

Pro Smartphone Cross-Platform Development

iPhone, BlackBerry, Windows Mobile, and
Android Development and Distribution



**Sarah Allen,
Vidal Graupera,
Lee Lundrigan**

Apress®

Pro Smartphone Cross-Platform Development: iPhone, Blackberry, Windows Mobile and Android Development and Distribution

Copyright © 2010 by Sarah Allen, Vidal Graupera, Lee Lundrigan

All rights reserved. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage or retrieval system, without the prior written permission of the copyright owner and the publisher.

ISBN-13 (pbk): 978-1-4302-2868-4

ISBN-13 (electronic): 978-1-4302-2869-1

Printed and bound in the United States of America 9 8 7 6 5 4 3 2 1

Trademarked names, logos, and images may appear in this book. Rather than use a trademark symbol with every occurrence of a trademarked name, logo, or image we use the names, logos, and images only in an editorial fashion and to the benefit of the trademark owner, with no intention of infringement of the trademark.

The use in this publication of trade names, trademarks, service marks, and similar terms, even if they are not identified as such, is not to be taken as an expression of opinion as to whether or not they are subject to proprietary rights.

President and Publisher: Paul Manning

Lead Editor: Mark Beckner, Ewan Buckingham

Technical Reviewer: Fabio Claudio Ferracchiati

Editorial Board: Clay Andres, Steve Anglin, Mark Beckner, Ewan Buckingham, Gary Cornell,

Jonathan Gennick, Jonathan Hassell, Michelle Lowman, Matthew Moodie, Duncan

Parkes, Jeffrey Pepper, Frank Pohlmann, Douglas Pundick, Ben Renow-Clarke, Dominic

Shakeshaft, Matt Wade, Tom Welsh

Coordinating Editor: Jim Markham

Copy Editor: Ralph Moore

Compositor: MacPS, LLC

Indexer: BIM Indexing & Proofreading Services

Artist: April Milne

Cover Designer: Anna Ishchenko

Distributed to the book trade worldwide by Springer Science+Business Media, LLC., 233 Spring Street, 6th Floor, New York, NY 10013. Phone 1-800-SPRINGER, fax (201) 348-4505, e-mail orders-ny@springer-sbm.com, or visit www.springeronline.com.

For information on translations, please e-mail rights@apress.com, or visit www.apress.com.

Apress and friends of ED books may be purchased in bulk for academic, corporate, or promotional use. eBook versions and licenses are also available for most titles. For more information, reference our Special Bulk Sales—eBook Licensing web page at www.apress.com/info/bulksales.

The information in this book is distributed on an “as is” basis, without warranty. Although every precaution has been taken in the preparation of this work, neither the author(s) nor Apress shall have any liability to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the information contained in this work.

The source code for this book is available to readers at www.apress.com. You will need to answer questions pertaining to this book in order to successfully download the code.

To Bruce and Jack Allen for their love and support.

—Sarah Allen

To my loving wife, Tara, and my children Maggie, Grace, James, and Kathleen.

—Vidal Graupera

Contents at a Glance

■ Contents	v
■ Foreword	x
■ About the Authors	xii
■ About the Technical Reviewer	xiii
■ Acknowledgments	xiv
■ Introduction	xv
■ Chapter 1: The Smartphone is the New PC	1
Part 1: Platform Development and Distribution	15
■ Chapter 2: iPhone	17
■ Chapter 3: Android	35
■ Chapter 4: BlackBerry	51
■ Chapter 5: Windows Mobile	65
Part 2: Cross-Platform Native Frameworks	81
■ Chapter 6: Rhodes	83
■ Chapter 7: RhoSync	113
■ Chapter 8: PhoneGap	131
■ Chapter 9: Titanium Mobile	153
Part 3: HTML Interfaces	161
■ Chapter 10: Mobile HTML and CSS	163
■ Chapter 11: iWebKit	183
■ Chapter 12: Animated UI with jQTouch	207
■ Chapter 13: Sencha Touch	225
■ Chapter 14: BlackBerry HTML UI	235
■ Appendix: Cascading Style Sheets	247
■ Index	255

