The DataAdapter

- ***Understanding the DataAdapter***

Like the Connection and Command objects, the DataAdapter is part of the Data Provider, and there is a version of the DataAdapter specific to each Data Provider. In the release version of the .NET Framework, this means the OleDbDataAdapter in the System.Data.OleDb namespace and the SqlDataAdapter in the System.Data.SqlClient namespace. Both of these objects inherit from the System.Data.DbDataAdapter, which in turn inherits from the System.Data.DataAdapter.

DataAdapters act as the 'glue' between a data source and the DataSet object. In very abstract terms, the DataAdapter receives the data from the Connection object and passes it to the DataSet. It then passes changes back from the DataSet to the Connection to update the data in the data source. (Remember that the data source can be any kind of data, not just a database.)

Tip Typically, there is a one-to-one relationship between a DataAdapter and a DataTable within a DataSet, but a SelectCommand that returns multiple result sets may link to multiple tables in the DataSet. To perform updates on the data source, DataAdapters contain references to four Data Commands, one for each possible action: SelectCommand, UpdateCommand, InsertCommand, and DeleteCommand.

Note With the exception of some minor differences in the *Fill* method, which we'll look at later, the SqlDataAdapter and OleDbDataAdapter have identical properties, methods, and events. For the sake of simplicity, we'll only use the SqlDataAdapter in this chapter, but all of the code samples will work equally well with OleDb if you change the class names of the objects.

- ***DataAdapter Properties***

The properties exposed by the DataAdapter are shown in Table 4-1. The SqlDataAdapter and OleDbDataAdapter objects expose the same set of properties.

Table 4-1: DataAdapter Properties

Property	Description
AcceptChangesDuringFill	Determines whether *AcceptChange s* is called on a DataRow after it is added to the DataTable
DeleteCommand	The Data Command used to delete rows in the data source
InsertCommand	The Data Command used to insert rows in the data source
MissingMappingAction	Determines the action that will be taken when incoming data cannot be matched to an existing table or column
MissingSchemaAction	Determines the action that will be taken when incoming data does not match the schema of an existing DataSet
SelectCommand	The Data Command used to retrieve rows from the data source
TableMappings	A collection of DataTableMapping objects that determine the relationship between the columns in a DataSet and the data sour
UpdateCommand	The Data Command used to update rows in the data source

The AcceptChangesDuringFill property determines whether the *AcceptChanges* method is called for each row that is added to a DataSet. The default value is *true*. The MissingMappingAction property determines how the system reacts when a SelectCommand returns columns or tables that are not found in the DataSet. The possible values are shown in Table 4-2. The default value is *Passthrough*.

Table 4-2: MissingMappingAction Values

Value	Description
Error	Throws a SystemException
Ignore	Ignores any columns or tables not found in the DataSet
Passthrough	The column or table that is not found is added to the DataSet, using its name in the

Similarly, the MissingSchemaAction property determines how the system will respond if a column is missing in the DataSet. The MissingSchemaAction property will be called only if the MissingMappingAction is set to *Passthrough*. The possible values are shown in Table 4-3. The default value is *Add*.

Table 4-3: MissingSchemaAction Values

Value	Description
Add	Adds the necessary columns to the DataSet
AddWithKey	Adds both the necessary columns and tables and PrimaryKey constraints
Error	Throws a SystemException
Ignore	Ignores the extra columns

- ***DataAdapter Commands***

As we've seen, each DataAdapter contains references to four Command objects, each of which has a CommandText property that contains the actual SQL command to be executed.

If you create a DataAdapter by using the Data Adapter Configuration Wizard or by dragging a table, view, or stored procedure from the Server Explorer, Visual Studio will attempt to automatically generate the CommandText property for each command. You can also edit the SQL command in the Properties window, although you must first associate the command with a Connection object.

- ***DataAdapter Methods***

The DataAdapter supports two important methods: Fill, which loads data from the data source into the DataSet, and Update, which transfers data the other direction—loading it from the DataSet into the data source.

The Fill Method

The Fill method loads data from a data source into one or more tables of a DataSet by using the command specified in the DataAdapter's SelectCommand. The DbDataAdapter object, from which both the OleDbDataAdapter and the SqlDataAdapter are inherited, supports several variations of the Fill method, as shown in Table 4-4.

Table 4-4: DbDataAdapter Fill Methods

Method	Description
Fill(DataSet)	Creates a DataTable named Table and populates it with the rows returned from the data source
Fill(DataTable)	Fills the specified DataTable with the rows returned from the data source
Fill(DataSet, tableName)	Fills the DataTable named in the *tableName* string, within the DataSet specified, with the rows returned from the data source
Fill(DataTable, DataReader)	Fills the DataTable using the specified DataReader (Because DataReader is declared as an IDataReader, either an OleDbDataReader or a SQLDataReader can be used)
Fill(DataTable, command, CommandBehavior)	Fills the DataTable using the SQL string passed in command and the specified CommandBehavior
Fill(DataSet, startRecord,maxRecords, tableName)	Fills the DataTable specified in the tableName string, beginning at the zero-based startRecord and continuing for maxRecords or until the end of the result set
Fill(DataSet, tableName, DataReader, startRecord, maxRecords)	Fills the DataTable specified in the tableName string, beginning at the zero-based startRecord and continuing for maxRecords or until the end of the result set, using the specified DataReader (Since DataReader is declared as an IDataReader,

	either an OleDbDataReader or a SQLDataReader can be used)
Fill(DataSet, startRecord, maxRecords, tableName, command, CommandBehavior)	Fills the DataTable specified in the tableName string, beginning at the zero-based startRecord and continuing for maxRecords or until the end of the result set, using the SQL text contained in command and the specified CommandBehavior
Fill(DataTable, adoObject)	Fills the specified DataTable with rows from the ADO Recordset or Record object specified in adoObject
Fill(DataSet, adoObject, tableName)	Fills the specified DataTable with rows from the ADO Recordset or Record object specified in adoObject, using the DataTable specified in the tableName string to determine the TableMappings

In addition, the OleDbDataAdapter supports the two additional versions of the Fill method shown in Table 4-5, which are used to load data from Microsoft ActiveX Data Objects (ADO).

Method	Description
Fill(DataTable, adoObject)	Fills the specified DataTable with rows from the ADO Recordset or Record object specified in adoObject
Fill(DataSet, adoObject, tableName)	Fills the specified DataTable with rows from the ADO Recordset or Record object specified in adoObject, using the DataTable specified in the tableName string to determine the TableMappings

The Update Method

Remember that the DataSet doesn't retain any knowledge about the source of the data it contains, and that the changes you make to DataSet rows aren't automatically propagated back to the data source. You must use the DataAdapter's Update method to do this. The Update method calls the DataAdapter's InsertCommand, DeleteCommand, or UpdateCommand, as appropriate, for each row in a DataSet that has changed. The System.Data.Common.DbDataAdapter, which you will recall is the DataAdapterclass from which relational database Data Providers inherit their

DataAdapters, supports a number of versions of the Update method, as shown in Table 4-6. Neither the SqlDataAdapter nor the OleDbDataAdapter add any additional versions.

Table 4-6: DbDataAdapter Update Methods

Method	Description
Update(DataSet)	Updates the data source from a DataTable named Table in the specified
Update(dataRows)	Updates the data source from the specified array of dataRows
Update(DataTable)	Updates the data source from the specified DataTable
Update(dataRows, DataTableMapping)	Updates the data source from the specified array of dataRows, using the specified DataTableMapping
Update(DataSet, sourceTable)	Update(DataSet, sourceTable) Updates the data source from the DataTable specified in sourceTable in the specified DataSet