



# iBATIS IN ACTION

Clinton Begin  
Brandon Goodin  
Larry Meadors

MANNING

# *contents*

---

*preface xvii*  
*acknowledgments xix*  
*about this book xxiii*  
*about the authors xxvii*  
*about the title xxviii*  
*about the cover illustration xxix*

<b>PART 1 INTRODUCTION .....</b>	<b>1</b>
----------------------------------	----------

---

<b>1</b>	<b><i>The iBATIS philosophy 3</i></b>
1.1	A hybrid solution: combining the best of the best 4 <i>Exploring the roots of iBATIS 5</i> <i>Understanding the iBATIS advantage 10</i>
1.2	Where iBATIS fits 14 <i>The business object model 15 ■ The presentation layer 15</i> <i>The business logic layer 17 ■ The persistence layer 18</i> <i>The relational database 19</i>
1.3	Working with different database types 22 <i>Application databases 22 ■ Enterprise databases 23</i> <i>Proprietary databases 25 ■ Legacy databases 25</i>

1.4	How iBATIS handles common database challenges	26
	<i>Ownership and control</i>	26
	<i>Access by multiple disparate systems</i>	27
	<i>Complex keys and relationships</i>	28
	<i>Denormalized or overnormalized models</i>	29
	<i>Skinny data models</i>	30
1.5	Summary	32

## 2 *What is iBATIS?* 33

2.1	Mapping SQL	35
2.2	How it works	37
	<i>iBATIS for small, simple systems</i>	38
	<i>iBATIS for large, enterprise systems</i>	39
2.3	Why use iBATIS?	40
	<i>Simplicity</i>	40
	<i>Productivity</i>	41
	<i>Performance</i>	41
	<i>Separation of concerns</i>	42
	<i>Division of labor</i>	42
	<i>Portability: Java, .NET, and others</i>	42
	<i>Open source and honesty</i>	43
2.4	When not to use iBATIS	43
	<i>When you have full control...forever</i>	43
	<i>When your application requires fully dynamic SQL</i>	44
	<i>When you're not using a relational database</i>	44
	<i>When it simply does not work</i>	45
2.5	iBATIS in five minutes	45
	<i>Setting up the database</i>	46
	<i>Writing the code</i>	46
	<i>Configuring iBATIS (a preview)</i>	47
	<i>Building the application</i>	49
	<i>Running the application</i>	49
2.6	The future: where is iBATIS going?	50
	<i>Apache Software Foundation</i>	50
	<i>Simpler, smaller, with fewer dependencies</i>	51
	<i>More extensions and plug-ins</i>	51
	<i>Additional platforms and languages</i>	51
2.7	Summary	52

## PART 2 iBATIS BASICS .....55

---

## 3 *Installing and configuring iBATIS* 57

3.1	Getting an iBATIS distribution	58
	<i>Binary distribution</i>	59
	<i>Building from source</i>	59
3.2	Distribution contents	62

3.3	Dependencies	62
	<i>Bytecode enhancement for lazy loading</i>	63
	■ <i>Jakarta Commons Database Connection Pool</i>	63
	■ <i>Distributed caching</i>	64
3.4	Adding iBATIS to your application	64
	<i>Using iBATIS with a stand-alone application</i>	64
	<i>Using iBATIS with a web application</i>	65
3.5	iBATIS and JDBC	65
	<i>Releasing JDBC resources</i>	66
	■ <i>SQL injection</i>	66
	<i>Reducing the complexity</i>	67
3.6	iBATIS configuration continued	68
	<i>The SQL Map configuration file</i>	69
	■ <i>The &lt;properties&gt; element</i>	70
	<i>The &lt;settings&gt; element</i>	71
	■ <i>The &lt;typeAlias&gt; elements</i>	73
	■ <i>The &lt;transactionManager&gt; element</i>	75
	■ <i>The &lt;typeHandler&gt; element</i>	77
	■ <i>The &lt;sqlMap&gt; element</i>	78
3.7	Summary	78