Contents

■ Contents at a Glance.....	iv
■ Foreword	x
■ About the Authors	xii
■ About the Technical Reviewer	xiii
■ Acknowledgments	xiv
■ Introduction.....	xv
■ Chapter 1: The Smartphone is the New PC.....	1
Application Marketplace	2
Increase in Mobile Usage and Trend Toward Smartphones	2
What is a Smartphone?.....	4
Smartphone Landscape	4
Cross-Platform Frameworks	5
The Branded Experience of Mobile Applications	6
Web Techniques	10
Cross-Platform Frameworks	10
About this Book.....	13
Part 1: Platform Development and Distribution.....	15
■ Chapter 2: iPhone	17
Introducing Xcode	17
iPhone Development Standard Practices.....	18
Building a Simple iPhone app	18
Create the Xcode Project	19
Create the Interface	20
Installing the App on the Device	29
Finding Your Device ID.....	31
Create the Provisioning Profile	32
Install the Provisioning Profile	32
Install and Run on the Device	32

Chapter 3: Android	35
Android Development.....	36
Setting Up The Development Environment With Eclipse.....	36
Building a Simple Android Application.....	39
Simple Application Using Android WebView	46
Building for an Android Device	48
Distribution on the Web	50
Android Market	50
Chapter 4: BlackBerry	51
BlackBerry Platform	51
Set Up for Classic Java Development	52
Building a Simple BlackBerry Application.....	53
Create the Eclipse Project.....	53
Create the Interface	55
Code Explained	57
Build and Test the Application	58
Simple User Interface Application Using a Label, Text Field, and Button	58
Code Explained	60
Simple Application Using BlackBerry Browser Field.....	61
Chapter 5: Windows Mobile.....	65
Setting Up for Windows Mobile 6.5 Development.....	66
Building a Simple Windows Mobile App	67
Creating a Smart Device Project.....	67
Setting Up Base Functionality.....	68
Deploying and Test your Application	72
Fleshing Out the Application	73
Packaging and Distributing Your App	76
Adding a CAB Project to the Solution.....	77
Customizing Your Product Name	77
Adding the Application to the CAB Project.....	78
Creating an Application Shortcut	78
Adding a Registry Entry	78
Building and Deploying the CAB File.....	78
Installing the CAB File.....	79
Distributing Your Application	80
Part 2: Cross-Platform Native Frameworks.....	81
Chapter 6: Rhodes	83
Development Architecture	84
Runtime Architecture	85
Device Capabilities and Native UI Elements	86
Database (Rhom)	86
Threading.....	87
Differences Between Rhodes and Rails	88
Creating a Rhodes App	88
Installation and Setup	88
Building a Rhodes Application	89

Running the Application.....	91
Running on the iPhone.....	93
Running on Android	94
Running on BlackBerry	94
Running on Windows Mobile 6	95
Generating a Model.....	95
Debugging Tips	100
iPhone	100
BlackBerry	101
Android	101
Rhodes Device Capabilities.....	101
Contacts Example	103
Camera Example.....	106
Geolocation and Mapping Example.....	108
Creating the application.....	109
Chapter 7: RhoSync	113
How the Sync Server Works	114
Data Storage: Why Triples?	114
RhoSync Source Adapters	115
Initialize	116
Authenticating with Web Services: Login and Logoff	116
Retrieving Data: Query and Sync	117
Query	117
Sync.....	119
Submitting Data: Create, Update, and Delete	119
Create	119
Update.....	120
Delete.....	120
User Authentication	121
Product Inventory Example	122
Creating Your Application on RhoHub.....	122
Creating Your Application on a Local RhoSync Server.....	127
Debugging RhoSync Source Adapters	130
Testing Your Application	130
Chapter 8: PhoneGap	131
Getting Started with PhoneGap.....	133
Sample Application	134
Android	136
BlackBerry	137
PhoneGap Simulator	138
Writing Hello World in PhoneGap.....	139
Writing a PhoneGap Application.....	141
Contacts Example	146
Contact Example Code Explained	149
Camera Example.....	150
Camera Example Code Explained	152

