Working with Data in ASP.NET 2.0 :: Updating and Deleting Existing Binary Data

Introduction

Over the past three tutorials we’ve added quite a bit of functionality for working with binary data. We started by adding a BrochurePath column to the Categories table and updated the architecture accordingly. We also added Data Access Layer and Business Logic Layer methods to work with the Categories table’s existing Picture column, which holds the binary content’s of an image file. We have built web pages to present the binary data in a GridView – a download link for the brochure, with the category’s picture shown in an <img> element – and have added a DetailsView to allow users to add a new category and upload its brochure and picture data.

All that remains to be implemented is the ability to edit and delete existing categories, which we’ll accomplish in this tutorial using the GridView’s built-in editing and deleting features. When editing a category, the user will be able to optionally upload a new picture or have the category continue to use the existing one. For the brochure, they can either choose to use the existing brochure, to upload a new brochure, or to indicate that the category no longer has a brochure associated with it. Let’s get started!

Step 1: Updating the Data Access Layer

The DAL has auto-generated Insert, Update, and Delete methods, but these methods were generated based on the CategoriesTableAdapter’s main query, which does not include the Picture column. Therefore, the Insert and Update methods do not include parameters for specifying the binary data for the category’s picture. Like we did in the preceding tutorial, we need to create a new TableAdapter method for updating the Categories table when specifying binary data.

Open the Typed DataSet and, from the Designer, right-click on the CategoriesTableAdapter’s header and choose Add Query from the context menu to launch the TableAdapter Query Configuration Wizard. This wizard starts by asking us how the TableAdapter query should access the database. Choose “Use SQL statements” and click Next. The next step prompts for the type of query to be generated. Since we’re creating a query to add a new record to the Categories table, choose “UPDATE” and click Next.
We now need to specify the UPDATE SQL statement. The wizard automatically suggests an UPDATE statement corresponding to the TableAdapter’s main query (one that updates the CategoryName, Description, and BrochurePath values). Change the statement so that the Picture column is included along with a @Picture parameter, like so:

```sql
UPDATE [Categories] SET
    [CategoryName] = @CategoryName,
    [Description] = @Description,
    [BrochurePath] = @BrochurePath,
    [Picture] = @Picture
WHERE (([CategoryID] = @Original_CategoryID))
```

The final screen of the wizard asks us to name the new TableAdapter method. Enter UpdateWithPicture and click Finish.
Step 2: Adding the Business Logic Layer Methods

In addition to updating the DAL, we need to update the BLL to include methods for updating and deleting a category. These are the methods that will be invoked from the Presentation Layer.

For deleting a category, we can use the CategoriesTableAdapter’s auto-generated Delete method. Add the following method to the CategoriesBLL class:

```csharp
public bool DeleteCategory(int categoryID)
{
    int rowsAffected = Adapter.Delete(categoryID);

    // Return true if precisely one row was deleted, otherwise false
    return rowsAffected == 1;
}
```

For this tutorial, let’s create two methods for updating a category - one that expects the binary picture data and invokes the UpdateWithPicture method we just added to the CategoriesTableAdapter and another that accepts just the CategoryName, Description, and BrochurePath values and uses CategoriesTableAdapter class’s auto-generated Update statement. The rationale behind using two methods is that in some circumstances, a user might want to update the category’s picture along with its other fields, in which case the user will have to upload
the new picture. The uploaded picture’s binary data can then be used in the \texttt{UPDATE} statement. In other cases, the user might only be interested in updating, say, the name and description. But if the \texttt{UPDATE} statement expects the binary data for the \texttt{Picture} column as well, then we’d need to provide that information as well. This would require an extra trip to the database to bring back the picture data for the record being edited. Therefore, we want two \texttt{UPDATE} methods. The Business Logic Layer will determine which one to use based on whether picture data is provided when updating the category.

