

Contents

About the Author	xv
About the Technical Reviewer	xvi
Acknowledgments	xvii
Introduction	xix
CHAPTER 1 A Quick Look at Berkeley DB XML	1
A Complete Example	1
Creating and Using a Database	2
Querying a Database	3
Creating and Querying a Second Database	3
Metadata	4
XQuery	4
Conclusion	5
CHAPTER 2 The Power of an Embedded XML Database	7
Database Servers vs. Embedded Databases	7
Architecture Example	9
Embedded Databases You Might Know	10
SQLite	11
Wordnet	11
Embedded Databases on the Desktop	14
XML for Data Exchange	14
XML for Data Storage	16
Indexing XML	18
High-Performance XML Databases	20
BDB XML for Quality Architecture	21
Conclusion	23
CHAPTER 3 Installation and Configuration	25
BDB XML Packages and Layout	25
Berkeley DB	25
Xerces C++	25
Pathan	26

	XQuery	26
	Berkeley DB XML	26
	Installation	26
	Windows	26
	Unix	28
	Building and Using Individual Packages	29
	Unix Variants	30
	Building Bindings	31
	Conclusion	33
CHAPTER 4	Getting Started	35
	Core Concepts	35
	The Shell	35
	Shell Options	36
	Creating Containers	36
	Adding and Deleting Documents	37
	Querying Containers	38
	Indexing Containers	40
	Using XQuery	41
	Metadata	43
	Transactions	44
	Conclusion	45
CHAPTER 5	Environments, Containers, and Documents	47
	Environments	47
	Creating and Opening Environments	48
	Additional Environment Configuration	49
	Containers	50
	Creating and Opening Containers	50
	Container Types	51
	Some Container Operations	52
	Documents	53
	Adding Documents	54
	Retrieving a Document	54
	Replacing Documents	55
	Modifying Documents Programmatically	55
	Deleting Documents	56
	Transactions	56
	Validation	56
	Metadata	57
	Conclusion	57

CHAPTER 6	Indexes	61
	Creating and Manipulating Indexes	61
	Index Nodes	62
	Index Types	62
	Uniqueness	63
	Path Types	63
	Node Types	64
	Key Types	64
	Syntax Types	65
	Managing Indexes	65
	Adding Indexes	65
	Listing Indexes	67
	Deleting and Replacing Indexes	67
	Default Indexes	68
	Index Strategies	68
	Query Plans	70
	Conclusion	72
CHAPTER 7	XQuery with BDB XML	73
	Trying XQuery	73
	Sample Data	74
	XPath	75
	Expressions	76
	Sequences	77
	A Complete Example	78
	FLWOR Expressions	80
	for	80
	let	81
	where	81
	order by	81
	return	82
	Data Types	82
	Nodes	84
	Atomic Values	84
	Navigation	84
	Comparisons	85
	User Functions	86
	Modules	87
	Some XQuery Tricks	87
	Iteration vs. Filtering	87
	Regular Expressions	88
	Querying for Metadata	89

	Querying Multiple Data Sources	90
	Recursion	90
	Reshaping Results	92
	Utilizing Hierarchy	94
	Ranges	96
	Unions, Intersections, and Differences	98
	Indexes and Queries	99
	Query Plans	99
	Node Names and Wildcards	101
	Queries Against Results	102
	Conclusion	102
CHAPTER 8	BDB XML with C++	103
	Compiling Applications	103
	Class Organization	104
	Errors and Exception Handling	105
	Opening Environments	107
	XmlManager Class	108
	Instantiating XmlManager Objects	108
	Managing Containers	108
	Loading Documents	110
	Preparing and Executing Queries	112
	Using Query Results	114
	Creating Other Objects	115
	Using XmlContainer	116
	Using XmlDocument	119
	Using XmlModify	120
	Using XmlTransaction	121
	BDB XML Event API	123
	Conclusion	124
CHAPTER 9	BDB XML with Python	125
	Running Applications	125
	Class Organization	125
	Errors and Exception Handling	126
	Environments	126
	XmlManager	127
	Instantiating XmlManager Objects	127
	Managing Containers	127
	Loading Documents	128

	Preparing and Executing Queries	129
	Using Query Results	131
	Creating Other Objects	133
	Using XmlContainer	133
	Using XmlDocument and XmlModify	136
	Transactions	138
	Conclusion	139
CHAPTER 10	BDB XML with Java	141
	Running Applications	141
	Class Organization	142
	Errors and Exception Handling	142
	Environments	144
	XmlManager	145
	Instantiating XmlManager Objects	145
	Managing Containers	145
	Loading Documents	147
	Preparing and Executing Queries	148
	Using Query Results	151
	Creating Other Objects	153
	Using XmlContainer	153
	Using XmlDocument and XmlModify	156
	Conclusion	159
CHAPTER 11	BDB XML with Perl	161
	Running Applications	161
	Class Organization	161
	Errors and Exception Handling	162
	Environments	163
	XmlManager	163
	Instantiating XmlManager Objects	163
	Managing Containers	163
	Loading Documents	165
	Preparing and Executing Queries	166
	Using Query Results	168
	Creating Other Objects	169
	Using XmlContainer	169
	Using XmlDocument	172
	Using XmlModify	173
	Conclusion	175

CHAPTER 12	BDB XML with PHP	177
	Running Applications	177
	Class Organization	177
	Environments	178
	XmlManager	179
	Instantiating XmlManager Objects	179
	Managing Containers	179
	Loading Documents	180
	Preparing and Executing Queries	181
	Using Query Results	183
	Creating Other Objects	184
	Using XmlContainer	185
	Using XmlDocument	187
	Using XmlModify	188
	Conclusion	189
CHAPTER 13	Managing Databases	191
	Populating Containers	191
	Dumping Containers	192
	Loading Containers	193
	Managing Logs	193
	Detecting Deadlocks	194
	Checkpointing Transactions	195
	Recovery	195
	Debugging Databases	196
	Backup and Restore	196
	Conclusion	197
APPENDIX A	XML Essentials	199
	It's About the Data	199
	XML Building Blocks	203
	Elements	203
	Attributes	203
	Well-Formedness	204
	CDATA	205
	Relationships	206
	Namespaces	206
	Validation	207
	XML Schemas	209
	XPath: the Gist	210
	Paths	211
	Nodes	211

Document Object Model (DOM)	212
XPath: the Details	214
Contexts	214
Path Operators	214
Predicates	215
Operators	217
Axes	217
Functions	219
XML DOM, Continued	221
Implementation Considerations	222
Reading and Writing XML	223
Other XML Technologies	226
XSLT	226
SAX	229
RPC-XML and SOAP	229
Conclusion	230

■ APPENDIX B **BDB XML API Reference**

Language Notes	231
DbEnv	232
DbXml	235
XmlContainer	238
XmlContainerConfig	260
XmlDocument	261
XmlDocumentConfig	269
XmlException	270
XmlIndexLookup	270
XmlIndexSpecification	275
XmlInputStream	282
XmlManager	284
XmlManagerConfig	310
XmlMetadataIterator	311
XmlModify	312
XmlQueryContext	317
XmlQueryExpression	324
XmlResults	327
XmlStatistics	332
XmlTransaction	334
XmlUpdateContext	336
XmlValue	337

■ APPENDIX C	XQuery Reference	343
	Expressions	343
	Functions	347
	Data Types	351
■ INDEX		355