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# The Internet of Things

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- Launch a new product
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***The Internet  
of Things***

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***KORE Wireless Edition***

**by Brian Underdahl**

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## The Internet of Things For Dummies®, KORE Wireless Edition

Published by  
**John Wiley & Sons, Inc.**  
111 River St.  
Hoboken, NJ 07030-5774  
[www.wiley.com](http://www.wiley.com)

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ISBN 978-1-118-93357-2 (pbk); ISBN 978-1-118-93717-4 (ebk)

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

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## Publisher's Acknowledgments

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

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# Table of Contents

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|   |           |
|---|-----------|
| <b>Chapter 1: What Is the Internet of Things? . . . . .</b>                             | <b>1</b>  |
| About This Book .....   | 1         |
| Understanding the Internet of Things .....  | 2         |
| Looking at the Basics.....  | 3         |
| Considering Some Applications and Examples.....   | 4         |
| Wearables .....   | 4         |
| Connected vehicles .....  | 5         |
| Home automation .....   | 5         |
| Location-based services .....   | 6         |
| <b>Chapter 2: A Recipe for Building a<br/>Consumer Solution . . . . .</b>               | <b>7</b>  |
| Identifying a Need .....  | 7         |
| Designing an Internet of Things Solution .....  | 8         |
| Putting It all Together.....  | 9         |
| Hardware .....  | 9         |
| Application .....   | 9         |
| Connectivity .....  | 10        |
| <b>Chapter 3: Launching a Consumer Product . . . . .</b>                                | <b>11</b> |
| Handling Logistics and Fulfillment .....  | 11        |
| Managing Security.....  | 12        |
| Providing Customer Support.....   | 13        |
| <b>Chapter 4: Managing the Internet of Things . . . . .</b>                             | <b>15</b> |
| Choosing the Right Tools.....   | 15        |
| Partnering with the Right People.....   | 17        |
| <b>Chapter 5: Ten Facts You Need to Know about the<br/>Internet of Things . . . . .</b> | <b>19</b> |

## Chapter 1

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# What Is the Internet of Things?

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### *In This Chapter*

- ▶ Getting to know the Internet of Things
  - ▶ Seeing some of the basics
  - ▶ Looking at some examples
- 

**T**he Internet of Things is a term that requires some explanation. It sounds kind of odd, but in all likelihood it will soon become common parlance — the system of communication it describes is rising in popularity. In fact, some of the products you buy and services you use may already be using the Internet of Things. It's a system that allows devices to communicate directly with each other without human intervention. Odd as it may sound, it truly is an Internet for things.

This chapter provides a brief introduction to the topic. It also discusses the book as a whole, taking you through the basics of the Internet of Things and offering some examples of how the Internet of Things is becoming a part of everyday life.

After you read this book, go out there in this age of the Internet of Things and become part of the movement: Innovate, explore, and capitalize on this ever-expanding and evolving industry.

## *About This Book*

This book describes what the Internet of Things is and explains why it's important for your company to enter into this rapidly developing area. You'll first find out what the Internet of Things

is, then see how to begin your planning, what you need to know in order to launch a new product, and how to make sure you get the most from your investment.

This book uses the following icons to call your attention to information that you may find helpful in particular ways.



The information in paragraphs marked by the Remember icon is important. This way, you can easily spot the information when you refer to the book later.



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## Understanding the Internet of Things

Certain devices can connect to the Internet so that *you* can share and receive information. Such devices include smartphones, tablets, PCs, and so on. Recently, though, new devices have been introduced that can communicate with *each other* using the Internet and some other methods. These methods could include things such as RFID, near-field communications, various types of barcodes, and so on. The communication capabilities are built-in and allow for new services — such as thermostats that track your energy usage and adapt to your habits to save you money.

This method of machines talking to each other is called *device-to-device communication*, also known as the *Internet of Things*. Your devices talk to each other, not to plot against you like in a science fiction movie, but rather to help you out. So why does this seemingly scary power exist? Well, a lot of efficiency can be gained when devices communicate their status without human intervention.