■ Chapter 9: Titanium Mobile	153
Getting Started.....	153
Writing Hello World	155
Building for Device.....	157
Titanium Mobile Device Capabilities.....	157
Camera Example	158
Part 3: HTML Interfaces	161
■ Chapter 10: Mobile HTML and CSS	163
Platform Overview	163
iOS for iPhone, iPad, iPod Touch.....	164
Android	164
BlackBerry	165
Windows Mobile.....	165
Common Patterns	165
Screen-Based Approach	165
Navigation.....	166
UI Widgets.....	169
Check Boxes	169
Selection Boxes	171
Text Boxes	173
Text Areas.....	174
Radio Buttons.....	175
Additional Components.....	177
WebKit Web Views	178
■ Chapter 11: iWebKit.....	183
Working With the iWebKit Framework	184
A Few Words of Caution.....	185
Required Header	186
Body.....	186
Organizing Data with Lists	187
Navigation.....	194
Forms.....	196
Landscape Mode.....	200
Phone Integration.....	200
Integrating iWebKit in Mobile Applications	201
Creating a Native iPhone Application with iWebKit in Objective C.....	201
Create an Application.....	203
Add iWebKit Framework to Application Layout Template.....	204
Setting up PhoneGap for iWebKit.....	205
■ Chapter 12: Animated UI with jQTouch.....	207
Getting Started with jQTouch.....	208
Running Example Code	208
Creating a Simple jQTouch Application.....	209
Adding Screens.....	211
Loading Additional Screens with Ajax.....	212
Cancel, Back, and Browser History.....	214

Other Buttons.....	215
jQuery Initialization Options	215
Basic Views.....	217
Customizing Your jQuery Applications	218
Animations	218
Navigation Bar (aka the Toolbar)	218
Customizing Your Views with Themes	221
Integration with Rhodes.....	222
Integration with PhoneGap	222
■ Chapter 13: Sencha Touch.....	225
Getting Started.....	225
Adding HTML Text with a Panel	228
Adding Components.....	231
Creating Interactivity.....	232
■ Chapter 14: BlackBerry HTML UI	235
BlackBerry Browser UI Controls.....	236
BlackBerry 4.2 Browser Control.....	237
Fonts	239
Frames	241
JavaScript.....	241
Rhodes Tip for Dynamic Layout	242
BlackBerry 4.6 Browser Control.....	244
Display and User Interaction	244
Development Environment.....	245
■ Appendix: Cascading Style Sheets	247
The Cascading in Style Sheets.....	247
CSS Syntax.....	248
Comments.....	249
Identifying Elements with ID and Class.....	249
Common Patterns	250
Common CSS Attributes (Display: block verses inline).....	251
■ Index.....	255

Foreword

The year 2010 is an exciting time for those of us who have worked in and around the mobile industry since before the, now, decade-old 21st century. Some have referred to this year as “The Year of the Mobile Developer.” It’s true that, following the creation of frictionless paths to market through Apple’s App Store, Google’s Android Market, and the other handset or OS app stores, developers and brands alike are pursuing a market previously limited in reach. The options of distribution of applications until recently included carrier decks, handset portals, third-party channels such as Motricity, or even one’s own web site.

Carriers once dominated and controlled which applications were allowed to reach eager end users via their portals—picking winners and losers by the weight of their business development and testing processes. Distribution via carriers has been difficult and costly, requiring direct relationships with carriers. Each carrier required a new business development effort and a different set of requirements for OSes and handsets supported, along with a unique testing process. Handset portals also required major effort from business development and also required joining expensive developer programs. The third-party and web-site options for distribution were easier but required individual marketing effort by developers, and the process for users to install downloaded apps on their own was a barrier for widespread adoption. Until recently, these challenges in the business of mobile development limited experimentation and innovation by all but a few hardy souls or the largest brands with the budgets to support it. Enter Apple’s App Store.

The Apple App Store not only provided a path to market, but also, a dramatic change in marketing position for developers. Apple established the new industry standard with the “There’s an App for That” campaign. Suddenly, instead of choosing a device for its hardware specs, end users considered what they could do with a phone beyond make calls and send text messages. The value of a device, now, has become its ability to run lots of applications. The iPhone didn’t initially include an App Store. End users drove this innovation, as is often the case. Early adopters of the iPhone broke open the OS and began to extend its capabilities with apps, but Apple was quick enough to leverage the iTunes connection for delivering \$.99 songs to delivering \$.99 applications.

The app store trend didn’t and couldn’t have happened without the availability of more capable devices. Nokia punctuated the importance of a new class of handset commonly referred to as smartphones in 2007 by calling their advanced handsets “Multimedia Computers.” Smartphone as computers has become a more common analogy as smartphones grew in processing and storage capability. The steady increase of smartphone marketshare hit an inflection point in 2008 by crossing the magical 20% penetration rate in both the UK and the US. Historically, any technology mainstreams at the 20% penetration level, which has clearly been demonstrated by experience since 2008. According to Morgan Stanley analyst Mary Meeker, the rest of the world (ROW) will reach 20% smartphone penetration in 2012.

