IBM
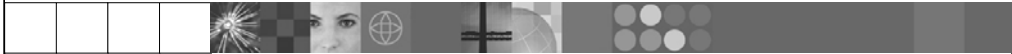
IBM Software Group

Web Tools: Beyond the Basics
WebSphere Development Studio Client Version 5.0

WebSphere software

e business software

Agenda

- J2EE
  - A deeper look into J2EE
  - JDBC
  - J2EE Connector Architecture
  - Java Naming and Directory Interface

- Web Tools
  - Web projects
  - J2EE Navigator and Hierarch Views
  - Cascading Style Sheets
  - Struts

- Server Tools
  - Creating new server configurations in the test environment
  - Configuring the test environment

Introduction

- There are many different technologies at your disposal when creating Web applications (and lots of acronyms to go with them!)
  - J2EE, JDBC, JCA, JMS, CSS, HTML, JSP, WAS, …
  - Each has it's own useful purpose
- However, some are more common than others

  CSS – Cascading Style Sheets for defining a consistent look and feel across all your web pages

  HTML and JSP – Replace DDS as way to define the user interface

  Struts – Great architecture to follow for your overall Web application

  JDBC – Database access and stored procedure call using SQL

  JCA – Java Connector Architecture for calling iSeries programs and service programs

Purpose of this presentation is to cover the more common Web technologies in greater detail and provide you with a foundation to explore the others.

J2EE – The Technologies

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J2EE - Components

- There are 4 main pieces to J2EE application model
  - Components
  - Containers
  - Services
  - Connectors

- Components (Modules)
  - You develop your code as components of a J2EE application
  - Many different types of components
    - Applets
    - Application clients (full graphical client)
    - Enterprise JavaBeans components (business logic)
    - Web components

J2EE - Containers

- Components run inside of a container
- Containers are typically provided by system vendors like IBM
  - Web and EJB containers are provided with WebSphere Application Server
- Provide services that can be used by used by the components which run in the container
  - Transaction support
  - Resource pooling
    - database connections
  - Often allow component behavior to be specified at deployment time instead of development time
    - Configuring which database to access
    - Maximum number of database connections

J2EE – Service Technologies

- The J2EE specification defines standard APIs to access many common services
  - JDBC
    - Database-independent method for using SQL
    - Database provides provide JDBC drivers
      - IBM, Microsoft, Oracle, …
  - Java Transaction API
  - Naming Service
    - Java Naming and Directory Interface (more on this later)
  - J2EE Connector Architecture
  - Java Message Service (JMS)
  - There are others, but these are the main ones

J2EE – Connector Architecture

- Provides a standard / portable API to use in Java components to access Enterprise Information Systems (EIS)
- Typically provided by the EIS vendor

 IBM provides connectors for

   Calling an RPG or COBOL program

   Accessing CICS

Everything is Components, Containers, Services and Connectors

*You develop your components using the help of the services
and connectors then deploy to a container!*

JDBC
J2EE Connector Architecture (JCA)
Java Naming and Directory Interface (JNDI)

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JDBC

- Standard Java interface for running SQL
  - Independent of any single Database vendor
  - Works with DB2 UDB, Cloudscape, Informix, Microsoft SQL Server, Oracle, Sybase, …
  - Lots of JDBC articles, books, web sites, ...

- Development time:
  - You write the code using JDBC and standard SQL

- Deployment time:
  - You specify which Database to use
  - This is configured in the "Web Deployment Descriptor" for you Web project (web.xml)
    - More on this latter!

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JDBC Java Interfaces

- Use JDBC to:
  - Directly read, write and update DB2 UDB for iSeries using SQL
  - Call stored procedures written using RPG, COBOL or Java

- JDBC Terms
  - Connection (`java.sql.Connection`)
    - Live connection (session) with a specific database
    - Statements are associated with a Connection
  - Statement (`java.sql.Statement`)
    - Java interface used for executing SQL
  - PreparedStatement (`java.sql.PreparedStatement`)
    - Same as Statement, except it is precompiled for performance
    - Use PreparedStatement if you are running the same statement multiple times
  - CallableStatement (`java.sql.CallableStatement`)
    - Java interface used for calling stored procedures

