



IBM eServerJ iSeriesJ

Session: 404382

iSeries Access: Three Tier Development

Brent Nelson
bmnelson@us.ibm.com

© Copyright IBM Corporation, 2003. All Rights Reserved.
This publication may refer to products that are not currently available in your country. IBM makes no commitment to make available any products referred to herein.

IBM eServer iSeries



Agenda



Three Tier Environments

- Windows
- Java
- Linux



iSeries Access Offerings



Tips

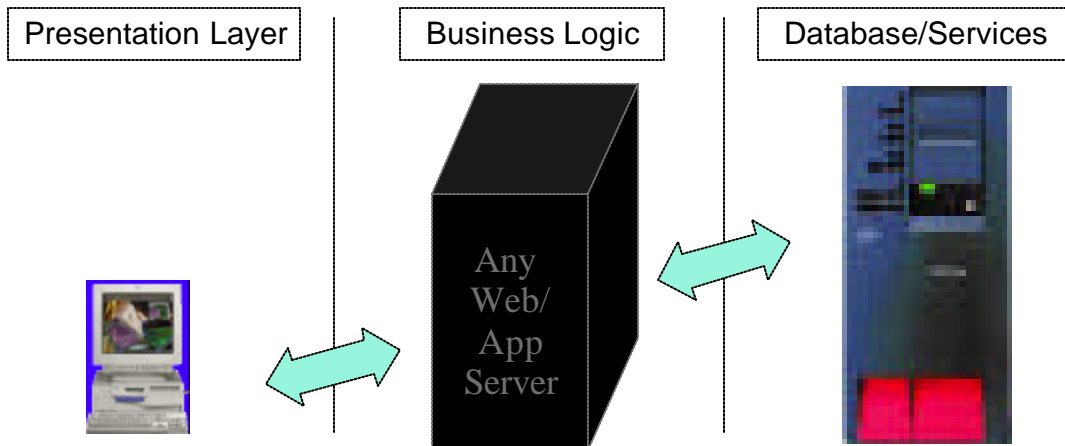


Code walkthrough

© 2003 IBM Corporation

What is 3 Tier?

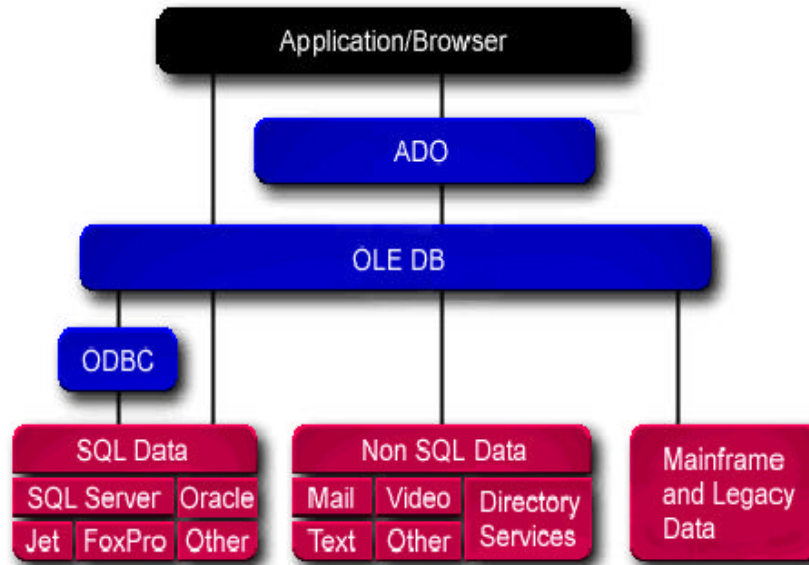
- A client/server programming model with a second tier in the middle



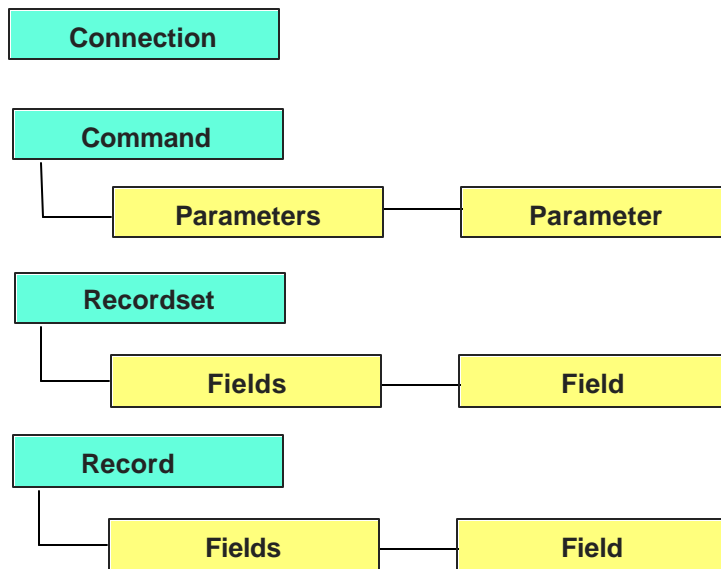
Database Access Technologies

- Microsoft
 - ODBC – 1st set of APIs, provides mechanism to process SQL statements
 - OLE DB – ODBC + access to non-SQL data (spreadsheets, webpages,...)
 - ADO (ActiveX Data Objects) - Thin layer over OLE-DB
 - ADO.NET – Similar to ADO in appearance, designed for Internet applications
- Java
 - JDBC
- Linux
 - ODBC

