Index

Accept/Reject rule, 160
AcceptChanges() method, 198–200
AcceptRejectRule, 134
Access
database access, listing of, 5
SQL Server, 17–19
Active Server Pages. See ASP
ActiveX Data Objects. See ADO
ActiveX Data Objects for .NET. See ADO.NET
Add() method, 229
Add value, 124
Add value, 209
AddHandler, 41
AddWithKey value, 124
ADO (ActiveX Data Objects), 4
connectivity dependence of, 5, 8
managed code in, listing of, 6–7
ADO.NET (ActiveX Data Objects for .NET)
classes, connecting to database
using, 19
connection life, 9
data structures in, 10–15
managed providers in, 15–19
namespaces in, 10
AllowDBNull, 98
ANSI (American National Standards Institute), 82
API (application program interface), 3
ArgumentException value, 129
ArrayList class, 102
ASP (Active Server Pages), 4
Asterisk (*), 83, 208
Attribute mapping, 270
Attributes, specifying columns and, 271
Authentication, 26–29
Auto-incremented value, 130
Auto value, 279
AutoIncrement column, 146–147
BaseCatalogName value, 99
BaseColumnName value, 99
BaseSchemaName value, 99
BaseTableName value, 99
Batch queries, 76–79
BeginEdit() method, 195
BeginLoadData() method, 196
BeginTransaction connection, 73
Binding. See Data binding
Binding object, 296
BindingContext property, 305
brackets ([ ]), 87
Business object layers
best practices, 326
using Typed Datasets as, 170–171
create table method, 175–176
CreateNameDataTable() method, 178
notification registration, 171–172
Caching
best practices, 327
client caching, 311–312
server caching, 311
CancelEdit() method, 196
Cascade value, 134
catch block, 49
Celko, Joe, 82
INDEX