## Who knows where the Internet of Things will end up?

The Internet of Things is still in its infancy. At this point, the possibilities are endless. To get a sense of the growth potential inherent in the Internet of Things, consider some of the ways that people use the Internet today compared to how the Internet was envisioned just 25 years ago. Who could have forecast things like YouTube, Facebook, or Netflix?

Remember, the Internet was originally thought of as simply a way for researchers to share files. People have made huge fortunes by imagining new ways to use those connections and now those new uses have become a part of your everyday life. What great idea will you add to the Internet of Things?

For example, if you own a refrigerator that is able to track the freshness dates on products it contains, you might get a text message on your smartphone telling you to pick up a carton of milk on your way home from the office. And guess who sent that text message? Your refrigerator! Because your fridge is able to examine the information on your carton of milk, it can let you know that the milk is out of date and you need new milk in order to cook the rice pudding you were planning for tonight. How does it know about the rice pudding? Because you can also enter your menu plans into some appliances. Imagine, no more nasty surprises hiding at the back of your refrigerator shelves and no more getting home to find you're out of what you need for tonight's dinner!

## *Looking at the Basics*

A key feature of the Internet of Things is that each device must be uniquely identifiable or addressable. Just as the computer in your home has a uniquely identifiable address called an IP address, the devices on the Internet of Things must be identifiable. There are, of course, many different methods of making those devices uniquely identifiable.

The specific components that are needed vary according to the communication needs of each situation. For example, your intelligent refrigerator needs a way to connect to the Internet as well



as a unique address. The consumables you place in your refrigerator don't require either, but they do need something on the order of a specialized barcode or RFID tag that contains information about the type of product and freshness information.



Although they use the same technologies and similar infrastructures, machine-to-machine technologies (M2M) and the Internet of Things are separated at the consumer level. As you look around the industrial and enterprise spaces, M2M technologies are enabling companies to better operate their businesses, take burdens off supply chains, and relay more informative data in real-time. The Internet of Things takes M2M technologies and uses them to deliver convenience to consumers in new and responsive ways. The Internet of Things responds to the way that you live, it interacts with you throughout the day, and it keeps your home functioning the way it should be by inserting connectivity into your everyday life.

## *Considering Some Applications and Examples*

The following sections examine some of the products you might buy that connect to the Internet of Things.

### *Wearables*

One hot area of device-to-device development is wearable health devices. For example, some heart rate and fitness monitors help people track their workouts and assess their physical condition. These devices can also be worn at night to let you know how well you slept and how long you were asleep. There are even shoes that help people get proper exercise by monitoring how they walk.

One of the newest wearable items is the Google Glass device that enables people to use various Internet applications on the go. For example, doctors are using Google Glass to virtually see into patients during critical operations.

## Connected vehicles

Today, almost no one uses paper maps anymore. Most folks use either an in-car navigation system or a mapping app on their smartphone to find their way in unfamiliar places. These navigation systems are handy, but they're just the tip of the iceberg in terms of automotive connectivity.

Rather than simply providing driving directions, connected vehicles (using systems like Audi connect, for instance) can inform the driver of traffic problems, help find the least expensive place to refuel, and provide a mobile hotspot so that passengers can surf the web or watch the latest movies during a commute or a road trip. Audi has even launched the *Audi Urban Future Initiative* competition to award teams that come up with the most innovative ways to make connected cars better fit into crowded urban spaces.

## Home automation

Home automation systems used to be available only to techno-geeks with a lot of spare money. Today, smart devices connected to the Internet of Things enable you to closely monitor and interact with your home:

- ✔ **Smart thermostats:** These devices can learn and adapt to your family's lifestyle and save energy by reducing consumption when the house is empty or everyone is sleeping.
- ✔ **Smart appliances:** In addition to refrigerators that can monitor food freshness, other appliances could monitor time-of-day pricing so that they run when utility rates are lowest. Some appliances can also access recipes directly to help you cook dinner!
- ✔ **Intelligent lighting:** Some LED-based lighting systems can turn themselves off when no one's in the room, and can also be remotely controlled over the Internet via your smartphone. You know that feeling when you're not sure you turned off a light before you left? Well, now you can just check your phone to find out.

