networking is the 802.11 protocol, which includes Wi-Fi (the wireless standard known as 802.11b) and its faster cousin, 802.11g. With easy-to-install 802.11

network hardware available everywhere you turn, the choice seems simple, and many people dive into wireless computing with less thought and planning than they'd give to a wired network. But it's wise to be familiar with both the capabilities and risks associated with the 802.11 protocols. And 802.11 Wireless Networks: The Definitive Guide, 2nd Edition is the perfect place to start. This updated edition covers everything you'll ever need to know about wireless technology. Designed with the system administrator or serious home user in mind, it's a no-nonsense guide for setting up 802.11 on Windows and Linux. Among the wide range of topics covered are discussions on: deployment considerations network monitoring and performance tuning wireless security issues how to use and select access points network monitoring essentials wireless card configuration security issues unique to wireless networks With wireless technology, the advantages to its users are indeed plentiful. Companies no longer have to deal with the hassle and expense of wiring buildings, and households with several computers can avoid fights over who's online. And now, with 802.11 Wireless Networks: The Definitive Guide, 2nd Edition, you can integrate wireless technology into your current infrastructure with the utmost confidence.

**IEEE 802.11 Handbook** - Bob O'Hara 2005

The first generation 802.11 wireless market, once struggling to expand, has spread from largely vertical applications such as healthcare, point of sale, and inventory management to become much more broad as a general networking technology being deployed in offices, schools, hotel guest rooms, airport departure areas, airplane cabins, entertainment venues, coffee shops, restaurants, and homes. This has led to the tremendous growth of new sources of IEEE 802.11 devices. IEEE 802.11 equipment is now moving into its second stage, where the wireless LAN is being treated as a large wireless communication system. As a system, there is more to consider than simply the communication over the air between a single access point and the associated mobile devices. This has led to innovative changes in the equipment that makes up a wireless LAN. The IEEE 802.11 Handbook: A Designer's Companion, Second Edition is for the system network architects, hardware engineers

and software engineers at the heart of this second stage in the evolution of 802.11 wireless LANs and for those designers that will take 802.11 to the next stage.

*High Performance Browser Networking* - Ilya Grigorik 2013-09-11

How prepared are you to build fast and efficient web applications? This eloquent book provides what every web developer should know about the network, from fundamental limitations that affect performance to major innovations for building even more powerful browser applications—including HTTP 2.0 and XHR improvements, Server-Sent Events (SSE), WebSocket, and WebRTC. Author Ilya Grigorik, a web performance engineer at Google, demonstrates performance optimization best practices for TCP, UDP, and TLS protocols, and explains unique wireless and mobile network optimization requirements. You'll then dive into performance characteristics of technologies such as HTTP 2.0, client-side network scripting with XHR, real-time streaming with SSE and WebSocket, and P2P communication with WebRTC. Deliver superlative TCP, UDP, and TLS performance Speed up network performance over 3G/4G mobile networks Develop fast and energy-efficient mobile applications Address bottlenecks in HTTP 1.x and other browser protocols Plan for and deliver the best HTTP 2.0 performance Enable efficient real-time streaming in the browser Create efficient peer-to-peer videoconferencing and low-latency applications with real-time WebRTC transports

**Deploying Voice Over Wireless LANs** - James T. Geier 2007

Master the design, installation, management and troubleshooting of a voice network over a wireless LAN from industry leader Jim Geier.

*A Field Guide to Wireless LANs* - Thomas Maufer 2004

Finally--an 802.11 deployment guide for business and home use that demystifies the alphabet soup of IEEE standards and explains the features and benefits of each with regards to speeds and feeds.

*Wi-Fi Handbook* - Frank Ohrtman 2003

Written for network engineers by highly experienced wireless and Ethernet experts, this title is one of the first to provide the know-how for enterprise implementations.

