Contents

Author Biography ix

Author's Acknowledgments xi

Symbian Press Acknowledgments xiii

1 Introduction 1
- 1.1 What is PC Connectivity and Why is This Book Different from Other Symbian OS Books ? 2
- 1.2 What This Book Will Tell You (and What It Will Not) 3
- 1.3 How This Book is Structured 4
- 1.4 Conventions Used in This Book 5
- 1.5 Developer Resources 5

2 A History of Symbian OS and PC Connectivity 7
- 2.1 A History of Symbian OS 7
- 2.2 PC Connectivity Using PLP 8
- 2.3 PC Connectivity Using TCP/IP 8
- 2.4 PC Connectivity Using OBEX 10

3 An Architectural Overview of PC Connectivity 11
- 3.1 The Bearers, TCP/IP and PPP 11
- 3.2 A Client-Server Model of PC Connectivity 12

4 The Symbian Connect Object Model 15
- 4.1 Overview 15
- 4.2 Functionality in SCOM and in PC Suites 15
- 4.3 SCOM and BAL 16
- 4.4 COM Programming and Language Choice 17
- 4.5 Error Handling 18

4.6 SCOM Class Reference 18
4.7 BAL Class Reference 33
4.8 Using SCOM in C++ and Visual Basic 37

5 An Example PC Connect Application – a File Browser 39
5.1 Overview 39
5.2 Connecting to a Phone or Emulator 39
5.3 Accessing SCOM and Connecting to a Device 48
5.4 Handling Differences Between Devices 52
5.5 Copying Files – Asynchronous Actions 53
5.6 Navigating the Filing System 58
5.7 A File Browser Application 60
5.8 Simple Actions on Files and Directories 66
5.9 Error Handling and Disconnection 77
5.10 Visual C++ Code for Application and Device Management 78
5.11 Visual C++ Code for Drive and Directory Navigation 86
5.12 Visual C++ Code for Synchronous and Asynchronous Operations 87

6 Programming for Symbian OS 89
6.1 Building a Project 90
6.2 Using the Emulator 96
6.3 Types and Naming Conventions 100
6.4 Error Handling 102
6.5 Descriptors 106
6.6 Arrays 108
6.7 Processes and Threads 109
6.8 Active Objects 110
6.9 Backwards Compatibility and Programming for Multiple Phone Types 113

7 Developing Custom Servers 117
7.1 Overview of Custom Servers 117
7.2 Limitations of Custom Servers 118
7.3 Custom Servers API 119
7.4 Protocol Conventions 123
7.5 Creating Your First Custom Server 124
7.6 Installing a Custom Server 129
7.7 Starting a Custom Server from SCOM 130
7.8 Communicating with a Custom Server 132
7.9 Asynchronous Communication 133
7.10 Debugging a Custom Server 136

8 Developing Socket Servers 137
8.1 Overview of Connectivity Socket Servers 137
8.2 An Introduction to the Server Socket Classes 138
8.3 Using the Service Broker API 141
8.4 Server Socket Classes 142
8.5 Developing an Echo Socket Server 151
8.6 Installing and Registering a Server Socket Service 161
8.7 Starting a Socket Service from SCOM 163
8.8 Communicating with a Socket Service 164
8.9 Asynchronous Communication 165
8.10 Debugging a Socket Service 165

9 Introducing SMS and Messaging Classes 167
9.1 The Message Server and MTMs 167
9.2 The Structure of Messages 170
9.3 Message Server Events and Sessions 173
9.4 SMS Specific Variations 174
9.5 Common Messaging Classes 175
9.6 SMS Specific Classes 187

10 Developing an SMS Management Connectivity Service 191
10.1 SMS Management Protocol 191
10.2 Packing and Unpacking Data 200
10.3 Obtaining Access to the Message Server and the SMS MTM 204
10.4 Listing SMS Messages and Returning Their Contents 206
10.5 Deleting and Creating SMS Messages 209
10.6 Handling Message Server Events 213
10.7 Putting the Messaging Code in a Connectivity Plug-in 215
10.8 A Command-line SMS Application 219

11 Using the Contacts Model 227
11.1 Databases and Models 227
11.2 The Contacts Model 228
11.3 Views 230
11.4 Contacts Observers 230
11.5 Synchronization and Performance Issues 231
11.6 Contacts Model API 231
11.7 A Contacts Connectivity Service 256

12 Using the Agenda Model 283
12.1 The Various Agenda Models 283

12.2 Types of Agenda Entries 284
12.3 Repeating Entries 285
12.4 Alarms 285
12.5 List and Filter Classes 286
12.6 Agenda Model API 286
12.7 An Agenda Connectivity Service 325

13 Developing a Specialized Connectivity GUI Application 347
13.1 What is Special About a GUI Application? 347
13.2 Managing Connections to Phones 347
13.3 Starting a PC Connectivity Service 351
13.4 Communicating and Managing Delays 351
13.5 A GUI SMS Application 358
13.6 A Contacts GUI Application 367
13.7 An Agenda GUI Application 384
13.8 Conclusion and Ideas for Further Development 396

14 Starting General Socket Servers 397
14.1 Communicating with a Socket Server 398
14.2 Starting a Server 400

15 Connectivity Dos and Don'ts 403
15.1 Protocol Design 403
15.2 Robustness and Defensive Design 406
15.3 Device and Service Management 407
15.4 General Development and Debugging Skills 410

Appendix 1 Developer Resources 413

Appendix 2 Specifications of Symbian OS Phones 421

Index 441