To facilitate this, add two methods to the \texttt{CategoriesBLL} class, both named \texttt{UpdateCategory}. The first one should accept three strings, a byte array, and an int as its input parameters; the second, just three strings and an int. The string input parameters are for the category’s name, description, and brochure file path, the byte array is for the binary contents of the category’s picture, and the int identifies the \texttt{CategoryID} of the record to update. Notice that the first overload invokes the second if the passed-in byte array is null:

\begin{verbatim}
[System.ComponentModel.DataObjectMethodAttribute
 (System.ComponentModel.DataObjectMethodType.Update, false)]
public bool UpdateCategory(string categoryName, string description,
 string brochurePath, byte[] picture, int categoryID)
{
    // If no picture is specified, use other overload
    if (picture == null)
        return UpdateCategory(categoryName, description, brochurePath, categoryID);

    // Update picture, as well
    int rowsAffected = Adapter.UpdateWithPicture
        (categoryName, description, brochurePath, picture, categoryID);

    // Return true if precisely one row was updated, otherwise false
    return rowsAffected == 1;
}

[System.ComponentModel.DataObjectMethodAttribute
 (System.ComponentModel.DataObjectMethodType.Update, true)]
public bool UpdateCategory(string categoryName, string description,
 string brochurePath, int categoryID)
{
    int rowsAffected = Adapter.Update
        (categoryName, description, brochurePath, categoryID);

    // Return true if precisely one row was updated, otherwise false
    return rowsAffected == 1;
}
\end{verbatim}

\textbf{Step 3: Copying Over the Insert and View Functionality}

In the \textit{preceding tutorial} we created a page named \texttt{UploadInDetailsView.aspx} that listed all categories in a GridView and provided a DetailsView to add new categories to the system. In this tutorial we will extend the GridView to include editing and deleting support. Rather than continuing to work from \texttt{UploadInDetailsView.aspx}, let’s instead place this tutorial’s changes in the \texttt{UpdatingAndDeleting.aspx} page from the same folder, ~/BinaryData. Copy and paste the declarative markup and code from \texttt{UploadInDetailsView.aspx} to \texttt{UpdatingAndDeleting.aspx}.

Start by opening the \texttt{UploadInDetailsView.aspx} page. Copy all of the declarative syntax within the \texttt{<asp:Content>} element, as shown in Figure 3. Next, open \texttt{UpdatingAndDeleting.aspx} and paste this markup within its \texttt{<asp:Content>} element. Similarly, copy the code from the \texttt{UploadInDetailsView.aspx} page’s code-
behind class to UpdatingAndDeleting.aspx.

Figure 3: Copy the Declarative Markup from UploadInDetailsView.aspx

After copying over the declarative markup and code, visit UpdatingAndDeleting.aspx. You should see the same output and have the same user experience as with UploadInDetailsView.aspx page from the previous tutorial.

**Step 4: Adding Deleting Support to the ObjectDataSource and GridView**

As we discussed back in the An Overview of Inserting, Updating, and Deleting Data tutorial, the GridView provides built-in deleting capabilities and these capabilities can be enabled at the tick of a checkbox if the grid’s underlying data source supports deleting. Currently the ObjectDataSource the GridView is bound to (CategoriesDataSource) does not support deleting.

To remedy this, click on the Configure Data Source option from the ObjectDataSource’s smart tag to launch the wizard. The first screen shows that the ObjectDataSource is configured to work with the CategoriesBLL class. Hit Next. Currently, only the ObjectDataSource’s InsertMethod and SelectMethod properties are specified. However, the wizard auto-populated the drop-down lists in the UPDATE and DELETE tabs with the UpdateCategory and DeleteCategory methods, respectively. This is because in the CategoriesBLL class we marked these methods using the DataObjectMethodAttribute as the default methods for updating and deleting.

For now, set the UPDATE tab’s drop-down list to “(None)”, but leave the DELETE tab’s drop-down list set to DeleteCategory. We’ll return to this wizard in Step 6 to add updating support.
Figure 4: Configure the ObjectDataSource to Use the DeleteCategory Method

Note: Upon completing the wizard, Visual Studio may ask if you want to “Refresh Fields and Keys,” which will regenerate the data Web controls fields. Choose No, because choosing Yes will overwrite any field customizations you may have made.

The ObjectDataSource will now include a value for its DeleteMethod property as well as a DeleteParameter. Recall that when using the wizard to specify the methods, Visual Studio sets the ObjectDataSource’s OldValuesParameterFormatString property to original_{0}, which causes problems with the update and delete method invocations. Therefore, either clear out this property altogether or reset it to the default, {0}. If you need to refresh your memory on this ObjectDataSource property, see the An Overview of Inserting, Updating, and Deleting Data tutorial.