## *Location-based services*

The Internet of Things can also provide many useful services that are location based. For example:

- ✔ **Automated notifications:** If you're waiting for a repair person or an installer to arrive, location-based sensors could send you an automated message 15 minutes before their expected arrival time, based on both their route history and their current location.
- ✔ **Tracking children:** All parents today worry about the safety of their children. Using location-based services, you could receive automated notifications of their location and alerts should they end up in places they shouldn't be.
- ✔ **Eldercare:** Many people now are responsible for elderly relatives. Location-based services can provide peace of mind because you can find your relatives if they've become confused and wandered off.
- ✔ **Location-based marketing:** Marketers can use your location to automatically deliver e-coupons when you enter a store, change the content of billboards as you drive by, or even provide an audio reminder on your car's navigation system when you're driving near a favorite restaurant during lunch time.

## Chapter 2

# A Recipe for Building a Consumer Solution

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### *In This Chapter*

- ▶ Deciding what to do
  - ▶ Creating your product
  - ▶ Understanding what you need
- 

**T**he Internet of Things provides an opportunity you don't want to miss. Integrating the right product with the Internet of Things could lead to great success. First, though, you may want to understand just what it takes to build a successful consumer solution for the Internet of Things. This chapter gives you some information to get started.

### *Identifying a Need*

Some products are successful when they fulfill a need people didn't know they had. Ten years ago, people didn't know that they needed a new way to read books, but today more people read e-books on tablets than read printed books. Some other new ideas that meet the needs and demands people didn't know they had include:

- ✔ Refrigerators that can automatically order food for you when you're running out of essentials.
- ✔ Sensors that help locate misplaced items such as a wallet you accidentally left somewhere.
- ✔ Home thermometers that save energy by automatically adapting to a family's lifestyle patterns.



The Internet of Things allows devices to communicate new information in new ways. These new communication capabilities provide many opportunities for your business.

It really doesn't matter if you're thinking of developing a new product or of enhancing an existing one, because fundamentally what you're trying to do is to figure out how enhanced communications from a device will make the product more desirable. Wouldn't it be awfully handy if your grill sent you a text when the steaks were perfectly cooked? No more standing there breathing in smoke waiting for your food to get done — how's that for a need you didn't know you had?

## *Designing an Internet of Things Solution*

The Internet of Things opens up new possibilities through connected products that improve or enhance the way people live. You could invent a great new product like a set of golf clubs that can instantly analyze your swing and send helpful suggestions right to your smartphone (on second thought, maybe you don't really want a set of wisecracking golf clubs).



Simply inventing a new product based on a great idea isn't enough — you also need to create a product people want to use. Creating a wearable device that looks like a prop from a bad 1950's science fiction movie probably won't make you a millionaire.

But the Internet of Things isn't just about inventing new products; it also gives you great opportunities to innovate and improve existing products. For example, if you think about how people currently use your products, you might discover that a little tweak here or there could really make your product stand out from all the rest. Who wouldn't want a coffee pot that knew enough to ask if you want an extra strong pot when you came home really late the night before?

Designing your solution is really all about figuring out innovative ways to meet the needs that people didn't know they had.

# Putting It all Together

If you've identified a need and designed a solution to fill that need, your next step is determining exactly how to implement your solution.

## Hardware

The Internet of Things offers solutions that begin with hardware (because the things I'm talking about, after all, are physical objects). But in this case, the hardware you need to consider consists of things like sensors, processors, and communications modules. Your device needs these types of hardware in order to determine what's going on and to communicate that information.



Sensors can include many different types of devices from GPS modules to determine location, accelerometers to discern motion, thermocouples to measure temperature, and so on. Fortunately, sensor technology has advanced at an extremely rapid pace so that the size, cost, and energy consumption of sensors is a fraction of what it was just a few years ago. Consider, for example, that virtually every smartphone today has GPS and accelerometers built in.

Small, low-power processors are everywhere, so it's really easy to incorporate the necessary computing power in your device.

