Smart Homes FOR DUMMIES®

3RD EDITION

by Danny Briere and Pat Hurley

Wiley Publishing, Inc.

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Smart Homes For Dummies®, 3rd Edition
Published by
Wiley Publishing, Inc.
111 River Street
Hoboken, NJ 07030-5774
www.wiley.com

Copyright © 2007 by Wiley Publishing, Inc., Indianapolis, Indiana

Published by Wiley Publishing, Inc., Indianapolis, Indiana

Published simultaneously in Canada

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Library of Congress Control Number: 2007930401

ISBN: 978-0-470-16567-6

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

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Danny Briere founded TeleChoice, Inc., a telecommunications consulting company, in 1985 and now serves as CEO of the company. Widely known throughout the telecommunications and networking industry, Danny has written more than one thousand articles about telecommunications topics and has authored or edited ten books, including *Internet Telephony For Dummies*, *Wireless Home Networking For Dummies (*now in its second edition*), Wireless Hacks and Mods for Dummies, Windows XP Media Center Edition 2004 PC For Dummies,* and *Home Theater For Dummies*. He is frequently quoted by leading publications on telecommunications and technology topics and can often be seen on major TV networks, providing analysis on the latest communications news and breakthroughs. Danny splits his time between Mansfield Center, Connecticut, and his island home on Great Diamond Island, Maine, with his wife and four children.

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Dedication

I dedicate this book to my wife, Holly, and publicly and officially confess that she has a better memory and is smarter than I. Plus, she's usually right. I thank her dearly for putting up with me while I put in long hours at the office to finish this book, including the 19 times that I was late for dinner. Okay, so that's a low number. Okay, so Holly also doesn't exaggerate as much as I do. In any case, I hope that she will continue to let me infiltrate the home with smart-home techniques (which she secretly likes but won't say) and at least once say that she likes ONE thing I've installed.

— Danny

I dedicate this book to my wife, Christine, for allowing me to bore her nearly to death with long, breathless discussions of networking toys that no normal person wants to spend more than three minutes talking about, and for letting me scare the living daylights out of the dogs with remote-controlled gizmos. To thank her more completely, I promise to not bring a robot into the home — thus avoiding all those dog psychiatrist bills — well, unless it's a robotic dog poop picker-upper!

— Pat

Authors' Acknowledgments

It takes a lot of effort by a lot of people to put a book together. We probably can't give proper acknowledgment to everyone who's given us advice, opinions, and guidance as we've worked on this project, but we'd like to try.

For this third edition, we'd like to specifically thank the following folks for sharing their knowledge and providing their extremely helpful insights into the world of the smart home. To name just a few, we'd like to thank Ian Hendler, Grant Sullivan, Marc Ceraculo, Mara White, and Jack Merrow at Leviton (sorry for leaving you guys at the dinner table during that work crisis!), Gordon Sell at Gordon Sell PR for Canton, Alex Elliot at NextAlarm, Joelle Kenealey at Coltrin Associates for Control4, Eric Smith at Control4, Julie Stern at LEGO Systems, Karl Pawlewicz from Griffin PR for Middle Atlantic, Michael Cukrow and Mark Tracy at Middle Atlantic Products, Barry Haaser at Echelon, Ralph Maniscalco at Honeywell, Michelle Laird at SmartLabs, Brad Kayton at 4HomeMedia, Casey Munck and Frank Sterns at Niles Audio, Roger Dressler and Jeanne Alford at Dolby Labs, Adam Weissman and Jeff Talmadge at Denon, Ted White at the Green Glue Company, Joel Sider at Microsoft, Dave Gilbert at Sound Seal, Steve Muellner and Andrew Corkill at Meade, and Melanie Jensen and Colleen Logan at iFit. And to all the others we forgot — thank you too!

For our earlier editions of the book, Sandy Daniels kept us organized, connected, and sane. She prodded us along, set up interviews, found people we couldn't find ourselves, and generally acted like a bulldog in breaking through corporate mazes to find the right people to interview for the book. If you ever meet her, you'll wonder how such a nice person can be so effective.