After completing the wizard and fixing the OldValuesParameterFormatString, the ObjectDataSource’s declarative markup should look similar like the following:

```xml
<asp:ObjectDataSource ID="CategoriesDataSource" runat="server" OldValuesParameterFormatString="{0}" SelectMethod="GetCategories" TypeName="CategoriesBLL" InsertMethod="InsertWithPicture" DeleteMethod="DeleteCategory">
  <InsertParameters>
    <asp:Parameter Name="categoryName" Type="String" />
    <asp:Parameter Name="description" Type="String" />
    <asp:Parameter Name="brochurePath" Type="String" />
    <asp:Parameter Name="picture" Type="Object" />
  </InsertParameters>
</asp:ObjectDataSource>
```
After configuring the ObjectDataSource, add deleting capabilities to the GridView by checking the “Enable Deleting” checkbox from the GridView’s smart tag. This will add a CommandField to the GridView whose ShowDeleteButton property is set to true.

Figure 5: Enable Support for Deleting in the GridView

Take a moment to test out the delete functionality. There is a foreign key between the Products table’s CategoryID and the Categories table’s CategoryID, so you will get a foreign key constraint violation exception if you attempt to delete any of the first eight categories. To test this functionality out, add a new category, providing both a brochure and picture. My test category, shown in Figure 6, includes a test brochure file named Test.pdf and a test picture. Figure 7 shows the GridView after the test category has been added.
In Visual Studio, refresh the Solution Explorer. You should now see a new file in the ~/Brochures folder, Test.pdf (see Figure 8).

Next, click the Delete link in the Test Category row, causing the page to postback and the CategoriesBLL class’s
DeleteCategory method to fire. This will invoke the DAL’s Delete method, causing the appropriate DELETE statement to be sent to the database. The data is then rebound to the GridView and the markup is sent back to the client with the Test Category no longer present.

While the delete workflow successfully removed the Test Category record from the Categories table, it did not remove its brochure file from the web server’s file system. Refresh the Solution Explorer and you will see that Test.pdf is still sitting in the ~/Brochures folder.

![Solution Explorer](image.png)

Figure 8: The Test.pdf File Was Not Deleted from the Web Server’s File System

**Step 5: Removing the Deleted Category’s Brochure File**

One of the downsides of storing binary data external to the database is that extra steps must be taken to clean up these files when the associated database record is deleted. The GridView and ObjectDataSource provide events that fire both before and after the delete command has been performed. We actually need to create event handlers for both the pre- and post-action events. Before the Categories record is deleted we need to determine its PDF file’s path, but we don’t want to delete the PDF before the category is deleted in case there is some exception and the category is not deleted.

The GridView’s **RowDeleting event** fires before the ObjectDataSource’s delete command has been invoked, while its **RowDeleted event** fires after. Create event handlers for these two events using the following code:

```csharp
// A page variable to "remember" the deleted category's BrochurePath value
```
string deletedCategorysPdfPath = null;

protected void Categories_RowDeleting(object sender, GridViewDeleteEventArgs e)
{
    // Determine the PDF path for the category being deleted...
    int categoryId = Convert.ToInt32(e.Keys["CategoryID"]);

    CategoriesBLL categoryAPI = new CategoriesBLL();
    Northwind.CategoriesDataTable categories =
        categoryAPI.GetCategoryByCategoryID(categoryId);
    Northwind.CategoriesRow category = categories[0];

    if (category.IsBrochurePathNull())
        deletedCategorysPdfPath = null;
    else
        deletedCategorysPdfPath = category.BrochurePath;
}

protected void Categories_RowDeleted(object sender, GridViewDeletedEventArgs e)
{
    // Delete the brochure file if there were no problems deleting the record
    if (e.Exception == null)
    {
        // Is there a file to delete?
        if (deletedCategorysPdfPath != null)
        {
            System.IO.File.Delete(Server.MapPath(deletedCategorysPdfPath));
        }
    }
}

In the RowDeleting event handler, the CategoryID of the row being deleted is grabbed from the GridView’s DataKeys collection, which can be accessed in this event handler through the e.Keys collection. Next, the CategoriesBLL class’s GetCategoryByCategoryID(categoryID) is invoked to return information about the record being deleted. If the returned CategoriesDataRow object has a non-NULL BrochurePath value then it is stored in the page variable deletedCategorysPdfPath so that the file can be deleted in the RowDeleted event handler.

