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ADO.NET Components
The ADO.NET components have been designed to factor data access from data manipulation. There are two central components of ADO.NET that accomplish this: the DataSet, and the .NET Framework data provider, which is a set of components including the Connection, Command, DataReader, and DataAdapter objects.
The ADO.NET DataSet is the core component of the disconnected architecture of ADO.NET. The DataSet is explicitly designed for data access independent of any data source. As a result it can be used with multiple and differing data sources, used with XML data, or used to manage data local to the application. The DataSet contains a collection of one or more DataTable objects made up of rows and columns of data, as well as primary key, foreign key, constraint, and relation information about the data in the DataTable objects.
The other core element of the ADO.NET architecture is the .NET Framework data provider, whose components are explicitly designed for data manipulation and fast, forward-only, read-only access to data. The Connection object provides connectivity to a data source. The Command object enables access to database commands to return data, modify data, run stored procedures, and send or retrieve parameter information. The DataReader provides a high-performance stream of data from the data source. Finally, the DataAdapter provides the bridge between the DataSet object and the data source. The DataAdapter uses Command objects to execute SQL commands at the data source to both load the DataSet with data, and reconcile changes made to the data in the DataSet back to the data source.
You can write .NET Framework data providers for any data source. The .NET Framework ships with two .NET Framework data providers: the .NET Framework Data Provider for SQL Server and the .NET Framework Data Provider for OLE DB.
The following diagram illustrates the components of ADO.NET architecture.
Populating a DataSet from a DataAdapter
The ADO.NET DataSet is a memory-resident representation of data that provides a consistent relational programming model independent of the data source. The DataSet represents a complete set of data including tables, constraints, and relationships among the tables. Because the DataSet is independent of the data source, a DataSet can include data local to the application, as well as data from multiple data sources. Interaction with existing data sources is controlled through the DataAdapter.
Each .NET Framework data provider included with the .NET Framework has a DataAdapter object: the .NET Framework Data Provider for OLE DB includes an OleDbDataAdapter object,