ChangeDatabase() method, 31–33
Chaos isolation level, 73
Char string type, 59
CheckBox, 294
Child relations, 208
Client caching, 311–312
CloseConnection value, 90
Code, examples. See Listings
ColumnChanged event, 139, 140
ColumnChanging event, 139, 140
ColumnMappings, 117–118, 270
ColumnName value, 98
ColumnOrdinal value, 98
Columns. See also DataColumns
   as attributes, 271
   AutoIncrement column, 146–147
   expression, 147–149
   schema, 142–146
ColumnSize value, 98
COM (Component Object Model), 4
COM+, 76
ComboBox, 294
Command class, 10, 18
Command line options, 165–166
CommandBehavior flag, 89
CommandBehavior.KeyInfo option, 94
CommandBuilder, 15, 218–219, 233–234
CommandBuilder.RefreshSchema() method, 223
Commands
   CommandType, 55
   creating, 53–54
   DELETE, 221, 229–230
   executing, 55–57
   Fill, 117
   INSERT, 221, 227–229
   overview, 53
   parameters, 57–60
   result sets, 57
   stored procedures, 54
   TableDirect, 54
   Text, 54
   UPDATE, 221, 230–231, 233
CommandType enumeration
described, 55
Text, 55
StoredProcedure, 55
TableDirect, 55
Commit method, 73
Comparison operators, 208
Component Object Model. See COM
Compound expressions, 208
Concurrency
destructive
defined, 218
implementing, 247–251
optimistic
defined, 218
implementing, 220–222
row identification, 222
pessimistic
defined, 218
implementing, 243–247
violations, handling, 237–243
Connection class, 18
Connection strings. See Connections
Connection Timeout
   OLE DB connection strings and, 27
   overview, 30
   SQL Server connection strings and, 26
ConnectionFactory class, 43–45, 328–329
Connections
   ChangeDatabase() method, 31–33
   command relationship and, 22
   Connection object, 23
   connection pooling
      ODBC Managed Provider, 36–39
      OLE DB Managed Provider, 34–36
      Oracle Managed Provider, 36
      SQL Server Managed Provider, 33–34
   connection strings
      best practices, 329
      ODBC connection strings, 28–29
      OLE DB connection strings, 26–27
      Oracle connection strings, 28
      overview, 24–25
      SQL Server connection strings, 26
   error handling, 47–49
   events, 39–43
   integrated security, 30–31
   opening and closing of, 24
   simple listing of, 22
   SqlConnection.ConnectionTimeout
   property, 25
Connectivity
   in ADO
      advantages of, 7–9
      dependence, 5, 8
   in ADO.NET, listing of, 9
Constraint class, 10, 12
Convert.ChangeType() method, 195
COUNT function, 83
Create, Read, Update, Delete (CRUD), 170, 194
CreateNameDataTable() method, 178
CRUD (Create, Read, Update, Delete), 170, 194
CurrencyManager class, 304–306
CurrentRows value, 209
Cursors, 338
/d command line option, 165
DAO (Data Access Objects), 4
Data binding
in ASP.NET
complex binding, 308–309
data control binding, 309
to DataReader, 310
overview, 306–307
performance considerations, 310–312
simple binding, 307–308
CurrencyManager class, 304–306
overview, 293
in Windows Forms
complex binding, 297–299
DataGridView binding, 299–302
master detail binding, 302–304
overview, 294–296
simple data binding, 296–297
Data caching on Web servers, 319–320
Data Source Name. See DSN
Data warehouses, 324
DataAdapter class, 13, 112
DataAdapter.ContinueUpdateOnError property, 239
DataAdapter.Fill() method, 116–117, 119
DataAdapter.FillSchema() method, 125
DataAdapter.RowUpdating() method, 223