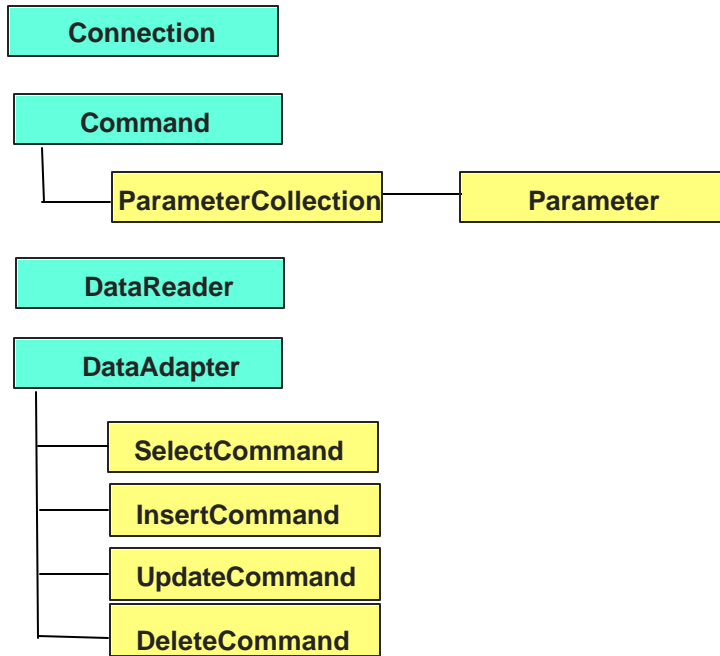
ADO Architecture



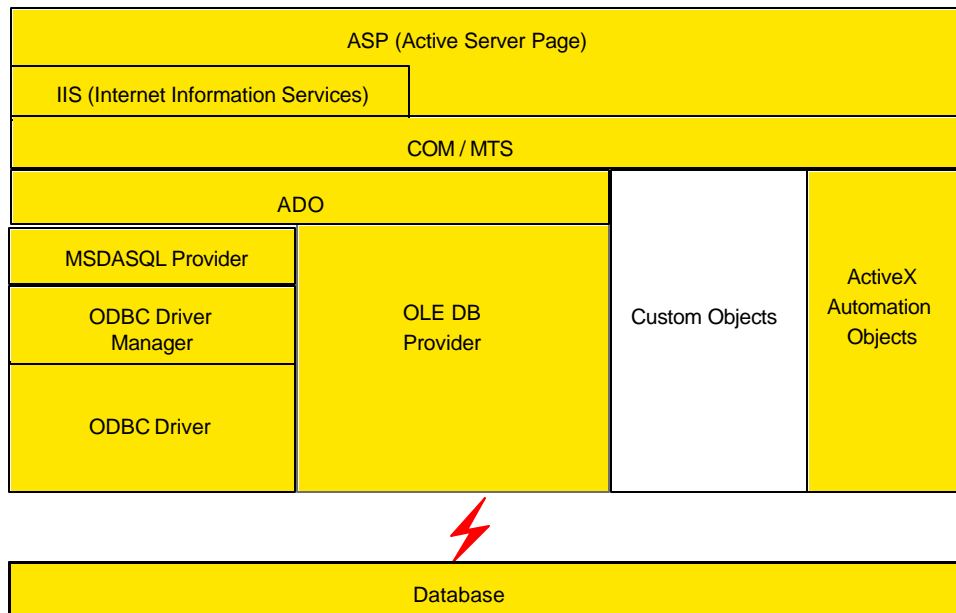
ADO Model



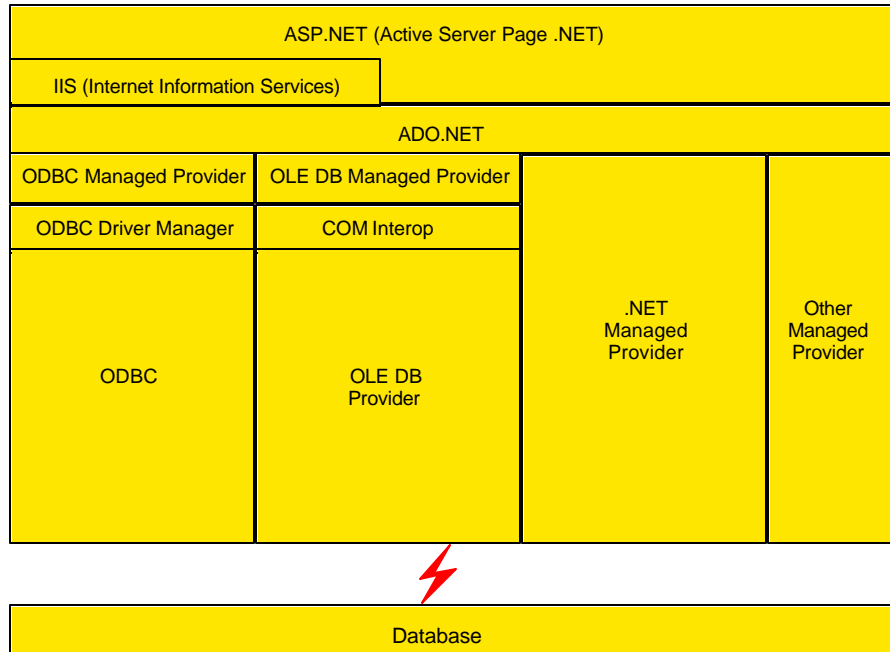
ADO.NET Model



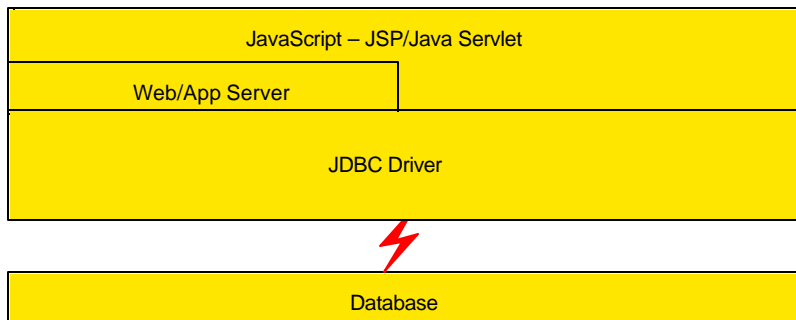
Windows Environment



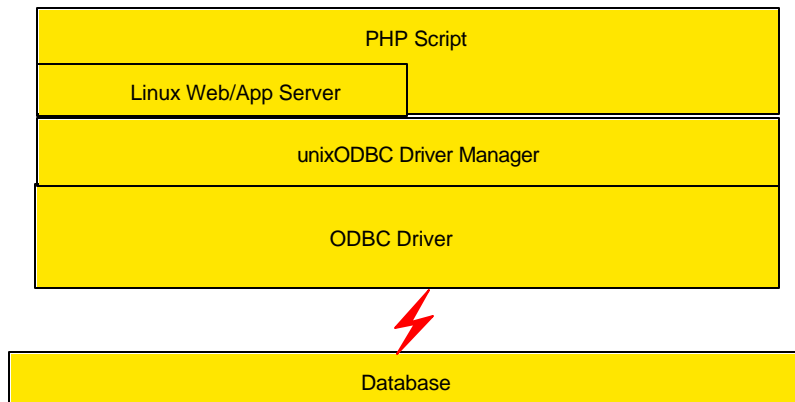
.NET Environment



Java Environment



Linux Environment



Distributed Transactions in a 3 Tier Environment

- Distributed transactions involve the coordination of a transaction across multiple database systems
- Windows
 - MTS (Microsoft Transaction Server)
- Java
 - XAConnection, XAResource objects in JDBC
- Linux
 - Some ODBC drivers have XA support

iSeries Access ODBC Driver

- <http://publib.boulder.ibm.com/series/v5r2/ic2924/index.htm>
- Microsoft MSDASQL provides the bridge between OLE DB
- Must define an ODBC (system) data source name
- Functionality
 - SQL statements
 - SQL stored procedures
 - MTS support
- Advantages
 - Better SQL support

