



CMER

Centre for Mobile Education and Research

BlackBerry Applications using Microsoft Visual Studio and Database Handling



Extending Microsoft Visual Studio Environment

- **In an effort to support popular development environments, RIM has introduced the BlackBerry Plug-in for Microsoft Visual Studio**
- **This plug-in enables developers who are experienced in the .NET framework to extend their applications wirelessly using BlackBerry Mobile Data System (MDS)**



Overview

- Using the BlackBerry Plug-in for Microsoft Visual Studio, one can develop rich-client BlackBerry MDS runtime applications
- One can also design and test BlackBerry MDS Runtime applications using a set of predefined controls, methods, and classes
 - **Easy to build**
 - **Drag and drop**



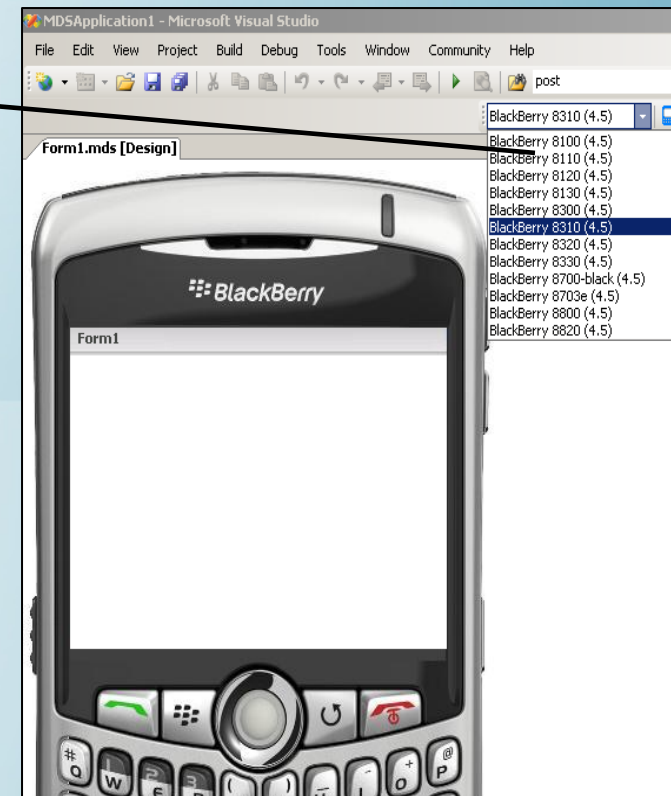
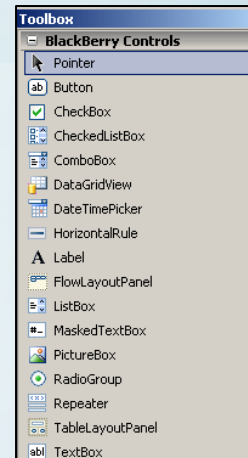
BlackBerry Plug-in for Microsoft Visual Studio Features

- **Some of the main features include:**
 - **Visual Graphical User Interface (GUI)**
 - **Code generation**
 - **Testing and debugging**
 - **Support for Web services**
 - **ASP.NET application support**
 - **GPS support**



BlackBerry Plug-in for Microsoft Visual Studio Features (continued)

- Using the plug-in, one has access to multiple BlackBerry simulators
- One also has access to a wide variety of BlackBerry controls





BlackBerry Plug-in for Microsoft Visual Studio Features (continued)

- Developers can write their code in the .NET framework (i.e. C#, or VB.NET)
 - Event handling and application logic is written in JavaScript

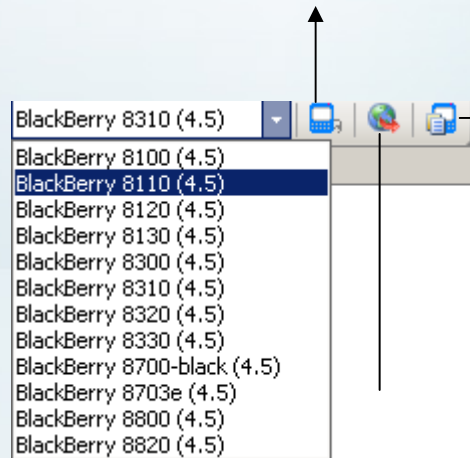
```
function Form1_button1_Click()  
{  
    Screen.refresh()  
}
```



