ESSENTIALS EDITION

Bluetooth Application Programming with the JAVA APIs

TIMOTHY J. THOMPSON • PAUL J. KLINE • C BALA KUMAR

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BLUETOOTH® APPLICATION PROGRAMMING WITH THE JAVA™ APIs *ESSENTIALS EDITION*

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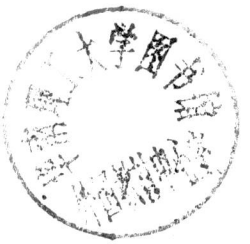

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To my wife, Karmen, and son, Zane
—Tim

To my daughter, Rose, and her family, Terry, Morgan, and Andrew
—Paul

To my wife, Sundari, and sons, Sailesh and Shiva
—Bala

Preface

Bluetooth® wireless technology is a short-range radio standard that provides new opportunities for wireless devices. Originally, Bluetooth wireless technology was designed as a way of eliminating the cables attached to nearly all consumer electronic devices. However, the goals for Bluetooth wireless technology grew as its designers recognized that it enables a new kind of wireless network between electronic devices.

Since 2001, Java developers have had the opportunity to develop applications for a variety of wireless devices and cell phones. In 2000, the Java community recognized the importance of creating a standard extension to the Java programming language for use with Bluetooth devices. A standard application programming interface (API) for Bluetooth was needed because each Bluetooth software protocol stack had its own API for application programmers. These proprietary APIs meant that a Bluetooth application had to be ported to different Bluetooth stacks to run on different devices. Apart from the work involved in writing the code, interoperability testing on the various devices costs time and money for the involved companies. A standard API would help alleviate all these problems.

A team of experts from across the industry was assembled for this effort under Java Specification Request 82 (JSR-82). The result was a specification for Java APIs for Bluetooth wireless technology (JABWT). Since the release of JSR-82 in the spring of 2002, Bluetooth wireless technology has become a standard feature in cell phones with many of these phones also having support for JSR-82.

This book is based on the *Bluetooth Application Programming with the Java APIs* [2] written by the same authors. For this *Essentials Edition*, the authors have updated the background information to reflect the changes that have occurred in the area of Bluetooth wireless technology and

JSR-82, including support for MIDP Push, since *Bluetooth Application Programming with the Java APIs* was published in 2004. While reading the JSR-82 specification document provides you with a description of the API, this book provides you with the rationale and best practices in utilizing the API.

The objectives of this book are to

Give an overview of Java™ Platform, Micro Edition (Java ME) and Bluetooth wireless technology

Outline the JABWT architecture

Explain the API in detail

Intended Audience

The book is intended for software developers, academics, and other professionals who want to develop Java software for Bluetooth devices. To gain the most out of this book, you will find it helpful to have a working knowledge of Java ME and familiarity with Bluetooth wireless technology. The book cites several references that provide additional information on these subjects. We believe that a Java ME programmer will need no additional reading beyond this book to write JABWT applications.

If you would like more examples or more information on developing and porting JSR-82 to a handset, the authors recommend the predecessor to this book: *Bluetooth Application Programming with the Java APIs*.

How This Book Is Organized

Different readers of this book will be seeking different information. We have identified three sets of people:

1. Those looking for an overview to make decisions on projects
2. Those who will be leading projects or managing projects in this area
3. Programmers who need detailed information on how to program using JABWT

Apart from the introductory chapters, the chapters are organized into three main sections to accommodate the three sets of people identified above. The three divisions are

1. Overview: The executive introduction
2. API capabilities: The explanation for the project manager
3. Programming with the API: The programmer's guide

Readers can choose the sections that suit their needs in each chapter. Chapters 1 through 3 are overview chapters. Chapters 4 through 9 detail the various sections of the API. Chapter 9 describes the MIDP Push capabilities added since the last book. Throughout the book many code examples are given to explain the API. The complete JSR-82 API is available at www.jcp.org/en/jsr/detail?id=82.

There is a website for this book where you can access the complete code examples found in the book. In addition, you can find the latest news about JABWT, book errata, and other useful links. To access the website, go to www.mkp.com and use the search option with the title of this book.

The topics in this book are organized as follows:
Chapter 1, Introduction, presents an overview of Bluetooth wireless technology and Java ME. It also provides a context for the JABWT specification.
Chapter 2, An Overview of JABWT, defines the goals, characteristics, and scope of JABWT.
Chapter 3, High-Level Architecture, presents the high-level architecture of JABWT.
Chapter 4, RFCOMM, discusses the APIs for Bluetooth serial port communications using RFCOMM.
Chapter 5, OBEX, introduces the architecture and the APIs for making OBEX connections.
Chapter 6, Device Discovery, discusses the APIs for Bluetooth device discovery.
Chapter 7, Service Discovery, describes the APIs for service discovery and service registration.
Chapter 8, L2CAP, presents the API for Bluetooth communications using the logical link control and adaptation protocol.
Chapter 9, Push Registry, describes the support available in JABWT for the Push Registry as described in MIDP 2.0.

About the Authors

Timothy J. Thompson is a Principal Software Engineer on the Advanced Technology and Architecture team in Motorola's Mobile Device Business. He is currently the JSR-82 Maintenance Lead. He was the OBEX architect on the JABWT specification team at Motorola. He received his Master's degree in Computer Science from Texas A&M University.

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A large number of people were involved with the original development of the Java APIs for Bluetooth wireless technology. As the three of us set out to write a book explaining those Bluetooth APIs, we were pleased to discover that we would again receive contributions and assistance from a large number of dedicated and talented individuals.

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The Java APIs for Bluetooth wireless technology were developed by a team of industry experts, the JSR-82 expert group, and the team at Motorola that drafted the specification, wrote the reference implementation, and developed the conformance tests. The authors believe that the efforts and contributions of all these individuals produced an API that will have important benefits to the Java community. The authors would like to thank the members of the JSR-82 expert group for all their work on the API: Jouni Ahokas, Patrick Connolly, Glade Diviney, Masahiro Kuroda, Teck Yang Lee, Paul Mackay, Brent Miller, Jim Panian,

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Tim Thompson

Paul Kline

C Bala Kumar

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