We also have built on the help of literally dozens of vendors during our research in previous editions of this book. Special thanks go to Keith Smith at Siemon, David Allred at DirecTV DSL, Jeff Denenholz at X10 Wireless Technologies, Mike Hernandez at ChannelPlus, Peter Radscliff and Jim Gist at Monster Cable, Doug Hagan at Netgear, Matt Graves and Sean Ryan at Listen.com, Nick Smith and Vanessa Tuell at Request, Tom Reed of the HomePlug Powerline Alliance, Dave Thompson of CopperGate Communication, Brian McLeod at Harmony, Andrew Liu at Intel, Mel Richardson and his team at BellSouth, Lawrence Cheng at XM Radio, Tom Lucke, Fred Bargetzi, and Ray O'Sullivan at Crestron, Paul Cunningham at Cunningham Security in Portland, Maine, and George Snyder at Home Automated Living.

Finally, we want to thank the Wiley team who (once again!) bought into our vision of a smart home, and made sure we crossed our *i*'s and dotted our *t*'s (or something like that). Thanks especially to Susan Pink, our project editor, and Melody Layne, our acquisitions editor.

Publisher's Acknowledgments

We're proud of this book; please send us your comments through our online registration form located at www.dummies.com/register/.

Some of the people who helped bring this book to market include the following:

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Introduction

Welcome to *Smart Homes For Dummies,* 3rd Edition. This book is the first to specifically tell you how to futureproof your home to take advantage of the present and upcoming gee-whiz things that can make your home a 21st century castle.

Very few things can prepare you for the massive changes that are taking place due to the innovations offered by an interconnected world. The Internet and electronic commerce are changing the way we live, the way we work, and the way we play. (We hope there's more of the last one!)

We're so used to going to stores and buying things. To calling toll-free numbers so we can ask questions and order products. To going to school to learn. To going to the movies to watch the latest *Harry Potter* release. To going to the music store to buy the top-of-the-charts CDs.

Now it can all come to us. We can buy things through our TV sets. We can ask questions and videoconference through our computers. We can attend classes through computer-based training. We can click our remote controls to get video-on-demand. We can download new CDs, live, over the Internet.

It's at our doorstep. The question is, "Can you let it in?" Without a home network, all this might stay outside, or in the TV room, or trapped in that attic office of yours. A home network opens the world to your entire household, and now more than ever is the time to plan.

That's what *Smart Homes For Dummies,* 3rd Edition, provides — a plan for your networked future.

If you plan nothing and simply go with the flow, ordering new capabilities from your cable or telephone company when available, you'll find that they'll start deciding how your home network should be built and operated. This is dangerous because they will not think about what's best for your home — rather, they'll install whatever gets their technicians in and out of your home the fastest. These companies are also not looking at your big picture. In this book, we help you understand how your home can be compatible with what they want, and still keep your vision of a whole-home network too. Read on!

About This Book

Within these pages, you'll find a number of technologies and issues relating to developing digital smart-home technologies. Following are some of the things you discover:

- What a home network is, and what it takes to build one
- The key points to think about before starting to conceptualize a home-network design
- What the various home-network devices and services do
- What's involved in making a home-entertainment center accessible throughout the house
- What you need to create a home-security network
- Your options for dressing up your home-telephone capabilities
- The best way to design a home-data local area network (LAN)
- The ways to boost your in-home wireless LAN and cell phone signals
- The best way to connect your home to the Internet
- What's coming down the road and into your home in the future

Some of the networks and issues that we cover in *Smart Homes For Dummies* are in the realm of the do-it-yourselfer, so we present the big-picture stuff for those readers and give high-level instructions. These instructions don't go into stuff such as removing your drywall and running cables through your house. We recommend *Home Improvement For Dummies* by Gene Hamilton, Katie Hamilton, and the editors of HouseNet (published by Wiley Publishing, Inc.) if you need help with that stuff. And if you don't feel comfortable running cables through your house, hire a professional!

If you're renovating a home, building a new home, or trying to figure out how to connect anything with anything else in your home, you need *Smart Homes For Dummies* to make sure you're getting what you need — not what your builder happens to be selling.

What You're Not to Read

Smart Homes For Dummies isn't a novel. You don't have to read page 1 before going to page 2. So that means that you can just flip around through the book and start wherever you like. You won't feel lost.

You can use the Table of Contents at the front of the book to find out where to look for a topic that interests you, whether it's distributing a DVD signal from your home-entertainment center to your bedroom, or making your lights go on and off by themselves. Or you can search the index for a particular term that interests you. However you find the information, read it and then put the book back on the shelf. That's how this book is meant to be used.

