

IBM



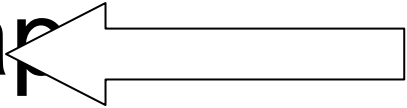
Web Tools for IBM System i5 developers

ibm.com
the power of one

IBM System i5 Technical conference 2006

Claus Weiss weiss@ca.ibm.com

WebTools agenda

- ▶ WDS overview and AD roadmap 
- ▶ Website creation
- ▶ Webpage templates
- ▶ Designer for static WebPages
- ▶ Designer for Web objects
- ▶ Tool for Cascading Style Sheets
- ▶ Tools to create WebApplications
- ▶ Designer for dynamic WebPages
- ▶ Tools to create WebServices

WebSphere Development Studio

RPG	COBOL
C/C++	PDM SEU SDA RLU

Current 5722-WDS customers with software subscription for V5R3, to upgrade to WDSc V6.0 use feature #: 2656
Available after GA

Upgrade from WDS 6.0 to 6.0.1 using Rational Product updater

Unlimited Licenses

New WDSc Lite
Technology preview

iSeries	iSeries	iSeries	iSeries	Web Facing WDHT support	iSeries Projects	+CODE +VisualAge RPG	
Java™	Debug	Struts Web	Web Service		RSE		
JSF	EGL Java generation	Trace	Profiling	DB	XML	App Server	HATS Toolkit

www.ibm.com/software/awdtools/iseries

WebSphere Development Studio Client V6.0.1 based on RWD V6

WebSphere Development Studio Client Advanced Edition 6.0.1

*Workstation License
order through Passport Advantage*

http://www.lotus.com/services/passport.nsf/WebDocs/Passport_Advantage_Home

Upgrade from WDSC 6.0 to 6.0.1 using Rational Product updater

+CODE
+VisualAge RPG

iSeries	iSeries	iSeries *	iSeries	Web Facing * WDHT support	iSeries Projects		
Java	Debug	Struts Web	Web Service		RSE		
JSF	EGL Java generation	Trace	Profiling	DB	XML	App Server	HATS Toolkit
	EGL * COBOL generation	EJB *	Test * Cases	Portal *			
		J2EE *					

New WDS Lite
Technology preview

www.ibm.com/software/awdtools/iseries

WebSphere Development Studio Client V6.0.1 based on RAD V6

iSeries Developer Roadmap - Architecture

Traditional ——— *Improve your Productivity* ——— *Enhance the End User Experience* ——— *Create Modular Architecture* ——— *Integrate Applications* ——— *Integrate Business Processes*

5250 5250 5250 GUI 5250 GUI 5250 GUI 5250 GUI

User Interface

RPG/COBOL RPG/COBOL RPG/COBOL ILE/Java ILE and Java Java/EJB HTML/JSP HTML/JSP HTML/JSP

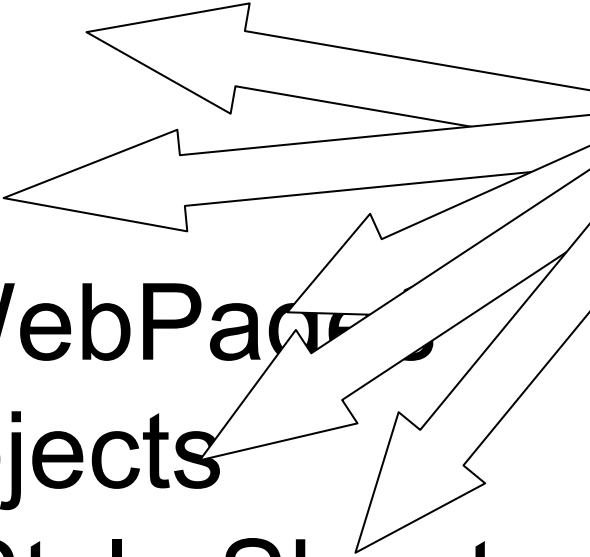
Remote System Explorer

Application Technology

HTML/JSP	HTML/JSP	HTML/JSP	HTML/JSP	HTML/JSP	HTML/JSP
Servlets	Servlets	Servlets	Servlets	Servlets	Servlets
Portlets	Portlets	Portlets	Portlets	Portlets	Portlets
XML	XML	XML	XML	XML	XML
IBM WebFacing Tool		Connectors	Connectors	Process Choreography	Process Choreography
IBM WebSphere Host Access Transformation Server		Web Services	Web Services	Web Services	Web Services
	DB2 and SQL	DB2 and SQL	DB2 and SQL	DB2 and SQL	DB2 and SQL