## Application

With your hardware in place, your next step is to design your application. Depending on your needs, the device you choose for your application may not need to do much except collect and send simple sensor data. On the client side, you need to make sure that your application tells the users what they need to know in a clear and understandable manner.

## *Connectivity*

How will your device communicate what it knows? Appropriate solutions range from very low-power Bluetooth to Wi-Fi or even 4G LTE radios. Of course, some solutions need combinations of communication capabilities. For example, a smart car system playing video or using GPS navigation might need 4G LTE in order to communicate with the outside world, and Wi-Fi to communicate with devices like the tablets used by backseat passengers.

## Chapter 3

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# Launching a Consumer Product

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### *In This Chapter*

- ▶ Getting it out there
  - ▶ Making sure it's secure
  - ▶ Supporting your customers
- .....

**I**n addition to building the right product for the Internet of Things, you need to properly plan for launching the product to ensure its success. This chapter describes what a successful product launch looks like.

## *Handling Logistics and Fulfillment*

A lot of moving parts go into *logistics* and *fulfillment* of an Internet of Things product. Logistics include agenda items such as making sure that all assets are properly tagged so that they can be tracked throughout your system, installing the SIM cards to make sure that devices can communicate properly, and making sure that each device is properly configured.

Fulfillment is the process of actually getting all the orders filled properly. This process includes such things as shipping devices to multiple locations, making sure that shipments are tracked and customers notified, and keeping track of all device assets. In addition, you need to maintain and manage a pool of spare devices so that you can quickly deal with any equipment failures. Of course, you also need to make sure that your inventory



is secure so that you don't have to contend with shrinkage. On the other side, reverse logistics become necessary when working with warehousing and returns. And making sure that you have a good system available for customers who want to make returns is a big part of customer support. For more on customer support, see "Providing Customer Support" later in the chapter.

Logistics and fulfillment may not be the most exciting part of launching a new product, but unless you handle them properly, all of your other efforts at developing the next big thing can go to waste.



You may want to consider partnering with a vendor that has expertise in logistics and fulfillment as managed services. Such vendors already know how to handle all the picky little details that are so important to a successful product launch.

## *Managing Security*

Today, security means a whole lot more than it did in the past. Not only do you need to make sure that your assets are covered, but you also need to protect your customers. After all, it's embarrassing to have your company's name in the news for allowing millions of customers' credit card records to be stolen. And it's also hard to regain customer confidence after such highly publicized incidents.



Quite frankly, any company that does business today needs to remember that security of customer data is a major issue. Unless you deal strictly in cash and don't keep any record of customer information, you have a huge responsibility to protect every piece of customer information that you gather. Managing security is important and can also be quite a challenge. The crooks that want access to your information don't play by any rules.

Managing security requires restricting access to your systems as well as making sure that any data transmissions are properly encrypted. As a number of recent news articles have reported, trying to maintain adequate security can be an ongoing, arduous process. Find a vendor that knows all about managing security and can help keep your company's name out of the news.

## Providing Customer Support

Another vital piece of the puzzle when you're launching a consumer product is providing good customer support. This is especially important for a new Internet of Things-related product, because you're talking about new technology that customers won't already be familiar with.

Customer support needs range from simple things like "How do I turn it on?" to more complex questions such as "How can I make your thingamajig work with the flux capacitor on my home-built supercomputer?" Well, maybe that last one is a bit of a stretch, but you get the idea. Your customer support team needs to be ready to handle the mundane along with a bit of the bizarre.

Modern customer support relies on call centers where customer service representatives typically work from scripts to answer customer questions. You need to develop those scripts so that your representatives actually know what they're talking about.



Most consumers expect to be able to reach customer support at times that are convenient for the consumer. You won't gain a lot of points by making customers call during limited hours in the middle of the week. Rather, you want to make sure that customers can get support 24 hours a day, seven days a week, 365 days a year.

In addition to providing support when people need it, another consideration is making sure that you have a large enough support team (or at least enough available backup) to handle surges in demand. No one wants to wait on hold listening to funky music for half an hour. In fact, some folks may hang up and find another product if put in that situation.