BlackBerry Toolbox

- The toolbox allows you to

Connect to a BlackBerry device



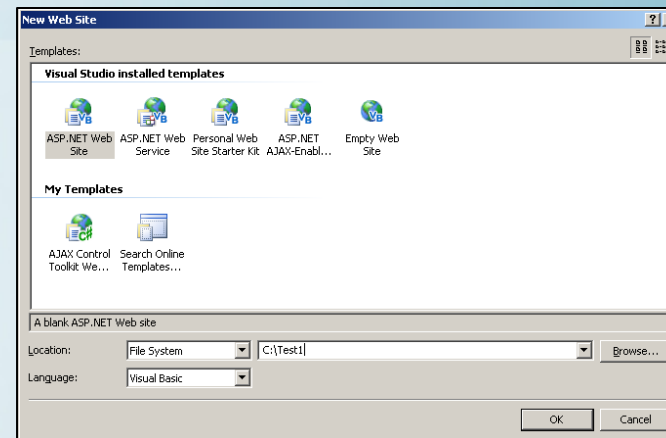
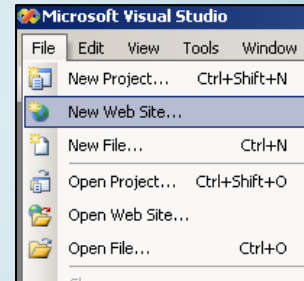
Launch sample browser

Publish an application



Creating Mobile Web Applications Using BlackBerry Plug-in (1)

- Create a new Web site using Microsoft Visual Studio
- Select the template “ASP.NET Web Site” and define the location of the Web site





Creating Mobile Web Applications using BlackBerry Plug-in (2)

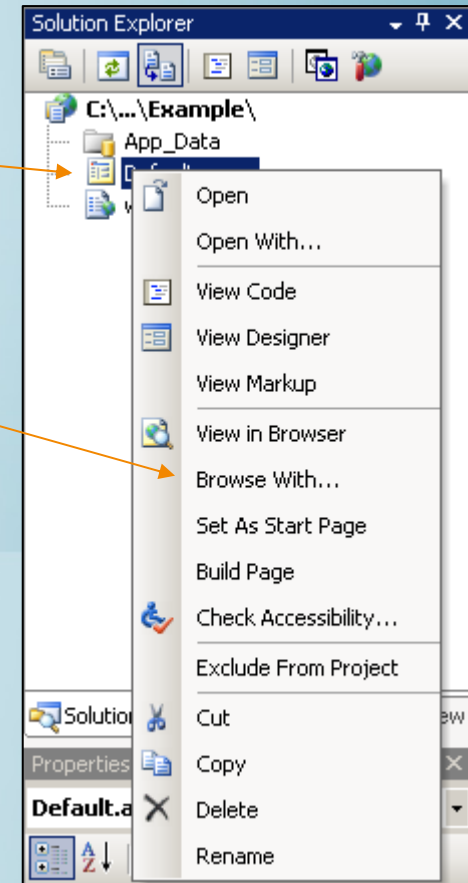
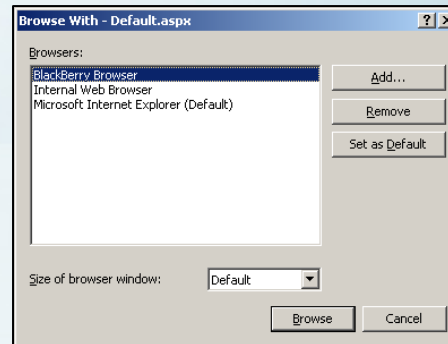
- Create a simple Web page in XHTML

```
1 <%@ Page Language="VB" Debug="true"%>
2
3 <script runat="server">
4     Sub Page_Load()
5         msg.Text = "Hello World"
6     End Sub
7
8 </script>
9
10 <html xmlns="http://www.w3.org/1999/xhtml" >
11 <head runat="server">
12     <title>Hello World</title>
13 </head>
14 <body>
15     <form id="form1" runat="server">
16     <div>
17         <asp:Label runat="server" ID="msg" />
18     </div>
19     </form>
20 </body>
21 </html>
22
```