WebSphere Development Studio Client for iSeries

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- 

WebSite designer

Design page relations

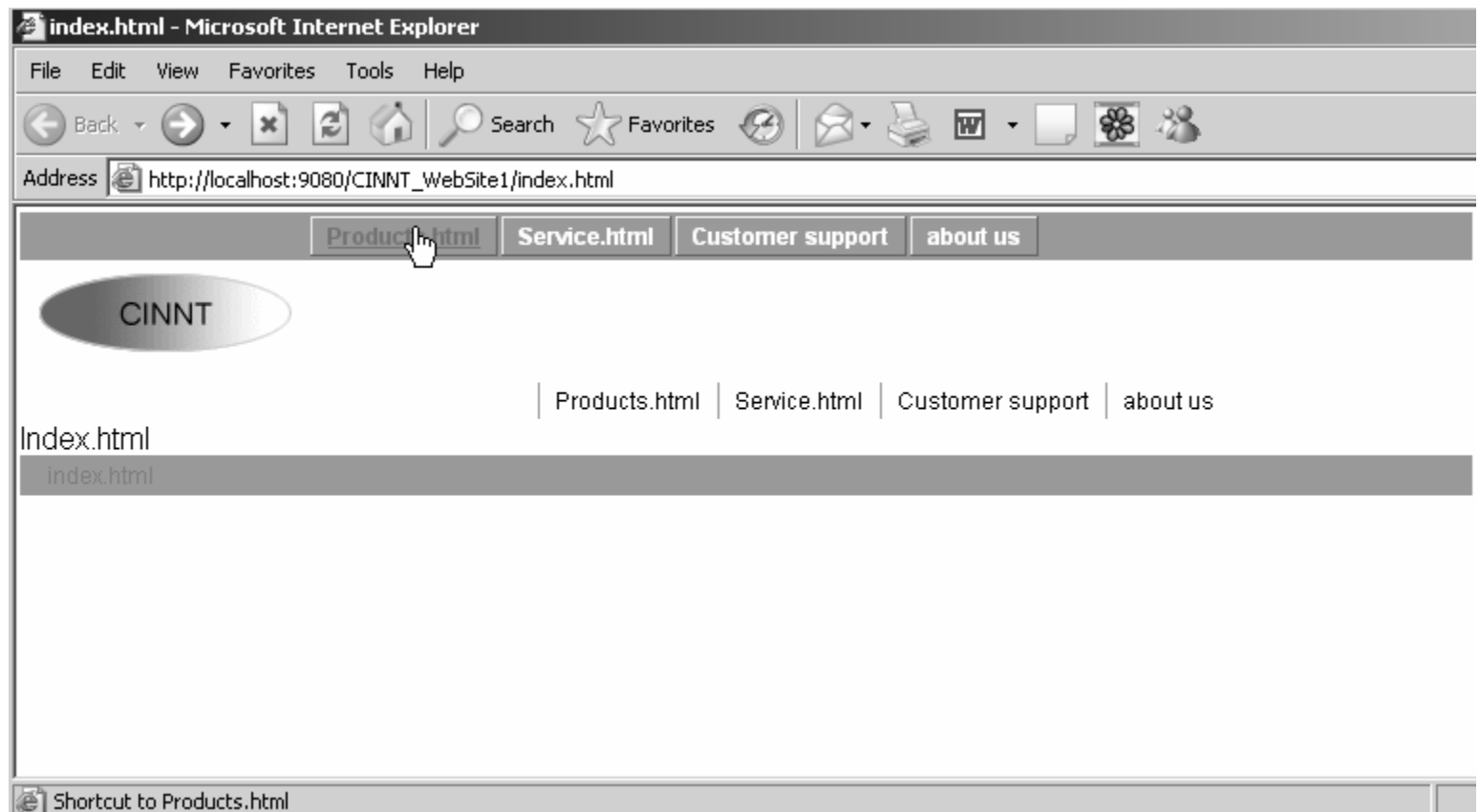
Bind to real Webpages later

The screenshot displays the IBM Rational Software Development Platform interface for a web site designer. On the left, the Project Explorer shows a file tree for 'Navigation - CINNT_WebSite1', including files like `nav_top3.html`, `index.html`, and `Products.html`. The main workspace shows a hierarchical diagram of pages. A context menu is open over the `index.html` node, with options such as 'Add New Page', 'Add Existing Pages...', and 'Add External Page'. A box labeled 'Pages already exist' has arrows pointing to existing files in the diagram, while a box labeled 'Page doesn't exist' points to a dashed box representing a missing page.

WebPage templates

Template used with Navigation bar

Navigation bar automatically updated from WebSite designer



Create a new page template

New Page Template File
Specify a name and location for the new Page Template file

Folder: /CINNT_WebSite
File Name: C_Template
Markup Language: HTML
Options: Use XML Styl... Create from...

Model: Template contain...
Generate a new...

New Page Template File
Page Template File Selection
Select a page template to use when creating this file.

Page template type
 Sample page template User-defined page template

Page Template File
Location: Browse...
File name: JSP-A-03_gray.jtpl

Thumbnail:

JSP-C-02_blue.jtpl JSP-C-02_olive.jtpl JSP-C-02_umber.jtpl

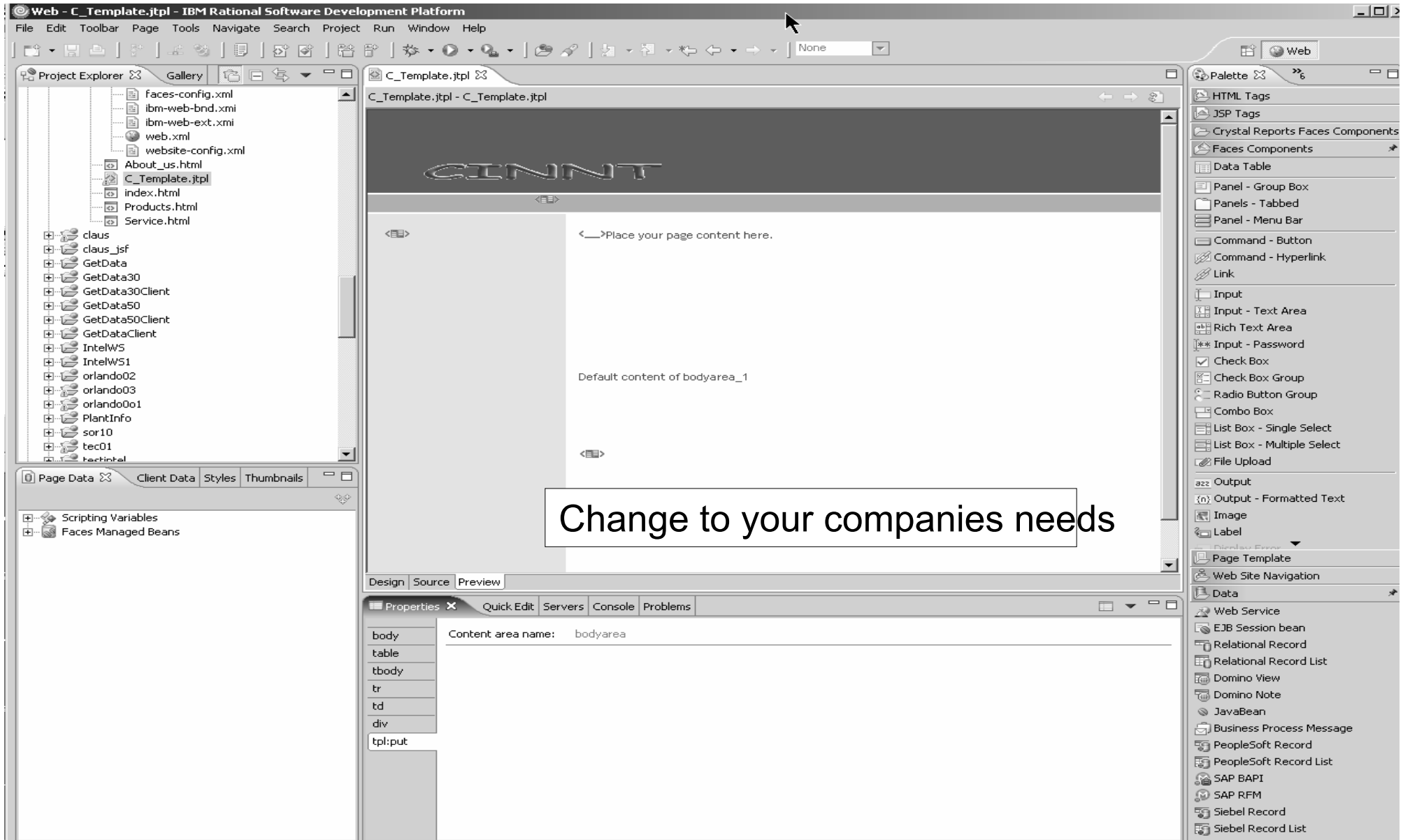
Configure advanced options

< Back Next > Finish Cancel

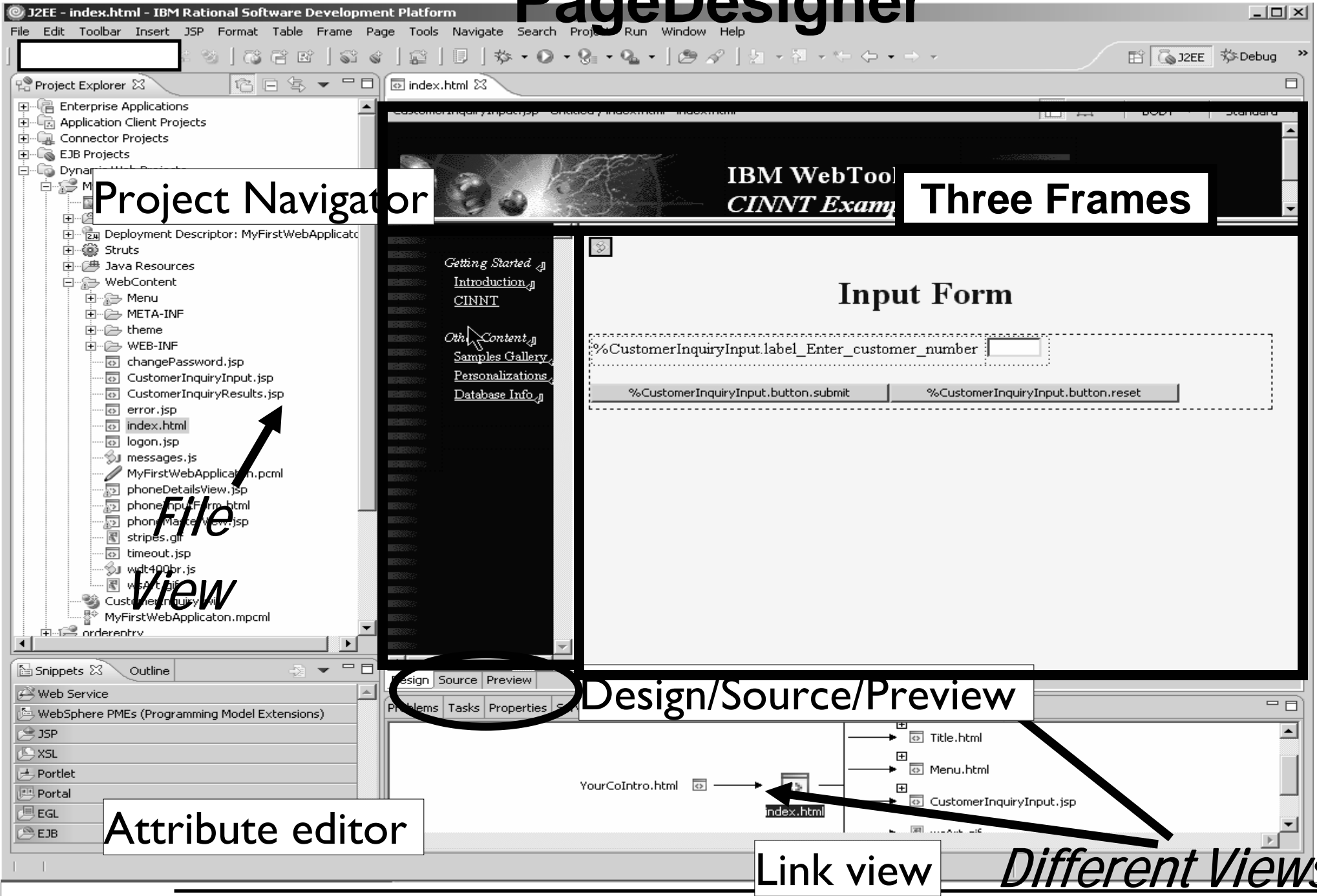
Create new customized template

Based on sample template

Change page template



PageDesigner



Frame tools

Set attributes of selected Frameset

The screenshot displays the 'Frame Attributes' dialog box in the IBM WebSphere Development Studio Client. The dialog is open over a frameset editor. The 'Frame tree' on the left shows a hierarchy: FrameSet -> Title.html -> FrameSet -> Menu.html -> YourCoIntro.html. The 'Menu.html' frame is selected. The 'Size - cols:' table shows a value of 160 pixels and a unit of '*'. The 'Frame Attributes' dialog on the right shows the following settings:

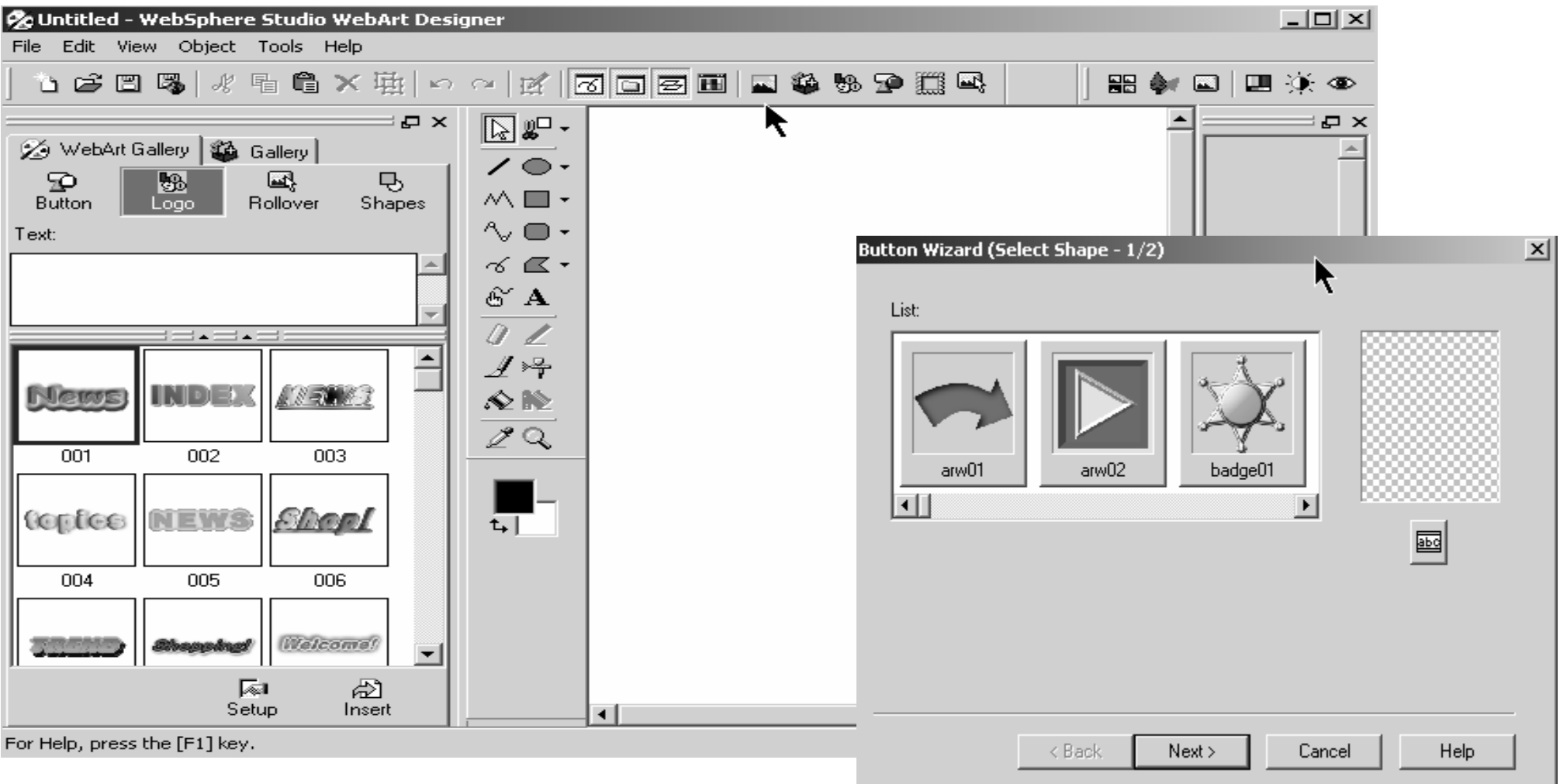
- URL: Menu/Menu.html
- Frame name: menu
- No resize on border
- Scrollbar: (Auto)
- Horizontal margin: 0 pixels
- Vertical margin: 0 pixels