Note: Rather than retrieving the BrochurePath details for the Categories record being deleted in the RowDeleting event handler, we could have alternatively added the BrochurePath to the GridView’s DataKeyNames property and accessed the record’s value through the e.Keys collection. Doing so would slightly increase the GridView’s view state size, but would reduce the amount of code needed and save a trip to the database.

After the ObjectDataSource’s underlying delete command has been invoked, the GridView’s RowDeleted event handler fires. If there were no exceptions in deleting the data and there is a value for deletedCategorysPdfPath, then the PDF is deleted from the file system. Note that this extra code is not needed to clean up the category’s binary data associated with its picture. That’s because the picture data is stored directly in the database, so deleting the Categories row also deletes that category’s picture data.

After adding the two event handlers, run this test case again. When deleting the category, its associated PDF is also deleted.

Updating an existing record’s associated binary data provides some interesting challenges. The remainder of this tutorial delves into adding update capabilities to the brochure and picture. Step 6 explores techniques for updating
the brochure information while Step 7 looks at updating the picture.

**Step 6: Updating a Category’s Brochure**

As discussed in the [An Overview of Inserting, Updating, and Deleting Data](#) tutorial, the GridView offers built-in row-level editing support that can be implemented by the tick of a checkbox if its underlying data source is appropriately configured. Currently, the `CategoriesDataSource` ObjectDataSource is not yet configured to include updating support, so let’s add that in.

Click the Configure Data Source link from the ObjectDataSource’s wizard and proceed to the second step. Because of the `DataObjectMethodAttribute` used in `CategoriesBLL`, the UPDATE drop-down list should automatically be populated with the `UpdateCategory` overload that accepts four input parameters (for all columns but `Picture`). Change this so that it uses the overload with five parameters.

![Configure ObjectDataSource to Use the UpdateCategory Method that Includes a Parameter for Picture](image)

Figure 9: Configure the ObjectDataSource to Use the UpdateCategory Method that Includes a Parameter for Picture

The `ObjectDataSource` will now include a value for its `UpdateMethod` property as well as corresponding `UpdateParameters`. As noted in Step 4, Visual Studio sets the `ObjectDataSource`’s `OldValuesParameterFormatString` property to `original_{0}` when using the Configure Data Source wizard. This will cause problems with the update and delete method invocations. Therefore, either clear out this property altogether or reset it to the default, `{0}`.

After completing the wizard and fixing the `OldValuesParameterFormatString`, the ObjectDataSource’s declarative markup should look like the following:
To turn on the GridView’s built-in editing features, check the “Enable Editing” option from the GridView’s smart tag. This will set the CommandField’s ShowEditButton property to true, resulting in the addition of an Edit button (and Update and Cancel buttons for the row being edited).

Figure 10: Configure the GridView to Support Editing
Visit the page through a browser and click one of the row’s Edit buttons. The CategoryName and Description BoundFields are rendered as textboxes. The BrochurePath TemplateField lacks an EditItemTemplate, so it continues to show its ItemTemplate—a link to the brochure. The Picture ImageField renders as a TextBox whose Text property is assigned the value of the ImageField’s DataImageUrlField value, in this case CategoryID.

![Figure 11: The GridView Lacks an Editing Interface for BrochurePath](image)

**Customizing the BrochurePath’s Editing Interface**

We need to create an editing interface for the BrochurePath TemplateField, one that allows the user to either:

- Leave the category’s brochure as-is,
- Update the category’s brochure by uploading a new brochure, or
- Remove the category’s brochure altogether (in the case that the category no longer has an associated brochure).

We also need to update the Picture ImageField’s editing interface, but we’ll get to this in Step 7.

From the GridView’s smart tag, click on the “Edit Templates” link and select the BrochurePath TemplateField’s EditItemTemplate from the drop-down list. Add a RadioButtonList Web control to this template, setting its ID property to BrochureOptions and its AutoPostBack property to true. From the Properties window, click on the ellipses in the Items property, which will bring up the ListItem Collection Editor. Add the following three options with Values 1, 2 and 3, respectively:

- Use current brochure
- Remove current brochure
- Upload new brochure
Set the first ListItem’s Selected property to true.