Creating Mobile Web Applications using BlackBerry Plug-in (3)

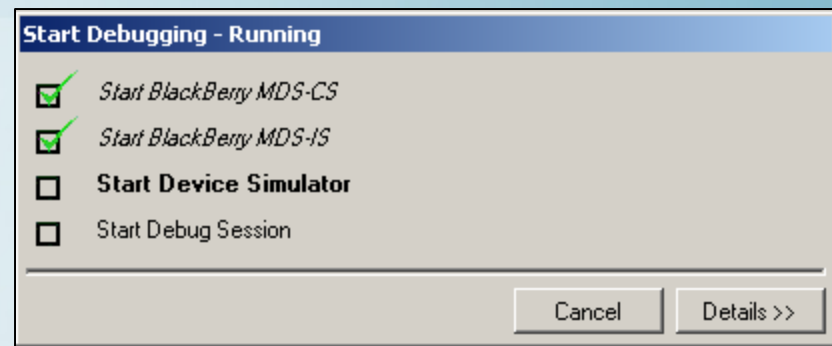
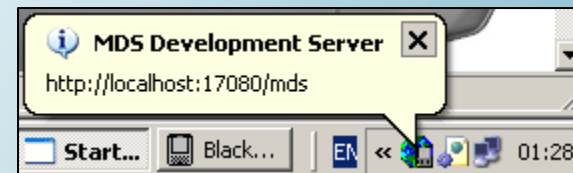
- Right click on the filename in the solution explorer
- Select “Browse With...”
- Select “BlackBerry Browser”





Creating Mobile Web Applications using BlackBerry Plug-in (4)

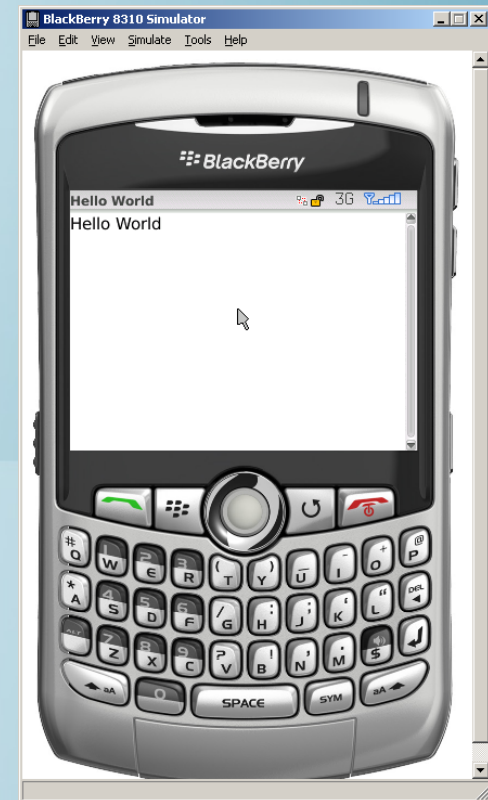
- After clicking “Browser” button, the BlackBerry MDS Development Server simulator starts
 - An icon appears in the desktop task bar
 - A “Start Debugging” window appears





Creating Mobile Web Applications using BlackBerry Plug-in (4)

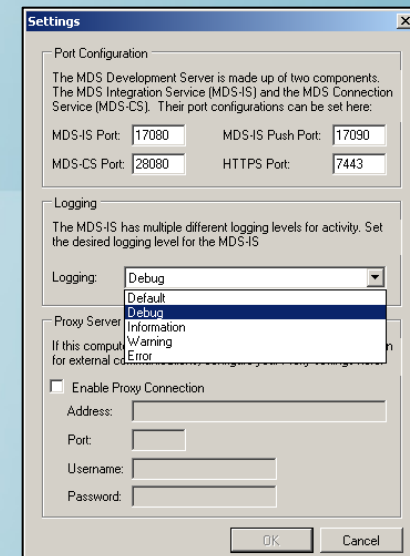
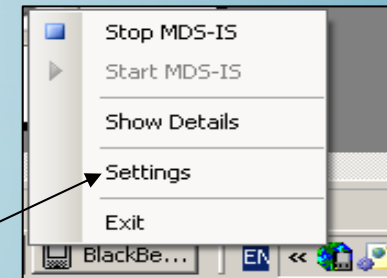
- The BlackBerry simulator starts, launching the Web page in the simulator's browser and displaying the results
- **Advantage**
the plug-in automatically launches the MDS Development Server and BlackBerry Device Simulator