It is in this context of explosive growth in smartphone marketshare, a frictionless path to market through device and OS app stores, and a viable business model that the authors take us to the next step—cross-platform development. Cross-platform frameworks are still in the early

stages of technology evolution, but the timing is perfect for developers to add cross-platform frameworks to their tool box.

This is especially true for web developers and those serving brands that benefit most from the tradeoffs between wide distribution and deep integration.

In Part 1, the authors provide a survey of the top development and distribution options consisting of mainly handset and OS vendors including the iPhone, Android, BlackBerry, and Windows Mobile. Part 2 follows by introducing emerging cross-platform solutions covering both proprietary and open source frameworks with an emphasis on building native applications. And finally in Part 3, the authors address techniques for using HTML to create a native look-and-feel for web applications and services.

A key thread throughout the book is recognition that mobile development is a business endeavor and opportunity. There is a presentation of how-to instructions and code samples that will be useful to those just getting started with mobile development, but the audience that will benefit most from the pragmatic vision of the authors are professional developers and agencies. Certainly, many web developers are pursuing mobile development because it's a good decision to grow their business and if their clients aren't already requesting mobile applications, they will soon.

The book isn't targeted at developers of gaming apps. While gaming is a leading category for all app stores, it's one of those categories that benefits most from deep integration into the OS or device. Cross-platform frameworks aren't likely to be the best solution for games. Productivity apps, branded apps, and some communications services such as social networking apps will benefit from using the tools and techniques covered in the book.

Several of the tools presented in the book are currently leading this emerging category. We are in the early days of cross-platform use on mobile devices. Of the estimated 17 million software developers worldwide, according to Motorola as quoted in Forbes, around 4 million of them are developing for mobile. While Rhodes, Appcelerator, and PhoneGap have been used to deliver applications via the Apple App Store, the total number of developers using these frameworks is in the low six figures. Like the early days of the web, and to some extent, still, experimentation is vital to moving the ecosystem forward. This book is an important contribution to that effort.

Debi Jones
Editor In Chief
Telefonica Developer Programs

About the Authors



Sarah Allen leads Blazing Cloud, a San Francisco consulting firm that specializes in developing leading-edge mobile and web applications. She is also co-founder and CTO of Mightyverse, a mobile startup focused on helping people communicate across languages and cultures. In both technical and leadership roles, Sarah has been developing commercial software since 1990 when she co-founded CoSA (the Company of Science & Art), which originated After Effects. She began focusing on Internet software as an engineer on Macromedia's Shockwave team in 1995. She led the development of the Shockwave Multiuser Server, and later the Flash Media Server and Flash video. An industry veteran who has also worked at Adobe, Aldus, Apple, and Laszlo Systems, Sarah was named one of the top 25 women of the Web by SF WoW (San Francisco Women of the Web) in 1998.

Website: blazingcloud.net
Personal Blog: www.ultrasaurus.com
Twitter: @ultrasaurus



Vidal Graupera has been developing award-winning mobile applications starting as far back as the Apple Newton in 1993. He founded and ran a successful software company that developed more than a dozen consumer applications on a variety of mobile platforms over a period of ten years. Vidal holds engineering degrees from Carnegie Mellon University and the University of Southern CA, and an MBA from Santa Clara University. Vidal currently consults with clients on developing web and mobile applications.

Website: vdgroup.com
Personal Website: www.vidalgraupera.com
Twitter: @vgraupera



Lee Lundrigan, a founding engineer at Blazing Cloud, develops mobile applications using cross-platform frameworks on four platforms and Objective-C on the iPhone and iPad. He is an expert in CSS and HTML and also has experience creating dynamic UI in JavaScript. He has developed cross-browser CSS and HTML to run on iPhone, Android, BlackBerry, and Windows Mobile.

Website: blazingcloud.net
Personal Blog: www.macboypro.com

About the Technical Reviewer

Fabio Claudio Ferracchiati is a prolific writer on cutting-edge technologies. Fabio has contributed to more than a dozen books on .NET, C#, Visual Basic, and ASP.NET. He is a .NET Microsoft Certified Solution Developer (MCSD) and lives in Rome, Italy.