*802.11 Wireless Network Site Surveying and Installation* - Bruce E. Alexander 2005

"Performing a wireless LAN (WLAN) site survey before installing a wireless network is the key to any successful WLAN deployment. Yet each location and company have unique needs that must be taken into account. *802.11 Wireless Network Site Surveying and Installation* helps you understand the challenges associated with any site survey, including multipath mitigation, reflection, absorption, and radio wave interference, plus the added complexity of user and application demands. This book helps you identify obstacles to a successful deployment and guides your equipment decisions to ensure that your WLAN reaches its maximum potential."--BOOK JACKET.

*CCIE Wireless Exam (350-050) Quick Reference* - Roger Nobel 2012-04-15

As a final exam preparation tool, the *CCIE Wireless (350-050) Quick Reference* provides a concise review of all objectives on the new written exam. The short eBook provides readers with detailed, graphical-based information, highlighting only the key topics in cram-style format. With this document as your guide, you will review topics on concepts and commands that apply to this exam. This fact-filled *Quick Reference* allows you to get all-important information at a glance, helping you focus your study on areas of weakness and enhancing your memory retention of essential exam concepts. The Cisco *CCIE Wireless* certification assesses and validates broad theoretical knowledge of wireless networking and a solid understanding of wireless LAN technologies from Cisco. The written exam is a two-hour, multiple choice test with 90-110 questions that will validate that professionals have the expertise to plan, design, implement, operate and troubleshoot Enterprise WLAN networks.

**802.11 Demystified** - James LaRocca 2002

Unlike most other references on the market, this next-generation resource goes well beyond Bluetooth specifications and thoroughly examines different implementation approaches - as taught by a "master instructor." This book discusses Bluetooth in detail, covering both

operational characteristics as well as its use as a wireless communications system. It addresses the coexistence of Bluetooth with other wireless networks and provides information on the significant security problems that exist when communicating without wires. It is based on 2 very popular and highly effective courses the author has been teaching for more than a year.

**802.11n: A Survival Guide** - Matthew S. Gast 2012-04-02

Wireless has finally come of age. With a significant jump in throughput over previous standards, 802.11n is the first wireless technology that doesn't trade speed for mobility, and users have stormed onto wireless networks with a passion. In this concise guide, Matthew Gast—chair of the IEEE group that produced revision 802.11-2012—shows you why wireless has become the default method of connecting to a network, and provides technical details you need to plan, design, and deploy 802.11n today. Building a network for the multitude of new devices is now a strategic decision for network engineers everywhere. This book gives you an in-depth look at key parts of 802.11n, and shows you how to achieve an Ethernet-free wireless office. Learn how MIMO's multiple data streams greatly increase wireless speed Discover how 802.11n modifications improve MAC efficiency Examine advanced PHY features such as beamforming and space-time code block Use advanced MAC features to maintain interoperability with older devices Plan an 802.11n network by determining traffic demand, key applications, power requirements, and security Choose the architecture, select hardware, and plan coverage to design and build your network

**Top-Down Network Design** - Priscilla Oppenheimer 2010-08-24

Objectives The purpose of Top-Down Network Design, Third Edition, is to help you design networks that meet a customer's business and technical goals. Whether your customer is another department within your own company or an external client, this book provides you with tested processes and tools to help you understand traffic flow, protocol behavior, and internetworking technologies. After completing this book, you will be equipped to design enterprise networks that meet a customer's requirements for functionality, capacity, performance,

availability, scalability, affordability, security, and manageability. Audience This book is for you if you are an internetworking professional responsible for designing and maintaining medium- to large-sized enterprise networks. If you are a network engineer, architect, or technician who has a working knowledge of network protocols and technologies, this book will provide you with practical advice on applying your knowledge to internetwork design. This book also includes useful information for consultants, systems engineers, and sales engineers who design corporate networks for clients. In the fast-paced presales environment of many systems engineers, it often is difficult to slow down and insist on a top-down, structured systems analysis approach. Wherever possible, this book includes shortcuts and assumptions that can be made to speed up the network design process. Finally, this book is useful for undergraduate and graduate students in computer science and information technology disciplines. Students who have taken one or two courses in networking theory will find Top-Down Network Design, Third Edition, an approachable introduction to the engineering and business issues related to developing real-world networks that solve typical business problems. Changes for the Third Edition Networks have changed in many ways since the second edition was published. Many legacy technologies have disappeared and are no longer covered in the book. In addition, modern networks have become multifaceted, providing support for numerous bandwidth-hungry applications and a variety of devices, ranging from smart phones to tablet PCs to high-end servers. Modern users expect the network to be available all the time, from any device, and to let them securely collaborate with coworkers, friends, and family. Networks today support voice, video, high-definition TV, desktop sharing, virtual meetings, online training, virtual reality, and applications that we can't even imagine that brilliant college students are busily creating in their dorm rooms. As applications rapidly change and put more demand on networks, the need to teach a systematic approach to network design is even more important than ever. With that need in mind, the third edition has been retooled to make it an ideal textbook for college students. The third edition features review questions and design