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JDBC Connection Pooling

- **Problem:**
  - In a typical web application there maybe 1000s of requests coming in every minute
  - There is a lot of overhead to create and close a connection to the database for every request
  - But you need a connection to run SQL queries

- **Solution:**
  - Use Connection pooling
  - Web App container creates JDBC connections in a pool
  - Instead of creating a Connection in your code you:
    - Ask the pool for a connection
    - Use the connection to run SQL statements
    - Return the connection to the pool so it can be reused

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J2EE Connector Architecture (JCA)

- J2EE Connector Architecture provides a standard architecture for accessing various Enterprise Information Systems (EIS) from your Java application
  - RPG and COBOL programs or service programs
  - CICS
  - Enterprise Resource Planning (ERP) systems

- Resource Adapters
  - Provided by each vendor for their EIS system
  - Plugs into the application server and handles things like:
    - Communications
    - Transactions
    - Security
  - Development Studio Client provides resource adapter for calling RPG and COBOL programs
    - D:\WDSC\iseries\eclipse\plugins\com.ibm.etools.iseries.webtools_5.0.1\lib\iseriespgmcall.rar

JNDI – How To Find Things

- Problem:
  - Many of the components to a web application are distributed across multiple servers
  - Components need to be dynamically changed or updated without having to modify the code and recompile
    - Changing a JDBC Database connection from the development database to the production database

- This is the domain of enterprise naming and directory servers
- Many different naming and directory server packages available
  - Need a standard way to interface with them so the code is not directly tied to a specific vendor's implementation

JNDI – How To Find Things

- Solution
  - Java Naming and Directory Interface (JNDI)
  - Allows developer to write programs that can lookup resources dynamically at runtime
    - Can easily change which database is used for JDBC without recompiling
  - Standard extension to the Java platform for connecting to and interfacing with naming and directory servers

- Use JNDI to locate other J2EE resources:
  - Database connections (JDBC)
  - RPG or COBOL program call resource adapters (JCA)
  - Message queue (JMS)

- JNDI is just an interface for locating services / components

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Programming With JNDI – Two steps

- Writing you application using JNDI to locate components
  - Or have one of the wizards generate the code
    - iSeries Program Call wizard
    - Database pages wizard

- Configuring the naming and directory server with the components you need at runtime
  - For example: Define the Database connection and pooling information
  - In a Web application with is done by configuring the properties for the Web application server
    - More on this later…

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Code Example: Using JNDI to Lookup JDBC Connection

```
// import JDBC Interfaces
import java.sql.Connection;
import java.sql.ResultSet;
import java.sql.Statement;

// import JNDI classes and interfaces
import javax.naming.Context;
import javax.naming.InitialContext;

...

// Retrieve JNDI context
Context initialContext = new InitialContext();
// Lookup JDBC DataSource using JNDI
DataSource datasource = (DataSource)
  initialContext.lookup("jdbc/customer");

// Use JDBC Data Source to run SQL query
Connection connection = datasource.getConnection();
Statement statement = connection.createStatement();
ResultSet results = statement.executeQuery("SELECT * FROM
  CUSTOMER");

// Do something with the result set
```
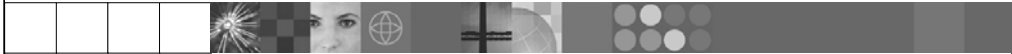
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J2EE – The Tools

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New Web Project Wizard

Create a Web Project

Define the Web Project
Create a Web Project.

Use J2EE Web Project for Web applications with **dynamic content** (servlets and JSPs)

Project name: Demo Web Project

☑ Use default

New project location: C:\Documents and Settings\yantzi\My Documents\IBM\wds Browse...

⦿ J2EE Web Project ○ Static Web Project

Use "Static Web Project" for Web sites with **no dynamic content** (just HTML and graphics)

Description:

In a J2EE Web Project you will be able to create content served by a traditional HTTP server (HTML, JavaScript, images, text..) as well as content to be served by a J2EE Application Server (Servlets, JSPs, EJBs..)