DataAdapter.SelectCommand() method, 223, 257
DataAdapter.Update() method, 14, 219, 221, 222, 224, 243
DataRelation class, 10, 12
DataRelationCollection.Add() method, 131
DataRowAction, 140
DataRowActivity event, 141
DataRowCollection class, 187
DataRowCollection.Add() method, 189
DataRowCollection.RemoveAt() method, 190
DataRowCollection.Rows. See also Rows
DataRowCollection.RemoveAt() method, 190
DataRowCollection.RemoveAt() method, 190
DataRow.Delete() method, 190
DataRowHasVersion() method, 200
DataRow.RemoveAt() method, 190
DataRow.Deleted() method, 190
DataRow.Delete() method, 190
DataRow.HasVersion() method, 200
DataRow: See also Rows
indexers, 192
values, reading, 191–192
DataRowVersion enumeration, 199
relational, 131–133
SQL server connection strings and, 26
DataBind() method, 307
DataBindings property, 296
DataColumn class, 10
DataColumnChanged event, 141
DataColumnChanging event, 141
DataColumn.Expression property, 207, 210
DataColumnMapping object, 117–118
DataColumns. See also Columns
convertible values, adding, 194–195
structure of, controlling, 269–271
DataConstraint, 110
DataGrid, 294, 299–302, 309
DataGrid.SetDataBinding() method, 300
DataList, 309
dataMember, 297
DataReader
accessing data from, 87–89
best practices, 328
columns, retrieving, 87
construction, 86
data binding to, 310
functionality of, 87
how to use, 11
locking records in, 94
metadata, working with, 96–99
OdbcDataReader class, 85
OleDbDataReader class, 85
overview, 85
SqlDataReader class, 85
DataRelation class, 10, 12
DataRelationCollection.Add() method, 131
DataRepeater controls, 309
DataRow class, 10, 110
DataRowAction, 140
DataRowChanged event, 141
DataRowChangeEventArgs, 140
DataRowChanging event, 141
DataRowCollection class, 187
DataRowCollection.Add() method, 189
DataRowCollection.InsertAt() method, 190
DataRowCollection.Remove() method, 190
DataRowCollection.RemoveAt() method, 190
DataRow.Delete() method, 190
DataRow.HasVersion() method, 200
DataRow.RemoveAt() method, 190
DataRowVersion enumeration, 199
relational, 131–133
SQL server connection strings and, 26
DataBind() method, 307
DataBindings property, 296
DataColumn class, 10
DataColumnChanged event, 141
DataColumnChanging event, 141
DataColumn.Expression property, 207, 210
DataColumnMapping object, 117–118
DataColumns. See also Columns
convertible values, adding, 194–195
structure of, controlling, 269–271
DataConstraint, 110
DataGrid, 294, 299–302, 309
DataGrid.SetDataBinding() method, 300
DataList, 309
dataMember, 297
DataReader
accessing data from, 87–89
best practices, 328
columns, retrieving, 87
construction, 86
data binding to, 310
functionality of, 87
how to use, 11
locking records in, 94
metadata, working with, 96–99
OdbcDataReader class, 85
OleDbDataReader class, 85
overview, 85
SqlDataReader class, 85
DataRelation class, 10, 12
DataRelationCollection.Add() method, 131
DataRepeater controls, 309
DataRow class, 10, 110
DataRowAction, 140
DataRowChanged event, 141
DataRowChangeEventArgs, 140
DataRowChanging event, 141
DataRowCollection class, 187
DataRowCollection.Add() method, 189
DataRowCollection.InsertAt() method, 190
DataRowCollection.Remove() method, 190
DataRowCollection.RemoveAt() method, 190
DataRow.Delete() method, 190
DataRow.HasVersion() method, 200
DataRow.RemoveAt() method, 190
DataRowVersion enumeration, 199
INDEX