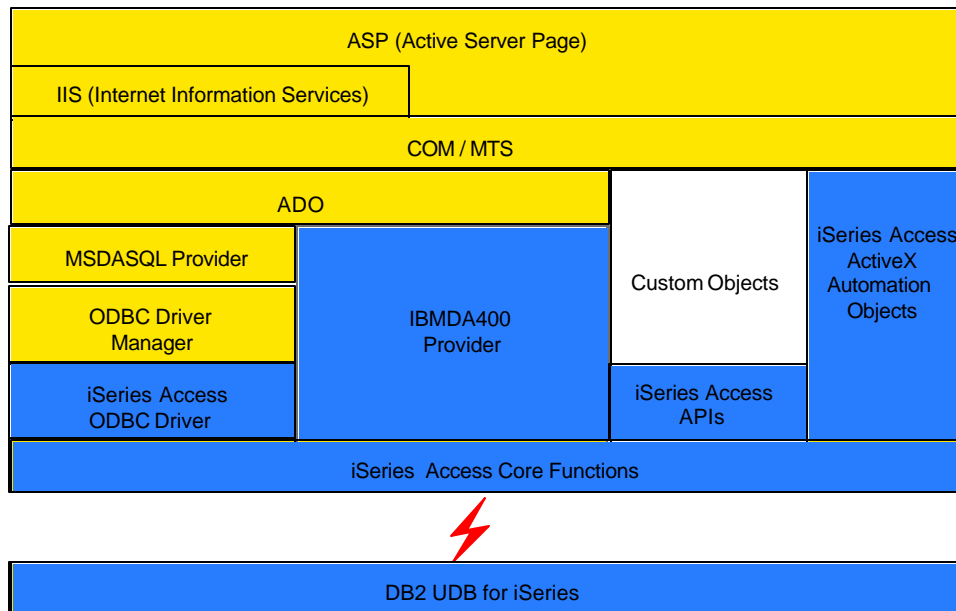
iSeries Access OLE DB Provider (IBMDA400)

- OLE DB Technical Reference (installed with iSeries Access)
- Functionality
 - SQL statements
 - SQL stored procedures
 - Tables record level access
 - Data queues
 - CL commands
 - Program calls
- Advantages
 - Non-SQL support

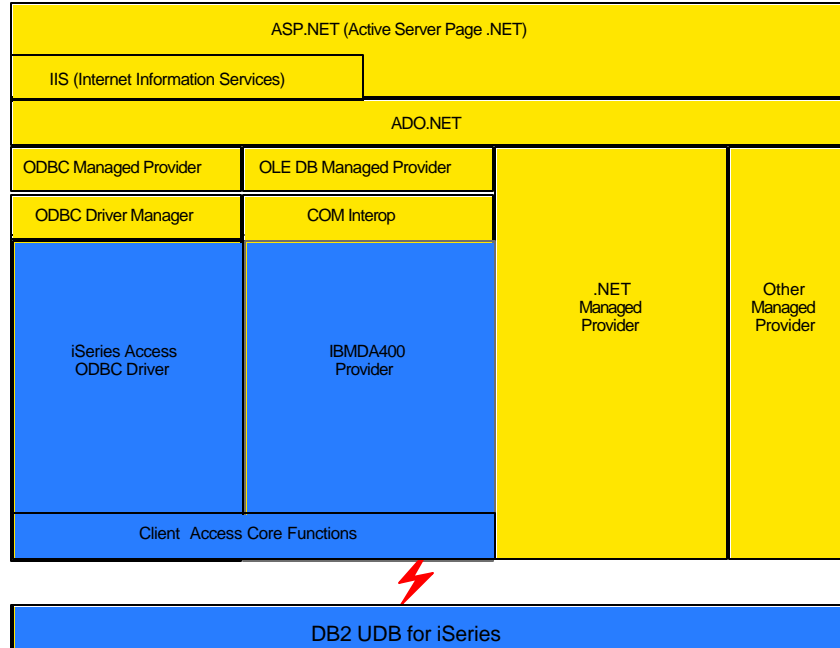
iSeries Access ActiveX Automation Interfaces

- <http://publib.boulder.ibm.com/series/v5r2/ic2924/info>
- **Functionality**
 - Client information
 - iSeries system list
 - Connections
 - Data queues
 - CL commands
 - Program call
 - Numeric, structure, code page conversions

iSeries Access in Windows Environment



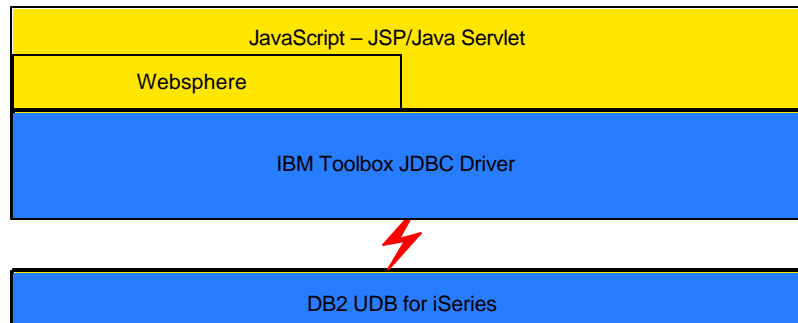
iSeries Access in .NET Environment



Toolbox JDBC driver

- <http://publib.boulder.ibm.com/series/v5r2/ic2924/index.html>
- **Functionality**
 - SQL statements
 - SQL stored procedures
 - XA support
- **Advantages**
 - Better SQL support
 - Open Source version (JT400) available on web