The dialog also includes 'Apply', 'OK', and 'Cancel' buttons. A mouse cursor is visible over the dialog.

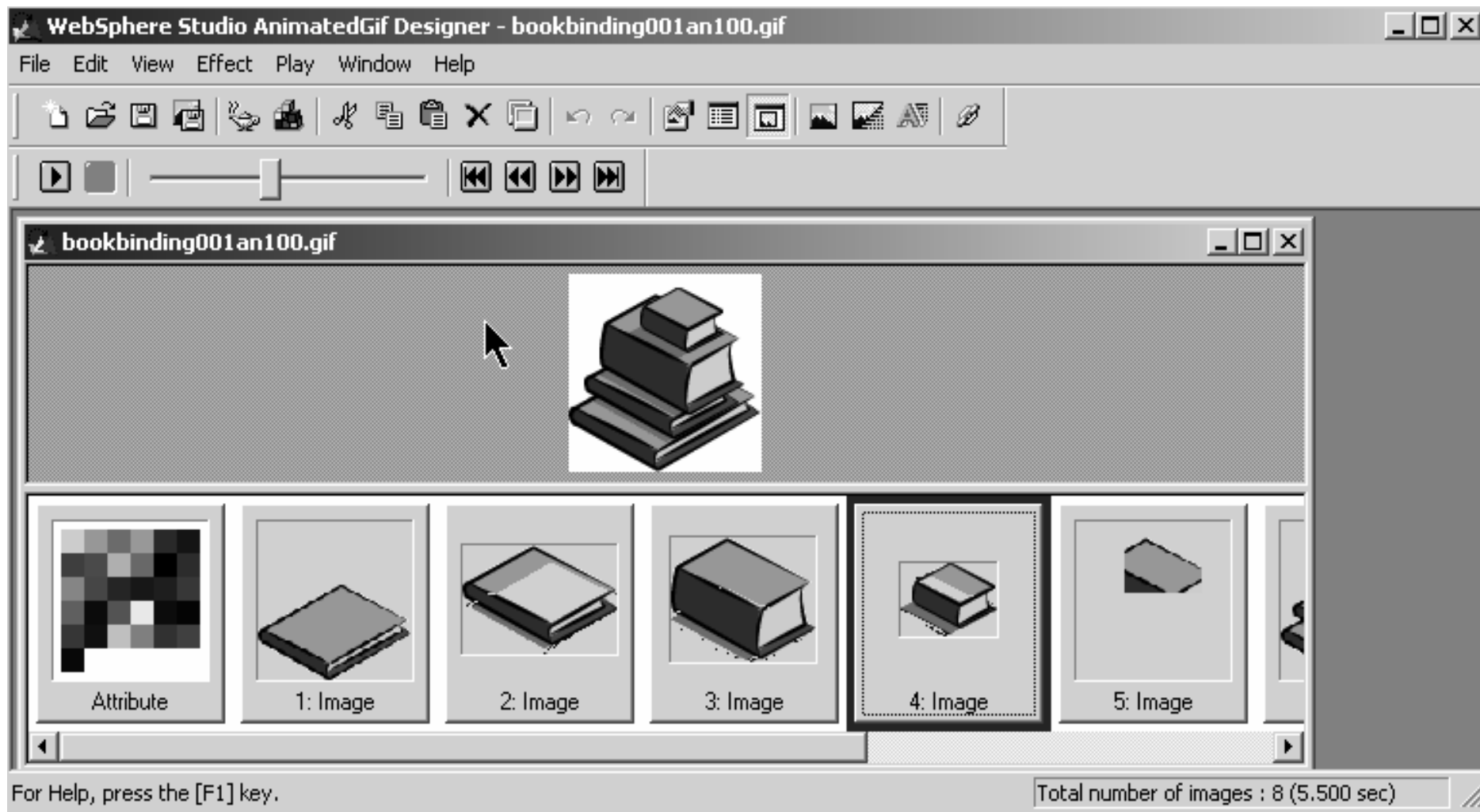
Value	Unit
160	pixels
1	*

WebArt Designer

Wizards for Logo/Button/PhotoFrame/Rollover



Animation GIF designer



Running the application

The screenshot shows a Microsoft Internet Explorer browser window displaying a web application. The address bar shows the URL: `http://localhost:9080/MyFirstWebApplication/index.html`. The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. The toolbar contains Back, Forward, Stop, Refresh, Home, Search, Favorites, Media, History, Print, Stop, and Go. The main content area features a header with the text "IBM WebTooling CINNT Example" and a navigation menu on the left. The main content area displays "Customer details" with the following information:

Customer number: 0010100
Customer name: Meridien Electronics Limited
Rep number: 43443
Contact name: Alfredo Bayonne
Customer phone: 206-865-4027
Customer fax: 206-865-4037
Country: U.S.A.
Zip code: 98007
Zip code location:

At the bottom of the form are two buttons: "Submit" and "Reset". The status bar at the bottom of the browser window shows "Done" and "Local intranet".

