LESSON 2

98-363 Web Development Fundamentals

2.1 Read and Write XML Data

2.2 Distinguish Between DataSet and DataReader Objects

2.3 Call a Service from a Web Page

2.4 Understand DataSource Controls

2.5 Bind Controls to Data by Using Data-Binding Syntax

2.6 Manage Data Connections and Databases

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Read and Write XML Data

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Lesson Overview

What is XML?

In this lesson, you will review:

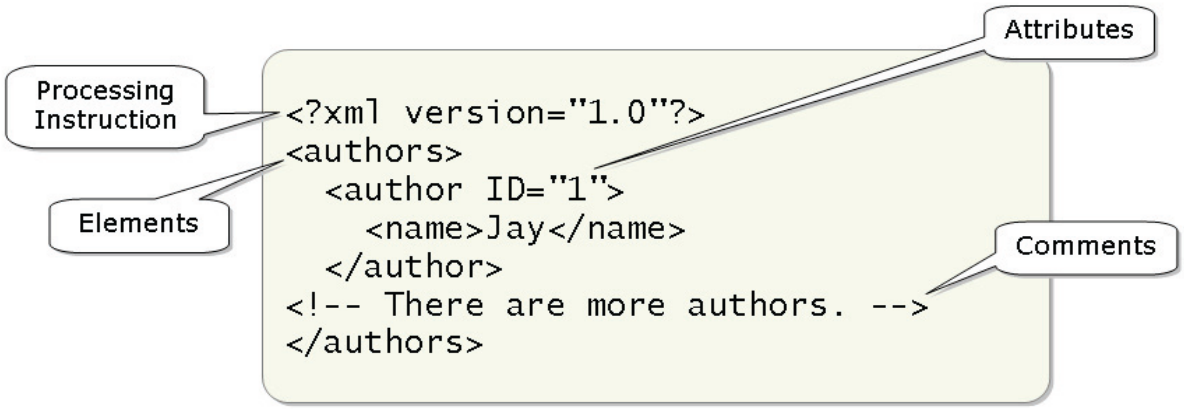
- The structure of an XML document
- XML core technologies
- Criteria of a well-formed XML document
- XML Validation

Guiding Questions

- What is XML?
- What role does it play in a Web application?
- What is the advantage of managing data by using XML?

Anatomy of an XML page

- Provides a uniform method to describe and exchange structured data
- Define your own elements and attributes
- Nest elements



- Valid XML and well-formed XML

XML

- Acronym for eXtensible Markup Language
- A universal format that you can use to describe and exchange structured documents and data
- Used to define elements and attributes
- A valid XML page must be well-formed
- Uniform method to describe and exchange data

Assignment

- Complete student activity 2.1

Lesson Review

- What is meant by a well-formed XML page?
- How do you know an XML page is valid?
- What are the key components of an XML Page?

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Distinguish Between DataSet and DataReader Objects

Lesson Overview

In this lesson, you will learn about:

- DataSet
- DataReader
- Selecting the proper data object

Guiding Questions

1. When should a DataReader object be used?

2. When should a DataSet object be used?

3. What are the fundamental differences between the two?

DataSet vs DataReader

DataSet	DataReader
Read/write access to data	Read-only
Includes multiple tables from different databases	Based on one SQL statement from one database
Disconnected	Connected
Bind to multiple controls	Bind to one control only
Forward and backward scanning of data	Forward-only
Slower access	Faster access
Supported by Visual Studio 2008 Designer	Manually coded

Assignment

- Complete student activity 2.2

Lesson Review

- DataSet objects are complex objects that enable storage of multiple DataTables of data.
  - — DataSet objects can consume a lot of resources.
- DataReader objects are lightweight objects used for read-only access to the data.
  - — Most often, a Web page only needs to read from a data source.
  - — DataReader objects are used more often than DataSet objects, especially when higher performance is desired.

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Call a Service from a Web Page

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Lesson Overview

What is a Web service?

In this lesson, you will learn:

- The key aspects of a Web service
- How to create a Web service

Web Services

- Enable applications to send and receive information across the Internet.
- Enable programming logic and capabilities to shared with many other applications.
- Contain programmable logic accessible by standard Web protocols.
- Microsoft Visual Studio 2008 makes Extensible Markup Language (XML) Web services extremely easy to develop and to use.