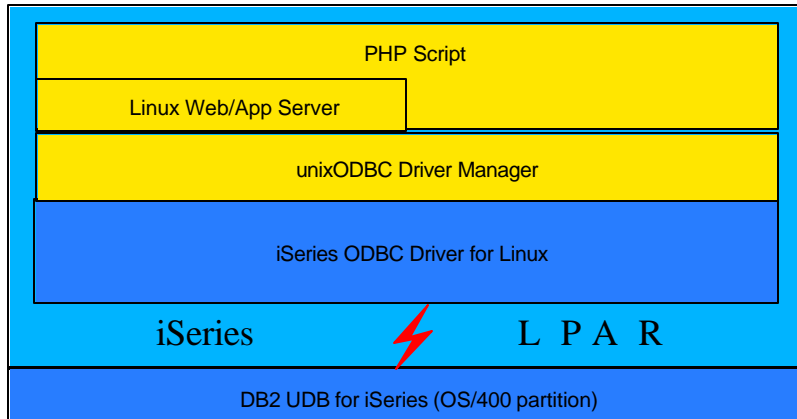
Toolbox JDBC in Java Environment



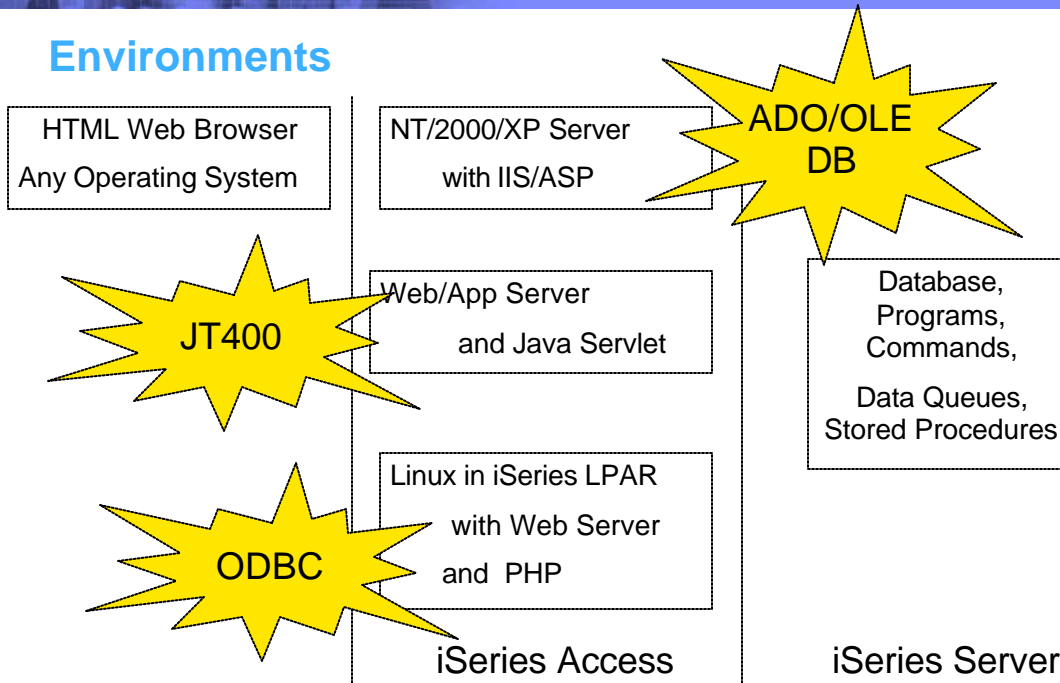
iSeries ODBC Driver for Linux

- <http://www-1.ibm.com/servers/eserver/series/linux/odbc/guide/>
- **Functionality**
 - SQL statements
 - SQL stored procedures
- **Advantages**
 - Better SQL support

iSeries ODBC in Linux Environment



Environments



Installation

- MS Windows Server
 - NT Server 4.0 with IIS
 - 2000/XP Server
 - MDAC 2.5 or later
 - iSeries Access with OLE DB and ODBC
- Web/App Server and Java Servlets
 - IBM Toolbox for Java
- Linux in iSeries LPAR
 - Web Server with PHP
 - unixODBC Driver Manager
 - iSeries ODBC Driver for Linux

Performance Tips

- Connection pooling
- Stored procedures
- Block inserts / Block fetches
- Compression
- Avoid signon prompts

Tips and Techniques for ASP

- Always Dim your ASP variables
- Don't save remote objects, such as connection and recordsets in the Application variable since IIS would then need to maintain those objects across multiple application instances. Use the Session variable.
- Keep all your ASP code in 1 set of <% %> having multiple <% %> cause the IIS server engine to switch modes which causes impact to performance. When you need to write HTML to the browser, use Response.Write method.
- Consider using a COM/MTS "business" object for complicated logic. ASP should be used for the user interface.
- Watch **record locking**. The AS/400 uses pessimistic record locking, so if the ADO record is opened for update and is positioned on a record, that record is locked and cannot be read for update by anyone else.

Tips and Techniques for ASP

- Make sure to set the **userid and password**. IIS will appear to hang if your ASP causes a iSeries Access userid/password prompt.
- When checking for errors, check the VBScript built-in Err object first. Second, check the Connection object Errors collection for specific error messages and descriptions.
- Be aware of **date/time/timestamp data type processing**. IBMDBA400 will accept and return string data for these types. The ODBC driver will convert to/from the PC date/time/timestamp data types.
- iSeries SQL uses "soft" **cursor closes**, which means the actual close is delayed. This helps improve performance when accessing the table multiple times. However, any record or member locks are not released when you close a recordset. This does not apply to record-level access; member and records locks are released on a recordset close.
- Use the METADATA tag as the preferred method to access constants that are contained in a type library rather than using includes.

Summary

- Use the correct interface that suits your business needs
- Take advantage of the iSeries Information Center

<http://publib.boulder.ibm.com/pubs/html/as400/infocenter.html>

Code Walkthrough

Selection Panel

How would you like to retrieve the data:

- IBMDA400 using SQL
- IBMDA400 using Record Level Access
- MSDASQL using ODBC

Get the Data

Result Table

CUSNUM	LSTNAM	INIT	STREET	CITY	STATE	ZIP	CD	ILMT	CHG	GOOD	BALDUE	CDT	DUE
938472	Heming	G K	4859 Elm Ave	Dallas	TX	75217	5000	3		37	0		
839283	Jones	B D	21B NW 135 St	Clay	NY	13041	400	1		100	0		
392859	Vine	S S	PO Box 79	Broton	VT	5046	700	1		439	0		
938485	Johnson	J A	3 Alpine Way	Helen	GA	30545	9999	2		3987.5	33.5		
397267	Tyron	W B	13 Myrtle Dr	Hector	NY	14841	1000	1		0	0		
389572	Stevens	K L	208 Snow Pass	Denver	CO	80226	400	1		58.75	1.5		
846283	Alison	J S	787 Lake Dr	Isle	MN	56342	5000	3		10	0		
475938	Doe	J W	59 Archer Rd	Sutter	CA	95685	700	2		250	100		
693829	Thomas	A N	3 Dove Circle	Casper	WY	82609	9999	2		0	0		
593029	Williams	E D	485 SE 2 Ave	Dallas	TX	75218	200	1		25	0		
192837	Lee	F L	5963 Oak St	Hector	NY	14841	700	2		489.5	0.5		
583990	Abraham	M T	392 Mill St	Isle	MN	56342	9999	3		500	0		

Selection Panel HTML Code

```
<HTML><HEAD><TITLE>Browse A File</TITLE></HEAD>

<BODY>
How would you like to retrieve the data:<br>

<FORM NAME="Dialog" METHOD="POST" ACTION="browse.asp">
<INPUT TYPE="Radio"
  NAME="ConnectionType"
  VALUE="IBMSQL"
  CHECKED="Yes">IBMDA400 using SQL<br>
<INPUT TYPE="Radio"
  NAME="ConnectionType"
  VALUE="IBMRLA">IBMDA400 using Record Level Access<br>
<INPUT TYPE="Radio"
  NAME="ConnectionType"
  VALUE="ODBC">MSDASQL using ODBC<br>
<br>
<br>
<INPUT TYPE=SUBMIT
  NAME="go"
  VALUE="Get the Data"
  ALIGN=RIGHT>
</FORM></BODY></HTML>
```

Global.asa

```
<!-- Session level variables -->

<SCRIPT LANGUAGE="VBScript" RUNAT="Server">

Sub Session_OnStart
  Session("AS400_Userid") = "MyUserid"
  Session("AS400_Password") = "MyPassword"
  Session("Library") = "QIWS"
  Session("FileName") = "QCUSTCDT"
  Session("AS400_SystemName") = "SystemA"
  Session("ODBC_DataSourceName") = "SystemA"
End Sub

</SCRIPT>
```