Creating Mobile Web Applications using BlackBerry Plug-in (5)

- You can control the status of the MDS Development Server simulator by right clicking on the icon on the task bar
- You can also specify advanced settings such as port information and proxy connection information using the “**Settings**” option





Database-Driven Mobile Web Applications

- Databases are a way for managing and delivering information over the Web
- In a typical Web application, a GUI controls the *front-end* of the application and the database are used to manage the *back-end* delivery of information



What is a database?

- Database: A collection of facts that are systematically organized [Ashenfelter, 1999]
- The most common type of databases is the relational database
- Relational databases allow the linking between tables
 - *a table can “relate” to other tables*



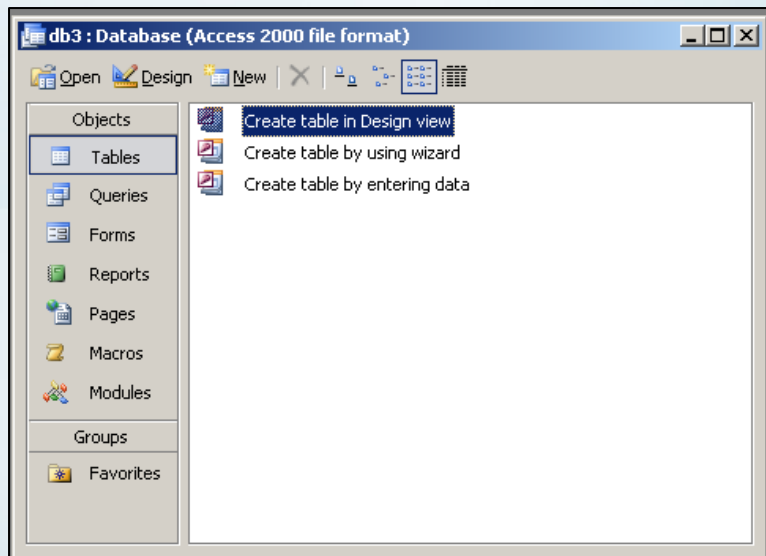
Database Components

- **Tables**
 - Organized database elements into columns (identifiers) and rows (values)
- **Queries**
 - Tools that are used to add, modify, or delete information from a database
- **Forms**
 - UI for database applications (accessed directly)
- **Reports**
 - Printable documents for group of records



Database Components Example

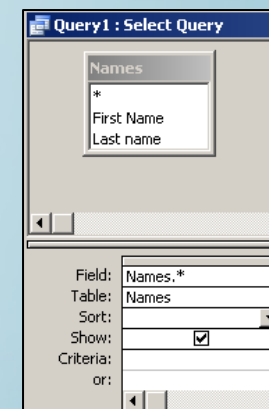
- Example from Microsoft Access



Table

	First Name	Last name
	John	Doe
	Jane	Doe
*		

Queries





Database Tables

- Database tables are organized into
 - Columns (fields)
typically contain the **identifiers**
(can be unique)
 - Rows (records)
typically contain **values** of data
items

Field (identifier)