Foolish Assumptions

This book is for everyone. Few people don't have a TV, radio, or some sort of computing device that would benefit from being networked in the future. Although it's easy to say now that computers are only for families in certain financial brackets, within a few years, many TV sets will start shipping with Internet connectivity options on-board. So, if you want to make the most of your home's electronic systems by networking them, you need to read this book or one like it.

You'll get the most out of this book if you're remodeling or building a home, because you're in a position to run wires through your walls. Apartment dwellers can do some of the stuff that we outline in this book (using wireless technologies), and they can get cool ideas for when they do buy their homes.

One big assumption that we (and many in the industry) have had to get out of our heads over the past few years regards wireless technologies. Some folks have taken the position that today's wireless technologies (and no-new-wires technologies that leverage existing phone and power lines) have eliminated the requirement to put network wiring in your walls. Well, wireless is great — it can be an invaluable complement to a wired network. If you live in an apartment or condo and can't get inside the walls to run new wire, wireless may even be good enough to build your entire network around. But if you live in a typical home, we think you're going to find that a wired network is more capable, more reliable, and more flexible. And a wired infrastructure can be a good investment that pays you back if you sell your home.

How This Book Is Organized

We realize that not everyone is going to want to do everything we discuss in the book. So we broke the book down into distinct parts, each of which tackles a different aspect of building a smart-home infrastructure. Part I is the high-level, 50,000-foot view — describing why you might want to create a smart home. Parts II through V look in depth at how to design your home and home network to take advantage of all the neat things coming down the road in each of the major zones, and Part VI tells you how to interconnect them all.

Part I: Future-Perfect Homes

Part I describes where we're trying to get to: our future-proofed home. We talk about the different major network zones of your home: your entertainment system, your security system, your phone system, and your computer system. We talk about all the other things that you might want to link and why you'd want to do that. And finally, we talk about how you can start thinking about the various things you could accomplish with a fully networked home — your smart home.

Part II: Making Your Home an Entertainment Center

Part II looks at how to make your home an entertainment center. You find out about creating not merely a home theater, but a true home-wide entertainment complex. How do you listen to your favorite CD from anywhere in the house? How do you share a satellite dish among multiple TVs. How do you watch your napping baby from your living room TV?

We tell you how to sensibly build a media backbone in your home without breaking your bank account. We help you plan for things such as flat-screen TVs, intercom systems, whole-home audio systems, gaming consoles, and satellite systems. We talk about your wiring (and wireless) options for communicating with each part of your home-entertainment complex.

Part III: Now We're Communicating!

Part III delves into the world of telephones. Life used to be simple in this area. If you wanted a new phone, you could go to the local department store or Radio Shack and buy one. Now you have all sorts of complications in this area. You can choose a multiline phone, a 2.4-GHz or 5-GHz cordless, a VoIP phone, a Skype phone, a screen phone, a combined phone-fax-printer-scanner, an answering machine, central-office-based voice-mail services, and a whole lot more. We help you craft your home-telephone network so that you can communicate with anyone from anywhere — without all that scratchy static, we hope.

Part IV: Livin' Off the Fat of the LAN

Part IV looks at your computer zone. A smart home has a high-bandwidth backbone connection running throughout the house, so you can tap into your data autobahn wherever you like. We help you understand how you can play networked games, share files between computers, print or fax from any computer in the home, or even get the whole family on the Net, at the same time! We look at the world of DSL, cable modems, HughesNet dishes, wireless Internet connections, electrical data connections, and more. Wired or wireless, we help you plan and design a computer LAN for your home. We guide you through the maze of wiring options to make sure that if you want to surf the Net while mowing the lawn, you can.

Part V: Keeping the Bad Guys at Bay — Security

Part V takes you through our home-security boot camp and looks at everything you'd want to do to secure and protect your home. We describe not just fire and burglar alarms, but also video doorbells, closed-circuit TV, driveway sensors, and ways to watch out for your kids. We help you plan your way to a more secure and protected home.

Part VI: Putting It All Together — Home Automation and Control

Part VI brings it all together — the ultimate guide to home networking. We walk you through a whole-home approach to network design. We provide home-design and home-layout tips and expose you to the various products on the market for centralized home networking.

Want to fire up that coffee pot while you're still asleep? Or how about setting the mood with automated lighting? We look at all the latest trends and gadgets governing home automation, including the details about X10, ZigBee, Z-Wave, and Insteon.

Part VII: The Part of Tens

Part VII is the infamous Part of Tens, where we give you ten common pitfalls to avoid when automating your smart home and the top ten toys of the future.