Browse.asp

```

<HTML><HEAD><TITLE>ADO Record Level Access Active Server Page Sample</TITLE>
<!-- METADATA TYPE="typelib" UUID="00000200-0000-0010-8000-00AA006D2EA4" NAME="ADO Type
Library" --></HEAD><BODY>
<%
' This sample will dynamically generate a table for the QCUSTCDT file on the AS/400 and
' display all the records of the file. The method of retrieving the records is based on the
' user selection in browse.htm. For those records in which the CDTDUE field is
' greater than 0, the CDTDUE value is highlighted in red. If you removed the CDTDUE checking
' code you could use this ASP to generate a table for any AS/400 DB file.
'
' Global.ASA file contains the following information:
' - Library
' - File Name
' - Userid
' - Password
' - AS/400 System Name
' - ODBC data source name

'Always DIM your variables, even though you don't have to.
'All ASP variables are variants, you cannot specify the data type
Dim AS400Connection
Dim AS400Command
Dim AS400File_rs
Dim ConnectionString

```

Browse.asp (2)

```

Dim Color
Dim ColorEnd
Dim CommandText
Dim CommandType
On Error Resume Next

' Setup appropriate connection string and command information
Select Case Request.Form("ConnectionType")
  Case "IBMSQL"
    ConnectionString = "Provider=IBMDA400;Data Source=" & Session("AS400_SystemName") & ";"
    CommandText = "SELECT * FROM " & Session("Library") & "." & Session("FileName")
    CommandType = adCmdText
  Case "IBMRLA"
    ConnectionString = "Provider=IBMDA400;Data Source=" & Session("AS400_SystemName") & ";"
    CommandText = "/QSYS.LIB/" & Session("Library") & ".LIB/" & Session("FileName") & ".FILE()"
    CommandType = adCmdTable
  Case "ODBC"
    ConnectionString = "Provider=MSDASQL;DSN=" & Session("ODBC_DataSourceName") & ";"
    CommandText = "SELECT * FROM " & Session("Library") & "." & Session("FileName")
    CommandType = adCmdText
  Case Else
    ' No connection type was selected, so redisplay the selection page
    Response.Redirect("browse.htm")
End Select

```

Browse.asp (3)

```
' Open the connection
Set AS400Connection = Server.CreateObject("ADODB.Connection")
AS400Connection.Open ConnectionString,Session("As400_Userid"),Session("AS400_Password")

Set AS400Command = Server.CreateObject("ADODB.Command")
AS400Command.ActiveConnection = AS400Connection

' Specify Read-Only. See the OLE/DB documentation in the Client Access/400 toolkit for more
' info on the Updatability property. This is a custom property only for the IBMDA400 property.
If (InStr(1,Request.Form("ConnectionType"),"IBM",vbTextCompare) > 0) Then
    AS400Command.Properties("Updatability") = 0
End If

'Set the command to execute
AS400Command.CommandText = CommandText
AS400Command.CommandType = CommandType

'Execute the command on the AS/400
Set AS400File_rs = AS400Command.Execute
```

Browse.asp (4)

```
If (Err.Number = 0 ) Then

    Response.Write("<table border=1 cellpadding=1 cellspacing=0>")
    Response.Write("<tr bgcolor=#c8d8f8>")

    ' Loop through all the fields in the file and generate the column headings of the table
    For Each fd in AS400File_rs.Fields
        Response.Write("<td nowrap>" & fd.Name & "</td>")
    Next
    Response.Write("</tr>")

    ' Loop through all the records
    While NOT AS400File_rs.EOF
        Response.Write("<tr>")

        ' Loop through each field and generate the row the row in the table, if it's the
        ' CDTDUE field, check to see if it's greater than 0, if so, make it red
        For Each field in AS400File_rs.Fields
            Color = ""
            ColorEnd = ""
            If (field.Name = "CTDUE") Then
                If (CDBL(field.Value) > 0) Then
                    Color = "<font color=#f0020>"
                    ColorEnd = "</font>"
                End If
            End If
            Response.Write("<td nowrap>" & color & field.Value & ColorEnd & "</td>")
        Next
        Response.Write("</tr>")
        AS400File_rs.MoveNext
    Wend

    Response.Write("</table>")

Else
```

Browse.asp (5)

```
'An Error Occurred
  DisplayError AS400Connection, Err.Number, Err.Description, Err.Source, "Main"
End If
```

```
AS400File_rs.Close
Set AS400File_rs = Nothing
AS400Connection.Close
Set AS400Connection = Nothing
Set AS400Command = Nothing
```

Browse.asp (6)

```
*****
**** Subroutine DisplayError
*****
Sub DisplayError(Connection,errNum,errDesc,errSource,proc)

On Error Resume Next

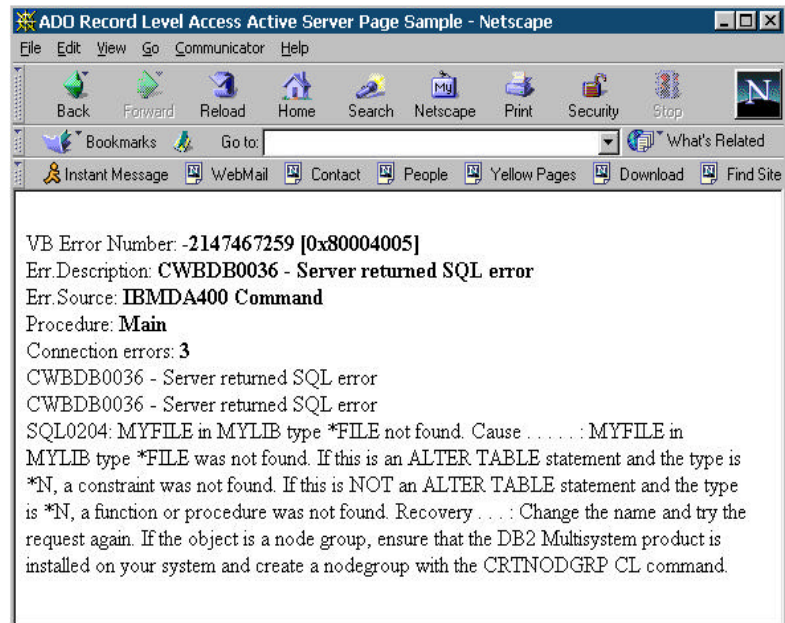
Response.Write("<br>VB Error Number: <b>" & errNum & " [0x" & Hex(errNum) & "]-</b>")
Response.Write("<br>Err.Description: <b>" & errDesc & "</b>")
Response.Write("<br>Err.Source: <b>" & errSource & "</b>")
Response.Write("<br>Procedure: <b>" & proc & "</b>")

Response.Write("<br>Connection errors: <b>" & Connection.Errors.Count & "</b>")
If (Connection.Errors.Count > 0) Then
  For Each ErrorMessage in Connection.Errors
    Response.Write("<br>" & ErrorMessage.Description)
  Next
End If

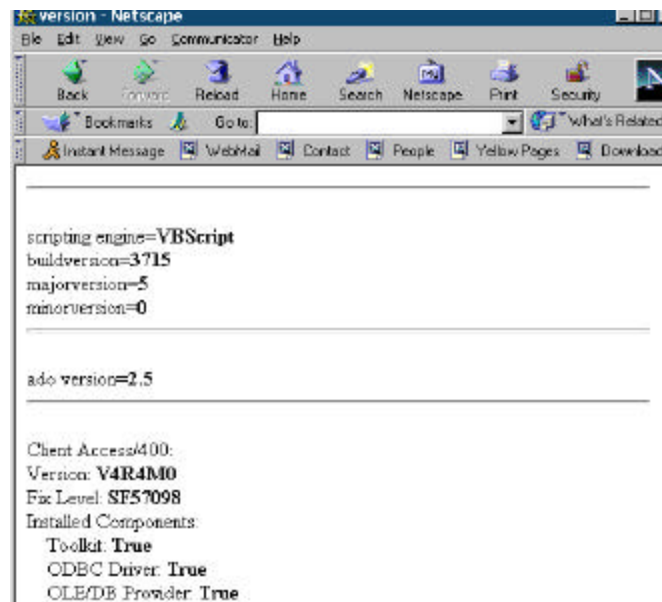
End Sub

%>
</BODY>
</HTML>
```