Checkboxes to automatically add Struts support and Tag libraries to your new Web Project

Web Project features:

☑ Add Struts support
☐ Create a default .cvsignore file
☑ Create a default CSS file
☑ Include Tag Libraries for accessing JSP ob
☐ Include Tag Libraries for database access
☐ Include Tag Libraries for internationalizati

Description:

This Tag library is an implementation of the JSP Standard Tag Library. The JSTL provides a set of standard tags for common function. This feature should only be added to a Web Project with a J2EE level of 1.3.

< Back   Next >   Finish   Cancel

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New Web Project Wizard - 2

Each J2EE Web project must be associated with an **Enterprise application project**

Enterprise application projects are associated with test environment server configurations (for testing your Web Application)

Use J2EE 1.3 with WebSphere Application Server 5.0

Use J2EE 1.2 with WebSphere Application Server 4.0

Create a Web Project

J2EE Settings Page
Set the Enterprise Application project settings, context root, and J2EE level.

Enterprise application project: ⊙ New ○ Existing

New project name: DefaultEAR

☑ Use default

New project location: C:\Documents and Settings\yantzi\My Documents\IBM\wds   Browse...

Context root: demo

J2EE Level: 1.3 ▼

Description:
J2EE Level 1.3 includes a Servlet Specification level of 2.3 and a JSP Specification level of 1.2. Applications developed for this J2EE level typically target a WAS version 5.0 server.

< Back   Next >   Finish   Cancel

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J2EE Navigator View

- The Web project that gets created complies (and enforces) the J2EE standard Web application structure

- J2EE Navigator view
  - Shows all J2EE related projects
    - Web Projects
    - EJB Projects
    - Connector Projects
    - Server Projects
  - Provides an easy way to manage your J2EE projects
    - Edit files
    - Copy, move rename and delete files
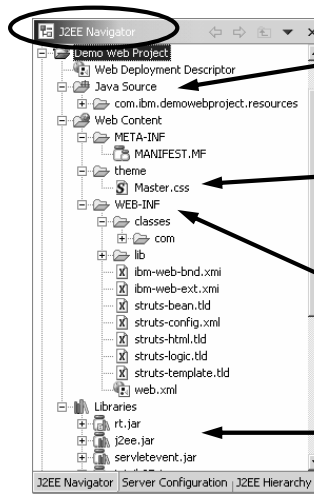
Java source code for Servlets and Java beans

Cascading style sheets

HTML and JSP files

These libraries are from the build path and are not part of the project

J2EE Hierarchy View

- Shows all of your J2EE resources in the workspace
  - Enterprise application projects
  - Web Projects (modules)
  - Enterprise JavaBean projects (modules)
  - Databases
  - Connectors
  - Test environment servers and configurations
- Displays resources in their hierarchy and how they are related
- Does not show projects

```
J2EE Hierarchy                                           ×
  Enterprise Applications
    DefaultEAR
      Modules
        Program_Call_Project.war
        WebFacing_Project.war
        test.war
        Demo_Web_Project.war
      Project Utility JARs
      Utility JARs
    StrutsTradeSample: TradeSample
  Application Client Modules
  Connector Modules
    Connector Project: Connector iSeries Program Call Resou
  Web Modules
    Demo Web Project
    Program Call Project
    test
    Trade: Trade Web Application
    TradeTutorial: Trade Tutorial Web Application
    WebFacing Project
  EJB Modules
  Databases
    WHOLESALE Database: TORASCGM (DB2 Universal Datab
  Servers
    WAS5 on TORAS3RM
    WebSphere v5.0 Test Environment
  Server Configurations
    WAS5 on TORAS3RM
    WebSphere v5.0 Server Configuration
      DefaultEAR

J2EE Navigator | Server Configuration | J2EE Hierarchy
```

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Cascading Style Sheets

- Cascading Style Sheets (CSS) provide a central place to define the appearance of all HTML and JSP pages in your Web app

  Properties are specified for the various HTML tags like BODY, H1, H2, TABLE

  Fonts, colors, spacing, margins, positioning, alignment, …

- Stored in a separate .css file

  Associated with HTML or JSP file using the HTML link tag

  ```
  <LINK href="theme/Master.css" rel="stylesheet" type="text/css">
  ```

- CSS

  Specialized graphical editor for working with CSSs

  New HTML and JSP file wizards ask if you want to associate new file with an existing CSS