Icons Used in This Book

We use helpful graphical icons to point out items of interest — sort of like Kodak Picture Spots at Disney World. These icons are meant to encourage you to pause and take in what we're saying at that point. Following are the icons we use.

This is the fun stuff. This icon highlights neat new technical and other advances that are just arriving or not too far away. It's like a free pass to the World's Fair and a glimpse at the World of the Future.

This is a helpful reminder to do certain things, which translates to "we've forgotten to do this so often that we put it here just to remind ourselves."

When you see this icon, you may want to wait to make a decision until the industry decides which way it wants to go. Remember the Betamax VCR?

A few people in every crowd raise their hands and ask what's underneath the hood, so every now and then we stop to point out some of the neat stuff that makes the technology work. (We say *neat* because we're nerdy enough to enjoy writing about it.)

This icon highlights a shortcut or timesaving secret that we wished someone had told us before we learned the hard way.

This is never a good icon to see. It means you're working in a part of the Internet or your computer that's dangerous. It's like knowing the Wicked Witch of the West is in your neighborhood and you're wearing the ruby slippers. Be careful.

This icon tells you about a wireless technology that you can use instead of ripping your walls out.

Where to Go from Here

To help you keep up with the latest and greatest in smart-home devices and technologies, we created a companion Web site. Just type `www.digital-dummies.com` in your favorite Web browser, and you can catch up on the latest smart home news, find bonus material that we just couldn't fit into the book, and read our reviews of the coolest new gadgets.

See something that is not quite right? A typo? Something we should correct in the next edition? Drop us an e-mail at `dummies@telechoice.com`.

Whew! As Willy Wonka says, "So much time, so little to do . . . reverse that." Let's get going!

Part I
Future-Perfect Homes

"Roger! Check the sewing machine's connection to the PC. I'm getting e-mails stitched across my curtains again."

In this part . . .

In the olden days, your home network was basically comprised of electrical wires and phone lines, with a smattering of alarm wiring here and there. Now your home network covers all sorts of wiring and wireless options, to connect any of a number of different devices — including your car and your microwave.

You can connect home-entertainment systems, security systems, computer networks, telephone systems, and appliances and come up with all sorts of neat applications to help make your home living simpler and more enjoyable.

In this part, we tell you all about the potential of a home network. We discuss the major elements of a whole-home network and describe the advantages of connecting them together. We also give you some advice on how much everything will cost, and show you what the finished product (a networked home) will look like — inside the walls! By the end of this part, you'll be more excited than ever about hooking everything together.

Chapter 1

Mi Casa, Cool Casa

In This Chapter

- Looking at a day in the life of your wired home
- Understanding what goes into a wired home
- Quantifying the benefits of a home network
- Outlining the requirements for a home network

If you stop the average person on the street and start talking about home networks, he or she would probably make references to ABC, CBS, NBC, and FOX, or mention the Home Shopping Network or some other cable network show. *Network,* until recently, has meant little else to most people.

But times, they are a changin'. The invasion of telecommunications into all aspects of life is creating a different meaning of the word *network.* Most people have had some contact with a network through their work environment — computer local area networks (LANs) in the office, control networks in factories, telephone networks in many mid-sized or larger businesses . . . heck, the Internet is a huge network.

You can think of networks simply as things that help you do your work. As you concentrate on printing a document, calling up a database, or checking out the price of a product online, the network is invisible (that is, until it's broken).

The network concept has begun to move from the workplace to the home, and smart home builders and remodelers (and forward-looking owners of otherwise perfect existing homes) are starting to think in terms of wiring (or *wirelessing*) their homes both to make use of a network today and to future-proof against upcoming requirements.

Before you go any further, do this little exercise (don't worry, we won't grade you): Write down all the things in your house that you think you may want to network. Be as creative as you can. Think about your lifestyle and the way your house is set up. When you finish, put the list aside and continue to read this chapter. Toward the end, we'll share our list with you.

Living in Your Smart Home

Your smart home can seep into all aspects of your life. It helps you do those day-to-day tasks that can take up so much time, such as opening the draperies, dimming the lights, and flipping on the Weather Channel to see whether the kids have a snow day. How far you go with your smart home depends on your lifestyle, budget, and tastes.

This section spends a virtual day in a fictitious smart home. Here's the scenario: You, the reader, are part of a family of six, plus the requisite pets (we prefer dogs). You and your spouse both work, and the kids range in age from 8 to 17.