Unexpected Error



Version Information Panel



Version.asp

```
<HTML><HEAD><!-- METADATA TYPE="typelib" UUID="AD8D8CE0-15D3-11D2-849C-0004AC94E175"
NAME="IBM AS/400 Client Access Express ActiveX Object Library" -->
<TITLE>version</TITLE></HEAD><body bgcolor="#FFFFFF">
```

```
<%
```

```
'This ASP displays the version information for the various components involved in ASP processing
'and accessing data on the AS/400 server
'Always DIM your variables, even though you don't have to.
'All ASP variables are variants, you cannot specify the data type
```

```
Dim tempconn
Dim ca400
Dim as400
```

```
On Error Resume Next
```

```
'Script engine version
response.write "<hr><br>"
response.write "scripting engine=<b>" & scriptengine() & "</b><br>"
response.write "buildversion=<b>" & scriptenginebuildversion() & "</b><br>"
response.write "majorversion=<b>" & scriptenginemajorversion() & "</b><br>"
response.write "minorversion=<b>" & scriptengineminorversion() & "</b><br>"
```

Version.asp (2)

```
'ADO version
response.write "<hr><br>"
set tempconn=server.createobject("adodb.connection")
response.write "ado version=<b>"
response.write tempconn.version & "</b><br>"
set tempconn=nothing
```

```
'Client Access/400 Version
response.write "<hr><br>"
```

```
set ca400 = server.createobject("cwbx.ClientInfo")
response.write "Client Access/400: <br>"
response.write "Version: <b>V" & ca400.ClientVersion & "R" & ca400.ClientRelease & "M" &
ca400.ClientModificationLevel & "</b><br>"
response.write "Fix Level: <b>" & ca400.ClientFixLevel & "</b><br>"
response.write "Installed Components: <br>"
response.write "&nbsp; &nbsp; Toolkit: <b>" & ca400.ComponentInstallStatus(cwbadCompToolkit) & "</b> <br>"
response.write "&nbsp; &nbsp; ODBC Driver: <b>" & ca400.ComponentInstallStatus(cwbadCompODBC) & "</b> <br>"
response.write "&nbsp; &nbsp; OLE/DB Provider: <b>" & ca400.ComponentInstallStatus(cwbadCompOLEDB) & "</b>
<br>"
set ca400 = Nothingresponse.write "minorversion=<b>" & scriptengineminorversion() & "</b><br>"
```

Version.asp (3)

```
'AS400 Version
response.write "<hr><br>"
set as400 = server.createobject("cwbx.AS400System")
as400.Define Session("AS400_SystemName")
as400.userid = Session("AS400_Userid")
as400.password = Session("AS400_Password")
as400.promptmode = cwbcPromptNever
as400.Signon
response.write "AS/400:<br>"
if (Err.Number = 0) Then
    response.write "Version: <b>V" & as400.HostVersion & "R" & as400.HostRelease & "</b><br>"
    response.write "IP Address: <b>" & as400.IPAddress & "</b><br>"
    response.write "Codepage: <b>" & as400.HostCodePage & "</b><br>"
    response.write "Last Signed On: <b>" & as400.PrevSignonDate & "</b><br>"
else
    response.write "<font color=#ff0020>Could not retrieve AS/400 Version information.</font><br>"
    response.write "Number of errors: " & as400.Errors.Count & "<br>"
    response.write "<table border=1 cellpadding=1 cellspacing=0>"
    response.write "<tr><td>Class</td><td>Text</td></tr>"
    for each as400Error in as400.Errors
        response.write "<tr><td>" & as400Error.Class & "</td><td>" & as400Error.Text & "</td></tr>"
    next
    response.write "</table>"
end if
```

Version.asp (4)

