

VoIP
FOR
DUMMIES®

VoIP FOR **DUMMIES®**

by Timothy Kelly

Foreword by Don Peterson

Chairman and Chief Executive Officer, Avaya Inc.



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About the Author

Timothy Kelly is an Information Systems technology professional with more than twenty-five years of experience. His background includes the design of many telecommunications network enterprises, from small simple networks that support a single building location to large multilocation networks running integrated data, voice, and videoconferencing applications.

From 1992 until 2002, Tim was principal consultant for Network Technology Services, a Pittsburgh-based company. He has completed network design engagements for countless organizations, including Alcoa, Blue Cross, Mercy Health System, Mine Safety Health Administration, the U. S. Navy, South Hills Health System, Westinghouse Telecommunications, ARBROS Communications, The Community Builders, and Lucent Technologies. Kelly is a certified ORACLE DBA Master and Network+ Professional.

Tim is an honors graduate of Duquesne University. He went on to complete the MSIS and post-graduate certificate in Telecommunications at the University of Pittsburgh. His terminal degree is a Doctor of Science in Information Systems from Robert Morris University. His research focus was the effects that converging technology networks have on organizations and people, an area in which he is well published and has made numerous presentations before academic and corporate bodies.

Tim Kelly is author of *Bits & Bytes Y2K & Beyond* and is well known for his consults and media appearances during the years and final months preceding the year 2000. He was dubbed a “calming influence” on the Y2K scare by the Pittsburgh media.

From 1983 to 2004, he taught Information Systems Technology courses for local Pittsburgh schools, including Duquesne University, Indiana University of Pennsylvania, and Robert Morris University. In 2003, with the help of former associates, he started the National Center for Converging Technology Research, an organization dedicated to helping other organizations understand how best to apply converging technologies such as VoIP in their business environments. In Fall 2004, he began teaching full-time for the University of North Carolina at ECSU.

Tim Kelly will be co-authoring a VoIP solutions book that defines the latest convergence options for running data, voice, and video applications — the “triple play.” The book will provide current coverage on the latest wireless forms of networking. The effect on business of WiMax and other fixed-wireless alternatives will be treated. Tim believes the solution to the triple play model lies with resolving the dilemma of inadequate bandwidth and that VoIP over WiMax and WiFi show how close we are to cracking this nut. The next few years for VoIP should be really exciting.

Dedication

To my primary passion source, my heart and soul, my Tushka; and our four children: Laural, Christal, Gabe, and Matt. Each beat of my heart has four distinct iterations.

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I would like to express a truly heartfelt thanks to Greg Croy at Wiley Publishing. Greg believed in my ideas and supported me through the entire process. It is not easy to become a *For Dummies* author, but the guidance from Greg enriched the process while making it possible and enjoyable. I also want to thank Leah Cameron, who conducted the first nuts-and-bolts review of my work. Her feedback was invaluable. I want to thank Nancy Stevenson for her help in finalizing the Table of Contents.

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Foreword

Communications is the heart of your business, and voice over IP has the capability to strengthen that heart and thereby strengthen your business. VoIP is not just another form of connectivity. Yes, it combines the intimacy of voice with the power of data, but it is more than voice over the Internet or voice over your data network. It enables the merging of voice and data applications in ways that liberate business processes. VoIP extends voice communications to anyone, anywhere, over any device — it is the fundamental building block of intelligent communications. It offers businesses the benefits of significant cost savings, increased revenue, and better customer service. It puts communications at the core of the business, enabling faster decisions, revitalized business processes, and new business models.

This year is a pivotal one in electronic communications. With customer confidence growing, IP is now preferred over traditional phone systems. With VoIP becoming mainstream, the adoption rate is accelerating.

Voice over IP is no longer a wait-and-see decision. It's happening right now. You can't afford to limit your communications options or neglect the role that it can play in business performance. But maximizing success in switching to a VoIP system requires top-notch planning, design, implementation, and management. To help you get started and understand the fundamentals, Tim Kelly has written a fine book, *VoIP For Dummies*. This book lifts any confusion you may have about the subject and clearly identifies the many benefits of VoIP for businesses. This book is your portal to understanding how VoIP can make your business stronger by making your communications systems stronger. The results will be people more productive, processes more efficient, and customers more loyal.

Don Peterson

Chairman and Chief Executive Officer, Avaya Inc.

Introduction

VoIP (pronounced *voyp*) is the name of a new communications technology that changes the meaning of the phrase *telephone call*. VoIP stands for *voice over Internet protocol*, and it means “voice transmitted over a computer network.”

Internet protocol (IP) networking is supported by all sorts of networks: corporate, private, public, cable, and even wireless networks. Don't be fooled by the “Internet” part of the acronym. VoIP runs over any type of network. Currently, in the corporate sector, the private dedicated network option is the preferred type. For the telecommuter or home user, the hands-down favorite is broadband.

You may be wondering what all this means in terms of your actual telephone. This is the really cool part: You can access your account on the VoIP network by a desktop telephone, a wireless IP phone (similar to a cell phone), or the soft screen dialpad of your laptop or desktop computer.

