ASP.NET - DATA SOURCES

A data source control interacts with the data-bound controls and hides the complex data binding processes. These are the tools that provide data to the data bound controls and support execution of operations like insertions, deletions, sorting, and updates.

Each data source control wraps a particular data provider-relational databases, XML documents, or custom classes and helps in:

- Managing connection
- Selecting data
- Managing presentation aspects like paging, caching, etc.
- Manipulating data

There are many data source controls available in ASP.NET for accessing data from SQL Server, from ODBC or OLE DB servers, from XML files, and from business objects.

Based on type of data, these controls could be divided into two categories:

- Hierarchical data source controls
- Table-based data source controls

The data source controls used for hierarchical data are:

- **XMLDataSource** - It allows binding to XML files and strings with or without schema information.
- **SiteMapDataSource** - It allows binding to a provider that supplies site map information.

The data source controls used for tabular data are:

Data source controls	Description
SqlDataSource	It represents a connection to an ADO.NET data provider that returns SQL data, including data sources accessible via OLEDB and QDBC.
ObjectDataSource	It allows binding to a custom .Net business object that returns data.
LinqdataSource	It allows binding to the results of a Linq-to-SQL query *supportedbyASP. NET*3.5*only*.
AccessDataSource	It represents connection to a Microsoft Access database.

Data Source Views

Data source views are objects of the DataSourceView class. Which represent a customized view of data for different data operations such as sorting, filtering, etc.

The DataSourceView class serves as the base class for all data source view classes, which define the capabilities of data source controls.

The following table provides the properties of the DataSourceView class:

Properties	Description
CanDelete	Indicates whether deletion is allowed on the underlying data

	source.
CanInsert	Indicates whether insertion is allowed on the underlying data source.
CanPage	Indicates whether paging is allowed on the underlying data source.
CanRetrieveTotalRowCount	Indicates whether total row count information is available.
CanSort	Indicates whether the data could be sorted.
CanUpdate	Indicates whether updates are allowed on the underlying data source.
Events	Gets a list of event-handler delegates for the data source view.
Name	Name of the view.

The following table provides the methods of the DataSourceView class:

Methods	Description
CanExecute	Determines whether the specified command can be executed.
ExecuteCommand	Executes the specific command.
ExecuteDelete	Performs a delete operation on the list of data that the DataSourceView object represents.
ExecuteInsert	Performs an insert operation on the list of data that the DataSourceView object represents.
ExecuteSelect	Gets a list of data from the underlying data storage.
ExecuteUpdate	Performs an update operation on the list of data that the DataSourceView object represents.
Delete	Performs a delete operation on the data associated with the view.
Insert	Performs an insert operation on the data associated with the view.
Select	Returns the queried data.
Update	Performs an update operation on the data associated with the view.
OnDataSourceViewChanged	Raises the DataSourceViewChanged event.
RaiseUnsupportedCapabilitiesError	Called by the RaiseUnsupportedCapabilitiesError method to compare the capabilities requested for an ExecuteSelect operation against those that the view supports.

The SqlDataSource Control

The SqlDataSource control represents a connection to a relational database such as SQL Server or Oracle database, or data accessible through OLEDB or Open Database Connectivity *ODBC*. Connection to data is made through two important properties ConnectionString and ProviderName.

The following code snippet provides the basic syntax of the control:

```
<asp:SqlDataSource runat="server" ID="MySqlSource"
   ProviderName='<%$ ConnectionStrings:LocalNWind.ProviderName  %>'
   ConnectionString='<%$ ConnectionStrings:LocalNWind %>'
   SelectionCommand= "SELECT * FROM EMPLOYEES" />

<asp:GridView ID="GridView1" runat="server" DataSourceID="MySqlSource" />
```

Configuring various data operations on the underlying data depends upon the various properties *propertygroups* of the data source control.

The following table provides the related sets of properties of the SqlDataSource control, which provides the programming interface of the control:

Property Group	Description
DeleteCommand, DeleteParameters, DeleteCommandType	Gets or sets the SQL statement, parameters, and type for deleting rows in the underlying data.
FilterExpression, FilterParameters	Gets or sets the data filtering string and parameters.
InsertCommand, InsertParameters, InsertCommandType	Gets or sets the SQL statement, parameters, and type for inserting rows in the underlying database.
SelectCommand, SelectParameters, SelectCommandType	Gets or sets the SQL statement, parameters, and type for retrieving rows from the underlying database.
SortParameterName	Gets or sets the name of an input parameter that the command's stored procedure will use to sort data.
UpdateCommand, UpdateParameters, UpdateCommandType	Gets or sets the SQL statement, parameters, and type for updating rows in the underlying data store.