DataSet schema
  AutoIncrement column, 146–147
  best practices, 326
  column schema, 142–146
  creating, listing of, 135–136, 167–168
defined, 122
  reason for, 122, 124
  as XSD document, 282–285
  XSDs to define, 126–127
DataSet.AcceptChanges() method, 282
DataSet.Merge() method, 213–215, 280
DataSet.ReadXml() method, 276, 282
DataSets. See also Typed DataSets
classes related to, 10
  constraints in, 133–134
creating
  from databases, 112–119
  programmatically, 121–122
  from XML, 119–121
data, getting into XML, 264–269
  event-driven, 171–173
filling
  with MissingSchemaAction.Error, 125
  with XML, 276–280
listing of, 12–13
managed providers and, 110–111
merging, 213–215
multi-table, dealing with, 251–254
navigating, 202–205
objects, list of, 110
overview, 11–12, 109
relationships between objects in, 12
saving as XML, 271–273
scaling architecture, 323
scaling out, 321
structure of, 110, 111, 152
transforming with XSLT, 291
  triggers (events), 139–141
DataSet.WriteXML() method, 273, 279
DataSource, 297, 298, 308
DataTable
  defined, 110
  multiple, 114–115
  DataTable.AcceptChanges() method, 198
  DataTable.DefaultView() method, 205
  DataTable.HasErrors property, 239
  DataTableMapping, 118
  DataTable.NewRow() method, 189
  DataTable.NewRowFromBuilder() method, 181
DataTable.Select() method, 210
DataTableextField property, 308
DataTextFieldFormatString property, 308
DataType value, 98
DataValueField property, 308
DataGridView class
  filtering with, 206–209
  overview, 205–206
  searching with, 212–213
  sorting with, 206
DataGridView.Find() method, 212–213
DataGridView.FindRows() method, 212–213
DataGridView.RowFilter() method, 206
DataGridViewRowState enumeration, 209
DataGridView.Sort property, 206, 212
Date filters, 207
DBAs (database administrators), 327
DBConcurrencyException, 237–238
DBNull value, 59, 194
DbType parameter, 59, 98
DELETE command, 221, 229–230
Delete rule, 160
DeleteCommand, 14–15, 112
Deleted value, 209
DeleteRule, 133
Deleting rows, 190–191
Destructive concurrency
  defined, 218
  implementing, 247–251
Dialog boxes
  Edit Key, 162
  Edit Relation, 158, 160–161
DiffGram, 273, 280–282
Direction value, 227
DisplayMember, 298, 299
Disposed event, 40
DLLImport, 37
DropDownList control, 308
DSN (Data Source Name)
  creating, 28
  disadvantages of, 29
  overview, 28
Duplication, 321–322
  Edit Key dialog box, 162
  Edit Relation dialog box, 158, 160–161
Element mapping, 270
_empty value, 166
EndEdit() method, 195
EndLoadData() method, 196
Equality operator (==), 207
Equal sign (=), 25, 207
Error Goto syntax, 47
Errors
  DataTable.HasErrors property, 239
  handling, 47–49
  Event-driven DataSets, 171–173
  Event handling, 41
Events
  ColumnChanged, 139, 140
  ColumnChanging, 139, 140
  DataColumnChanged, 141
  DataColumnChanging, 141
  DataRowChanged, 141
  DataRowChanging, 141
  Disposed, 40
  InfoMessage, 40, 43
  RowChanged, 139, 140, 171
  RowChanging, 139, 140, 171
  RowDeleted, 139
  RowDeleting, 139
  RowUpdating, 223
  StateChange, 40, 43
Ewald, Tim, 76
Example code. See Listings
ExecuteNonQuery() method, 55, 78
ExecuteReader() method, 56, 89–90
ExecuteScalar() method, 56
ExecuteXmlReader() method, 56–57
Expression columns, 147–149
Expressions
  compound expressions, 208
  wildcard, 208
  XPath, 288–291
Extensible Markup Language. See XML
Extensible Stylesheet Language. See XSL
Field class, 92–93
Fill() method, 113, 117
FillSchema() method, 125
Filtering
  with DataView class, 206–209
  date filters, 207
  text filters, 207
finally block, 48–49
Find() method, 212
ForeignKeyConstraint, 12, 133, 138–139
Fragment value, 279
FROM clause, 83
FullName property, 155, 298
GetChanges() method, 274, 282
GetChildRows() method, 205
GetName() method, 89
GetOrdinal() method, 89
GetParentRows() method, 205
GetRowType() method, 181
GetSchemaTable() method, 96
GUID (Globally Unique Identifier), 130
Hash sign (#), 207
Hidden mapping, 270
HTTP (Hypertext Transfer Protocol), 7
IDataInitialize::GetDataSource() method, 36
IDataReader interface, 101
IDbCommand interface, 10
IDbCommand.ExecuteNonQuery() method, 10
IDbCommand.ExecuteReader() method, 86, 94
IDbCommand.ExecuteScalar() method, 10
IDbConnection interface, 44
IDbTransaction interface, 217
IDENTITY field, 257–258
Ignore value, 124
IgnoreSchema, 273, 279
IIS (Internet Information Server), 4
IList, 298
In-place editing, 338
Indexers, 153, 192
InferSchema directive, 121, 280
InfoMessage event, 40
Input direction type, 59
InputOutput direction type, 59
INSERT command, 221, 227–229
InsertCommand, 14–15, 112
Instant SQL Programming, 82
Integrated security
  connections and, 30–31
  OLE DB connection strings and, 27
  Oracle Provider connection strings and, 28
  SQL server connection strings and, 26
Interfaces
  IDbReader, 101
  IDbCommand, 10
  IDbConnection, 44
  IDbTransaction, 217
Internet, ADO release and, 4
Internet Information Server. See IIS
INDEX