Stylesheet editor

The screenshot displays the IBM Rational Software Development Platform's Stylesheet editor. The interface is divided into several panes:

- Project Explorer:** Shows a project named 'orlando02' with a tree view containing folders like 'Web Site Navigation', 'Web Diagram', 'Deployment Descriptor', 'Struts', 'Java Resources', 'WebContent', and 'WEB-INF'. The 'Master.css' file is selected.
- Preview:** A central pane showing a preview of the selected style. A text box at the top reads "Instant feedback how it will look on Webpage". Below it, the preview shows "Style Of H2", "Standard HTML Elements", and various heading levels (Heading 1 through Heading 6) and paragraphs. A black arrow points from the text box to the preview area.
- Code Editor:** On the right, the CSS code for the selected style is visible. It includes rules for BODY, H1, H2, H3, H4, and H5. A black oval highlights the H2 rule in the code editor.
- Context Menu:** A context menu is open over the H2 rule, listing actions such as "Undo Add style rule", "Revert File", "Cut", "Copy", "Paste", "Cleanup Document...", "Format", "Run to Line", "Preferences...", "Add to Snippets...", "Properties", "Save", "Add...", and "Edit...". A black oval highlights the "Add..." option at the bottom of the menu.
- Page Data:** At the bottom left, a table lists the styles defined in the file:

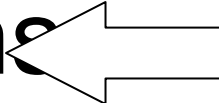
Name	Description	M...
BODY	Page properties	
H1	Heading 1	
H2	Heading 2	
H3	Heading 3	
H4	Heading 4	

Creating your own style classes

The screenshot illustrates the steps to create a new style class in IBM WebSphere:

- Project Explorer:** Shows a project named 'orlando02' with a 'Master.css' file under the 'WEB-INF' directory.
- Set Selector of New Style:** A dialog box where 'Class' is selected as the type, and the class name is set to '.myclass'.
- Add Style:** A dialog box where the 'Font' category is selected, and the font family is set to 'Comic Sans MS'.
- Font:** A dialog box where the font color is set to 'Blue' and the size is '36'.
- Code Editor:** Shows the resulting CSS code for the '.myclass' selector, including properties like 'border-bottom-width: thin;', 'color: blue;', 'border-style: solid;', 'border-right-width: medium;', 'border-left-width: medium;', 'font-size: 36pt;', 'font-family: "Comic Sans MS";', 'border-color: fuchsia;', 'padding: 1cm;', and 'border-top-width: thick;'.

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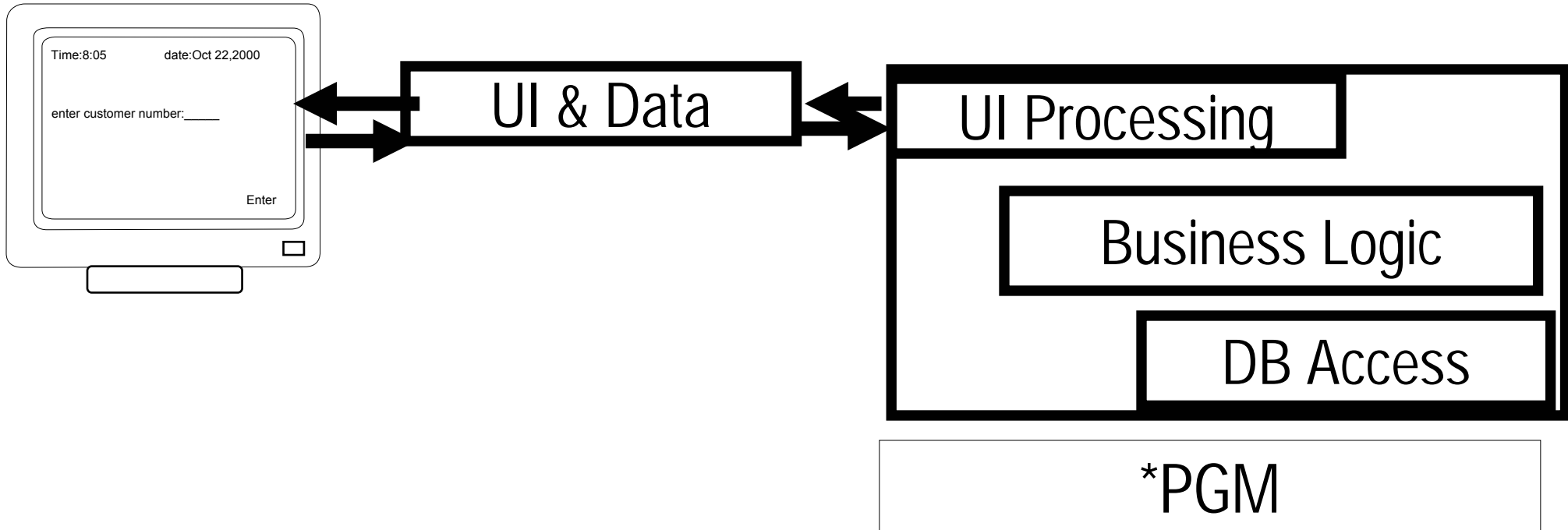
Web applications with dynamic webpages

- **Content of Webpages gets assembled at runtime**
 - 1. Applets (application running in a browser)**
 - 2. generate HTML at runtime on the fly**
 - 3. Use predefined HTML with leaving holes for runtime information**
 - **Substitution variables**
 - **Java Server Page (jsp) standard way in J2EE (Java code on server fills holes)**
 - **Jsp with Struts framework (controller logic strictly separated)**
 - **Java Server Face (jsf) framework that also addresses UI)**



Today's Model

5250 Screens



- Program puts up screen, waits for input
- Program processes input, does business logic