Columns

	First Name	Last name
	John	Doe
✎	Jane	Doe
*		

Rows

value



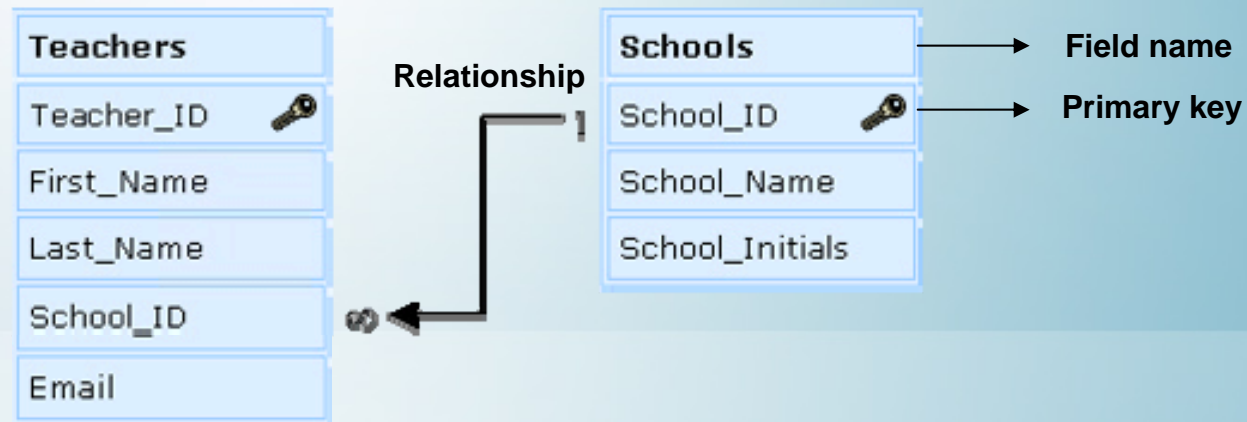
Primary Keys

- **Databases can ensure that values are unique**
 - **Attempting to enter a duplicate returns an error**
 - **One can assign a column a *primary key***
- **Primary Keys: values of two or more records in a field can not be the same**
 - **used to link tables with each other**



Database Relationships

- Databases can contain multiple tables
 - Tables can *relate* to each other



- School_ID is used to link the two tables



Database Environment

- **Database Management Systems (DBMS)** is a software that is responsible for defining, creating, and maintaining databases
 - Can assign roles for users to access databases
- **Examples:**
 - Microsoft Access, Oracle, SQL Server, etc.



.NET Environment

- Microsoft Windows-based operating systems provide the **Open Database Connectivity (ODBC)**
- ODBC acts as a translator between various database formats and a universal database language called **Structure Query Language (SQL)**



Structure Query Language (SQL)

- SQL is an industry standard
- Used to access databases
- It is composed on English language statements that specify a query to be executed
- Example: **SELECT * From tableName**



ASP.NET

- Designed by Microsoft that aim at changing the way businesses develop programs
- Unlike many other scripting technologies, ASP.NET is a **full-fledged** programming language that is supported by the .NET Framework



ASP.NET (continued)

- One can develop an ASP.NET application that is composed of a combination of languages
 - Visual Basic.NET (VB.NET), C-Sharp (C#) or JavaScript
 - Using ASP.NET, one has a greater selection of programming languages



Elements of ASP.NET Page

```
1 <%@ Page Language="VB" Debug="true"%>
2
3 <script runat="server">
4     Sub Page_Load()
5         msg.Text = "Hello World"
6     End Sub
7
8 </script>
9
10 <html xmlns="http://www.w3.org/1999/xhtml" >
11 <head runat="server">
12     <title>Hello World</title>
13 </head>
14 <body>
15     <form id="form1" runat="server">
16     <div>
17         <asp:Label runat="server" ID="msg" />
18     </div>
19     </form>
20 </body>
21 </html>
```

New tags in the form

- No form action
- If you do not specify an action, the form goes back to itself (postback form)

Runat: by specifying server, you instruct ASP.NET to keep track of this form on the server (without it, it acts as normal HTML)



Code Blocks

- **Code Declaration Block**
 - **<script></script>**: delimits a section of the page that the program will process dynamically
- The method of separating HTML from ASP.NET is achieved through **Server Controls**



Server Controls example

```
<Script language="VB" runat="server">  
Sub Page_Load()  
    Message.Text="ASP.NET Code line"  
End Sub  
</script>  
<html>  
<head>  
<Title>Server Controls example</Title>  
<Body>  
First HTML Line<br/>  
<asp:label id=Message runat="server"/>  
<br/>  
Second HTML Line<br/>  
</body>  
</html>
```