InvalidCastException, 88, 194
IsAutoIncrement value, 99
IsDBNull() method, 91, 93
IsDirty flag, 198
IsKeyColumn value, 98
IsLong value, 98
IsNull() method, 194
IsNullable value, 59
Isolation levels, for transactions, 73–74
IsolationLevel parameter, 217
IsolationLevel enumeration
    Chaos, 73
    ReadCommitted, 74
    ReadUncommitted, 74
    RepeatableRead, 74
    Serializable, 74
IsOnPrimaryKey property, 138
IsReadOnly value, 98
IsRowVersion value, 98
IsUnique value, 98
JOIN clause, 83–84

KeyInfo value, 90

/l command line option, 165
ListBox, 294, 299, 304, 308
Listings
    ADO (ActiveX Data Objects)
        connection usage in ADO.NET, 8
        database access, 5
        managed code in, 6–7
    ADO.NET (ActiveX Data Objects for .NET), connection life, 9
    batch queries, executing, 77–78
    ChangeDatabase() method, 31–33
    ColumnMappings, 117–119
    columns
        as attributes, 271
        expression, 147–148
    commands
        CommandType, 55
        creating, 53–54
    connections
        connection factories, 43–45
        connection pooling, 38–39
        events, 40–42
        life cycle of, 23
        simple example of, 22
    CurrencyManager class, 305

Data binding
    complex binding, 298, 299
    DataGrid binding, 300, 301
to DataReader, 310
    master detail, 302, 303
    simple, 297
    DataAdapters, multiple, 219–220
    DataColumn.GetMappingType, 269–270
    DataColumns, 193–194

DataReader
    columns, retrieving, 87
    SqlDataReader, 85
    System.Convert class, 88
typesafe access, 88
DataRows
    batch changes to, 196
    indexes, 192
    values, reading, 191–192

DataSet schema
    creating, 135–137, 166–168
    as XSD document, 283–285

DataSets, 12–13
    creating from database, 113
    creating programmatically, 121–122
    events, 140–141
    filling with
        MissingSchemaAction.Error, 125
    handling deletes with, 252–253
    handling inserts with, 254
    inheriting, 127
    loading with XML document, 119
    navigating, 202, 204–205
    reading XML into, 278–279
    saving as XML, 272–273
    updating database from, 14–15
    XML representation of, 264–266

DataTables
    bulk loading into, 197
    searching, 210–211

DataView
    searching with, 212–213
    sorting, 206

DBConcurrencyException, 237–238
DELETE command, 225, 229–230
Destructive concurrency, 247–251

DiffGrams
    exchanging changes between datasets
        using, 280–282
    generating, 274–275

Error handling, 47–48
ExecuteXmlReader(), 57
Field class, 92–93
finally block, 48–49
INSERT command, 225, 228–229
nested tables, 267–269
Null, checking for, 91–92
OLE DB schema information, retrieving, 46
optimistic concurrency, implementing, 220–221
parameters
creating, 60
queries, calling, 67
pessimistic concurrency, 243–247
PrimaryKey property, 128–129
results, multiple, 95
rows
adding, 189
deleting, 190–191
IDENTITY field, 257–258
inserting, 190
RowState, 200–202
SQL Server
access through OLE DB, 16–17
access through SqlClient Managed Provider, 17–18
SQLException handling, 50
stored procedures
calling, without parameter objects, 69
calling, without transactions, 71
wrapping, 60–66
TableMappings, 116–117
transactions
rolling back, 74–75
updating database using, 255–256
using, 71–72
Typed DataSets, 169
capturing events from, 171–172
creating an XSD from, 164–165
default behavior of, changing, 177
simple example of, 154
UPDATE command, 224–225, 231–232
XPath expressions, searching datasets with, 288–289
LoadData() method, 197
LoadDataRow() method, 197–198
Loading into DataTables, 196–198
Local Project Items, Data folder, 155
Locking records, in DataReader, 94
MappingType, 270
Master detail data binding, 302–304
MAX function, 83
Merging datasets, 213–215
Methods
AcceptChanges(), 198–200
BeginEdit(), 195
BeginLoadData(), 196
CancelEdit(), 196
ChangeDatabase(), 31–33
CommandBuilder.RefreshSchema(), 223
Commit, 73
Convert.ChangeType(), 195
CreateNameDataTable(), 178
DataAdapter.Fill(), 116–117, 119
DataAdapter.FillSchema(), 125
DataAdapter.RowUpdating(), 223
DataAdapter.Update(), 14, 219, 221, 222, 224, 243
DataBind(), 307
DataGrid.SetDataBinding(), 300
DataRelationCollection.Add(), 131
DataRowCollection.Add(), 189
DataRowCollection.RemoveAt(), 190
DataRow.Delete(), 190
DataRow.HasVersion(), 200
DataRow.IsNull(), 94
DataSet.AcceptChanges(), 282
DataSet.Merge(), 213–215, 280
DataSet.ReadXml(), 276, 282
DataSet.WriteXML(), 273, 279
DataTable.AcceptChanges(), 198
DataTable.DefaultView(), 205
DataTable.NewRow(), 189
DataTable.NewRowFromBuilder(), 181
DataTable.Select(), 210
DataView.Find(), 212–213
DataView.FindRows(), 212–213
DataView.RowFilter(), 206
EndEdit(), 195
EndLoadData(), 196
ExecuteNonQuery(), 55, 78
ExecuteReader(), 56, 89–90
ExecuteScalar(), 56
ExecuteXmlReader(), 56
Fill(), 113
FillSchema(), 125
GetChanges(), 282
GetChildRows(), 205
INDEX