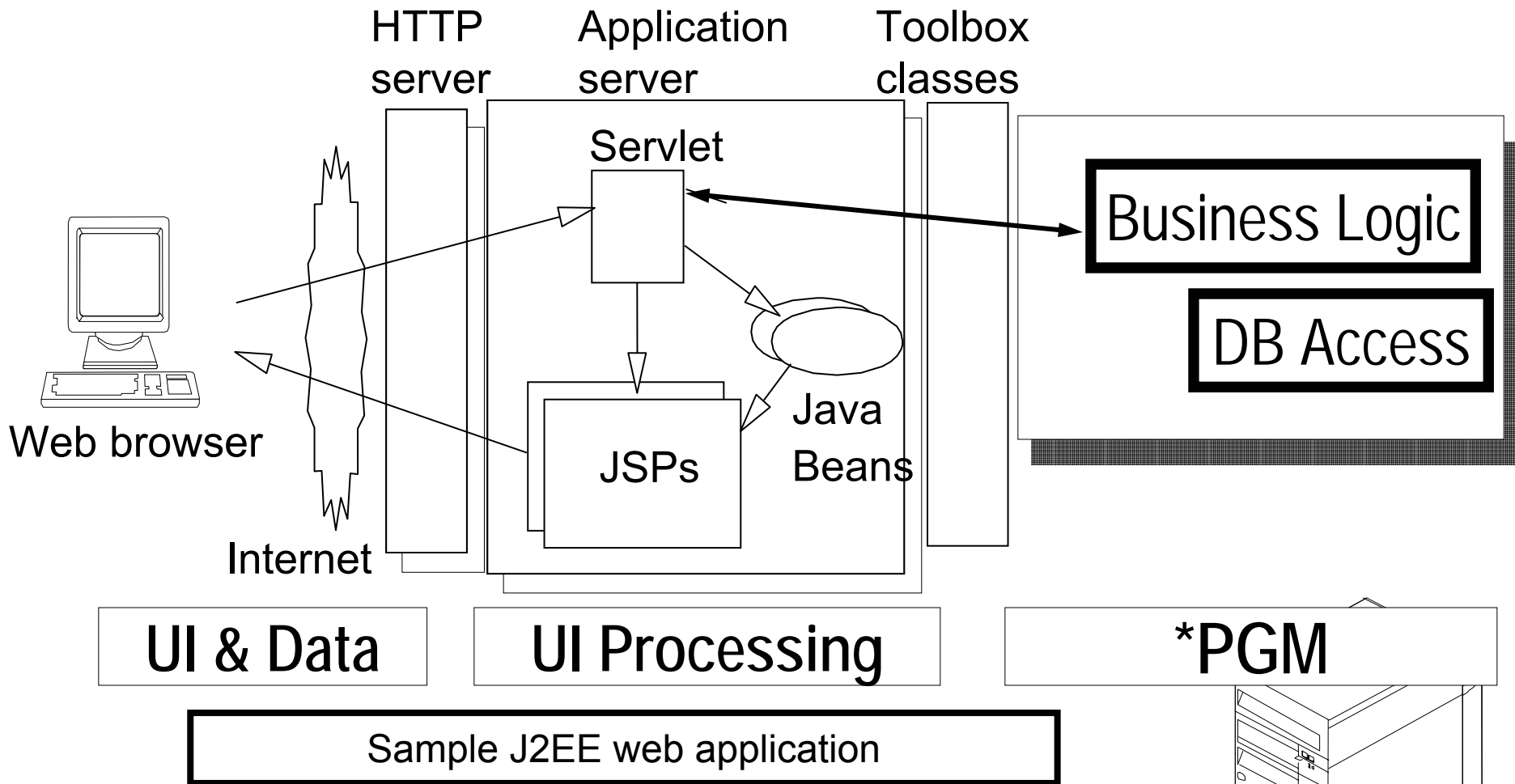
System i
© 2006 IBM Corporation

Modern Web App Architecture

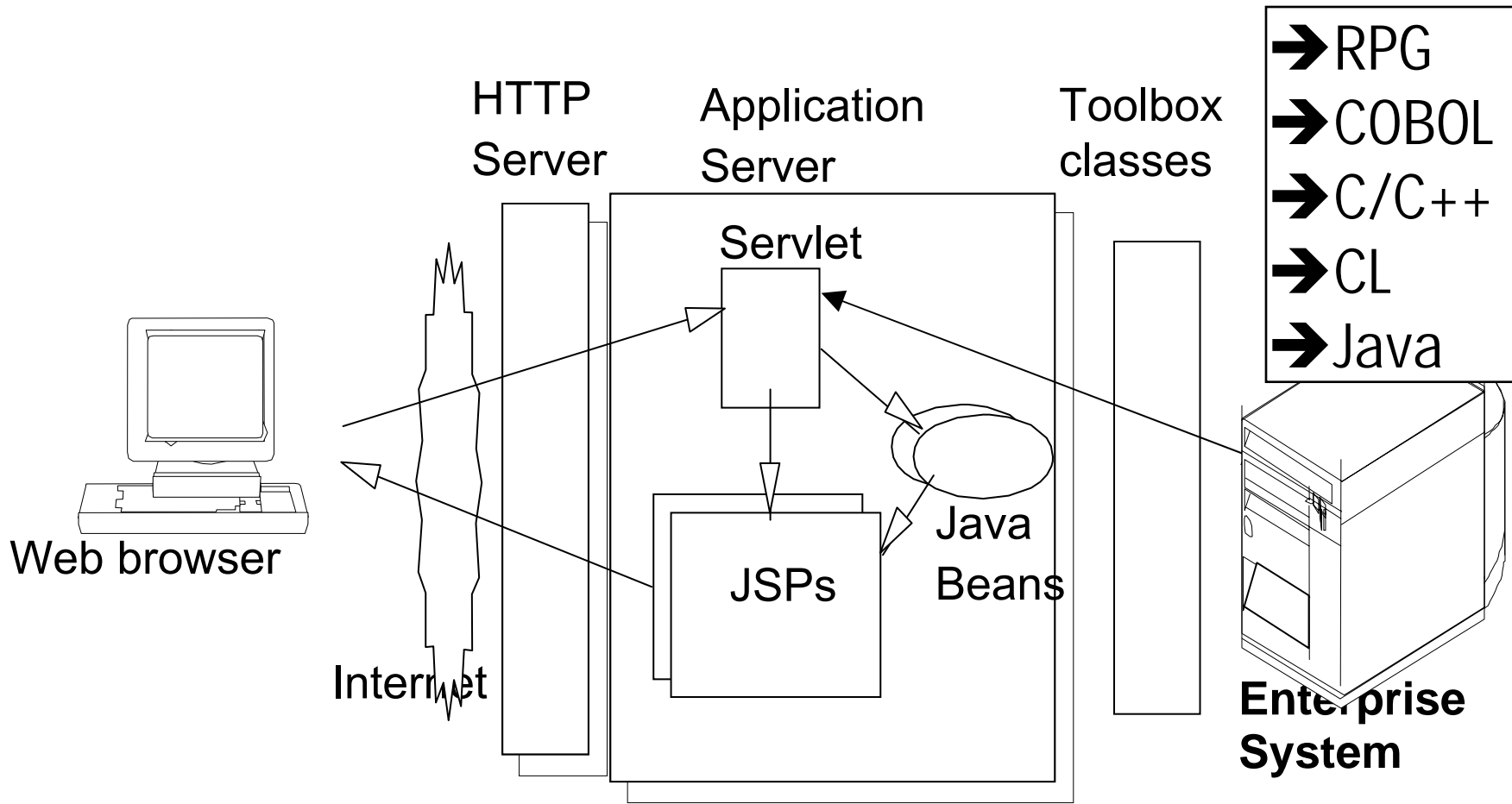
Tier 1

Tier 2

Tier 3



Tooling for modern web applications



- WDS** → iSeries webtooling
- Pagedesigner
 - Jsf tooling
 - Interaction wizard
 - WebServices wizard