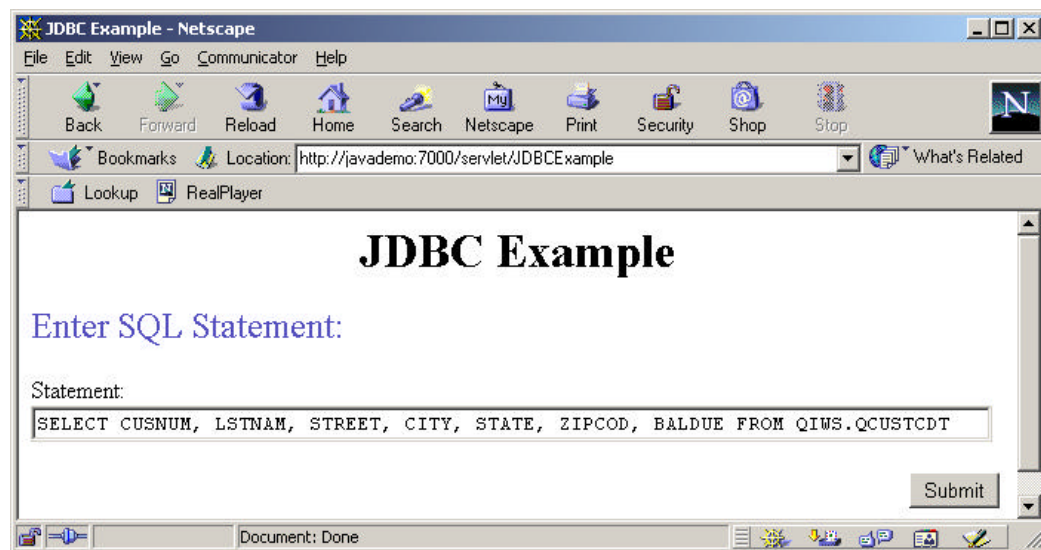
```
//S
response.write "<hr><br>"
serversoftware=request.servervariables("server_software")
response.write "server software=<b>"
response.write serversoftware & "</b><br>"

Response.Write "Script Timeout = <b>" & Server.ScriptTimeout & " seconds</b><br>"
Response.Write "Session Timeout = <b>" & Session.Timeout & " minutes</b><br>"

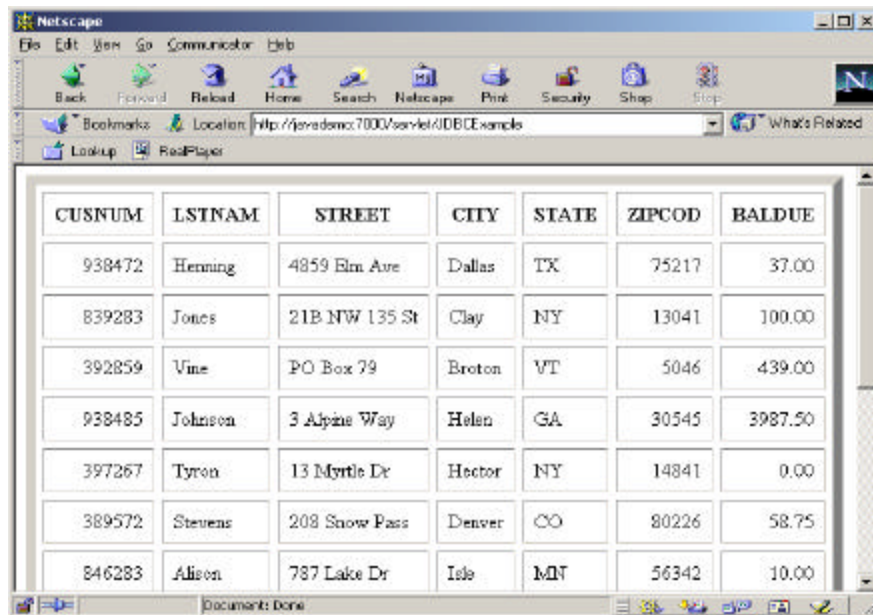
%>

</BODY>
</HTML>
```

JDBC Example



JDBC Example Result



JDBCExample.java

```
import java.io.*;
import java.util.*;
import java.awt.Color;

import javax.servlet.*;
import javax.servlet.http.*;

import com.ibm.as400.access.*;
import com.ibm.as400.access.AS400;
import com.ibm.as400.access.AS400JDBCdriver;
import com.ibm.as400.util.servlet.*;
import com.ibm.as400.util.servlet.HTMLTableConverter;
import com.ibm.as400.util.servlet.RowData;
import com.ibm.as400.util.servlet.ResultSetRowData;
import com.ibm.as400.util.html.*;

import java.sql.*;
```

JDBCExample.java (2)

```
public class JDBCExample extends AS400Servlet
{
    /**
     * Servlet initialization.
     *
     * @param config The servlet configuration.
     * @exception ServletException is thrown if a problem with the servlet occurs.
     */
    public void init(ServletConfig config) throws ServletException
    {
        super.init(config);
        setRealm(CPUStatus.systemName_);
        setUseConnectionPool(true);
    }

    /**
     * Process the GET request.
     * @param req The request.
     * @param res The response.
     */
    public void doGet(HttpServletRequest req, HttpServletResponse res)
        throws ServletException, IOException
    {
        res.setContentType("text/html");
        ServletOutputStream out = res.getOutputStream();
        out.println(showHTML());
        out.close();
    }
}
```


JDBCExample.java (3)

```
/**
 * Process the POST request.
 * @param req The request.
 * @param res The response.
 */
public void doPost (HttpServletRequest req, HttpServletResponse res)
    throws ServletException, IOException
{
    res.setContentType("text/html");
    ServletOutputStream out = res.getOutputStream();

    String textbox = req.getParameter("textbox");
    try
    {
        AS400 system = getSystem();

        out.println("<html>");

        HTMLTableConverter converter = new HTMLTableConverter();
        HTMLTable table = new HTMLTable();
        converter.setUseMetaData(true);
        table.setCellSpacing(6);
        table.setBorderWidth(8);
        table.setCellPadding(8);

        //verify statement is not empty
        if((textbox == null) || (textbox.equals(""))
        {
            throw new Exception("Please enter a statement");
        }
    }
}
```

JDBCExample.java (4)

```
converter.setTable(table);

//register and get a connection to the database
DriverManager.registerDriver(new AS400JDBCDriver());
Connection connection =
    DriverManager.getConnection("jdbc:as400://" + system.getSystemName(), system.getUserId(), "myPassword");
Statement statement = connection.createStatement();

//execute an SQL statement and get the result set
statement.execute(textbox);
ResultSet resultSet = statement.getResultSet();

//create the ResultSetRowData object and initialize it to the result set
SQLResultSetRowData rowdata = new SQLResultSetRowData(resultSet);

//verify that table is not empty
if(rowdata.length() == 0)
{
    throw new Exception("There is no data in the selected table. Please try again.");
}
```

JDBCExample.java (5)

```
//convert the ResourceListRowData into an HTMLTable
HTMLTable html = converter.convertToTable(rowdata, 0);
out.println(html.getTag());

//button to go back to Statement entry
out.println("<form action=/servlet/JDBCExample1 method=link>");
out.println("<br><input type=submit value=Enter Another Statement>");
out.println("</form>");
out.println("</html>");

returnSystem(system);
out.close();
}
catch(Exception e)
{
    out.println("<html>");
    out.println("<titleError</title>");
    out.println("<body>");
    out.println("<br><font size=5 color=#8f0c32>");
    //prints out appropriate error message
    out.println(e.getMessage());
    out.println("</font>");
    //button to go back to Statement entry
    out.println("<form action=/servlet/JDBCExample1 method=link>");
    out.println("<br><input type=submit value=Enter Another Statement>");
    out.println("</form></body></html>");
    e.printStackTrace();
}
}
```

JDBCExample.java (6)

```
//Create SQL Entry form
public String showHTML()
{
    StringBuffer page = new StringBuffer();

    HTMLForm form = new HTMLForm("/servlet/JDBCExample");
    HTMLHead head = new HTMLHead("JDBC Example");
    head.addMetaInformation(new HTMLMeta("expires", "Mon, 01 Jun 2000 12:00:00 CST"));
    head.addMetaInformation(new HTMLMeta("author", "Emily Engelbert"));
    head.addMetaInformation(new HTMLMeta("creation_date", "Mon, 01 Jul, 2000 12:00:00 CST"));

    form.addElement(new HTMLHeading(1, "JDBC Example", HTMLConstants.CENTER));

    page.append(head.getTag());
    page.append("<html>\n");
    page.append("<body>\n");

    try
    {
        form.setMethod(HTMLForm.METHOD_POST);

        //create instruction text
        LineLayoutFormPanel textLine = new LineLayoutFormPanel();
        HTMLText cmdText = new HTMLText("Enter SQL Statement");
        cmdText.setColor(new Color(86, 80, 190));
        cmdText.setSize(5);
        textLine.addElement(cmdText);
    }
}
```