scenarios at the end of each chapter to help students learn top-down network design. To address new demands on modern networks, the third edition of Top-Down Network Design also has updated material on the following topics: ∫ Network redundancy ∫ Modularity in network designs ∫ The Cisco SAFE security reference architecture ∫ The Rapid Spanning Tree Protocol (RSTP) ∫ Internet Protocol version 6 (IPv6) ∫ Ethernet scalability options, including 10-Gbps Ethernet and Metro Ethernet ∫ Network design and management tools

**Designing and Deploying 802.11 Wireless Networks** - Jim Geier  
2015-04-29

Designing and Deploying 802.11 Wireless Networks Second Edition A Practical Guide to Implementing 802.11n and 802.11ac Wireless Networks For Enterprise-Based Applications Plan, deploy, and operate high-performance 802.11ac and 802.11n wireless networks The new 802.11ac standard enables WLANs to deliver significantly higher performance. Network equipment manufacturers have refocused on 802.11ac- and 802.11n-compliant solutions, rapidly moving older versions of 802.11 toward “legacy” status. Now, there’s a complete guide to planning, designing, installing, testing, and supporting 802.11ac and 802.11n wireless networks in any environment, for virtually any application. Jim Geier offers practical methods, tips, and recommendations that draw on his decades of experience deploying wireless solutions and shaping wireless standards. He carefully introduces 802.11ac’s fundamentally different design, site survey, implementation, and network configuration techniques, helping you maximize performance and avoid pitfalls. Geier organizes each phase of WLAN deployment into clearly defined steps, making the entire planning and deployment process easy to understand and execute. He illuminates key concepts and methods through realistic case studies based on current Cisco products, while offering tips and techniques you can use with any vendor’s equipment. To build your skills with key tasks, you’ll find several hands-on exercises relying on free or inexpensive tools. Whether you’re deploying an entirely new wireless network or migrating from older equipment, this guide contains all the expert knowledge you’ll

need to succeed. Jim Geier has 30 years of experience planning, designing, analyzing and implementing communications, wireless, and mobile systems. Geier is founder and Principal Consultant of Wireless-Nets, Ltd., providing wireless analysis and design services to product manufacturers. He is also president, CEO, and co-founder of Health Grade Networks, providing wireless network solutions to hospitals, airports, and manufacturing facilities. His books include the first edition of Designing and Deploying 802.11n Wireless Networks (Cisco Press); as well as Implementing 802.1X Security Solutions and Wireless Networking Handbook. Geier has been active in the IEEE 802.11 Working Group and Wi-Fi Alliance; has chaired the IEEE Computer Society (Dayton Section) and various conferences; and served as expert witness in patent litigation related to wireless and cellular technologies. Review key 802.11 concepts, applications, markets, and technologies Compare ad hoc, mesh, and infrastructure WLANs and their components Consider the impact of radio signal interference, security vulnerabilities, multipath propagation, roaming, and battery limitations Thoroughly understand today’s 802.11 standards in the context of actual network deployment and support Plan your deployment: scoping, staffing, schedules, budgets, risks, feasibility analysis, and requirements Architect access networks and distribution system for maximum reliability, manageability, and performance Make the right tradeoffs and decisions to optimize range, performance, and roaming Secure WLANs via encryption, authentication, rogue AP detection, RF shielding, and policies Master design and site survey tools and methods for planning 802.11ac networks and migrations Efficiently install and test any 802.11ac or 802.11n wireless network Establish specialized support for wireless networks, including help desk operations Systematically troubleshoot connectivity, performance, and roaming issues Design efficient mesh networks and city-wide deployments