![ListItem Collection Editor](image)

**Figure 12: Add Three ListItem to the RadioButtonList**

Beneath the RadioButtonList, add a FileUpload control named `BrochureUpload`. Set its Visible property to false.
This RadioButtonList provides the three options for the user. The idea is that the FileUpload control will be displayed only if the last option, “Upload new brochure”, is selected. To accomplish this, create an event handler for the RadioButtonList’s SelectedIndexChanged event and add the following code:

```csharp
protected void BrochureOptions_SelectedIndexChanged(object sender, EventArgs e)
{
    // Get a reference to the RadioButtonList and its Parent
    RadioButtonList BrochureOptions = (RadioButtonList)sender;
    Control parent = BrochureOptions.Parent;

    // Now use FindControl("controlID") to get a reference of the
    // FileUpload control
    FileUpload BrochureUpload =
        (FileUpload)parent.FindControl("BrochureUpload");

    // Only show BrochureUpload if SelectedValue = "3"
    BrochureUpload.Visible = (BrochureOptions.SelectedValue == "3");
}
```

Since the RadioButtonList and FileUpload controls are within a template, we have to write a bit of code to programmatically access these controls. The SelectedIndexChanged event handler is passed a reference of the RadioButtonList in the `sender` input parameter. To get the FileUpload control, we need to get the RadioButtonList’s parent control and use the `FindControl("controlID")` method from there. Once we have a reference to both the RadioButtonList and FileUpload controls, the FileUpload control’s `Visible` property is set to `true` only if the RadioButtonList’s `SelectedValue` equals “3”, which is the `Value` for the “Upload new brochure” option.
With this code in place, take a moment to test out the editing interface. Click on the Edit button for a row. Initially, the “Use current brochure” option should be selected. Changing the selected index causes a postback. If the third option is selected, the FileUpload control is displayed, otherwise it is hidden. Figure 14 shows the editing interface when the Edit button is first clicked; Figure 15 shows the interface after the “Upload new brochure” option is selected.

![Figure 14: Initially, the “Use current brochure” Option is Selected](image)

![Figure 15: Choosing the “Upload new brochure” Option Displays the FileUpload Control](image)

**Saving the Brochure File and Updating the BrochurePath Column**

When the GridView’s Update button is clicked, its RowUpdating event fires. The ObjectDataSource’s update command is invoked and then the GridView’s RowUpdated event fires. Like with the deleting workflow, we need to create event handlers for both of these events. In the RowUpdating event handler, we need to determine what action to take based on the SelectedValue of the BrochureOptions RadioButtons:

- **If the SelectedValue is “1”,** we want to keep using the same BrochurePath setting. Therefore, we need to set the ObjectDataSource’s brochurePath parameter to the existing BrochurePath value of the record being updated. The ObjectDataSource’s brochurePath parameter can be set using e.NewValues["brochurePath"] = value.

- **If the SelectedValue is “2”,** then we want to set the record’s BrochurePath value to NULL. This can be accomplished by setting the ObjectDataSource’s brochurePath parameter to Nothing, which results in a database NULL being used in the UPDATE statement. If there is an existing brochure file that is being removed, we need to delete the existing file. However, we only want to do this if the update completes without raising an exception.

- **If the SelectedValue is “3”,** then we want to ensure that the user has uploaded a PDF file and then save it to the file system and update the record’s BrochurePath column value. Moreover, if there is an existing brochure file that is being replaced, we need to delete the previous file. However, we only want to do this if the update completes without raising an exception.
The steps needed to be completed when the RadioButtonList’s `SelectedValue` is “3” are virtually identical to those used by the DetailsView’s `ItemInserting` event handler. This event handler is executed when a new category record is added from the DetailsView control we added in the previous tutorial. Therefore, it behooves us to refactor this functionality out into separate methods. Specifically, I moved out the common functionality into two methods:

- **ProcessBrochureUpload** accepts as input a `FileUpload` control instance and an output Boolean value that specifies whether the delete or edit operation should proceed or if it should be cancelled due to some validation error. This method returns the path to the saved file or `null` if no file was saved.
- **DeleteRememberedBrochurePath** deletes the file specified by the path in the page variable `deletedCategorysPdfPath` if `deletedCategorysPdfPath` is not `null`.