Starting your day

Anyone with kids knows the importance of keeping on a schedule. Your home network helps you do just that, in style.

At first light, you wake to your home-controlled alarm — a stream of pleasant classical music coming over your home-audio network into your bedroom. After a preset length of time, the music fades out and the TV kicks on to your favorite local station, where you can get the weather and traffic reports and information about any school closings or delays. Down the hall, the kids awaken to the music of their choice.

In the kitchen, the coffeemaker starts brewing your morning caffeine requirements. Select shades and drapes throughout the house open to let the day's light stream in. It's winter, so the towel warmers and the radiant heat in the bathrooms' floors are turned on. The automatic pet door out back opens and lets the dog out for his morning constitutional.

By this time, you're already in the kitchen making school lunches. Being the nice person you are, you take a cup of coffee to your spouse, who is listening to National Public Radio in the bathroom. As you finish setting out breakfast for the kids, a glance at the upstairs monitors shows that two of your four kids are still in bed. Your eldest son is videoconferencing with his girlfriend on his computer. You punch the intercom and tell them all to get a move on.

As the children cycle into and out of the bathroom, the home-control system times their showers to make sure no one hogs the bathroom. The shower's water temperature is just to their liking, but that's hardly a surprise — it's the same setting they use each day this time of year.

As you sit down to breakfast, your spouse comes running through, late for the office. A printout of major headlines and personal stock standings sits waiting in the printer, having been created and downloaded from the Internet overnight.

Your spouse works down the street (we did tell you that you work at home, didn't we?), and your smart home knows that you both like a warm car when you get into a 15-degree garage, so the home controller starts the car 15 minutes before the scheduled departure time. Before your spouse climbs inside the toasty car, the home-control system gives a verbal reminder to put the bottles and cans next to the curb because today is recycling day.

As your spouse leaves the garage, your home-control system talks to your phone system and redirects all of your spouse's home-business line calls to the car phone. Once at work, a simple push of a speed dial button on the office phone dials in and redirects the calls again to your spouse's office.

Back at home, you confirm that the kids caught the bus by using the video monitor in the kitchen, and then you get ready for work. You ask the home controller to put the house in your personal mode — in terms of temperature, music, lighting, drape settings, and anything else you may have set.

Getting down to work

You get a second cup of coffee and decide to work for a while in the sunroom. You tell the home controller where you are, and the controller transfers all your business calls to the extension near the table. Your laptop is wirelessly connected to your server and the Internet. You check your various e-mail accounts and voice mail and make a few conference calls on the multiline home-telephone system. While you're on one phone call, you turn on the TV to access the local online directory and navigate to the ordering page for that posh take-out shop down the street. Twenty minutes later, the delivery person arrives at the front door; you take your wireless two-line headset phone — conference call and all — to the door, where you tip the delivery person (you paid over the TV set) and retreat back to the sunroom for lunch.

For a midafternoon break, you head for the exercise room to work off some of that lunch. When you enter, you announce yourself to your voice-activated home-automation system, and it automatically sets the music and other environmental settings to your previously defined preferences. You sit down at your rowing machine, which has a large monitor that shows real-life settings of popular rowing locales.

Halfway through your workout session, a delivery person shows up at your door. An announcement that someone is at the door interrupts the music, and the nearest video display shows a picture of who it is. You don't want to stop mid-workout, so you reply that you are busy and ask him to leave the package inside the door. You prompt for the control system to unlock the front door, and watch as the front door unlocks itself and the delivery person places the packages in the foyer. He leaves, and you start rowing again along Boston's Charles River.

It's your turn for a temperature-controlled shower, where you listen to CNN from the TV set, via moisture-resistant speakers mounted in the bath. Squeaky clean, you go back to work. At 3:00, you have your first videoconference of the day from your office downstairs. While in the basement, you call up your home-control system and start the roast cooking in the oven.

The kids drift home in the afternoon and spread out across the house. While you access your corporation's data network, your kids take advantage of the computers. The youngest kids — twins — play multiplayer games on the home's high-speed Internet connection. Your eldest daughter logs onto the school's educational network to do research for the midterm paper due next week. And your son, when home from football practice, logs onto his school's network to collaboratively work with three others on a joint presentation for the next day. Instant messages, e-mails, and file transfers all flow with ease.

The home controller's voice enunciator reminds you that the roast should be done by now, and you head upstairs.