This marker is known as **server control**.
The id attribute of the server control corresponds with the line of code in the <script> block which we specify the text to display.



asp:label Example

```
<body>
  <form id="form1" runat="server">
    <div>
      <asp:Label runat="server" ID="msg" />
    </div>
  </form>
</body>
```

- The **ID** attribute is used to uniquely identify the `<asp:label>` control one can refer to it in the ASP.NET code
- The **runat="server"** attribute tells the server to process the control and generate HTML code to be sent to the client



asp:DropDownList Example

```
<%@ Page Language="VB" Debug="true"%>
<script runat="server">
    Sub Page_Load()
        If Page.IsPostBack() Then
            msg.Text = "You selected " & CitySelect.SelectedItem.Text
        Else
            msg.Text = "Enter your selection"
        End If
    End Sub
</script>
<html xmlns="http://www.w3.org/1999/xhtml" >
<head runat="server">
    <title>Hello World</title>
</head>
<body>
    <form id="form1" runat="server">
        <div>
            <asp:Label runat="server" ID="msg" />
            <br />
            <asp:DropDownList ID="CitySelect" runat="server" AutoPostBack="true">
                <asp:ListItem Value="Select City" Selected="true"/>
                <asp:ListItem Value="Kitchener" />
                <asp:ListItem Value="Waterloo" />
                <asp:ListItem Value="Toronto" />
                <asp:ListItem Value="London" />
                <asp:ListItem Value="Hamilton" />
            </asp:DropDownList>
        </div>
    </form>
</body>
</html>
```



asp: DropDownList Example (continued)





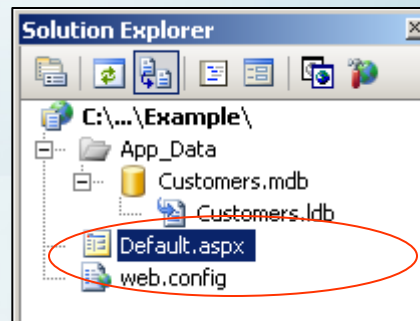
BlackBerry Database Example

- **Objective: Select a customer name from a drop down menu and display customer information**
- **Create a Microsoft Access (mdb) database**
 - **Customers.mdb**
 - **One table: CustomerInfo**
 - **Four Fields: Name, Telephone, Email, Country**



BlackBerry Database Example (continued)

- Place the database file “Customers.mdb” into the “App_Data” folder of Web site

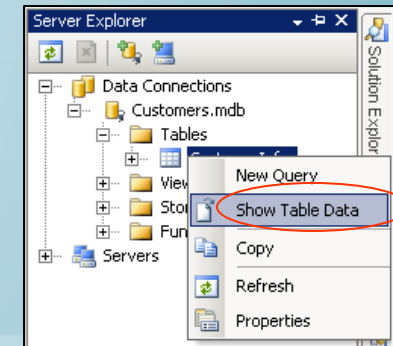


- Fill in some records into the database

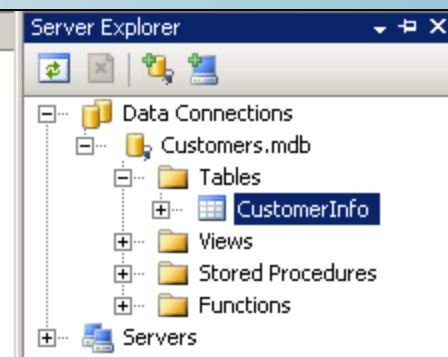


BlackBerry Database Example (continued)

- In **Server Explorer**, double click on **Tables** and right click on **CustomerInfo**, then select “**Show Table Data**”



	Name	Telephone	Email	Country
	John Doe	555-555-5555	john_doe@doe_com	Canada
	Jane Doe	444-444-4444	jane_doe@doe_com	Brazil
	John Lee	555-555-5555	john_lee@lee_com	United States
	Jane Lee	444-444-4444	jane_lee@lee_com	Ecuador
	Andrew Smith	333-333-3333	andrew_smith@smith_com	Spain
▶*	NULL	NULL	NULL	NULL





BlackBerry Database Example (continued)