The code for these two methods follows. Note the similarity between `ProcessBrochureUpload` and the DetailsView’s `ItemInserting` event handler from the previous tutorial. In this tutorial I have updated the DetailsView’s event handlers to use these new methods. Download the code associated with this tutorial to see the modifications to the DetailsView’s event handlers.

```csharp
private string ProcessBrochureUpload(FileUpload BrochureUpload, out bool CancelOperation)
{
    CancelOperation = false;   // by default, do not cancel operation

    if (BrochureUpload.HasFile)
    {
        // Make sure that a PDF has been uploaded
        if (string.Compare(System.IO.Path.GetExtension(BrochureUpload.FileName), 
                           ".pdf", true) != 0)
        {
            UploadWarning.Text = 
                "Only PDF documents may be used for a category's brochure."
                ;
            UploadWarning.Visible = true;
            CancelOperation = true;
            return null;
        }

        const string BrochureDirectory = "~/Brochures/";
        string brochurePath = BrochureDirectory + BrochureUpload.FileName;
        string fileNameWithoutExtension = 
            System.IO.Path.GetFileNameWithoutExtension(BrochureUpload.FileName);

        int iteration = 1;

        while (System.IO.File.Exists(Server.MapPath(brochurePath)))
        {
            brochurePath = string.Concat(BrochureDirectory, fileNameWithoutExtension, 
                                          "/", iteration, ".pdf" );
            iteration++;
        }

        // Save the file to disk and set the value of the brochurePath parameter
        BrochureUpload.SaveAs(Server.MapPath(brochurePath));
        return brochurePath;
    }
    else
    {
        // Handle the case where no file was uploaded
    }
}
```
The GridView’s **RowUpdating** and **RowUpdated** event handlers use the **ProcessBrochureUpload** and **DeleteRememberedBrochurePath** methods, as the following code shows:

```csharp
protected void Categories_RowUpdating(object sender, GridViewUpdateEventArgs e)
{
    // Reference the RadioButtonList
    RadioButtonList BrochureOptions =
        (RadioButtonList)Categories.Rows[e.RowIndex].FindControl("BrochureOptions");

    // Get BrochurePath information about the record being updated
    int categoryID = Convert.ToInt32(e.Keys["CategoryID"]);
    CategoriesBLL categoryAPI = new CategoriesBLL();
    Northwind.CategoriesDataTable categories =
        categoryAPI.GetCategoryByCategoryID(categoryID);
    Northwind.CategoriesRow category = categories[0];

    if (BrochureOptions.SelectedValue == "1")
    {
        // Use current value for BrochurePath
        if (category.IsBrochurePathNull())
            e.NewValues["brochurePath"] = null;
        else
            e.NewValues["brochurePath"] = category.BrochurePath;
    }
    else if (BrochureOptions.SelectedValue == "2")
    {
        // Remove the current brochure (set it to NULL in the database)
        e.NewValues["brochurePath"] = null;
    }
    else if (BrochureOptions.SelectedValue == "3")
    {
        // Reference the BrochurePath FileUpload control
        FileUpload BrochureUpload =
            (FileUpload)Categories.Rows[e.RowIndex].FindControl("BrochureUpload");

        // Process the BrochureUpload
        bool cancelOperation = false;
        e.NewValues["brochurePath"] =
            ProcessBrochureUpload(BrochureUpload, out cancelOperation);
    }
}
```
Note how the RowUpdating event handler uses a series of conditional statements to perform the appropriate action based on the BrochureOptions RadioButtonList’s SelectedValue property value.

With this code in place, you can edit a category and have it use its current brochure, use no brochure, or upload a new one. Go ahead and try it out. Set breakpoints in the RowUpdating and RowUpdated event handlers to get a sense of the workflow.

**Step 7: Uploading a New Picture**

The Picture ImageField’s editing interface renders as a textbox populated with the value from its DataImageUrlField property. During the editing workflow, the GridView passes a parameter to the ObjectDataSource with the parameter’s name the value of the ImageField’s DataImageUrlField property and the parameter’s value the value entered into the textbox in the editing interface. This behavior is suitable when the image is saved as a file on the file system and the DataImageUrlField contains the full URL of the image. With such circumstances, the editing interface displays the image’s URL in the textbox, which the user can change and have saved back to the database. Granted, this default interface doesn’t allow the user to upload a new image, but it does let them change the URL of the image from the current value to another. For this tutorial, however, the ImageField’s default editing interface does not suffice because the Picture binary data is being stored directly in the database and the DataImageUrlField property holds just the CategoryID.