Dinner time

Meanwhile, at work, your spouse glances at the clock and remembers in a panic that the family needs groceries. A quick dial into the home LAN yields the grocery list on the computerized message board in the kitchen. On the way home, a phone call into the home controller redirects calls back to the car phone in case someone tries to call.

The magnetic driveway sensor tells the home-control system to announce your spouse's arrival. As your spouse enters the house from the garage, the home controller again redirects all calls to the home office, completing the day's cycle. As your spouse brings the groceries into the kitchen, you receive a kiss (sorry, not automated).

Ready to eat, you ask the home controller to set dinner mode in the dining room. A microphone in the light switch hears the command and dims the

lights and turns on the gas-driven fireplace. The home-control system selects some family-oriented music from the MP3 server and plays it over the in-wall speakers in the dining room.

After dinner, you start cleaning up as your kids race to their rooms to finish their homework. Later, they watch a TV special in the living room, while you take in an old Spencer Tracy movie in your bedroom. In the meantime, your spouse has a late videoconference in the home office downstairs with clients in Japan. Occasionally, you access the picture-in-picture (PIP) capability on your TV set to check around the house, making sure that no one is getting into any trouble. After the movie, you give a simple command to the home controller and the lights are dimmed, the temperature in select zones is lowered, shades and draperies close, nightlights come on, and the intercom goes into monitor mode for the youngest kids, in case they're sick during the night. (The sound from those monitors plays only in the master bedroom area.)

Peace at last!

With the kids asleep for the night, you decide to take a nice relaxing bath. You instruct your home-control system to prepare the bathroom — dim the lights, open the skylight, run the bath at your favorite temperature, turn off the telephone extensions nearby (route them to voice mail instead), and play your favorite album on the bathroom speakers.

While lounging in bed watching the wide-screen TV, your spouse tells the home-entertainment system's *PVR* (personal video recorder, a hard-drive-based system that can record video digitally) to search the shows it has been archiving every day and play the most recent *Enterprise!* episode.

Your house is in off-hours mode. The dog is inside, and the doggy door is secure. All phones have muted ringing volumes; some don't ring at all. All drapes are closed. The temperature is lower to save energy when your family is tucked in tight under the covers. All security systems are now alert, looking for movement outside the house.

After your bath, you climb in bed and read for a while. You finish your electronic book and decide you want to read the sequel right away. You surf the Web from your TV set, find the book, buy it, download it to the home LAN and thus to your electronic book via a wireless connection.

Your dishwasher kicks on at midnight when the rates are low (you loaded it at dinnertime and turned it on, but the home controller activates it when rates drop). All night long, your home controller and its various sensors keep an eye on everything for you. You sleep peacefully.

The home-network revolution

What's brought about this progression of intelligent home networks into everyday life? One word: computers. And when we say computers, we don't mean only the PC sitting on a desk in a spare bedroom in 60 percent of American homes (although that's an important part of it). We mean also those little blobs of silicon that reside in so many things in your house, such as phones, televisions, refrigerators, and even the car in the garage.

Most of these systems are islands of computing power plugged into the power outlets of your home. The computer chips have no way of talking to each other or sharing the information that they gather and control. The network revolution — the home-network revolution — is taking place as these things begin to talk to each other. Imagine a refrigerator that talks to your electrical utility and goes into its power-hungry defrost mode when the electricity rates are lowest. Or suppose after a power outage that all your clocks reset themselves automatically because they're set to "network time."

Home networks aren't as advanced as the Jetsons' home, but they will be soon. And you'll be missing the boat if you build a new home or remodel your existing one without taking this kind of future into account. Although you can't know today exactly what will be connected to what (and how) tomorrow, you can design a wiring system for your home that will enable you to do the most you can today and be ready for tomorrow's needs.

What's in a Smart Home?