With VoIP, you can literally pick up your things and move to another location, within your office building or around the world, without having to forward your calls to a new telephone. VoIP's entirely portable!

What's more, you can access the Web from your IP phone, enabling you to get important (or not so important) announcements and e-mail on the go. It's like having a pocket PC and a cell phone rolled into one, specifically designed for *your* network.

As you can imagine, VoIP is a win-win for everyone. The added flexibility and quicker response times translate into greater customer satisfaction and increased productivity throughout your organization.

About This Book

VoIP For Dummies is written for anyone who wants to reduce or eliminate their toll charges while upgrading the level of computer networking services and calling features they receive. Here you discover not only what VoIP is but how you can implement it in your company or home. (You'll even find out whether VoIP makes a lot of sense for your situation.)

VoIP has particular appeal to those who want to use their computer network to carry their telephone calls, thereby saving the expense of running different networks for each.

If you're a consumer running broadband Internet services and you have significant toll charges each month, you should look into VoIP to make your toll calls. With VoIP running on your broadband line, you can save money each month by reducing your toll costs while still maintaining your traditional telephone service for local calls.

If you're a manager who needs to decide about support or recommend whether to make the switch to VoIP, or if you're an IT person looking to help your boss make an informed decision about integrated networking, this book provides an excellent place for you to begin.

I explain how VoIP works and how it compares to telecommunications technology that was previously considered irreplaceable. By the time you finish Part III, you'll see why many businesses throughout the world and consumers in the United States have turned to VoIP and integrated networking as their main system for data, voice, and video.

Conventions Used in This Book

To help you navigate through this book, I use the following conventions:

- ✓ *Italic* is used to highlight new words or terms that are defined.
- ✓ **Boldfaced** text is used for chapter titles, subtitles, and to indicate keywords in bulleted lists.
- ✓ `Monofont` is used for Web addresses.
- ✓ Sidebars, unlike the rest of the content, are shaded in gray.

What You're Not to Read

Whether you are a consumer or a corporate user, you don't have to read this book from cover to cover to find out how VoIP can benefit you or your company. You may miss some really interesting stuff, but if you're interested in knowing just the fundamentals of IP telephony and VoIP, you can get that information by reading just Chapters 1 and 2. These two chapters cover VoIP basics and introduce you to how you can make VoIP work for you.

If you're unfamiliar with how traditional telephone companies bill their customers (that's you!), Chapter 3 enlightens you with this information. (Before reading this chapter, you need to promise that you won't yank the phone cords out of the wall when you discover how much you are really paying — talk *isn't* cheap!)

If you're thinking of putting VoIP in your home or even in your home office, or you already have done so, you may be interested in gaining more information about VoIP fundamentals in Part I and then reading Chapter 6, where I describe how to put broadband VoIP to work in your home. If you're using VoIP from home to connect to your company's virtual private network (VPN), you'll also want to look at Chapter 9.

Information technology professionals working in the corporate world, and the people that manage them, will be more interested in Chapters 4 through 7 than any other section of the book. These chapters cover all the VoIP network types used in the corporate sector.

If you just want to define the type of telephone your company is currently using or may use with VoIP, check out Chapter 10. If you need to understand the traditional non-VoIP telephony system models that a company must have to even begin to look at VoIP, see Chapter 11.

If you want to move your company toward a VoIP telephony system model, you need to know how to make it work from a financial perspective; Chapters 12 and 13 can help with case studies and cost figures. These chapters detail how a multilocation company and a smaller single-location company can transform their monthly telephony system finances using a VoIP network. Chapter 14 details other factors that apply to evaluating a move to VoIP for any size network.

Feel free to read this book from cover to cover or just dip into whatever part or section best suits your needs. You can then return to the rest of the book when you have more time to enjoy the read.

Foolish Assumptions

As I wrote *VoIP For Dummies*, I made some assumptions about you and what you might already know about traditional telephony services in contrast to VoIP telephony. Here are those assumptions:

- ✔ You probably have trouble understanding your monthly telephone bills and don't realize that their long-distance is divided into four billable service categories.
- ✔ You rarely consider that there is a cost for the line (access line) and a cost for the usage on that line.
- ✔ You might be thinking that VoIP is a new way of doing telephony but, from what you've heard, it works only over the Internet.
- ✔ You may know the basics of computer networking and VoIP, but you want to gain advanced knowledge, like using your computer and your older POTS phone simultaneously with your new VoIP service.
- ✔ You've heard about all the new and exciting features that come with VoIP at no additional cost.
- ✔ You heard (incorrectly) that 911 and E911 do not work with VoIP, not knowing that VoIP principles are the technology that underlies E911.
- ✔ You've heard that VoIP can save the consumer or the company lots of money.
- ✔ You may want to protect your company's telephony systems investment while figuring out a way to bring VoIP in because you know it will save the company big bucks.

How This Book Is Organized

Each part of this book focuses on a different aspect of VoIP, as described in the following sections. VoIP is a technology that challenges all your preconceptions about telephony and networking.