JDBCExample.java (7)

```
LineLayoutFormPanel statementLine = new LineLayoutFormPanel();
statementLine.addElement(new LabelFormElement("Statement:"));

//create textbox to hold SQL statement, with default statement entered
TextFormInput statementTextbox =
new TextFormInput("textbox", "SELECT CUSNUM, LSTNAM, STREET, CITY, STATE, ZIPCOD,
BALDUE FROM QIWS.QCUSTCDT");

statementTextbox.setSize(80);
statementLine.addElement(statementTextbox);

//add the HTML text, textbos, and submit button to the form
form.addElement(textLine);
form.addElement(new LineLayoutFormPanel());
form.addElement(statementLine);
form.addElement(new LineLayoutFormPanel());
SubmitFormInput submitButton = new SubmitFormInput("submit", "Submit");
form.addElement(new HTMLAlign(submitButton, HTMLConstants.RIGHT));

page.append(form.toString());
}
catch(Exception e)
{
e.printStackTrace();
}

page.append("</body>\n");
page.append("</html>\n");
return page.toString();
}
```

JDBCExample.java (8)

```
public void destroy(ServletConfig config)
{
// do nothing
}

public String getServletInfo()
{
return "JDBC Servlet Example";
}
}
```

Download Code Sample

- ADO/OLE DB
 - <http://www-1.ibm.com/servers/eserver/iseries/access/toolkit/adooledb.htm>
- A Fast Path to AS/400 Client/Server Using AS/400 OLE DB Support (SG24-5183)
 - <http://www.redbooks.ibm.com>
 - Download from "Additional materials"
- iSeries Access ActiveX Objects
 - <http://www-1.ibm.com/servers/eserver/iseries/access/toolkit/activex.htm>
- DB2/400 PHP Demo – Linux ODBC Driver
 - <http://www-1.ibm.com/servers/eserver/iseries/linux/odbc/guide/>
 - look for Example/PHP in the left column

Project References

- ADO/OLE DB
 - Microsoft ActiveX Data Objects 2.5 Library (msado15.dll)
UUID="00000200-0000-0010-8000-00AA006D2EA4"
 - AS/400 Express Toolkit Table Index Type Library 1.2 (cwbzzidx.dll)
UUID="E1A6B8A3-3603-101C-AC6E-040224009C02"
- iSeries Access ActiveX Objects
 - IBM AS/400 Client Access Express ActiveX Object Library (cwbx.dll)
UUID="AD8D8CE0-15D3-11D2-849C-0004AC94E175"
- DB2/400 PHP Demo – Linux ODBC Driver
 - Everything is in the tar file. Untar it and open index.html

References

- AS/400 Client/Server Using AS/400 OLE DB Support (SG24-5183)"
 - <http://www.redbooks.ibm.com>
- iSeries Access 3 Tier Web Page
 - <http://www-1.ibm.com/servers/eserver/series/access/3tier/>
- Java Servlets and Java Server Pages - IBM Java Development
 - <http://www-919.ibm.com/servers/eserver/series/developer/java/>
- iSeries Access 3 Tier Questions/Comments E-Mail Address
 - rchca400@us.ibm.com (Include "3 Tier" in the subject to insure proper routing)
- iSeries Access OLE DB Technical Reference
 - Programmer's Toolkit->Database->ADO/OLE DB
- iSeries Access ADO/OLE DB Web Page
 - <http://www-1.ibm.com/servers/eserver/series/access/oledb/>
- Linux ODBC
 - <http://www.ibm.com/servers/eserver/series/linux/odbc/guide/>

MS Windows References

- Microsoft Internet Information Server (IIS) and NT Server
 - <http://www.microsoft.com/ntserver/>
- Active Server Pages (ASP)
 - <http://www.activeserverpages.com>
- Microsoft Data Access Components (MDAC)
 - <http://www.microsoft.com/data>
- Microsoft ADO Help
 - <http://www.microsoft.com/data/doc.htm>

Sample Code Disclaimer

This material contains IBM copyrighted sample programming source code for your consideration. This sample code has not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function. IBM provides no program services for this material. This material is provided "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THE ABOVE EXCLUSIONS MAY NOT APPLY TO YOU. IN NO EVENT WILL IBM BE LIABLE TO ANY PARTY FOR ANY DIRECT, INDIRECT, SPECIAL OR OTHER CONSEQUENTIAL DAMAGES FOR ANY USE OF THIS MATERIAL INCLUDING, WITHOUT LIMITATION, ANY LOST PROFITS, BUSINESS INTERRUPTION, LOSS OF PROGRAMS OR OTHER DATA ON YOUR INFORMATION HANDLING SYSTEM OR OTHERWISE, EVEN IF EXPRESSLY ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Trademarks and Disclaimers

© IBM Corporation 1994-2003. All rights reserved.

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.

The following terms are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both:

AS/400
AS/400e
eServer


IBM
IBM (logo)
iSeries
OS/400

Lotus and SmartSuite are trademarks of Lotus Development Corporation and/or IBM Corporation in the United States, other countries, or both.

MMX, Pentium, and ProShare are trademarks or registered trademarks of Intel Corporation in the United States, other countries, or both. Microsoft and Windows NT are registered trademarks of Microsoft Corporation in the United States, other countries, or both.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

SET and the SET Logo are trademarks owned by SET Secure Electronic Transaction LLC.

C-bus is a trademark of Corollary, Inc. in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product or service names may be trademarks or service marks of others.

Information is provided "AS IS" without warranty of any kind.

All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer.

Information in this presentation concerning non-IBM products was obtained from a supplier of these products, published announcement material, or other publicly available sources and does not constitute an endorsement of such products by IBM. Sources for non-IBM list prices and performance numbers are taken from publicly available information, including vendor announcements and vendor worldwide homepages. IBM has not tested these products and cannot confirm the accuracy of performance, capability, or any other claims related to non-IBM products. Questions on the capability of non-IBM products should be addressed to the supplier of those products.

All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only. Contact your local IBM office or IBM authorized reseller for the full text of the specific Statement of Direction.

Some information in this presentation addresses anticipated future capabilities. Such information is not intended as a definitive statement of a commitment to specific levels of performance, function or delivery schedules with respect to any future products. Such commitments are only made in IBM product announcements. The information is presented here to communicate IBM's current investment and development activities as a good faith effort to help with our customers' future planning.

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvements equivalent to the ratios stated here.

Photographs shown are of engineering prototypes. Changes may be incorporated in production models.