- iSeries 3 GL tooling
- Remote system explorer
 - LPEX source editor
 - Integrated Debugger

Calling native programs from Java

- A brief look at: **IBM System i5 Java toolbox**
- **Java toolbox is included in WDS**
- Lets look at: **Using Program Call Markup Language (PCML)**

ILE RPG and COBOL compilers can create PCML for you

→ OS/400 V5R2 and higher:

-New parameters in CRTxxxMOD and CRTBNDxxx

Create Bound RPG Program (CRTBNDRPG)

Language identifier: *JOB RUN
Replace program: > *YES
User profile: *USER
Authority: *LIBCRTAUT
Truncate numeric: *YES
Fix numeric: Add(H)
Target release: *CURRENT
Allow null values: *NO
Define condition names: Add(L)
Enable performance collection: *PEP
Profiling data: *NOCOL
Licensed Internal Code options: Character value
Include directory: Add(X)
Generate program interface: *PCML
Program interface stream file: payroll.pcm|
Preprocessor options: Add(I)
Output source file: Name
Library: *CURLIB Name
Output source member: *PGM Name
Output stream file: Name

Advanced(5) All Parameters(6) Keywords(7)

CRTBNDRPG PGM(RSELABXX/PAYROLL) SRCFILE(RSELABXX/QRPGLESRC) SRCMBR(PAYROLL) OPTION(*EVENTF) DBGVIEW(*SOURCE) REPLACE(*YES) PGMINFO(*PCML) INFOSTMF(payroll.pcm|)

Java Calling RPG

Say we have the following RPG code ...

```

FCUSTOML3  IF  E          K DISK
DCUSTINFO          DS
D Number          1      7A
D Name            8      47A
C      *ENTRY      PLIST
C      PARM          CUSTINFO
C      Number      SETLL  CUSTOM01
C      Number      READE  CUSTOM01      9091
C      EVAL        Name = CUSTNA
C      MOVE        *ON          *INLR
***** ** End of data *****

```

Pass in Customer ID and receive back customer name.

Use PCML to describe program interface

RPG/COBOL compilers create PCML

No need for you to write PCML

```
<pcml version="1.0">

  <!-- Create a Data Structure -->
  <struct name="custinfo">
    <data name="Number" type="char" length="7"
      usage="inputoutput" init="0014400"> </data>
    <data name="Name" type="char" length="40"
      usage="inputoutput" init=" "> </data>
  </struct>

  <!-- Program getcust -->
  <program name="getcust"
    path="/QSYS.lib/FARR.lib/GETCUST.pgm">
    <data name="gotback" type="struct"
      usage="inputoutput" struct="custinfo"> </data>
  </program>

</pcml>R
```

Program Call Markup Language (PCML)

Call RPG from Java Servlet

```
public static void main(String[] argv)
{
    AS400 as400System = new AS400();
    ProgramCallDocument pcml = null;
    String msgId, msgText;
    Object value = null;
    try {
        System.out.println(
            "Creating ProgramCallDocument for GetCust pgm.");
        pcml = new ProgramCallDocument(as400System, "GETCUST");
        boolean ok = pcml.callProgram("getcust");
        System.out.println(" rc is---> " + rc);
        if (!ok)
            { /* Retrieve list of AS/400 messages & display them */ }
        else
            {
                value = pcml.getValue("getcust.gotback.Name");
                System.out.println("Customer name: " + value);
            }
    } catch (PcmlException exc) {
        System.out.println("*** Call to getcust failed. ***");
        System.exit(0);
    }
    System.exit(0);
} // end main method
```

Using PCML to invoke native system I programs

1. First lets look at WebProjects
2. Interaction wizard
3. Jsf tooling
4. Web Services tooling

J2EE Web Application

► Standard Web App folder structure:

+Web application folder (root folder)

+**source**

–*all non-deployed files (java)*

+**WebContent**

–*all Web files (html, jsp, gif, ...)*

collectively known as "Web Resources"

+**META-INF**

–MANIFEST.MF

maps dependent jar files in other Web apps

+**theme**

–*.css style sheets*

Web application deployment descriptor:

► identifies servlets, security, env vars, mime types, key pages, external references and session configuration info

+**WEB-INF**

–web.xml

+**classes**

–*Java classes of this app (usually generated)*

+**lib**

Supporting classes and jar files

J2EE
1.3

Terms: Web Application

▶ Example Web Application

+accounts

+**source**

+**WebContent**

-index.html

www.mydomain.com/accounts

+receivable

-page1.html

www.mydomain.com/accounts/receivable/page1.html

+payable

-page1.html

www.mydomain.com/accounts/payable/page1.html

+**META-INF**

-MANIFEST.MF

+**theme**

-corporate.css

+**WEB-INF**

-web.xml

+**classes**

▶ Web Archive Files (WAR)

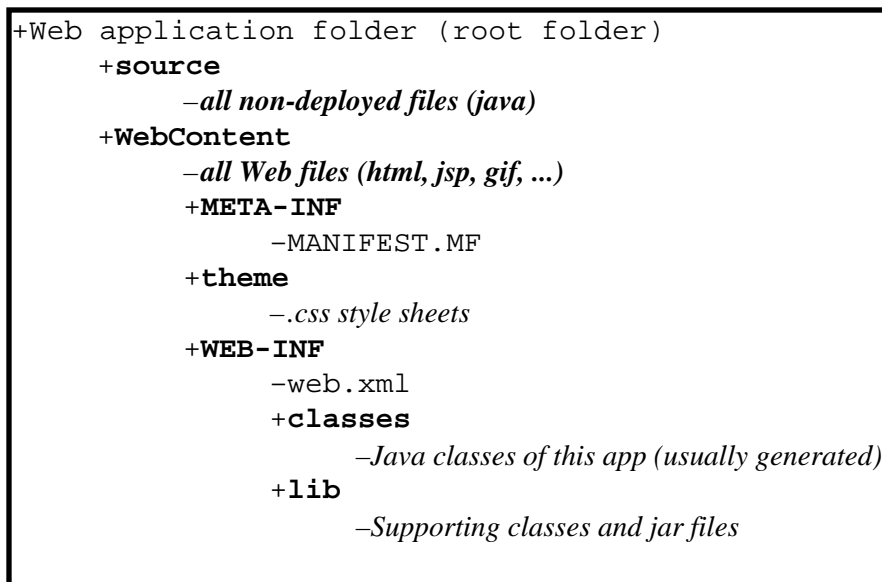
J2EE
1.3

- **One file containing**

- ▶ Whole folder structure of Web application
- ▶ Including web.xml file
- ▶ Optionally including source