A smart home is a harmonious home, a conglomeration of devices and capabilities working according to the Zen of Home Networking. At the beginning of this chapter, we suggested that you make a list of all the things you might want to network. Following is our list. Notice that practically anything in your home can be, and ultimately will be, networked. That's the whole point of whole-house networking:

- **Household items:** Drapes and shades, gates, garage doors, door locks, doorbells, lights, dishwasher, refrigerator, heaters, alarm clocks, washer, dryer, microwave, coffeemaker, hot water system, air conditioners, central vacuum system, water controls (shower, sink, and so on), pool cover, fireplaces, toys, e-books, lawnmower, cars and other vehicles, piano, weather station, furniture

- **Audio and video:** Receivers, amplifiers, speakers, VCRs, CD players, DVD players, PVR players, TVs, WebTV devices, Apple TV devices, DSS dish, radios, remote controls, gaming consoles, cable TV devices, TV videoconferencing devices
- **Security:** Baby monitor, video cameras, surveillance monitors, motion detectors, smoke detectors, occupancy sensors, pressure sensors, infrared sensors, intercoms, voice enunciators
- **Phones:** Corded phones, cordless phones, 900-MHz phones, 2.4-GHz phones, 5.8-GHz phones, fax machine, answering machine, PDAs, screen phone, video phone, cell phones
- **Computers:** PCs, Macs, laptops, modems, scanners, printers, home servers

The key is getting information to and from each of these devices. That takes a network. Your home network is actually a collection of networks. Communications in and among different devices travel over various network layers, such as your home-telephone network, your computing network, your security network, your electrical communications network (yes, you can talk over your electrical lines, believe it or not), and so on. These collectively are what we call your *home network,* and you mix, match, and jump among these network layers as you communicate throughout your household.

History of home wiring

Traditionally, homes have been wired for only two things: power and telephones. Add a few haphazardly run cable-TV outlets and some doorbells, and you have the sum of the wiring in most homes. Some people put in an alarm system or an intercom system, each with its own set of wires. The result is a house with an expensive bunch of wires that don't talk to each other and aren't good for anything else.

Even more important than the quantity of wires is the quality, especially when it comes to home automation and high-speed data services. Wiring systems that are inadequate for the needs of today's wired citizens occur not only in homes wired 50 years ago but also in many new homes. Older low-voltage wires (telephone and cable TV wires, for example) don't have adequate capacity for high-speed data use or for multiple lines. They don't go to enough places in the house, and they have no flexibility of configuration. When your needs change, you'll probably have to rewire.

Even electrical power cables may be inadequate (and not just because you don't have enough outlets) for home-automation and control systems to do such tasks as turn on lights and start the coffeemaker. These systems require a power system that is adequately isolated from interference and line noise, which is not the case in many homes.

Luckily, overcoming these problems isn't difficult — or even that expensive. All you need is a little knowledge and a good plan!

Home servers

Traditionally, you buy a lot of boxes for your house, such as VCRs, DVD players, and CD players. As the movement towards digital storage has blossomed, you find VCRs with hard disks and CD jukeboxes that can store hundreds of CDs. We call these boxes *servers* because they mimic the role of computer servers in a corporate environment.

There's a movement afoot to merge all of these servers into a *home server* that stores CDs, DVDs, games, software, and more and "serves" its content to devices that want to play that information. These also will access the Internet for easy access to online content such as iTunes (`www.itunes.com`) or YouTube (`www.youtube.com`). Gaming consoles such as the PlayStation 3 and Xbox 360 are trying to become such central repositories, and Microsoft has launched a new product called (not surprisingly) Windows Home Server (in beta at the time of this writing at (`http://connect.microsoft.com/WindowsHomeServer`). You'll also see home media centers in PC and standalone stereo gear that target the same market. Home servers will range in price from $400 to more than $25,000, depending on what and how much you are trying to store.

We think every home should have a home server of some sort. A home server makes finding things less difficult and creating backups easier, and certain programs such as iTunes run better when everything is in one place. Our approach to home networking in this book enables you to connect a home server whenever you decide to get one.

Why Network Your Home?

A network allows you to do a bevy of things. For instance, you can

- **Access the Internet from anywhere in your house:** A home network lets everyone share in the broadband wealth, so you can stop fighting over the one computer with the high-speed connection. What's more, by having a communications *backbone* (wiring infrastructure) in your house, you can let anything — from your TV set to your car — tap in and make use of that connectivity.
- **Remotely control your home:** After your home network is connected to your other networks, such as the Internet, you can suddenly do amazing things from almost any interconnected spot. The capability to control a device after it is hooked up to the network is limited only by the openness of the device itself. (In other words, the only limit is the degree of controllability of the device — your home's infrastructure won't hold you back.) Want to turn off the lights downstairs from the bedroom? Click your remote control, and out go the lights. Want to check the babysitter while you're at your neighbor's July 4th bash? Just use the neighbor's computer to log into your home's controller and check up on things. (You can even use your cell phone to do this!)