Visual Studio 2008

- Creates the required folders, files, and the XML Web service page when a Web service application is created
- Creates a default “Hello World” function on the XML Web service page
- Provides templates that make it easy to develop XML Web services

Example—Web Service code

- .asmx page
  - Contains file type information and a directive to the code-behind page
- Code-behind page

```
[Visual C#]
public class Service1 : System.Web.Services.WebService
{
    [WebMethod]
    public type function1()
    {
        //function here
    }
}
```

```
[Visual Basic]
Class Service1
    <WebMethod()> Public Function function1() As type
        'function_here
    End Function
End Class
```

Assignment

- Complete student activity 2.3

Lesson Review

- XML Web services provide a simple, flexible, standards-based model to connect applications over the Internet.
- XML Web services enable the developer to take advantage of the existing Internet infrastructure and link applications regardless of the platforms, programming languages, or object models used.
- XML Web services enable programming logic and capabilities to be shared with many other applications.

Microsoft

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Understand DataSource Controls

LinqDataSource

- Enables Language Integrated Query (LINQ) in an ASP.NET Web page through declarative markup to retrieve and modify data from a data object.
- Supports automatic generation of SELECT, UPDATE, INSERT, and DELETE commands
- Supports sorting, filtering, and paging

LINQ

- A set of extensions to the Microsoft .NET Framework that encompass LINQ, set, and transform operations
- Extends Microsoft C# and Microsoft Visual Basic with native language syntax for queries
- Provides class libraries to take advantage of these capabilities

ObjectDataSource

- Enables the use of a business object or other class to create Web applications that rely on middle-tier objects to manage data
- Supports advanced sorting and paging scenarios that are unavailable with other data source controls

XmlDataSource

- Enables use of an Extensible Markup Language (XML) file, especially for hierarchical ASP.NET server controls such as the TreeView or Menu control
- Supports filtering capabilities using XPath expressions and the application of XSLT transformation to the data
- Allows data to be updated by saving the entire XML document with changes

SqlDataSource

- Enables developers to work with Microsoft SQL Server, OLE DB, ODBC, or Oracle databases
- Supports advanced caching capabilities when used with SQL Server
- Supports sorting, filtering, and paging when data is returned as a DataSet object

Assignment

- Complete student activity 2.4

Lesson Review

- ASP.NET includes data source controls that enable processes with different types of data sources, such as a database, an XML file, or a middle-tier business object.
- Data source controls connect to and retrieve data from a data source and make it available for other controls to bind to, without requiring code.
- Data source controls can also support data modifications.

Microsoft

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Bind Controls to Data by Using Data-Binding Syntax

Lesson Overview

What is data binding?

In this lesson, you will learn:

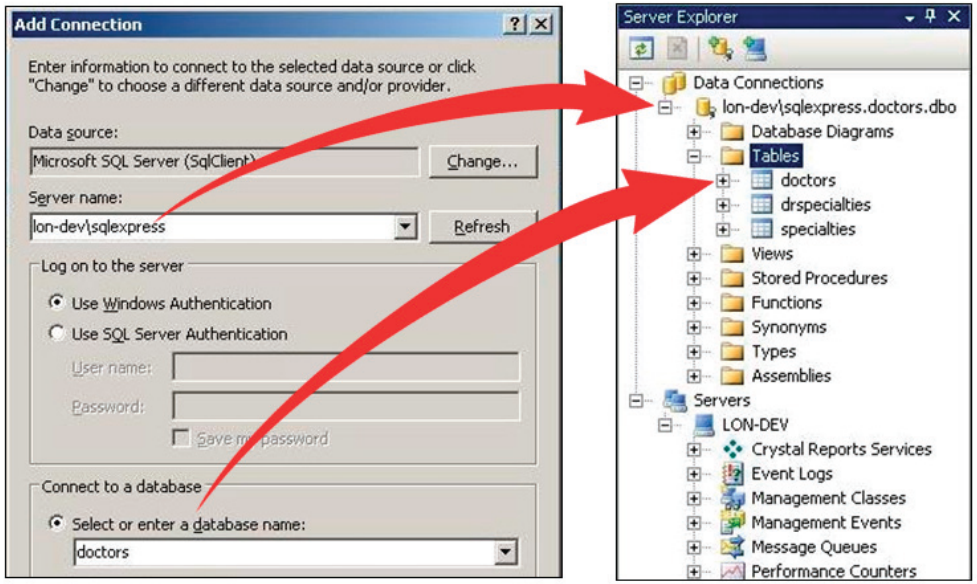
- How data is updated and displayed in data-aware controls

Guiding Questions

- What is data binding?
- What is meant by a data-aware control?

