



WiMAX CRASH COURSE

Network architecture and protocols

**Successful deployment strategies
from industry leaders**

Implementation issues, challenges, and pitfalls

Potential WiMAX services and their enablement

STEVEN SHEPARD

WiMAX Crash Course

Steven Shepard



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Sabine, Steve, and Cristina, thank you for being my family. I am so proud of all of you.

FOREWORD

Once more, and this time with feeling.

I write this book as a complement to the small collection of good technology-focused WiMAX books that are already in circulation. This title, like my other books, contains plenty of technology, but its primary focus is on markets, applications, revenue impacts, and integration. In reality, it's a business book more than a technology book. Embryonic though the technology is at the time of this writing (the current standard is still in draft form, and the next one isn't due for months), it has a growing base of supporters that includes component manufacturers, systems manufacturers, and a significant number of service providers. Prestandard hardware is on the market, numerous global trials are under way, and an industry standards group, the WiMAX Forum (www.wimaxforum.org), has been constituted by key influencers, including Intel, Proxim, BT, Alvarion, AT&T, and Samsung.

I have monitored the evolution of WiMAX for the last two years with great interest not because of how it works or what it does but because of what it catalyzes. WiMAX is an accelerator, and it wields its influence on the areas where businesses focus *their* attentions: revenue enhancement, cost containment, competitive advantage, and risk mitigation. Properly deployed, it will have far-reaching, global impacts—and that's where I focus *my* attention.

With 50 clients operating in more than 90 countries, I am blessed with the opportunity to see firsthand the impact that new technologies have on the developed, developing, and undeveloped worlds. I have watched as problems of conduit congestion, infrastructure disruption, and onerous permitting processes in major cities have been resolved through the judicious selection of broadband wireless as an alternative to optical

infrastructure. I have watched the frenzy in the developing world that occurs when liberalization and privatization take effect, bringing on a spate of competitive positioning by emergent players and the attendant deployment of innovative technologies. I also have watched magic happen: the arrival of a small town's first phone in Africa and the buzz of potential that it creates among vendors and shopkeepers who crave connections to the global market and everything that access to the Internet promises.

We are a big industry, so big that it's easy to get lost in the mundane daily grind of "doing telecom." There are chips to be manufactured, systems to be assembled, code to be debugged, standards to be written, networks to be managed, and customers to be billed. Working in the middle of that operational maelstrom, it's easy to forget why we do what we do.

For a long time I unwittingly operated under the belief that the telecom industry exists for the telecom industry, that it is an end unto itself. That assumption came to a jarring and abrupt halt when I began working in the third world and had an opportunity to see firsthand what we *really* do. Yes, we satisfy shareholders and employ large numbers of people because of the products we make and sell, the services we offer, and the targeted solutions we craft. However, beyond that, at the critical customer touchpoint where magic happens and sparks fly, we empower commerce, create markets, build businesses, and motivate thought leadership. Our networks make it possible to consider what could be, and our services and applications make it happen. In many ways we are the ultimate change agent, and in the years to come our influence will be felt most strongly in the realm of globalization.

In *The Lexus and the Olive Tree*, Tom Friedman describes a phenomenon that he calls "the Golden Arches Theory." That theory eerily and accurately observes that no two countries with a McDonald's have ever waged war against each other. As silly as that observation sounds, its implications are quite serious: When a country reaches a stage of economic development at which its citizens have enough disposable income to spend some of it at McDonald's, that country becomes a paid member of the global economic team. When that happens, when national economies become interlinked into a single global economy, the Golden Arches Theory is lived out: If I attack *you*, I attack *me*. As the checker-playing, Armageddon-bent supercomputer said to Matthew Broderick's character in the movie *War Games*, "An interesting game, Professor Falken. The only winning move is not to play."

This book is about WiMAX, but more than that, it is about the *promise* of WiMAX. Numbers as large as \$500 billion¹ have been tossed about as being indicative of the upward economic impact of broadband; imagine what happens when broadband mixes with global roaming. That, among other things, is the value that WiMAX brings to the table.

We begin with the vision: What will be possible when WiMAX arrives? We then discuss application scenarios before walking through the technology's brief history (it hasn't been around long enough to have a *real* history). Next, we dive into the inner workings of WiMAX and explain how it interworks with other technologies. Then we introduce the evolving application set that WiMAX enables before discussing the increasingly chaotic but very interesting world of regulation as it relates to broadband wireless. We conclude with a brief discussion about the players in the WiMAX game, followed by a peek into the future. WiMAX has the potential to be highly disruptive, but like all capable technologies, it can be enormously facilitative. We wrap up the book with a discussion of strategies for integrating and deploying WiMAX.

All my books include a comprehensive acronym list and a glossary. Thanks to all the readers who have lobbied for its inclusion; this book has it as well.

Thank you, readers, for your continued support. This book is for you.

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¹ Crandall, Robert W., and Charles L. Jackson, *The \$500 Billion Dollar Opportunity: The Potential Economic Benefit of Widespread Diffusion of Broadband Internet Access*. Criterion Economics, LLC, July 2001.