If you're working with a vendor that provides call center services, you might want to check on the quality of their services before signing on the bottom line. Make some customer service calls without identifying yourself as a potential call center client.

In choosing a call center service vendor to meet your customer service needs, make sure that they have the proper expertise in dealing with supporting new technology products. For an

Internet of Things product, this expertise includes things such as working with all of the national cell service carriers so that they can properly support your customers.

It's also important to make sure that you have proper reporting on all customer service issues. Not only will the good reporting help you make sure that you're actually meeting the needs of your customers, but you can use the reports to help determine if your product has inherent problems that need to be addressed.

## Chapter 4

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# Managing the Internet of Things

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### *In This Chapter*

- ▶ Selecting your tools
  - ▶ Getting the right partners
- .....

**T**he Internet of Things is more than just another fancy buzzword — it's a real business opportunity. And like any business opportunity, choosing the right tools and making sure that you connect with the right partners can make things a lot easier — so you can focus your efforts on building your business.

This chapter helps you make the right decisions so you can seize the opportunity and make the most of it.

## *Choosing the Right Tools*

It's pretty hard to do good work if you don't have the right tools. That's just as true for a company building an Internet of Things product as it is for a craftsman who builds high-quality custom furniture. That craftsman needs good saws, planes, chisels, and other tools designed specifically for the job, and you need tools such as the right software and applications to make sure you can make the most of your efforts, too.

For example, consider how you'll manage your connected solutions. Some very important functions you'll need include:

- ✔ **High-level intelligence:** This includes device details, usage records, historical details, billing history, and trends. This type of information gives you the quantitative data you need to make better, more informed decisions to improve your solutions.
- ✔ **Mobile compatibility:** This gets you the information where and when you need it most because you must be able to manage your solution from wherever you might be. You want optimized visibility on mobile devices as well as full functionality on computers, without the need to download an app.
- ✔ **Multicarrier support:** Depending on where your solutions are deployed, you may need to partner with a number of different wireless carriers. You don't want a tool that lacks the flexibility to incorporate different carriers into your solution easily.
- ✔ **Hardware independence:** To take maximum advantage of opportunities, you want tools that provide unlimited device options, seamless device integration, increased speed to market, enhanced troubleshooting capabilities, and flexibility with hardware technology evolutions. With these types of capabilities, you'll be ready to deploy your solutions in new markets as new types of hardware devices are introduced.
- ✔ **Precision technology:** To properly support your solutions, you want tools that provide accurate real-time data, a scalable platform that can handle a wide range of deployment sizes, multilayered security and full data redundancy to prevent losses, integrated diagnostic services, and user interfaces that are both intuitive and customizable.

KORE Wireless has the tools you need to create and deploy your Internet of Things product so you can minimize risk and maximize profits.

For example, you can easily get usage alerts to notify you when a device exceeds a threshold, such as when a collection bin is nearly full. Another example might be a GPS tracking device that keeps tabs on valuable equipment in real time to minimize or prevent theft.



Look for tools that have custom development options so that your solution can easily be branded with your name rather than that of the tool vendor.

## *Partnering with the Right People*

If you want to be an Internet of Things success, you need to make sure that you're partnering with the right people. It's a whole new world out there and a lot of things are ready to trip you up if you don't take advantage of the right knowledge sources.



The Internet of Things is a wide-open space that many would compare to the old Wild West. Often, it seems like written rules are lacking. Companies can go astray even if they have fantastic ideas and products but don't have the foresight to build them with regulations and carrier requirements in mind. These kinds of oversights can completely derail businesses and kill ideas. So look for vendors who actually have Internet of Things experience and know what works and what doesn't.



Stay nimble! As the Internet of Things continues to grow, change is inevitable. Your products need to be built in a way that allows flexibility when change is required. For example, you need to easily be able to activate and deactivate devices remotely as well as apply any required updates on the fly. Here, too, it's important that you partner with a vendor that has experience in dealing with such issues.

Companies like KORE Wireless have the expertise to help you deal with the complicated Internet of Things ecosystem. They have relationships with wireless carriers worldwide and know how to help you choose the correct path.