Generating a Connection by Using Server Explorer

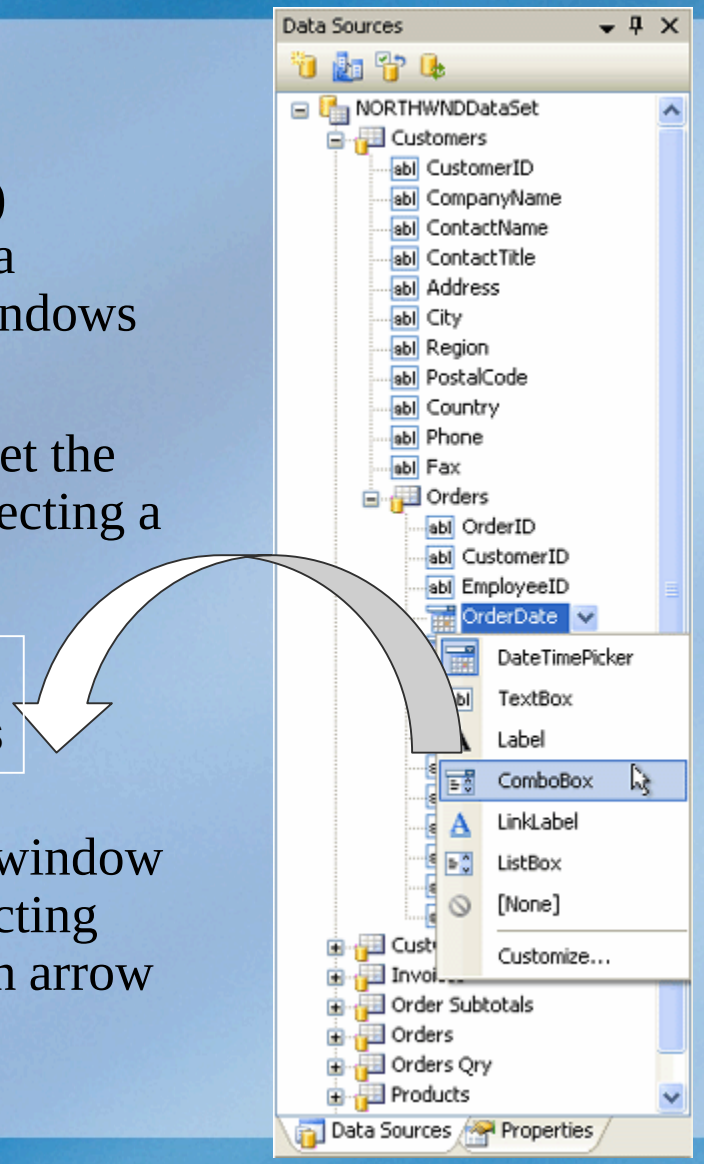
- In Server Explorer, right-click Data Connections, and then click Add Connection.
- Configure the connection



Data-aware Controls

- You can create data-bound (data-aware) controls by dragging items from the Data Sources window onto a form in your Windows application.
- Prior to performing the drag operation, set the controls to be created on the form by selecting a control from each item's control list.

Drag data field onto
form to create databound controls



- Each bindable item in the Data Sources window has a control list that is accessed by selecting the item and then clicking the drop-down arrow attached to the item.

Data-Binding Syntax

- Data-binding expressions are contained within <%# and %> delimiters and use the *Eval* and *Bind* functions.

- The *Eval* function is used to define one-way (read-only) binding.
  - — Takes the name of a data field and returns a string containing the value of that field from the current record in the data source.
  - — Can supply an optional second parameter to specify a format for the returned string.
  - — The string format parameter uses the syntax defined for the *Format* method of the *String* class.