To better understand what happens in our tutorial when a user edits a row with an ImageField, consider the following example: a user edits a row with CategoryID 10, causing the Picture ImageField to render as a textbox with the value “10”. Imagine that the user changes the value in this textbox to “50” and clicks the Update button. A
postback occurs and the GridView initially creates a parameter named `CategoryID` with the value “50”. However, before the GridView sends this parameter (and the `CategoryName` and `Description` parameters), it adds in the values from the `DataKeys` collection. Therefore, it overwrites the `CategoryID` parameter with the current row’s underlying `CategoryID` value, 10. In short, the ImageField’s editing interface has no affect on the editing workflow for this tutorial because names of the ImageField’s `DataImageUrlField` property and the grid’s `DataKey` value are one in the same.

While the ImageField makes it easy to display an image based on database data, we don’t want to provide a textbox in the editing interface. Rather, we want to offer a FileUpload control that the end user can use to change the category’s picture. Unlike the `BrochurePath` value, for these tutorials we’ve decided to require that each category must have a picture. Therefore, we don’t need to let the user indicate that there is no associated picture – the user may either upload a new picture or leave the current picture as-is.

To customize the ImageField’s editing interface, we need to convert it into a TemplateField. From the GridView’s smart tag, click on the “Edit Columns” link, select the ImageField, and click the “Convert this field into a TemplateField” link.

![Figure 16: Convert the ImageField Into a TemplateField](image)

Converting the ImageField into a TemplateField in this manner generates a TemplateField with two templates. As the following declarative syntax shows, the `ItemTemplate` contains an Image Web control whose `ImageUrl` property is assigned using databinding syntax based on the ImageField’s `DataImageUrlField` and `DataImageUrlFormatString` properties. The `EditItemTemplate` contains a TextBox whose `Text` property is bound to the value specified by the `DataImageUrlField` property.

```xml
<asp:TemplateField>
    <asp:ItemTemplate>
        <asp:Image runat="server" ImageUrl='<%# DataImageUrlField %>'/>
    </asp:ItemTemplate>
    <asp:EditItemTemplate>
        <asp:TextBox runat="server" Text='<%# DataImageUrlField %>'/>
    </asp:EditItemTemplate>
</asp:TemplateField>
```
We need to update the EditItemTemplate to use a FileUpload control. From the GridView’s smart tag click on the “Edit Templates” link and then select the Picture TemplateField’s EditItemTemplate from the drop-down list. In the template you should see a TextBox – remove this. Next, drag a FileUpload control from the Toolbox into the template, setting its ID to PictureUpload. Also add the text “To change the category’s picture, specify a new picture. To keep the category’s picture the same, leave the field empty” to the template, as well.

![Figure 17: Add a FileUpload Control to the EditItemTemplate](image)

After customizing the editing interface, view your progress in a browser. When viewing a row in read-only mode, the category’s image is shown as it was before, but clicking on the Edit button renders the picture column as text with a FileUpload control.
Recall that the ObjectDataSource is configured to call the CategoriesBLL class’s UpdateCategory method that accepts as input the binary data for the picture as a byte array. If this array has a null value, however, the alternate UpdateCategory overload is called, which issues the UPDATE SQL statement that does not modify the Picture column, thereby leaving the category’s current picture intact. Therefore, in the GridView’s RowUpdating event handler we need to programmatically reference the PictureUpload FileUpload control and determine if a file was uploaded. If one was not uploaded, then we do not want to specify a value for the picture parameter. On the other hand, if a file was uploaded in the PictureUpload FileUpload control, we want to ensure that it is a JPG file. If it is, then we can send its binary contents to the ObjectDataSource through the picture parameter.

Like with the code used in Step 6, much of the code needed here already exists in the DetailsView’s ItemInserting event handler. Therefore, I’ve refactored the common functionality into a new method, ValidPictureUpload, and updated the ItemInserting event handler to use this method.