**Implementing 802.11, 802.16, and 802.20 Wireless Networks** - Ron

Olexa 2004-08-04

This is not another book about installing a home or “hobby Wi-Fi system. Instead, this book shows you how to plan, design, install, and operate WLAN systems in businesses, institutions, and public settings such as libraries and hotels. In other words, this book is packed with serious information for serious professionals responsible for implementing robust, high performance WLANs covering areas as small as a coffee shop or as large as entire communities. Ron Olexa provides a solid foundation in RF/wireless theory as it applies to WLANs. His detailed, thorough coverage of propagation at GHz frequencies helps you understand the mysteries of WLAN coverage (such as how it can change from season to season due to foliage). You’ll also learn about antenna radiation patterns and gain so you can design you WLAN to have the coverage you need without causing interference to (or suffering interference from) other WLANs. Covers the widely used 802.11 family, as well as the new 802.16 and 802.20 standards Focuses on big commercial network implementations, such as in public buildings and businesses Author has over 25 years of experience with cellular systems and wireless networks

*Deploying Secure 802.11 Wireless Networks with Microsoft Windows* - Joseph Davies 2004

Get in-depth technical guidance for deploying a security-enhanced wireless network for your corporate, public, or small business network—direct from the Microsoft Windows Networking and Communications team. This essential reference details the latest IEEE 802.11 and related technologies for public and private wireless LANs, including the new Wi-Fi Protected Access (WPA) standard. You'll learn how to design and deploy an authentication infrastructure—including how to configure clients, Internet Authentication Service (IAS) servers, Active Directory directory service users and groups, certificate services, wireless access points, and other components—using best practices and real-world troubleshooting tactics from the extensive wireless LAN deployment at Microsoft. Get the technical drill-down you need to: Configure wireless client support for Windows XP, Windows Server 2003,

and Windows 2000 Build the authentication infrastructure—including IAS RADIUS servers and proxies, Active Directory users and groups, and a public key infrastructure (PKI) Determine the placement of wireless access points Configure a Windows PKI to issue certificates for authentication of wireless access Use the EAP-TLS or PEAP-MS-CHAP v2 authentication protocol to help maximize security for a wireless intranet Design wireless intranets for business partners, cross-forest authentication, or large-scale deployment Help mitigate network attacks by using the new Temporal Key Integrity Protocol (TKIP) and Michael features of WPA Troubleshoot Windows wireless clients, wireless access points, and the authentication infrastructure To learn about the changes in wireless standards and wireless support in Windows that have occurred since the publication of this book, download Updates to Deploying Secure 802.11 Wireless Networks with Microsoft Windows, a white paper by author Joseph Davies.

Wireless Network Design - Jeff Kennington 2010-11-10

This book surveys state-of-the-art optimization modeling for design, analysis, and management of wireless networks, such as cellular and wireless local area networks (LANs), and the services they deliver. The past two decades have seen a tremendous growth in the deployment and use of wireless networks. The current-generation wireless systems can provide mobile users with high-speed data services at rates substantially higher than those of the previous generation. As a result, the demand for mobile information services with high reliability, fast response times, and ubiquitous connectivity continues to increase rapidly. The optimization of system performance has become critically important both in terms of practical utility and commercial viability, and presents a rich area for research. In the editors' previous work on traditional wired networks, we have observed that designing low cost, survivable telecommunication networks involves extremely complicated processes. Commercial products available to help with this task typically have been based on simulation and/or proprietary heuristics. As demonstrated in this book, however, mathematical programming deserves a prominent place in the designer's toolkit. Convenient modeling languages and powerful

optimization solvers have greatly facilitated the implementation of mathematical programming theory into the practice of commercial network design. These points are equally relevant and applicable in today's world of wireless network technology and design. But there are new issues as well: many wireless network design decisions, such as routing and facility/element location, must be dealt with in innovative ways that are unique and distinct from wired (fiber optic) networks. The book specifically treats the recent research and the use of modeling languages and network optimization techniques that are playing particularly important and distinctive roles in the wireless domain.