- **Edit Default.aspx to**
 - Select the Name field
 - Display Name records in a drop down menu
- **Create DropDownList control**

```
<asp:DropDownList ID="selectCustomer" runat="server" AutoPostBack="true">  
</asp:DropDownList>
```

- **Create Label control**

```
<asp:Label runat="server" ID="msg" />
```



BlackBerry Database Example (continued)

- Connect to Microsoft Access database

```
Sub Page_Load()  
  If Not Page.IsPostBack() Then  
    msg.Text = "Enter your selection"  
    Dim myConn As New OleDbConnection("Provider=Microsoft.Jet.OleDb.4.0; Data Source=" & _  
      Server.MapPath("~/App_Data/customers.mdb"))  
    Dim query As String = "SELECT * From CustomerInfo"  
    Dim myCommand As New OleDbCommand(query, myConn)  
    myConn.Open()  
    .  
    .  
    .  
    myConn.Close()  
  End If  
End Sub
```

ODBC Driver

Database File

SQL

Three arrows originate from the code: one points from 'Provider=Microsoft.Jet.OleDb.4.0' to 'ODBC Driver', another points from 'Data Source=' to 'Database File', and a third points from 'SELECT * From CustomerInfo' to 'SQL'.



BlackBerry Database Example (continued)

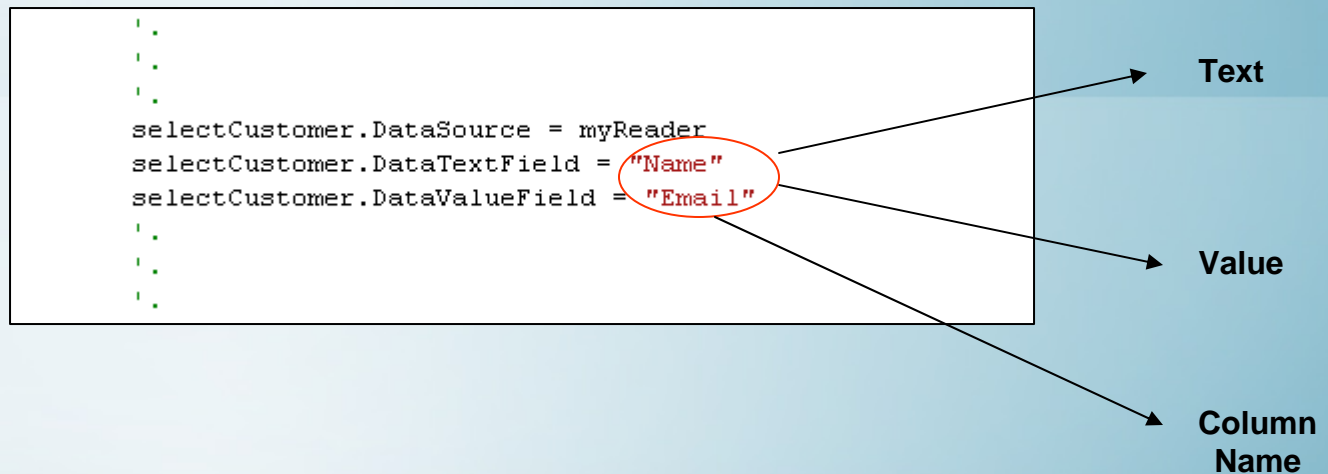
- Read the data from the database into an object called **DataReader**
 - **Locally stores database records in a Web page**

```
myConn.Open()  
Dim myReader As OleDbDataReader = myCommand.ExecuteReader()  
  
.....  
  
myConn.Close()
```



BlackBerry Database Example (continued)

- For each record, send the data to be added as a **ASP List Item**





BlackBerry Database Example (continued)

- Bind the data to the DropDownList control

```
selectCustomer.DataBind()
```

- DataBind is a built-in member that binds all data expressions to any ASP.NET server control



BlackBerry Database Example (continued)

- The DropDownList populates the ListItem controls directly from the database
 - The larger the database, the more time it would take to load the DropDownList
- Without the DataBind() method, the data would not be loaded
 - *Data binding may degrade your mobile Web application, depending on the nature of the calls and the amount of data*