Methods (continued)
- GetName(), 89
- GetOrdinal(), 89
- GetParentRows(), 205
- GetRowType(), 181
- GetSchemaTable(), 96
- IDDataInitialize::GetDataSource(), 36
- IDbCommand.ExecuteNonQuery(), 10
- IDbCommand.ExecuteReader(), 86, 94
- IDbCommand.ExecuteScalar(), 10
- IsDBNull(), 91, 93
- LoadData(), 197
- LoadDataRow(), 197–198
- MoveNext(), 11
- NameDataTable(), 177
- NewRowFromBuilder(), 181
- NextResult(), 95
- OleDbConnection.
  - GetOleDbSchemaTable(), 45
- OleDbConnection.ReleaseObjectPool(), 34
- Read(), 86, 95
- ReadXml(), 120, 278
- Register, 172
- RejectChanges(), 198–199
- ReleaseObjectPool(), 34
- Rollback, 73
- Save, 74
- TableMappings.Add(), 119
- ToString(), 101
- ToStringArray(), 103
- WriteXml(), 276, 282
- WriteXmlSchema(), 282, 283
- Microsoft Developer Network (MSDN), 26–27
- Microsoft Message Queue (MSMQ), 322
- Migration strategies to ADO.NET
  - ADO applications, rearchitecting, 331
  - command objects, migrating, 342–343
  - connections, migrating, 340–342
  - database manipulation code, 335–338
  - database reporting code, 332–335
  - recordsets, migrating, 343–345
- MissingSchemaAction property, 124–125
- MissingSchemaAction.Add property, 215
- ModifiedCurrent value, 209
- ModifiedOriginal value, 209
- MoveNext() method, 11
- MSDN (Microsoft Developer Network), 26–27
- MSMQ (Microsoft Message Queue), 322
- /n command line option, 165
- NameDataTable() method, 177
- Namespaces
  - overview, 10
  - relationships among, 11
  - System.Data, 10–11, 18, 110
  - System.Data.Common, 18, 111
  - System.Data.Odbc, 19, 111
  - System.Data.OleDb, 19, 111
  - System.Data.OracleClient, 19, 111
  - System.Data.SqlClient, 19, 111
- Nested tables, 267–269
- NewRowFromBuilder() method, 181
- NextResult() method, 95
- None value, 134, 209
- Null
  - IsDBNull() method, 91, 93
  - overview, 90
  - verbose checking for, 91–92
  - _null value, 166
  - nullValue attribute, 166
  - NumericPrecision value, 98
  - NumericScale value, 98
  - NVarChar string type, 59
- /o command line option, 166
- Object oriented programming (OOP), 315
- ODBC Managed Provider
  - connection pooling and, 36–39
  - connection strings and, 28–29
- ODBC (Open Database Connectivity), 3
- OdbcCommandBuilder, 223
- OleDbDataReader class, 85
- OdbcTransaction object, 71
- OLE DB Managed Provider
  - connection pooling, 34–36
  - connection strings, 26–27
  - overview, 15–16
  - schema information retrieving, 45–46
  - SQL Server access through, 16–17
- OLE DB (OLE for Databases), 4
- OleDbCommand class, 10
- OleDbCommandBuilder, 15, 223
- OleDbConnection class, 34
- OleDbConnection.GetOleDbSchemaTable() method, 45
- OleDbConnection.ReleaseObjectPool() method, 34
- OleDbDataReader class, 85
- OleDbSchemaGuid class, 46
INDEX