The following code snippet shows a data source control enabled for data manipulation:

```
<asp:SqlDataSource runat="server" ID= "MySqlSource"
   ProviderName='<%$ ConnectionStrings:LocalNWind.ProviderName  %>'
   ConnectionString=' <%$ ConnectionStrings:LocalNWind %>'
   SelectCommand= "SELECT * FROM EMPLOYEES"
   UpdateCommand= "UPDATE EMPLOYEES SET LASTNAME=@lame"
   DeleteCommand= "DELETE FROM EMPLOYEES WHERE EMPLOYEEID=@eid"
```

```
   FilterExpression= "EMPLOYEEID > 10">
   .....
   .....
</asp:SqlDataSource>
```

The ObjectDataSource Control

The ObjectDataSource Control enables user-defined classes to associate the output of their methods to data bound controls. The programming interface of this class is almost same as the SqlDataSource control.

Following are two important aspects of binding business objects:

- The bindable class should have a default constructor, it should be stateless, and have methods that can be mapped to select, update, insert, and delete semantics.
- The object must update one item at a time, batch operations are not supported.

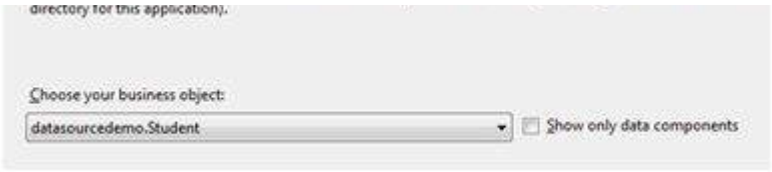
Let us go directly to an example to work with this control. The student class is the class to be used with an object data source. This class has three properties: a student id, name, and city. It has a default constructor and a GetStudents method for retrieving data.

The student class:

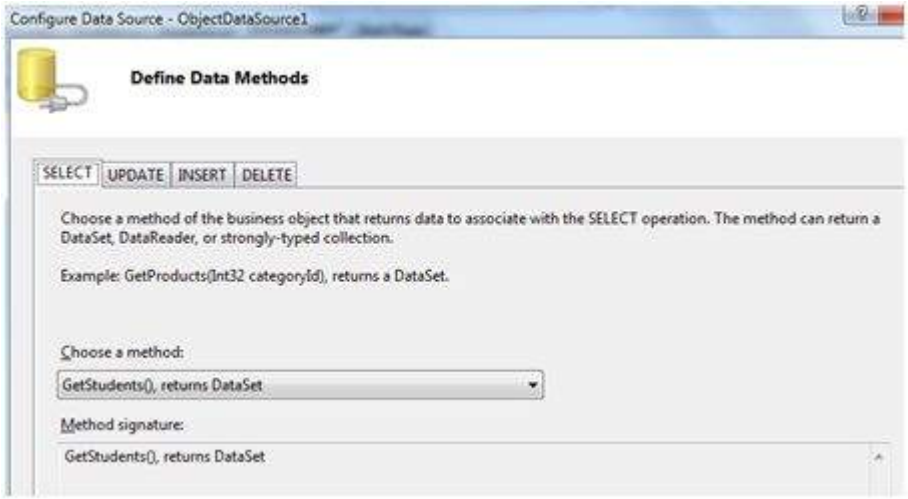
```
public class Student
{
   public int StudentID { get; set; }
   public string Name { get; set; }
   public string City { get; set; }

   public Student()
   { }

   public DataSet GetStudents()
   {
      DataSet ds = new DataSet();
      DataTable dt = new DataTable("Students");

      dt.Columns.Add("StudentID", typeof(System.Int32));
      dt.Columns.Add("StudentName", typeof(System.String));
      dt.Columns.Add("StudentCity", typeof(System.String));
      dt.Rows.Add(new object[] { 1, "M. H. Kabir", "Calcutta" });
      dt.Rows.Add(new object[] { 2, "Ayan J. Sarkar", "Calcutta" });
      ds.Tables.Add(dt);

      return ds;
   }
}
```