*802.11 Wireless Networks* - Matthew Gast 2002

Designed to help administrators set up and debug an 802.11 wireless network, this comprehensive handbook examines the 802.11 protocol in detail, discusses a variety of Linux networking issues, and explores wide area networking using 802.11. Original. (Advanced)

*Implementing 802.1X Security Solutions for Wired and Wireless Networks* - Jim Geier 2008-06-02

You know it's essential, and you've heard that it can be tricky? implementing the 802.1x standard. Here is a road map that will enable you to approach 802.1x implementation with confidence so that you can conduct successful implementation of 802.1x in both wired and wireless networks. Complete with step-by-step instructions, recommendations to help you choose the best solutions, and troubleshooting tips, it lets you benefit from the experience of others who have met the challenge.

**Wireless Network Administration A Beginner's Guide** - Wale Soyinka 2010-08-05

Learn the essentials of wireless networking Configure, manage, and secure wireless networks using the step-by-step details in this practical resource. *Wireless Network Administration: A Beginner's Guide* shows you how to work with the latest wireless networking standards, including the 802.11x family, on Windows, Mac, and Linux platforms. The book covers wireless network planning, design, hardware, services, protocols, device configuration, security, troubleshooting, and more. This hands-on guide will get you started administering wireless networks in no time.

Get details on regulatory and technical organizations Learn about different wireless standards and the basics of RF technologies Understand and determine client-side hardware requirements, including chipsets and various wireless interfaces Select infrastructure-side wireless hardware, such as antennas, wireless access points (WAPs), residential gateways, switches/controllers, routers, and bridges Learn about WLANs, WWANs, WMANs, and WPANs Work with standard wireless network protocols--TCP/IP (IPv4 and IPv6) Understand DNS, DHCP, and other supporting infrastructure services Secure wireless networks using cryptography Configure infrastructure devices, including a wireless access point device and wireless network switches and controllers Configure and manage wireless Microsoft Windows, Mac OS X, and Linux clients Plan, design, survey, deploy, and troubleshoot your wireless network

*Deploying and Troubleshooting Cisco Wireless LAN Controllers* - Mark L. Gress 2009-11-09

This is the only complete, all-in-one guide to deploying, running, and troubleshooting wireless networks with Cisco® Wireless LAN Controllers (WLCs) and Lightweight Access Point Protocol (LWAPP)/Control and Provisioning of Wireless Access Points (CAPWAP). Authored by two of the most experienced Cisco wireless support professionals, the book presents start-to-finish coverage of implementing WLCs in existing wired and wireless network environments, troubleshooting design-related issues, and using LWAPP/CAPWAP solutions to achieve your specific business and technical goals. One step at a time, you'll walk through designing, configuring, maintaining, and scaling wireless networks using Cisco Unified Wireless technologies. The authors show how to use LWAPP/CAPWAP to control multiple Wi-Fi wireless access points at once, streamlining network administration and monitoring and maximizing scalability. Drawing on their extensive problem-resolution experience, the authors also provide expert guidelines for troubleshooting, including an end-to-end problem-solving model available in no other book. Although not specifically designed to help you pass the CCIE® Wireless written and lab exams, this book does provide you with real-world

configuration and troubleshooting examples. Understanding the basic configuration practices, how the products are designed to function, the feature sets, and what to look for while troubleshooting these features will be invaluable to anyone wanting to pass the CCIE Wireless exams. Efficiently install, configure, and troubleshoot Cisco Wireless LAN Controllers Move autonomous wireless network solutions to LWAPP/CAPWAP Integrate LWAPP/CAPWAP solutions into existing wired networks Understand the next-generation WLC architecture Use Hybrid REAP and Home AP solutions to centrally configure and control branch/remote access points without deploying controllers in every location Use Mobility Groups to provide system-wide mobility easily and cost-effectively Use Cisco WLC troubleshooting tools, and resolve client-related problems Maximize quality in wireless voice applications Build efficient wireless mesh networks Use RRM to manage RF in real-time, optimizing efficiency and performance Reference the comprehensive WLC and AP debugging guide Part of the CCIE Professional Development Series, this is the first book to offer authoritative training for the new CCIE Wireless Exam. It will also serve as excellent preparation for Cisco's new CCNP® Wireless exam.