Part I: VoIP Basics

Part I introduces you to the basics of VoIP. You get the rundown on essential terms and the general workings of the technology. This part describes the basics of IP telephony and how VoIP calls get packetized and carried over external networks. Access services and the lines they run on are defined. You find out how traditional telephony models can become cash cows for the carriers. TCP/IP, the number one network design model, is introduced as the underlying design for VoIP networks.

Part II: Taking VoIP to Your Network

In Part II, you discover how networks connect to each other. From the public telephone network to the global Internet and all the network types in between, you'll find out what your networking options are.

The Internet is only one network option for VoIP (it also runs on all the other network types that drive industry). Network types include broadband networking, which exists mainly as a consumer option for VoIP. Other types covered in Part II are switched, dedicated, and wireless networks. There is no shortage of network types to run VoIP on.

To help set VoIP in a network context, Part II compares the transport lines (where applicable) and services available on each network type. Also covered are bandwidth options and quality of service. With these options, companies can support not only VoIP but their data and videoconferencing needs for all their locations.

Consumers are also treated to illustrated coverage on broadband networking options. You can run VoIP out of your home and receive ideal bandwidth options that support not just VoIP but your computer data — and even video.

When it comes to VoIP, all the network options in the world would be of little value if you couldn't actually talk on the phone! For that reason, Chapter 10 outlines the major VoIP-enabled telephone types: VoIP hard phone, VoIP soft phone, and VoIP wireless phone. It also covers the traditional telephone types that can be used in a VoIP network.

Part III: Making the Move to VoIP

The reasons to switch to VoIP are countless, depending on how far you want to project the future of the marketplace. Part III starts in Chapter 11 by describing the “final four” telephone system models. These are the traditional systems used by consumers and corporate customers. If you're not yet on VoIP, you must be running with one or more of the final four options.

Through real-world case studies, Part III provides guidance for both single-location and multilocation companies, covering the total cost factors and then applying a VoIP solution that significantly reduces the cost of a VoIP conversion while enhancing productivity.

Part IV: The Part of Tens

In Part IV, I provide specific content and advice for both corporate and consumer-based prospective VoIP users. This, of course, is accomplished in the time-honored *Dummies* format: the venerated Part of Tens.

If you're a company pondering the move to VoIP, Chapter 15 gives you the top ten reasons why you need to make the move. Consumers find the top ten reasons why they should change in Chapter 16. Chapter 17 dispels the top ten myths about VoIP. Get the truth about these myths here and now.

Finally, Chapter 18 provides a quick overview of the best of the best: the top ten VoIP manufacturers. When you're ready to make the move, you'll know who to go to for support.

Part V: Appendixes

Last, but by no means least, the final section of this book includes two reference items that you will find helpful in making sense of the world of VoIP. The first, Appendix A, provides an overview of the largest VoIP service providers in the world. These are the companies that you can partner with to realize all your VoIP dreams.

The second item is a handy glossary. Confused by a term you encounter while reading the book? Turn to the glossary and your bewilderment will fade into the past. (It's also a great tool for understanding VoIP marketing brochures and white papers.)

Icons Used in This Book

Throughout this book, I occasionally use icons to call attention to material worth noting in a special way. Here is a list of the icons, along with a description of each.



If you see a tip icon, perk up! You're about to find out how to save time, money, or effort. These are the nuggets that, when heeded, can make your life simpler.



This icon indicates information that is probably most interesting to those with a technical bent. If you're responsible for any aspect of the company network or feel comfortable hacking it alone at home on broadband, you'll have no problem breezing through information marked in this manner.



Some points bear repeating, and others bear remembering. When you see this icon, take special note of what you're about to read.



How many times have you heard the phrase *buyer beware*? In paying for traditional telephony and VoIP networks, most concerns revolve around cost and quality of service. When you see this icon, your life won't be in danger, but you will want to pay attention to the "gotcha" that this icon undoubtedly marks.

Where to Go from Here

The most important thing to keep in mind whenever you're exploring a new technology is how it fits into the larger picture. Take a global view. Specifically, always be thinking, "How will this feature increase my company's efficiency?" Or, "How will an integrated network help promote collaboration across my company?" Of course, you may also be wondering how you'll save money with VoIP.

Consider the direction of the telephony industry. The move toward VoIP is happening right here and right now. If you're a consumer, the question is no longer, "Should I get VoIP or broadband services in my home?" Instead, the question is "How do I get these services?"

If you're a decision-maker in your company, you need to strategize how to remain competitive in a constantly changing market. If you're a corporate professional working in a department such as IT, telecommunications, networking, or even finance, you need to research the available technologies so you can make recommendations to your boss and implement, if necessary, a VoIP system. End users need to be prepared to make the switch if their company adopts a VoIP system, or if they get transferred to a new location that already has such a system in place.

This book provides a great place for getting your feet wet, whether you're a consumer, a manager, in charge of the company finances, or an end user. My best advice on where to go from here? Flip the page and keep reading!