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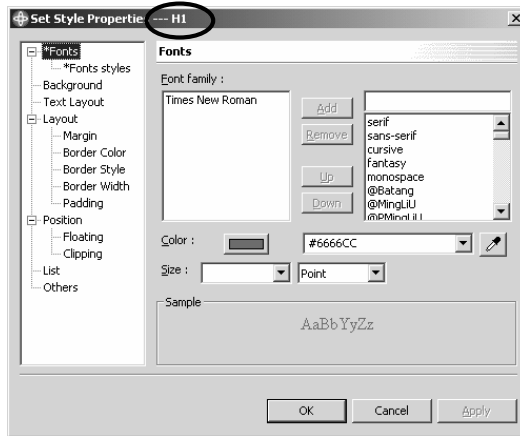# Cascading Style Sheet Editor

You can directly edit the CSS, or use the "Styles" view at the bottom

Preview area

To use the "Styles" view select the HTML tag, right click and select Edit…

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Cascading Style Sheet Editor

Properties for the H1 (heading 1) HTML tag.

Changing a property here changes the look of all H1 tags in your Web application.

Dialog for graphically editing the properties for an HTML tag.
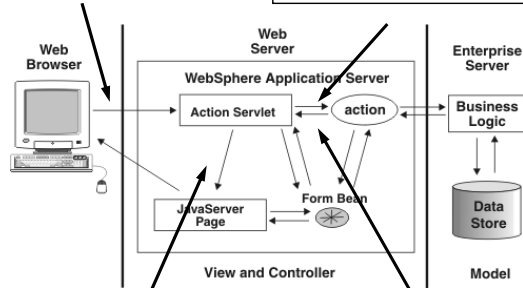
No need to know or learn the CSS syntax!

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Struts

- **What is Struts?**
  - Open source framework for developing web applications
  - Sponsored by the Apache Software Foundation
  - Supports developing Web based applications that follow the
  - Model-View-Controller design

- **How does it work?**
  - Struts provides the Controller
    - You provide the Model and the View
  - Struts also provides:
    - Custom tag libraries for:
      - Internationalization

- **Struts is supported by the WebSphere Studio development tools and the WebSphere Application Server runtime**

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Struts Overview

2. Struts ActionServlet looks up the corresponding action class for the request, populates the a form bean with incoming data and passes the request to the action class

1. Incoming request from Browser

Web Browser

Web Server

WebSphere Application Server

Action Servlet

action

Enterprise Server

Business Logic

Form Bean

JavaServer Page

Data Store

View and Controller

Model

4. ActionServlet forwards the request to the corresponding JSP which sends result to Browser as an HTML page

3. Action class processes the request (using OS/400 *PGMs and *SRVPGMs) places results in form bean and returns to ActionServlet

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How Does It Work - Controller

- Struts ActionServlet is the Controller
  - Uses configuration file (struts-config.xml) to determine:
    - ActionFormBeans
      - Uses the <form-bean> tag
    - Global Forwards
      - Uses the <forward> tag
    - ActionMappings
      - Uses the <action> tag

- What do you do?
  - Create an ActionForm to send data between view and model
  - Write an Action class for each request
  - Configure ActionMapping for each request

How Does It Work – Controller - ActionForm

- Stores and validates data from incoming HTML pages
- Transfers data between the view and the model
  - Can be stored in either the session or the request
- Upon receiving a request, the controller populates the associated ActionForm with data from the request and forwards the form bean to the Action class
- ActionForm can optionally perform validation on input
  - Override the method:
```
validate(ActionMapping mapping, HttpServletRequest
    request)
```
  - Struts handles redisplaying input page with error messages

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How Does It Work - Model

- Action class
  - Handle error checking and invokes business logic (model)
  - This is the part you have to code!
  - Implement the method:

    ```
    public ActionForward execute(ActionMapping mapping,
                                 ActionForm form,
                                 HttpServletRequest request,
                                 HttpServletResponse response
    ```

  - Return ActionForward instance to specify where control goes next
    - Typically a JSP to return results of Action to browser
    - Maps to an **Global Forward** (defined in struts-config.xml)

- ActionMapping
  - This is how the ActionServlet determines which incoming URL requests get mapped to which Action classes
  - ActionMappings are stored in the struts-config.xml file, requires the following info:
    - Incoming URI
    - Name of Action class
    - Name of the form bean used by this Action