Add the following code to the start of the GridView’s RowUpdating event handler. It’s important that this code come before the code that saves the brochure file since we don’t want to save the brochure to the web server’s file system if an invalid picture file is uploaded.

```csharp
// Reference the PictureUpload FileUpload
FileUpload PictureUpload =
    (FileUpload)Categories.Rows[e.RowIndex].FindControl("PictureUpload");
if (PictureUpload.HasFile)
{
    // Make sure the picture upload is valid
    if (ValidPictureUpload(PictureUpload))
    {
        e.NewValues["picture"] = PictureUpload.FileBytes;
    }
    else
    {
        // Invalid file upload, cancel update and exit event handler
        e.Cancel = true;
        return;
    }
}
```
The `ValidPictureUpload(FileUpload)` method takes in a `FileUpload` control as its sole input parameter and checks the uploaded file’s extension to ensure that the uploaded file is a JPG; it is only called if a picture file is uploaded. If no file is uploaded, then the picture parameter is not set, and therefore uses its default value of `null`. If a picture was uploaded and `ValidPictureUpload` returns `true`, the picture parameter is assigned the binary data of the uploaded image; if the method returns `false`, the update workflow is cancelled and the event handler exited.

```csharp
private bool ValidPictureUpload(FileUpload PictureUpload)
{
    // Make sure that a JPG has been uploaded
    if (string.Compare(System.IO.Path.GetExtension(PictureUpload.FileName), ".jpg", true) != 0 &&
        string.Compare(System.IO.Path.GetExtension(PictureUpload.FileName), ".jpeg", true) != 0)
    {
        UploadWarning.Text = 
            "Only JPG documents may be used for a category's picture."
        UploadWarning.Visible = true;
        return false;
    }
    else
    {
        return true;
    }
}
```

Step 8: Replacing the Original Categories’ Pictures with JPGs

Recall that the original eight categories’ pictures are bitmap files wrapped in an OLE header. Now that we have added the capability to edit an existing record’s picture, take a moment to replace these bitmaps with JPGs. If you want to continue to use the current category pictures, you can convert them to JPGs by performing the following steps:

1. Save the bitmap images to your hard drive. Visit the `UpdatingAndDeleting.aspx` page in your browser and for each of the first eight categories, right-click on the image and choose to save the picture.
2. Open the image in your image editor of choice. You can use Microsoft Paint, for example.
3. Save the bitmap as a JPG image.
4. Update the category’s picture through the editing interface, using the JPG file.

After editing a category and uploading the JPG image, the image will not render in the browser because the `DisplayCategoryPicture.aspx` page is stripping the first 78 bytes from the pictures of the first eight categories. Fix this by removing the code that performs the OLE header stripping. After doing this, the `DisplayCategoryPicture.aspx Page_Load` event handler should have just the following code:

```csharp
protected void Page_Load(object sender, EventArgs e)
{
    int categoryId = Convert.ToInt32(Request.QueryString["CategoryId"]);

    // Get information about the specified category
    CategoriesBLL categoryAPI = new CategoriesBLL();
}
Northwind.CategoriesDataTable categories = _
    categoryAPI.GetCategoryWithBinaryDataByCategoryID(categoryID);
Northwind.CategoriesRow category = categories[0];

    // For new categories, images are JPs...
    // Output HTTP headers providing information about the binary data
    Response.ContentType = "image/jpeg";
    // Output the binary data
    Response.BinaryWrite(category.Picture);
}

Note: The UpdatingAndDeleting.aspx page’s inserting and editing interfaces could use a bit more work. The CategoryName and Description BoundFields in the DetailsView and GridView should be converted into TemplateFields. Since CategoryName does not allow NULL values, a RequiredFieldValidator should be added. And the Description TextBox should probably be converted into a multi-line TextBox. I leave these finishing touches as an exercise for you.

Summary

This tutorial completes our look at working with binary data. In this tutorial and the previous three, we saw how binary data can be stored on the file system or directly within the database. A user provides binary data to the system by selecting a file from their hard drive and uploading it to the web server, where it can be stored on the file system or inserted into the database. ASP.NET 2.0 includes a FileUpload control that makes providing such an interface as easy as drag and drop. However, as noted in the Uploading Files tutorial, the FileUpload control is only well-suited for relatively small file uploads, ideally not exceeding a megabyte. We also explored how to associate uploaded data with the underlying data model, as well as how to edit and delete the binary data from existing records.

Our next set of tutorials explores various caching techniques. Caching provides a means to improve an application’s overall performance by taking the results from expensive operations and storing them in a location that can be more quickly accessed.

Happy Programming!

About the Author

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