

Contents

<i>Foreword</i>	<i>xv</i>
<i>About the Author</i>	<i>xvii</i>
<i>About the Technical Reviewer</i>	<i>xix</i>
<i>Acknowledgments</i>	<i>xxi</i>
<i>Introduction and AFAQ (Anticipated Frequently Asked Questions)</i>	<i>xxiii</i>
<i>Who Is This Book For?</i>	<i>xxiii</i>
<i>How Is This Book Different from Distributed .NET Programming in C#?</i>	<i>xxiv</i>
<i>What's Up with the ADO.NET Appendix by Andrew Troelsen?</i>	<i>xxiv</i>
<i>What Do I Need to Run the Examples?</i>	<i>xxiv</i>
<i>Why Isn't There Any Real-World Code?</i>	<i>xv</i>
<i>How Come You Don't Have Tables Listing All the Options/Methods/Parameters of Each Tool/Class/Method?</i>	<i>xv</i>
<i>Why Do I Keep Getting "File Not Found" Exceptions When I Run the Example Code?</i>	<i>xv</i>
<i>What's Up with the Spinal Tap Quotes?</i>	<i>xxvi</i>
 <i>Chapter 1 The Evolution of Distributed Programming</i>	 <i>1</i>
<i>Overview of Distributed Programming</i>	<i>1</i>
<i>Layering an Application</i>	<i>2</i>
<i>The Five Principles of Distributed Design</i>	<i>3</i>
<i>Defining Scalability</i>	<i>11</i>

<i>A Short History of Distributed Programming</i>	13
Centralized Computing	13
Two-tier Client/Server Architecture	14
Three-tier and N-tier Client/Server Architecture	15
The Web Architecture	17
<i>Microsoft and Distributed Computing</i>	18
The Era of PC Dominance	19
The Age of Enlightenment	19
The Days of Disillusionment	21
The Present: .NET	23
<i>Summary</i>	24
 Chapter 2 This Is .NET	27
 <i>Understanding the .NET Infrastructure</i>	27
The Importance of Type	28
The Three Cs of .NET: CTS, CLS, and CLR	28
Using Namespaces	30
Assemblies and Manifests	32
Intermediate Language	32
<i>Building and Configuring .NET Assemblies</i>	33
Building a Private Assembly	33
Building a Shared Assembly	44
<i>Understanding .NET Versioning</i>	54
Setting an Assembly's Version Information	54
Revisiting the Application Configuration File	57
Setting Machine-wide Version Policies	58
Using the .NET Framework Configuration Tool	58
Configuring Publisher Policy	61
Policy Precedence	64
Using the <codeBase> Element	64
Viewing the Assembly Binding Log	66
Summary of the Binding Process	68
<i>Understanding Attributes and Reflection</i>	68
Using CLR Attributes	69
Implementing Custom Attributes	71
Reflecting upon Reflection	72
Attributes and Reflection in Perspective	75
<i>Understanding Garbage Collection</i>	75
Reference Counting vs. Garbage Collection	76
Garbage Collection Internals	78

Implementing the Finalize Method	79
Implementing the IDisposable Interface	81
Garbage Collection in Perspective	84
<i>Serialization</i>	84
Using the Serializable Attribute	85
ISerializable and Formatters	87
<i>Summary</i>	89
 Chapter 3 Introduction to .NET Remoting	91
<i>What Is Remoting?</i>	91
<i>Understanding Application Domains</i>	92
Programming with Application Domains	93
Understanding Context	95
<i>Marshaling Objects</i>	105
Marshal By Value Objects	105
Marshal By Reference Objects	106
Shared Methods and Other Remoting Details	107
Summarizing Marshaling and Context Agility	108
<i>Examining the .NET Remoting Framework</i>	109
Looking at the Big Picture	109
Well-Known vs. Client-Activated Objects	110
Understanding Proxies	111
Understanding Channels and Formatters	114
<i>Summary</i>	117
 Chapter 4 Distributed Programming with .NET Remoting	119
<i>Implementing Well-Known Objects</i>	119
Building the Server	119
Building the Client	123
Singleton Mode vs. SingleCall Mode	127
Looking (Briefly) at Some Remoting Issues	130
Remoting Configuration	130
<i>Implementing Client-Activated Objects</i>	138
Building the Server	140
Building the Client	142
Understanding Lease-based Lifetimes	144

<i>Building Remoting Hosts</i>	159
Hosting Remotable Objects in a Windows Service	159
Hosting Remotable Objects in ASP.NET	167
<i>Summary</i>	172
 Chapter 5 Additional Remoting Techniques	175
<i>Solving the Metadata Deployment Issue</i>	175
Deploying Metadata Assemblies	176
Deploying Interface Assemblies	186
Using the Soapsuds Utility	193
Summary of Deployment Issues	200
<i>Calling Remote Objects Asynchronously</i>	201
Understanding Delegates	201
Using Delegates for Local Asynchronous Calls	206
Using Delegates for Remote Asynchronous Calls	214
Summarizing Asynchronous Remoting	227
<i>Understanding Call Context</i>	228
Call Context vs. Thread Local Storage	229
Using Call Context with Remoting	230
Using Call Context with Asynchronous Calls	233
Using Call Context Headers	235
<i>Summary</i>	236
 Chapter 6 Understanding XML Web Services	237
<i>Web Services Overview</i>	237
Why Web Services?	238
Web Service Composition	239
The World Wide Web Consortium	247
<i>Building and Consuming Web Services in .NET</i>	248
The IIS to ASP.NET to Web Service Relationship	248
Using Code-Behind	249
Building Web Services with Visual Studio .NET	251
Consuming the Web Service	255
Calling Web Services Asynchronously	258
Returning Custom Types from the Web Service	259
Using the ASP.NET Session Object	268
<i>Remoting vs. Web Services</i>	270
<i>Summary</i>	271