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How Does It Work – View

- Struts includes tag libraries to help you
  - Create internationalized applications
    - Load in translated messages
    - Format dates and numbers for different locales
  - Automatically validate user input
    - Automatically redisplay input page with error messages from validation
 - Pre-fill HTML entry fields with data from your application

Struts Tools in Development Studio Client

- Enable Web projects for Struts, this automatically:
  - Creates struts-config.xml
  - Adds Struts tag libraries to the project

- Wizards to create
  - Form beans
  - Action classes

- Special Struts Configuration File Editor
  - You don't have to know XML or the XML syntax used in the stuts-config.xml

Struts Configuration File Editor

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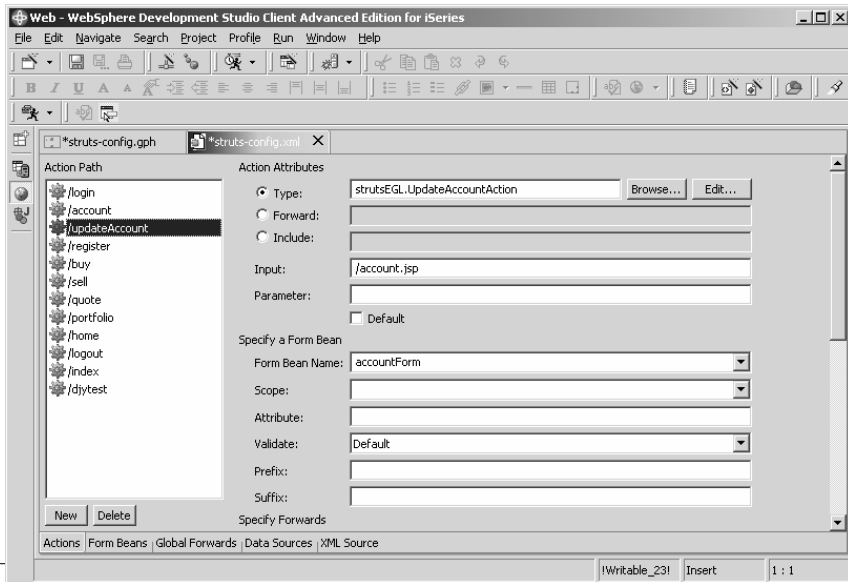
Struts Tools – Web Diagram Editor

- Shows a graph view of your Struts based Web application
- Can be used as a central point for working with the Web app
- Useful for:

    Adding new actions / form beans / JSPs

    Editing existing actions / form beans / JSPs

    Documenting overall architecture of the Web application

- As parts are added, deleted or updated in the Web diagram editor the struts-config.xml file is updated with changes

Double click on nodes to open associated editor.

Action Mapping Node

Web page

Server Tools
Configuring the Test Environment

WebSphere software

Servers and Server Configurations

- The test environment uses servers and server configurations to run and debug your web projects
  - The first time you test a Web project a server and server configuration is created for you
  - You can create your own, customize them and associate web projects with different servers
- Server Configuration
  - Setup and configuration information for a Server
- Server
  - Instance of a server configuration where you can test your Web applications
- Types of Servers and Server Configurations
  - WebSphere Application Server V5.0 and V4.0
  - Apache Tomcat V4.1, V4.0 and V3.2

Creating a New Test Environment Configuration

Create a New Server and Server Configuration

Create a new server and server configuration
Choose the properties for the new server.

Choose the properties for the new server.

Server name:	Test Server 2
Folder:	Servers
Server type:	WebSphere version 5.0
	Remote Server
	Remote Server Attach
	Test Environment
	WebSphere version 4.0
	Apache Tomcat version 4.1
	Apache Tomcat version 4.0
	Apache Tomcat version 3.2
	J2EE Publishing Server
Template:	None
Description:	Runs J2EE projects out of the workspace on the local test environment.

Server configuration type:	WebSphere v5.0 Server Configuration
Template:	None
Description:	A server configuration for WebSphere version 5.0.

[< Back] [Next >] [Finish] [Cancel]

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Create a New Server and Server Configuration

WebSphere Server Configuration Settings
Input settings for the new WebSphere server configuration.