Data-Binding Syntax (continued)

- The *Bind* function is used for two-way (updatable) binding.
  - The *Bind* method has some similarities to the *Eval* method, but there are significant differences.
    - — Although you can retrieve the values of data-bound fields with the *Bind* method, as you can with the *Eval* method, the *Bind* method is also used when data can be modified.
  - The *Bind* method is typically used with input controls such as the *TextBox* control rendered by a *GridView* row in edit mode.
    - — When the data-bound control creates these input controls as part of its own rendering, it can extract the input values.
- The *Bind* method takes the name of a data field to associate with the bound property, as shown in the code example on the next slide.

Code Example

```
<EditItemTemplate>
  <table>
    <tr>
      <td align=right>
        <b>Employee ID:</b>
      </td>
      <td>
        <%# Eval("EmployeeID") %>
      </td>
    </tr>
      <tr>
      <td align=right>
        <b>First Name:</b>
      </td>
         <td>
        <asp:TextBox ID="EditFirstNameTextBox" RunAt="Server"
          Text='<%# Bind("FirstName") %>' />
      </td>
      </tr>
```

(continued on next slide)

Code Example (continued)

```
    <tr>
      <td align=right>
        <b>Last Name:</b>
      </td>
      <td>
        <asp:TextBox ID="EditLastNameTextBox" RunAt="Server"
            Text='<%# Bind("LastName") %>'  />
      </td>
    </tr>
    <tr>
      <td colspan="2">
        <asp:LinkButton ID="UpdateButton" RunAt="server"
          Text="Update" CommandName="Update" />
         
        <asp:LinkButton ID="CancelUpdateButton" RunAt="server"
          Text="Cancel" CommandName="Cancel" />
      </td>
    </tr>
  </table>
</EditItemTemplate>>   </EditItemTemplate>
```

Lesson Review

- Explain the process of data binding and how it is used in Web development.

Microsoft

LESSON 2.6

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Manage Data Connections and Databases

Lesson Overview

What role do databases play in a Web application?

In this lesson, you will learn:

- How database connections are managed in a Web application using
  - Connection objects
  - Connection pooling
  - Transaction objects

Guiding Questions

1. What does it mean to establish a database connection?
2. How do you connect to a database?

General Information

- To bring data into your application (and send changes back to the data source), two-way communication must be established.
- This two-way communication is typically handled by a connection object (for example, a `SqlConnection`) that is configured with a *connection string*, the information it needs to connect to the data source.

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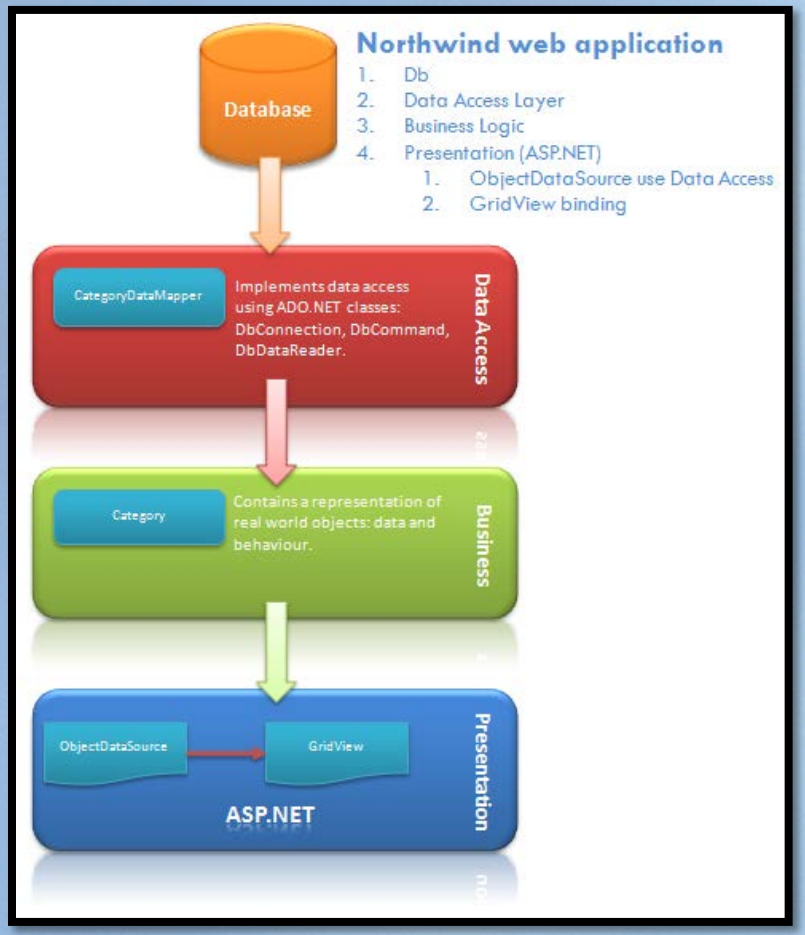