## 4 Working with mapped statements 80

4.1	Starting with the basics	81
	<i>Creating JavaBeans</i>	81
	■ <i>The SqlMap API</i>	85
	<i>Mapped statement types</i>	86
4.2	Using <select> mapped statements	89
	<i>Using inline parameters with the # placeholders</i>	89
	■ <i>Using inline parameters with the \$ placeholders</i>	91
	■ <i>A quick look at SQL injection</i>	92
	■ <i>Automatic result maps</i>	93
	<i>Joining related data</i>	95
4.3	Mapping parameters	95
	<i>External parameter maps</i>	95
	■ <i>Inline parameter mapping revisited</i>	97
	■ <i>Primitive parameters</i>	99
	<i>JavaBean and Map parameters</i>	99
4.4	Using inline and explicit result maps	100
	<i>Primitive results</i>	101
	■ <i>JavaBean and Map results</i>	102
4.5	Summary	103

## 5 Executing nonquery statements 105

5.1	The building blocks for updating data	106
	<i>The SqlMap API for nonquery SQL statements</i>	106
	<i>Nonquery mapped statements</i>	107

5.2	Inserting data	108
	<i>Using inline parameter mapping</i>	108
	<i>Using an external parameter map</i>	109
	<i>Autogenerated keys</i>	110
5.3	Updating and deleting data	113
	<i>Handling concurrent updates</i>	114
	<i>Updating or deleting child records</i>	114
5.4	Running batch updates	115
5.5	Working with stored procedures	117
	<i>Considering the pros and cons</i>	117
	<i>IN, OUT, and INOUT parameters</i>	119
5.6	Summary	121

## 6 Using advanced query techniques 122

6.1	Using XML with iBATIS	123
	<i>XML parameters</i>	123
	<i>XML results</i>	125
6.2	Relating objects with mapped statements	128
	<i>Complex collections</i>	128
	<i>Lazy loading</i>	131
	<i>Avoiding the N+1 Selects problem</i>	132
6.3	Inheritance	134
	<i>Mapping Inheritance</i>	136
6.4	Other miscellaneous uses	137
	<i>Using the statement type and DDL</i>	137
	<i>Processing extremely large data sets</i>	138
6.5	Summary	144

## 7 Transactions 145

7.1	What is a transaction?	146
	<i>A simple banking example</i>	146
	<i>Understanding transaction properties</i>	148
7.2	Automatic transactions	151
7.3	Local transactions	152
7.4	Global transactions	153
	<i>Using active or passive transactions</i>	154
	<i>Starting, committing, and ending the transaction</i>	155
	<i>Do I need a global transaction?</i>	156
7.5	Custom transactions	156

7.6 Demarcating transactions 158

*Demarcating transactions at the presentation layer* 159

*Demarcating transactions at the persistence layer* 160

*Demarcating transactions at the business logic layer* 160

7.7 Summary 161

## 8 Using Dynamic SQL 163

8.1 Dealing with Dynamic WHERE clause criteria 164

8.2 Getting familiar with the dynamic tags 166

*The <dynamic> tag* 168 ■ *Binary tags* 169 ■ *Unary tags* 171

*Parameter tags* 172 ■ *The <iterate> tag* 173

8.3 A complete simple example 175

*Defining how to retrieve and display data* 176 ■ *Determining which database structures are involved* 176 ■ *Writing the SQL in static format* 176 ■ *Applying Dynamic SQL tags to static SQL* 177

8.4 Advanced Dynamic SQL techniques 178

*Defining the resulting data* 178 ■ *Defining the required input* 179

*Writing the SQL in static format* 180 ■ *Applying Dynamic SQL tags to static SQL* 181

8.5 Alternative approaches to Dynamic SQL 183

*Using Java code* 184 ■ *Using stored procedures* 187

*Comparing to iBATIS* 189

8.6 The future of Dynamic SQL 190

*Simplified conditional tags* 190 ■ *Expression language* 191

8.7 Summary 191

---

PART 3 iBATIS IN THE REAL WORLD ..... 193

## 9 Improving performance with caching 195

9.1 A simple iBATIS caching example 196

9.2 iBATIS's caching philosophy 197

9.3 Understanding the cache model 198

*Type* 198 ■ *The readOnly attribute* 199 ■ *The serialize attribute* 199 ■ *Combining readOnly and serialize* 200

9.4	Using tags inside the cache model	201
	<i>Cache flushing</i>	201
	<i>Setting cache model implementation properties</i>	204
9.5	Cache model types	204
	<i>MEMORY</i>	205
	■ <i>LRU</i>	206
	■ <i>FIFO</i>	207
	■ <i>OSCACHE</i>	208
	<i>Your cache model here</i>	208
9.6	Determining a caching strategy	208
	<i>Caching read-only, long-term data</i>	209
	■ <i>Caching read-write data</i>	211
	■ <i>Caching aging static data</i>	213
9.7	Summary	216