⦿ Use default port numbers
  HTTP port number: 9080

◯ Use consecutive port numbers
  First port number:

> **You will need to change the port number if you plan on running multiple servers at the same time.**

< Back   Next >   Finish   Cancel

Editing a Server Configuration

Double click on the server configuration to open it in the editor

Various aspects of the server configuration that can be modified

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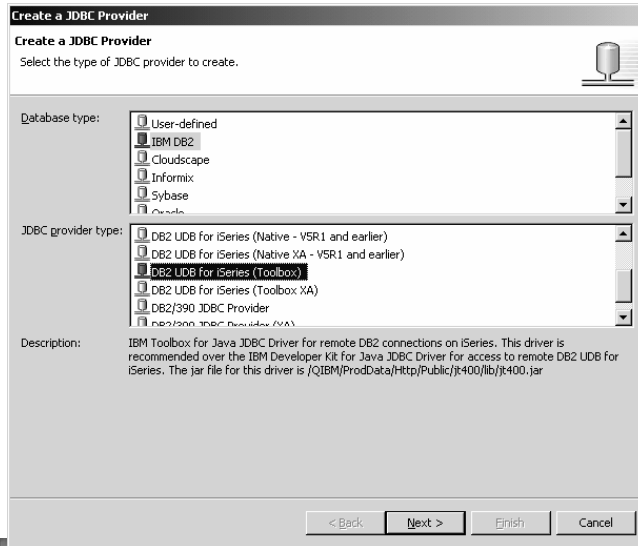# JDBC: Defining Connection Pools in the Test Environment

- Earlier we looked at JDBC, what it is and why you would use it

- Now we will look at how to configure JDBC connection pools in the WebSphere test environment
  - First you need to add the required JDBC driver to the **providers list**
  - Then you can define a connection pool for the JDBC driver

JDBC: Adding a Driver to the Provider List

JDBC: Adding a Driver to the Provider List - 2

Create a JDBC Provider

Create a JDBC Provider

Select the type of JDBC provider to create.

Database type:
- User-defined
- IBM DB2
- Cloudscape
- Informix
- Sybase
- Oracle

JDBC provider type:
- DB2 UDB for iSeries (Native - V5R1 and earlier)
- DB2 UDB for iSeries (Native XA - V5R1 and earlier)
- DB2 UDB for iSeries (Toolbox)
- DB2 UDB for iSeries (Toolbox XA)
- DB2/390 JDBC Provider
- DB2/390 JDBC Provider (XA)

Description: IBM Toolbox for Java JDBC Driver for remote DB2 connections on iSeries. This driver is recommended over the IBM Developer Kit for Java JDBC Driver for access to remote DB2 UDB for iSeries. The jar file for this driver is /QIBM/ProdData/Http/Public/jt400/lib/jt400.jar

< Back   Next >   Finish   Cancel

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JDBC: Adding a Driver to the Provider List - 3

Create a JDBC Provider

Create a JDBC Provider
Enter the properties of the JDBC provider.

Name:	iSeries Toolbox Driver
Description:	DB2 UDB for iSeries (Toolbox)
Implementation class name:	com.ibm.as400.access.AS400JDBCConnectionPoolDataSource
Class path:	D:\WDSC\iseries\eclipse\plugins\com.ibm.etools.iseries.toolbox_5.0.1\runtime\jt400.jar

Add Path...

Remove

Native path:

Add External JARs...

Add Path...

Remove

< Back   Next >   Finish   Cancel

JDBC: Configuring a Connection Pool - 4

Now we have the iSeries Toolbox JDBC driver registered.

Next you can define connection pools that use this driver.

Modify Data Source

Modify Data Source
Edit the settings of the data source.

Data Source settings
for Payroll Database

Name:	Payroll DataSource
JNDI name:	jdbc/payroll
Description:	DataStore for accessing Payroll application database tables
Category:	
Statement cache size:	10
Data source helper class name:	com.ibm.websphere.rsadapter.DB2AS400DataStoreHelper
Connection timeout:	1800
Maximum connections:	10
Minimum connections:	1
Reap time:	180
Unused timeout:	1800
Aged timeout:	0
Purge policy:	EntirePool
Component-managed authentication alias:	
Container-managed authentication alias:	

☐ Use this data source in container managed persistence (CMP)

Use this JNDI name in your Code to lookup JDBC connections From this Data Source

Settings to control the number of Connections in this pool

< Back   Next >   Finish   Cancel

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Create a Data Source

Modify Resource Properties

Edit the resource properties for this data source.