Think about a short-term and a long-term plan when it comes to wireless. You need to be nimble, proactive, and reactive to the market so that you're able to adapt as new technologies are developed. You may want to call for a request for proposal (RFP) asking vendors to show you why they should get your business. Remember that many projects are canceled because they run out of funding after the wrong vendors were chosen and the plans weren't properly implemented.

Advancements in technology will accelerate and with that will come huge change. There's been a shift from 2G to 3G to 4G, and now there's even mention of 5G — all within the last few years. As the demand to connect everything strengthens, technologies will constantly change.

It's important to stay nimble and partner with a team that has seen the winds of change come and has been around to withstand the future winds.

Remember, too, how hardware sizes are constantly decreasing. The first cellphones were huge devices the size of a large paving brick. Now devices have shrunk to the point that they are small enough to fit in a band on your wrist. Wireless coverage (satellite, cellular, and so on) is now everywhere!

## Chapter 5

# Ten Facts You Need to Know about the Internet of Things

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### *In This Chapter*

- ▶ Ten things to remember
- 

**T**his chapter presents ten important takeaways about the Internet of Things:

- ✔ **Data analytics make big data useful:** Although the technologies used to create the Internet of Things are collecting large amounts of data, only analytics can transform the data into a product that's actionable and consumable. Using the data is what makes collecting it meaningful.
- ✔ **Cloud technology enables the aggregation of diverse data:** Cloud-based tools allow diverse data to be seamlessly merged, analyzed, and consumed from places and sources all over the world — in real time. After all, the Internet is the important word in the phrase Internet of Things.
- ✔ **The Internet of Things changes the way people live:** Consumers are able to remotely control everything in their homes. Some examples include ordering groceries when the item runs out and drastically reducing energy bills by managing connected devices within the home. It is a technology that people will one day wonder how they ever lived without.



- ✔ **The Internet of Things creates awareness:** The Internet of Things is creating an age of awareness on every level. If you want to know your carbon imprint, it's available; if you want to know how well you slept the night previously or how many calories you burned that day, it's available. And if you don't like the results you created, you can receive information on how to improve or change those results.
- ✔ **The Internet of Things is affordable:** The Internet of Things applications have become very affordable. Sensors and radios are now small enough and inexpensive enough to include in almost anything.
- ✔ **Connected cars are here:** Connected cars are the new standard. Products like Audi connect are vital to competing for today's consumer dollars.
- ✔ **The Internet of Things is a growing market:** Bloomberg has said that the Internet of Things will become a 19 trillion dollar market in the very near future. Consumers are looking for new and innovative products.
- ✔ **Security is vital:** Security is one of the largest obstacles to the growth of the Internet of Things. Security needs to be part of your product planning — not an afterthought.
- ✔ **Fifty billion devices are coming:** Many predict that within the decade, there will be 50 billion connected devices in the world. You need to make sure your devices and services are ready to compete so they're not passed over in favor of newer, more exciting ones.
- ✔ **Cellular networks rule:** Cellular networks have become the standard for connecting the Internet of Things — offering superior reliability, coverage, and security. Make sure you take advantage of this option by choosing a partner with experience in cellular technology.

## Find out how the Internet of Things is driving product innovation!

The Internet of Things has taken over headlines across the technology world. Undoubtedly, the day is quickly approaching where everything from your toaster to your car will be connected. In this helpful book you will learn what the Internet of Things is, who you can partner with, and why you don't want to miss this technology.

- **Understand the Internet of Things** — *it's a term that has caught the attention of many, but learn what the IoT really is*
- **See how to build an Internet of Things product** — *identify a need, design a solution, and put it all together*
- **Launch your new product successfully** — *discover best practices that ensure your product gets to market and stays there*
- **Find the right tools and partners** — *signs that you're working with the right company*

**Brian Underdahl** is the author of over 120 books including over three dozen *For Dummies* titles. He's interested in the latest technology and how that technology keeps making our lives better.

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Open the book and find:

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- What you need to know to begin
- How you can identify a consumer need
- What's involved in rolling out your product
- Who to turn to for experienced help

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