## 10 *iBATIS data access objects* 217

10.1	Hiding implementation details	218
	<i>Why the separation?</i>	219
	■ <i>A simple example</i>	220
10.2	Configuring the DAO	223
	<i>The &lt;properties&gt; element</i>	223
	■ <i>The &lt;context&gt; element</i>	223
	<i>The &lt;transactionManager&gt; element</i>	224
	■ <i>The DAO elements</i>	229
10.3	Configuration tips	230
	<i>Multiple servers</i>	230
	■ <i>Multiple database dialects</i>	231
	<i>Runtime configuration changes</i>	232
10.4	A SQL Map DAO implementation example	233
	<i>Configuring the DAO in iBATIS</i>	234
	■ <i>Creating a DaoManager instance</i>	235
	■ <i>Defining the transaction manager</i>	235
	■ <i>Loading the maps</i>	236
	■ <i>Coding the DAO implementation</i>	239
10.5	Summary	241

## 11 *Doing more with DAO* 242

11.1	Non-SQLMap DAO implementations	243
	<i>A Hibernate DAO implementation</i>	243
	<i>A JDBC DAO implementation</i>	248
11.2	Using the DAO pattern with other data sources	253
	<i>Example: using a DAO with LDAP</i>	253
	<i>Example: using a DAO with a web service</i>	258
11.3	Using the Spring DAO	260
	<i>Writing the code</i>	260
	■ <i>Why use Spring instead of iBATIS?</i>	262

11.4	Creating your own DAO layer	262
	<i>Separating interface from implementation</i>	263
	<i>Decoupling and creating a factory</i>	263
11.5	Summary	266

## 12 *Extending iBATIS* 267

12.1	Understanding pluggable component design	268
12.2	Working with custom type handlers	269
	<i>Implementing a custom type handler</i>	270
	<i>Creating a TypeHandlerCallback</i>	271
	<i>Registering a TypeHandlerCallback for use</i>	275
12.3	Working with a CacheController	276
	<i>Creating a CacheController</i>	277
	<i>Putting, getting, and flushing a CacheController</i>	277
	<i>Registering a CacheController for use</i>	278
12.4	Configuring an unsupported DataSource	279
12.5	Customizing transaction management	280
	<i>Understanding the TransactionConfig interface</i>	281
	<i>Understanding the Transaction interface</i>	282
12.6	Summary	283

## PART 4 iBATIS RECIPES ..... 285

---

## 13 *iBATIS best practices* 287

13.1	Unit testing with iBATIS	288
	<i>Unit-testing the mapping layer</i>	288
	<i>Unit-testing data access objects</i>	291
	<i>Unit-testing DAO consumer layers</i>	293
13.2	Managing iBATIS configuration files	295
	<i>Keep it on the classpath</i>	295
	<i>Keep your files together</i>	297
	<i>Organize mostly by return type</i>	298
13.3	Naming conventions	298
	<i>Naming statements</i>	298
	<i>Naming parameter maps</i>	298
	<i>Naming result maps</i>	299
	<i>XML files</i>	299
13.4	Beans, maps, or XML?	300
	<i>JavaBeans</i>	300
	<i>Maps</i>	300
	<i>XML</i>	301
	<i>Primitives</i>	301
13.5	Summary	301

## 14 *Putting it all together* 303

- 14.1 Design concept 304
    - Account* 304 ■ *Catalog* 304 ■ *Cart* 305 ■ *Order* 305
  - 14.2 Choosing technologies 305
    - Presentation* 305 ■ *Service* 305 ■ *Persistence* 306
  - 14.3 Tweaking Struts: the BeanAction 306
    - BeanBase* 307 ■ *BeanAction* 307 ■ *ActionContext* 307
  - 14.4 Laying the foundation 308
    - src* 308 ■ *test* 309 ■ *web* 309  
*build* 310 ■ *devlib* 310 ■ *lib* 310
  - 14.5 Configuring the web.xml 311
  - 14.6 Setting up the presentation 312
    - The first step* 312 ■ *Utilizing a presentation bean* 315
  - 14.7 Writing your service 320
    - Configuring dao.xml* 321 ■ *Transaction demarcation* 322
  - 14.8 Writing the DAO 323
    - SQLMap configuration* 324 ■ *SQLMap* 325  
*Interface and implementation* 326
  - 14.9 Summary 328
- appendix iBATIS.NET Quick Start* 329**
- index* 337**