OLEDB_SERVICES Registry key, 35
OleDbTransaction object, 71
OOP (object oriented programming), 315
Open Database Connectivity. See ODBC
Operators, comparison operators, 208
Optimistic concurrency
defined, 218
implementing, 220–222
row identification in, 222
Oracle Managed Provider
connection pooling, 36
connection strings and, 28
OracleCommandBuilder, 223
ORDER BY clause, 84–85, 100
OriginalRows value, 209
Output direction type, 59
ParameterName, 59
Parameters
creating, 60
direction, 59
name of, 59
objects, alternatives to, 68–69
overview, 57
precision, 60
queries, 67
scale, 60
size, 59
types, 59
value of, 60
Parameters class, 18
Parent relations, 208
Passwords, ODBC connection
strings and, 29
Percent sign (%), 208
Performance. See Scalability and performance
Pessimistic concurrency
defined, 218
implementing, 243–247
Position property, 305
Precision, of parameters, 60
PrimaryKey, 15
PrimaryKey property, 128, 130
Prothman, Carl, 25
Queries
batch queries, 76–79
calling, without using parameters, 68–69
parameterized, 67
Read() method, 86, 95
ReadCommitted isolation level, 74
ReadSchema value, 280
ReadUncommitted isolation level, 74
ReadXml() method, 120, 278
Recordset, 11
Register method, 172
Registry key, OLEDB_SERVICES, 35
RejectChanges() method, 198–200
relational databases, 131–133
ReleaseObjectPool() method, 34
RepeatableRead isolation level, 74
Replacement value, 166
Resource pooling, 34
Result sets
defined, 57, 94
multiple, 95
NextResult() method, 95
ReturnValue direction type, 59
Rollback method, 73
RowChanged event, 139–140, 171
RowChanging event, 139–140, 171
RowDeleted event, 139
RowDeleting event, 139
RowError property, 239
RowSet, 11
RowState, 200–202, 209
RowUpdating event, 223
Save method, 74
Saving dataset data as XML, 271–273
Scalability and performance
best practices, 325–329
coupling components in systems, 315–316
data caching on Web servers, 319–320
Duplication, 321–322
overview, 313–314
scalable systems, designing, 314–315
Segmentation, 321–322
synchronization, 322
Scale, of parameters, 60
Schema, OLE DB, 45–46
Schema rowsets, 45
SchemaOnly value, 90
Searching
   DataTables, 210–211
   DataView, 212–213
Security. See Integrated security
Segmentation, 321–322
SELECT statement, 82
   FROM clause, 83
   JOIN clause, 83–84
   ORDER BY clause, 84–85
   WHERE clause, 83
SelectCommand property, 112, 124
SelectedValue value, 299
SelectSingleNode property, 291
Sells, Chris, 185
SequentialAccess value, 90
Serializable isolation level, 74
Server caching, 311
Server Explorer, 158
Servers
   ODBC connection strings and, 29
   OLE DB connection strings and, 27
   Oracle Provider connection
      strings and, 28
   SQL server Provider connection strings and, 26
SetDefault value, 134
setNull value, 134
SimpleContent mapping, 270
SingleResult value, 90
SingleRow value, 90
Size, of parameters, 59
Sort property, 206
SourceColumn value, 227
SourceVersion value, 227
sp_stored_procedure, 59
SQL for Smarties: Advanced SQL
   Programming, 82
SQL Server, access
   through OLE DB, 16–17
   through SQL Server Managed Provider, 17–19
SQL Server Managed Provider
   connection pooling, 33–34
   connection strings, 26
   overview, 15–16
SQL Server access through, 17–19
SQL (Structured Query Language), 82
SqlCommand class, 10
SqlCommandBuilder, 223
SqlConnection.ConnectionStringTimeout
   property, 25
SqlDataAdapter class, 113
SqlDataReader class, 85
SQLException handling, 50
SqlTransaction object, 71