Resource Properties:

Name	Description
serverName	This property is required. The name of the server from which the data
access	This value can be used to restrict the type of operations that can be d
blockSize	This is the number of rows that will be fetched at a time for a result se
blockCriteria	Returns the criteria for retrieving data from the iSeries or AS/400 serv
cursorHold	Specifies whether or not ResultSets should remain open when a trans

Name: serverName

Type: java.lang.String

Required: Yes

Value: TORAS1FB

Description: This property is required. The name of the server from which the datasource will obtain connectior

Additional properties specific to the JDBC driver, for example you need to specify a server name for the iSeries Toolbox JDBC driver.

< Back   Next >   Finish   Cancel

Done.

Now you can change which Database is used without having to modify the code.

J2EE Connector Architecture

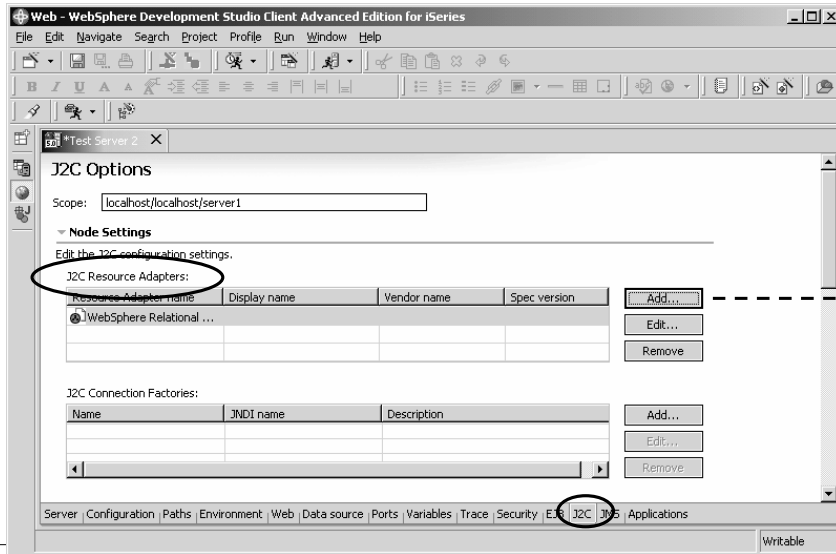- Earlier we looked at the J2EE Connector Architecture, what it is and why you would use it

- Now we will look at how to configure JCA in the WebSphere test environment
  - First you need to import the required **Resource Adapter** into the Workbench
    - Resource adapters get imported into a special type of project called a Connector Project
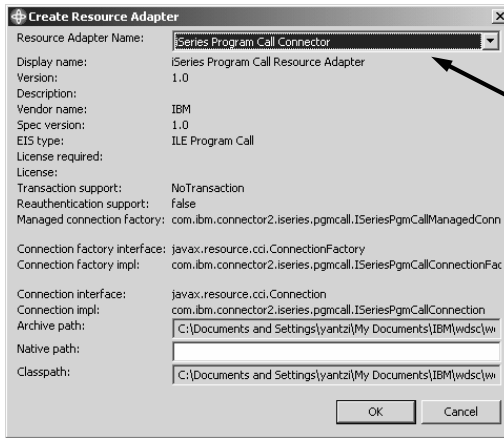 - Then you can define a Connection in the Server Configuration

JCA: Importing Resource Adapters

Import

Select

Import an external Connector RAR file into a Connector project

Select an import source:

- EJB JAR file
- Existing Project into Workspace
- External Plug-ins and Fragments
- File system
- FTP
- HTTP
- HTTP Recording
- Logging Utilities XML Log File
- Profiling file
- RAR file
- Remote file system
- Security Certificate
- Server Configuration
- Symptom Database File
- Team Project Set
- WAR file
- WebFacing Projects
- Web Service
- WebSphere Application Server Log File
- Zip file

< Back | Next > | Finish | Cancel

Import

Connector Import

Import a Connector project from the file system.