Chapter 7 Understanding COM Interop	273
<i>The Need for COM Interop</i>	273
<i>Managed to Unmanaged Interop</i>	274
Understanding the Runtime Callable Wrapper	274
Building an Interop Assembly	275
<i>Unmanaged to Managed Interop</i>	276
Understanding the COM Callable Wrapper	277
Registering an Assembly for COM Interop	278
Writing Managed Code for COM Interop	279
Managed Code and COM Versioning	285
Summary	288
 Chapter 8 Leveraging Component Services	 289
<i>Component Services Overview</i>	289
Component Services Motivation	290
Revisiting Context	290
Survey of Component Services	291
Survey of COM+ Configuration Settings	292
<i>Building Serviced Components in Managed Code</i>	295
Populating the COM+ Catalog	296
Experimenting with a Simple Serviced Component	299
Examining COM+ and .NET Interaction	317
Just-In-Time Activation	319
Understanding Object Pooling	329
Using Object Construction	334
<i>Automatic Transactions</i>	335
The Distributed Transaction Coordinator	336
Enabling Transactions	338
Determining the Transaction's Outcome	339
<i>Consuming Serviced Components</i>	346
Exposing Objects with DCOM	346
Exposing Objects with .NET Remoting	348
<i>Investigating New Features in COM+ 1.5</i>	351
Application Recycling and Pooling	351
Configurable Transaction Isolation Levels	353
SOAP Services	354
Summary	355

Chapter 9 .NET Message Queuing	357
<i>Message Queuing Overview</i>	357
Why Message Queuing?	358
Message Queuing Architecture	359
Message Queuing vs. Remoting vs. Web Services	360
<i>Installing and Administering MSMQ</i>	360
MSMQ Installation Options	360
Creating and Managing Queues	363
<i>Using .NET Message Queuing</i>	365
Building the Sender	365
Building the Receiver	370
Sending Custom Types in Messages	376
<i>Writing Queued Components in Managed Code</i>	384
The Queued Component Architecture	385
Implementing a Queued Component	387
Handling Queued Component Exceptions	388
<i>Summary</i>	391
 Appendix Data Access with ADO.NET	395
<i>The Need for ADO.NET</i>	395
ADO.NET: The Big Picture	396
<i>Understanding ADO.NET Namespaces</i>	398
<i>The Types of System.Data</i>	399
<i>Examining the DataColumn Type</i>	400
Building a DataColumn	402
Adding a DataColumn to a DataTable	403
Configuring a DataColumn to Function As a Primary Key	404
Enabling Auto-Incrementing Fields	404
Configuring a Column's XML Representation	406
<i>Examining the DataRow Type</i>	407
Understanding the DataRow.RowState Property	408
The ItemArray Property	410
<i>Details of the DataTable</i>	412

<i>Building a Complete DataTable</i>	413
Manipulating a DataTable: Deleting Rows	416
Manipulating a DataTable: Applying Filters and Sort Orders.....	418
Manipulating a DataTable: Updating Rows	421
<i>Understanding the DataView Type</i>	424
<i>Understanding the Role of the DataSet</i>	426
Members of the DataSet	428
Building an In-Memory DataSet	430
<i>Expressing Relations Using the DataRelation Type</i>	433
Navigating Between Related Tables.....	434
<i>Reading and Writing XML-Based DataSets</i>	438
<i>Building a Simple Test Database</i>	441
<i>ADO.NET Managed Providers</i>	442
<i>Working with the OleDb Managed Provider</i>	443
Establishing a Connection Using the OleDbConnection Type	444
Building a SQL Command	446
Working with the OleDbDataReader	447
Connecting to an Access Database	448
Executing a Stored Procedure	449
<i>The Role of the OleDbDataAdapter Type</i>	452
Filling a DataSet Using the OleDbDataAdapter Type	454
<i>Working with the SQL Managed Provider</i>	456
The System.Data.SqlTypes Namespace	457
Inserting New Records Using the SqlDataAdapter	458
Updating Existing Records Using the SqlDataAdapter	461
<i>Autogenerated SQL Commands</i>	463
<i>Filling a Multitabled DataSet (and Adding DataRelations)</i>	465
<i>Bring in the Wizards!</i>	469
Establishing a Data Connection	469
Creating a SQL Connection at Design Time.....	471
Building a Data Adapter	473
Using the Configured Data Adapter.....	477
<i>Summary</i>	478
 <i>Index</i>	 481