Take the following steps to bind the object with an object data source and retrieve data:

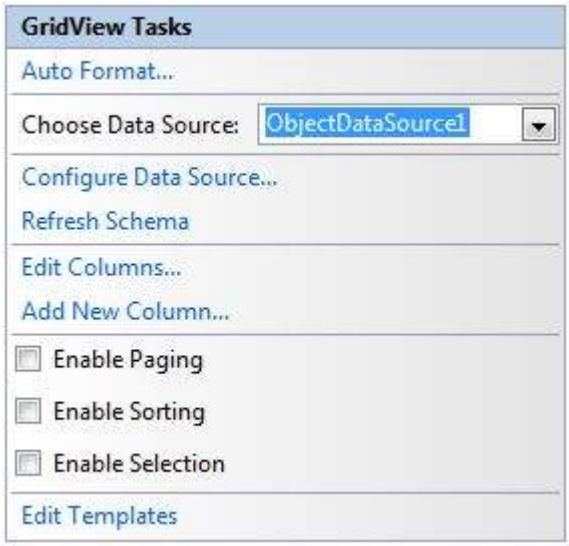
- Create a new web site.
- Add a class *Students. cs* to it by right clicking the project from the Solution Explorer, adding a class template, and placing the above code in it.
- Build the solution so that the application can use the reference to the class.
- Place an object data source control in the web form.
- Configure the data source by selecting the object.



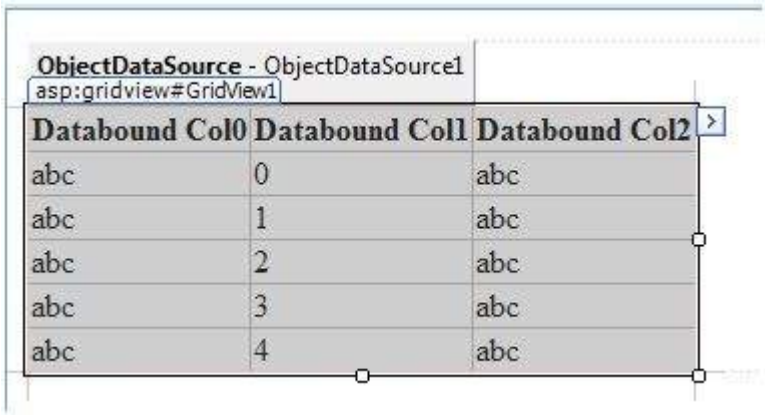
- Select a data methods for different operations on data. In this example, there is only one method.



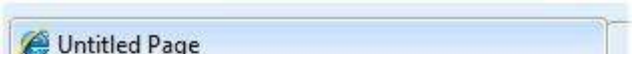
- Place a data bound control such as grid view on the page and select the object data source as its underlying data source.

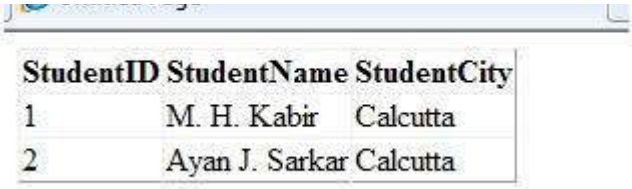


- At this stage, the design view should look like the following:



- Run the project, it retrieves the hard coded tuples from the students class.





StudentID	StudentName	StudentCity
1	M. H. Kabir	Calcutta
2	Ayan J. Sarkar	Calcutta

The AccessDataSource Control

The AccessDataSource control represents a connection to an Access database. It is based on the SqlDataSource control and provides simpler programming interface. The following code snippet provides the basic syntax for the data source:

```
<asp:AccessDataSource ID="AccessDataSource1 runat="server"
   DataFile="~/App_Data/ASPDotNetStepByStep.mdb" SelectCommand="SELECT * FROM
[DotNetReferences]">
</asp:AccessDataSource>
```

The AccessDataSource control opens the database in read-only mode. However, it can also be used for performing insert, update, or delete operations. This is done using the ADO.NET commands and parameter collection.

Updates are problematic for Access databases from within an ASP.NET application because an Access database is a plain file and the default account of the ASP.NET application might not have the permission to write to the database file.