Connector file: D:\WDSC\iseries\eclipse\plugins\com.ibm.etools.iseries.we ▼ | Browse...

Where do you want the imported resources to go?

☑ Standalone connector project

Connector project: ⦿ New ○ Existing

New project name: iSeries Program Call Connector

☑ Use default

New project location: C:\Documents and Settings\yantzi\My Documents\IB | Browse...

Enterprise application project: ○ New ○ Existing

New project name:

☐ Use default

New project location: | Browse...

Options:

☐ Overwrite existing resources without warning

< Back | Next > | Finish | Cancel

Adding Resource Adapters to the Test Environment

JCA: Configuring Resource Adapters in Servers

Create Resource Adapter

Resource Adapter Name:	iSeries Program Call Connector
Display name:	iSeries Program Call Resource Adapter
Version:	1.0
Description:	
Vendor name:	IBM
Spec version:	1.0
EIS type:	ILE Program Call
License required:	
License:	
Transaction support:	NoTransaction
Reauthentication support:	false
Managed connection factory:	com.ibm.connector2.iseries.pgmcall.ISeriesPgmCallManagedConn
Connection factory interface:	javax.resource.cci.ConnectionFactory
Connection factory impl:	com.ibm.connector2.iseries.pgmcall.ISeriesPgmCallConnectionFac
Connection interface:	javax.resource.cci.Connection
Connection impl:	com.ibm.connector2.iseries.pgmcall.ISeriesPgmCallConnection
Archive path:	C:\Documents and Settings\yantzi\My Documents\IBM\wdsc\w
Native path:	
Classpath:	C:\Documents and Settings\yantzi\My Documents\IBM\wdsc\w

OK   Cancel

Project where you imported the resource adapter

JCA: Creating A Connection Factory

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JCA: Creating A Connection Factory

Create Connection Factory	
Name:	iSeries Program Call Factory
JNDI name:	eis/pgmA
Description:	Program A for Payroll Application
Min connections:	0
Max connections:	0
Connection timeout:	0
Reap time:	0
Unused timeout:	0
Aged timeout:	0
Purge Policy:	EntirePool
Container-managed authentication alias:	
Component-managed authentication alias:	
Mapping configuration alias:	DefaultPrincipalMapping

OK   Cancel

JCA: Creating A Connection Factory

Web – WebSphere Development Studio Client Advanced Edition for iSeries

File Edit Navigate Search Project Profile Run Window Help

*Test Server 2

Node Settings

Edit the J2C configuration settings.

J2C Resource Adapters:

Resource Adapter name	Display name	Vendor name	Spec version
WebSphere Relational ...			
iSeries Program Call Co...	iSeries Program Call Reso...	IBM	1.0

J2C Connection Factories:

Name	JNDI name	Description
iSeries Program Call Fac...	eis/pgmA	Program A for Payroll Application

Resource Properties:

Name	Type	Value
ServerName	java.lang.String	TORAS1FB
UserName	java.lang.String	WEBUSER
Password	java.lang.String	AD685992

Server | Configuration | Paths | Environment | Web | Data source | Ports | Variables | Trace | Security | EJB | J2C | JMS | Applications

Writable

Done.

Now you can change which server, user profile and password are used for the program call without having to modify any code.

Summary

WebSphere software

Summary

- Java 2 Enterprise Edition
  - Standards based model for developing applications in Java
    - Web applications
    - Enterprise applications
    - Client / Server applications
  - Supported by major Web Application Server vendors

- WebSphere Development Studio Client
  - Great Web tools to make developing J2EE applications productive and easy
  - Views of your J2EE resources
  - Customized editors for all the various technologies
    - Cascading style sheets, JSPs, HTML, animations, server configurations, Web deployment descriptor, …

Additional Resources

- J2EE Technologies
  http://java.sun.com/j2ee

- Cascading Style Sheets
  http://www.w3c.org/Style/CSS/

- Struts
  http://jakarta.apache.org/struts/

- WebSphere Workbench Tools
  http://www.software.ibm.com/wsdd/zones/studio/
  http://www.ibm.com/developer

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