Acknowledgments

The authors received enthusiastic support from many of the creators of the software discussed herein. We would like to extend our thanks for technical review and enthusiastic support from the Rhomobile team: Adam Blum, Lars Burgess, Brian Moore, Evgeny Vovchenko, and Vladimir Tarasov; Brian LeRoux from Nitobi, David Richey and Jeff Haynie from Appcellerator; and Ed Spencer from Sencha. We also want to acknowledge Rupa Eichenberger's significant contribution to early technical reviews; Nola Stowe for initial work on the Android chapter; and Sarah Mei for her work on Rhodes geolocation. Jim Oser, Bruce Allen, and David Temkin each had a substantive impact in reviewing specific chapters.

Introduction

Developing mobile applications can be tricky business. Mobile developers need to use platform-specific tools and APIs and write code in different languages on different platforms. It is often hard to understand what it takes to develop and distribute an application for a specific device without actually building one. Each platform has different processes and requirements for membership in developer programs and documentation for different parts of the development process are often scattered and hard to piece together. Therefore, we have divided the book into three main topics: Platform Development and Distribution, Cross-Platform Native Frameworks, and HTML Interfaces.

Part 1: Platform Development and Distribution

In Chapters 1–5, we provide an overview of four platforms: iOS, for building iPhone, iPad, and iPod Touch applications; the Android open source platform, created by Google; Research In Motion's BlackBerry platform; and Windows Mobile from Microsoft. Each chapter follows the same outline:

- Building a Simple Hello World
- Running in the Simulator
- Adding a Browser Control
- Building for the Device
- Distribution Options and Requirements

This common outline allows for comparison across the operating systems and provides a feel for the patterns of the development process. If you decide to pursue native application development using only the vendor SDK, you will need a lot more details than any single chapter can provide, but this should provide the right amount of information to kick-off some experimentation or help make a decision about which platforms to pursue.

It is inevitable that developers create ways to share code across platforms when CPU power is fast enough and there is sufficient memory to support some kind of abstraction and demand fuels faster time to market. We saw this with cross-platform desktop frameworks that emerged in the 1990s, and now with cross-platform mobile frameworks.

Part 2: Cross-Platform Native Frameworks

Chapters 6–9 provide an overview and examples of applications written in three popular native frameworks. In categorizing as a “native framework,” we selected software that allows a common development approach across platforms but that build to an application that is indistinguishable by a user from one built with native code (as described in Part 1). Note that to build using these frameworks, you will still need the vendor SDK described in Part 1 and use vendor-specific techniques for code signing and distributions.

There are two chapters on the Rhomobile platform, one for the client-side Rhodes and one for the RhoSync server framework. Rhodes is covered in more depth than the other two platforms: Titanium Mobile and PhoneGap. Rhodes is at version 2 at this writing, Titanium v1.2 and PhoneGap 0.9. As with the rest of the book, these chapters are designed to provide a feel for what it is like to develop for each platform, to kick-start some experimentation, and aid in deciding what platform to spend more time with.

Part 3: HTML Interfaces

You can use the technique of adding a browser control in combination with the HTML and CSS patterns and frameworks presented in Chapters 10–14.

To develop a mobile application user interface, a mobile developer must typically learn a platform-specific language and SDK. This can become quite cumbersome if you need your application to run on more than one platform. Fortunately, there is an alternative; all smartphone platforms today include a browser control component (also known as a web view) that a developer can embed in their application that will allow them to write some or all of their app in HTML, CSS, and JavaScript.

Leveraging HTML and CSS for mobile application UI gets even better with the introduction of the mobile WebKit browser. WebKit is an open source browser engine originally created by Apple. WebKit introduces a partial implementation of HTML5 and CSS3 with full support for HTML4 and partial implementation CSS2. Note that as of this writing, HTML5 and CSS3 are still in “working draft;” however, these emerging standards have been aggressively adopted by multiple web browsers and the latest versions of WebKit-based browsers include most HTML5 and CSS3 features. The WebKit mobile browser is currently the native browser for iPhone/iPod Touch/iPad, Android, Palm, and many Symbian phones. BlackBerry plans to catch up with its own WebKit-based browser, recently demonstrated at Mobile World Congress in February 2010. Windows Mobile ships with an IE-based browser, which includes a better implementation of CSS1 and 2 compared with BlackBerry, but still has limitations. It is possible, though sometimes challenging, to build cross-platform UI in HTML and CSS that works across WebKit, mobile IE, and BlackBerry browsers. The most challenging part is differing levels of support for current HTML and CSS standards.