802.11 (Wi-Fi) - Neil P. Reid 2003

Aims to help you break free with the wireless networking capabilities of 802.11. This guide provides hardware advice, radio frequency fundamentals, performance tips, architecture requirements, and more. It also aims to provide clarity on connectivity issues for laptop computers, personal digital assistants (PDAs), and peripherals.

**Developments in Wireless Network Prototyping, Design, and**

**Deployment: Future Generations - Matin, Mohammad A. 2012-06-30**

"This book highlights the current design issues in wireless networks, informing scholars and practitioners about advanced prototyping innovations in this field"--

**Mobile Computing Deployment and Management - Robert J. Bartz 2015-02-06**

Mobile computing skills are becoming standard in the IT industry Mobile Computing Deployment and Management: Real World Skills for CompTIA

Mobility+ Certification and Beyond is the ultimate reference for mobile computing. Certified Wireless Network Expert Robert J. Bartz guides IT and networking professionals through the fundamental and advanced concepts of mobile computing, providing the information and instruction necessary to get up to speed on current technology and best practices. The book maps to the CompTIA Mobility+ (MB0-001) exam, making it an ideal resource for those seeking this rewarding certification. The mobile device has already overshadowed the PC as a primary means for Internet access for a large portion of the world's population, and by 2020, there will be an estimated 10 billion mobile devices worldwide. Mobile connectivity has become the new standard for business professionals, and when combined with cloud computing, it creates a world where instant access is the norm. To remain relevant, IT professionals must hone their mobile skills. The ability to manage, develop, and secure a mobile infrastructure is quickly becoming a key component to entering the IT industry, and professionals lacking those skills will be left behind. This book covers all aspects of mobile computing, including: Radio frequency, antenna, and cellular technology Physical and logical infrastructure technologies Common mobile device policies and application management Standards and certifications, and more Each chapter includes hands-on exercises, real-world examples, and in-depth guidance from the perspective of a mobile computing expert. IT professionals looking to expand their capabilities need look no further than Mobile Computing Deployment and Management: Real World Skills for CompTIA Mobility+ Certification and Beyond for the most comprehensive approach to mobile computing on the market today.

Implementing 802.11 with Microcontrollers: Wireless Networking for Embedded Systems Designers - Fred Eady 2005-10-18

Wireless networking is poised to have a massive impact on communications, and the 802.11 standard is to wireless networking what Ethernet is to wired networking. There are already over 50 million devices using the dominant IEEE 802.11 (essentially wireless Ethernet) standard, with astronomical growth predicted over the next 10 years. New applications are emerging every day, with wireless capability being

embedded in everything from electric meters to hospital patient tracking systems to security devices. This practical reference guides readers through the wireless technology forest, giving them the knowledge, the hardware and the software necessary to design a wireless embedded device rapidly, inexpensively, and effectively. Using off-the-shelf microcontrollers from Microchip and Atmel, the author provides step-by-step instructions for designing the hardware and firmware for a fully operational wireless networking device. The book gives a thorough introduction to 802.11 technology and puts it into perspective against the

other wireless standard options. Just enough theory and mathematics is provided to give the depth of understanding needed for practical design work. The book thoroughly covers: \* Laptop wireless Ethernet card introduction and theory \*Introduction to CompactFlash-to-microcontroller interfacing \* Implementing the laptop wireless Ethernet card in an embedded environment Covers the hottest new embedded market area- wireless networking Shows designers how to save money and time by using microcontrollers in their embedded wireless designs instead of expensive, complex prefab boards