Creating a Connection Programmatically

- Creating a **SqlConnection** instance

```
[Visual C#]
string connectionString = "data source=localhost; " +
  "initial catalog=northwind; integrated security=true";
SqlConnection connection = new SqlConnection(connectionString);
```

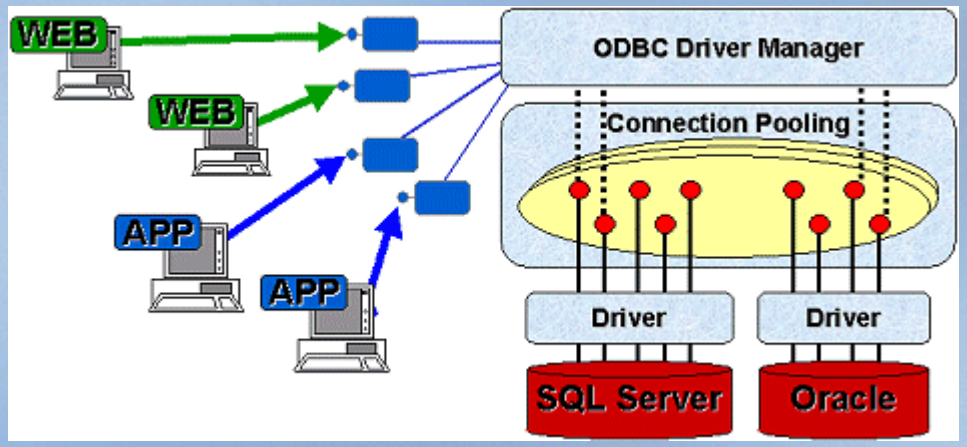
```
[Visual Basic]
Dim connectionString As String = "data source=localhost; " & _
  "initial catalog=northwind; integrated security=true"
Dim connection As New SqlConnection(connectionString)
```

- Setting connection string parameters
  - Connection timeout
  - Data source
  - Initial catalog
  - Integrated security
  - Password
  - Persist security info
  - Provider
  - User ID

Connection Objects

- To access data using your data environment, a connection object must be created.
  - — Every data environment should include at least one connection object.
  - — A connection object represents a connection to a remote database that is used as a data source.

Connection Pooling



- Connection pooling reduces the number of times that new connections need to be opened.
- The *pooler* maintains ownership of the physical connection.
- It manages connections by keeping alive a set of active connections for each given connection configuration.

Connection Pooling (continued)

1. When a user calls Open on a connection, the pooler looks to see if there is an available connection in the pool.
2. If a pooled connection is available, it returns it to the caller instead of opening a new connection.
3. When the application calls Close on the connection, the pooler returns it to the pooled set of active connections instead of actually closing it.
4. Once the connection is returned to the pool, it is ready to be reused on the next Open call.

- Only connections with the same configuration can be pooled.
- ADO.NET keeps several pools concurrently—one for each configuration.

Transaction Objects

- Transactions are operations combined into a logical unit of work.
  - — Used to control and maintain the consistency and integrity of each action in a transaction despite errors that might occur in the system.
- Connection and transaction objects are used to begin, commit, and roll back a transaction.

Assignment

- Complete student activity 2.6

Lesson Review

1. Describe methods for creating a database link.
2. List the benefit of connection pools.

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Complete Quia Test:

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