Stamp field, 232
StateChange event, 40, 43
Stored procedures
   calling
      without parameter objects, 69
      without transactions, 71
   defined, 54
   wrapping, 60–66
Structure Query Language. See SQL
Synchronization, 322
SystemConvert class, 88
System.Data namespace, 10–11, 18, 110
System.Data.Common namespace, 18
System.Data.Odbc namespace, 19, 111
System.Data.OleDb namespace, 19, 111
System.Data.OracleClient namespace, 19, 111
System.Data.SqlClient namespace, 18, 111
System.Object instance, 193
System.Object.Empty instance, 198
TableDirect command, 54
TableMappings property, 115–117
TableMappings.Add() method, 119
Tables
   adding to Typed DataSets, 158
   nested, 267–269
TDS (Tabular Data Stream), 18
Text command, 54
Text property, 296
TextBox, 294, 307
_throw value, 166
ToString() method, 101
ToStringArray() method, 103
Transactional COM+ Programming, 76
Transactions
   BeginTransaction connection, 73
   calling stored procedures without, 71
   isolation levels, 73–74
   OleDbTransaction objects, 71
   SqlConnection objects, 71
overview, 69–70
rolling back, 74–76
SavePoints, 74–76
SqlTransaction object, 71
updating databases using, 254–257
try-catch-finally construct, 47–48
Typed DataSets. See also DataSets
adding tables to, 158
best practices, 326
creating
   using Visual Studio .NET, 155–163
   using XSD.exe, 164–166
default behavior of, changing, 177
defined, 151
deriving from, 173–185
generated code, customizing with
   annotations, 166–168
   inheriting from, 174
   simple example of, 154
   structure of, 152
using as business object layer
   create table method, 175–176
   CreateNameDataTable, 178
   notification registration, 171–172
   overview, 170–171
typedChildren attribute, 166
typedName attribute, 166
typedParent attribute, 166
typedPlural attribute, 166
UI (user interface) element, 308
Unchanged value, 209
UniqueConstraint, 133, 138
Universal data access, history of, 3–7
UPDATE command, 221, 230–232, 233
Update() method, 15
Update rule, 160
UpdateCommand, 14–15, 112
UpdateRule, 133
User ID
   ODBC connection strings and, 29
   OLE DB connection strings and, 27
   SQL server connection strings and, 26
   User interface (UI) element, 308
ValueMember, 298–299
VarChar string type, 59
VB (Visual Basic), 3
Visual Studio .NET, creating Typed
   DataSets using, 155–163
Volatile data, 324
VT objects, 4
Web servers, data caching on, 319–320
WHERE clause, 83
Wildcard expressions, 208
Windows Forms, data binding in, 294–296
   complex binding, 297–299
   master detail binding, 302–304
   simple binding, 296–297
Wrapping stored procedures, 60–66
WriteSchema, 273–274
WriteXml() method, 276, 282
WriteXmlSchema() method, 283
XML (Extensible Markup Language)
   creating datasets from, 119–121
   filling datasets with, 276–280
   getting dataset data into, 264–269
   namespace within datasets, 275
   .NET and, 263
   saving dataset data as, 271–273
XML deserialization, 172
XML Schema Document. See XSD
XML serialization, 172
XmlDataDocument, 286–291
XmlDocument, 289
XmlNodeManager, 290
XmlReaderMode.InferSchema, 120
XmlWriteMode enumeration, 273
XmlWriteMode.DiffGram, 273–275
XmlWriteMode.WriteSchema mode, 273–274
XPath expressions, 288–291
XSD document, DataSet schema as, 282–286
   .XSD file, defining dataset schema using, 126–127
XSD (XML Schema Document), creating
   Typed DataSets using, 164–166
XSL (Extensible Stylesheet Language), 286
XSLT, transforming datasets with, 291