- **Used to**

- ▶ Install and configure Web application in an application server



MyWebProject war

J2EE
EJB
Spec

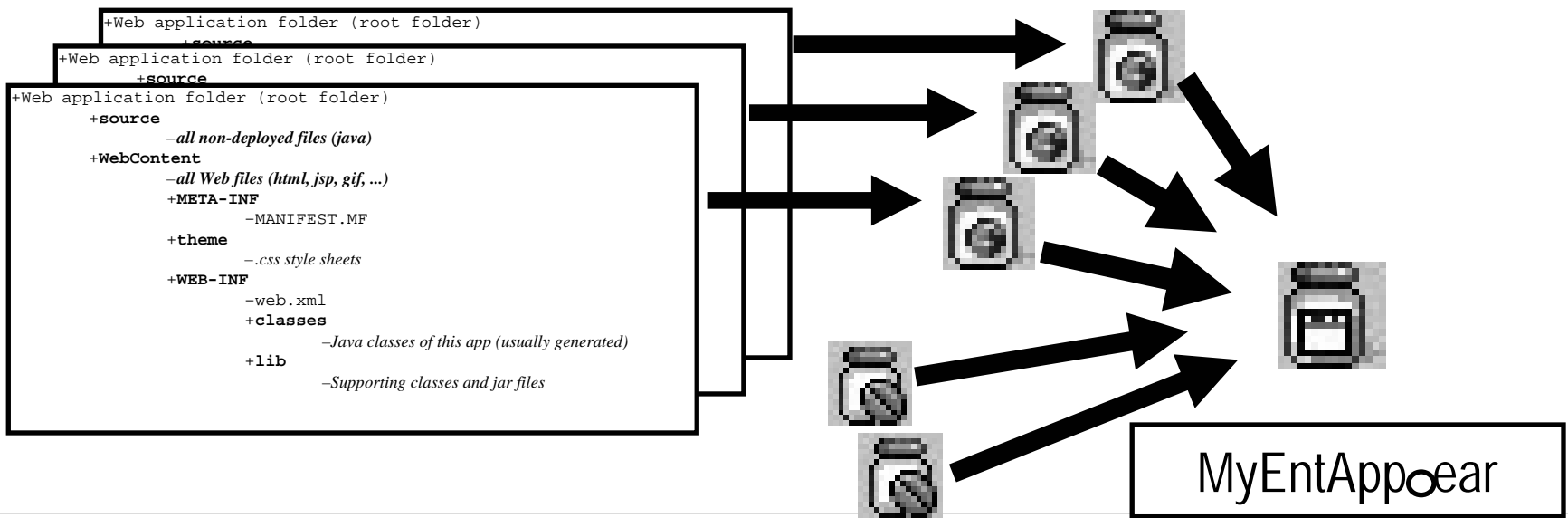
▶ Enterprise Archive Files (EAR)

• One file containing:

- ▶ Zero or more Web Archive (war) files
- ▶ Zero or more EJB jar files
- ▶ A J2EE deployment descriptor

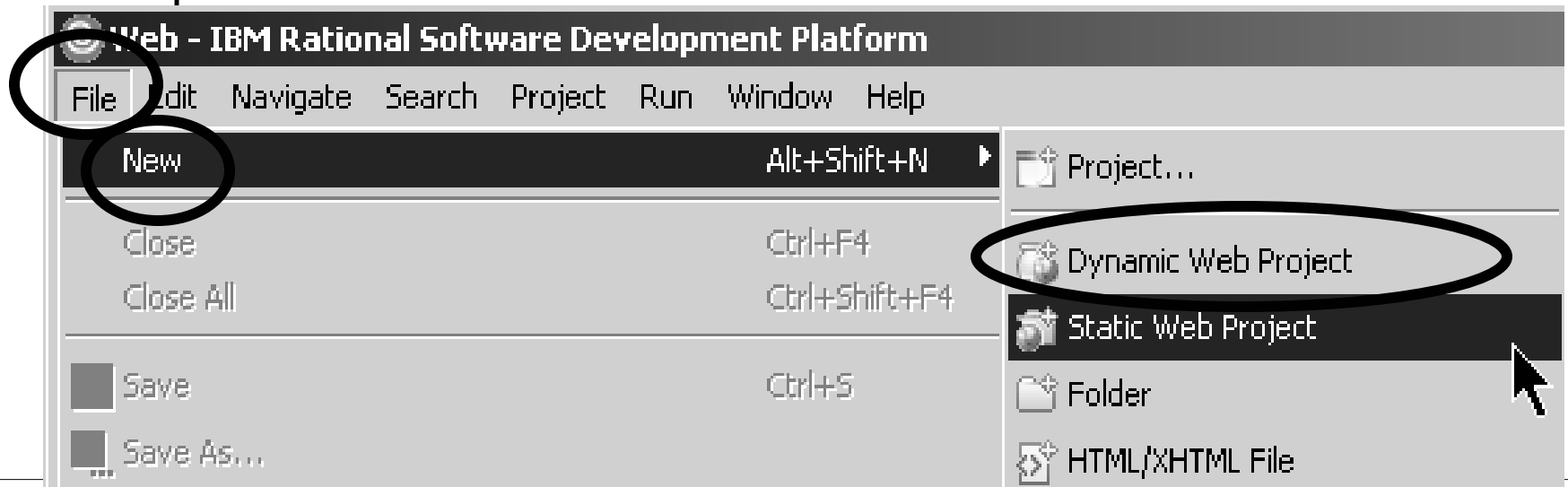
• Used to install and configure:

- ▶ All pieces of a J2EE Enterprise Application
 - ✓ Web application plus EJBs plus EJB clients
- ▶ All Web applications for a Web site (say)



Web Projects

- Create new web applications in a web project
- One of the project types in WDS*c*
 - ▶ With its own web perspective
 - ▶ With its own "new" wizard
 - ▶ With its own set of tools
- Created with J2EE folder layout
- Created with simple web.xml file
 - ▶ Automatically updated as resources are created
 - ▶ Has specialized web.xml editor



Web projects

New Dynamic Web Project wizard

Dynamic Web Project
Create a standalone Dynamic Web project or add it to a new or existing Enterprise Application project.

Name:

Project location:

Servlet version:

Target server:

Add module to an EAR project.

EAR project:

Context Root:

Add support for annotations

Functionality for the Web Project.

Select features being used in this web application

Select template for web pages

Automatically associates with a supplied EAR file for easy auto-cfg of Application Server

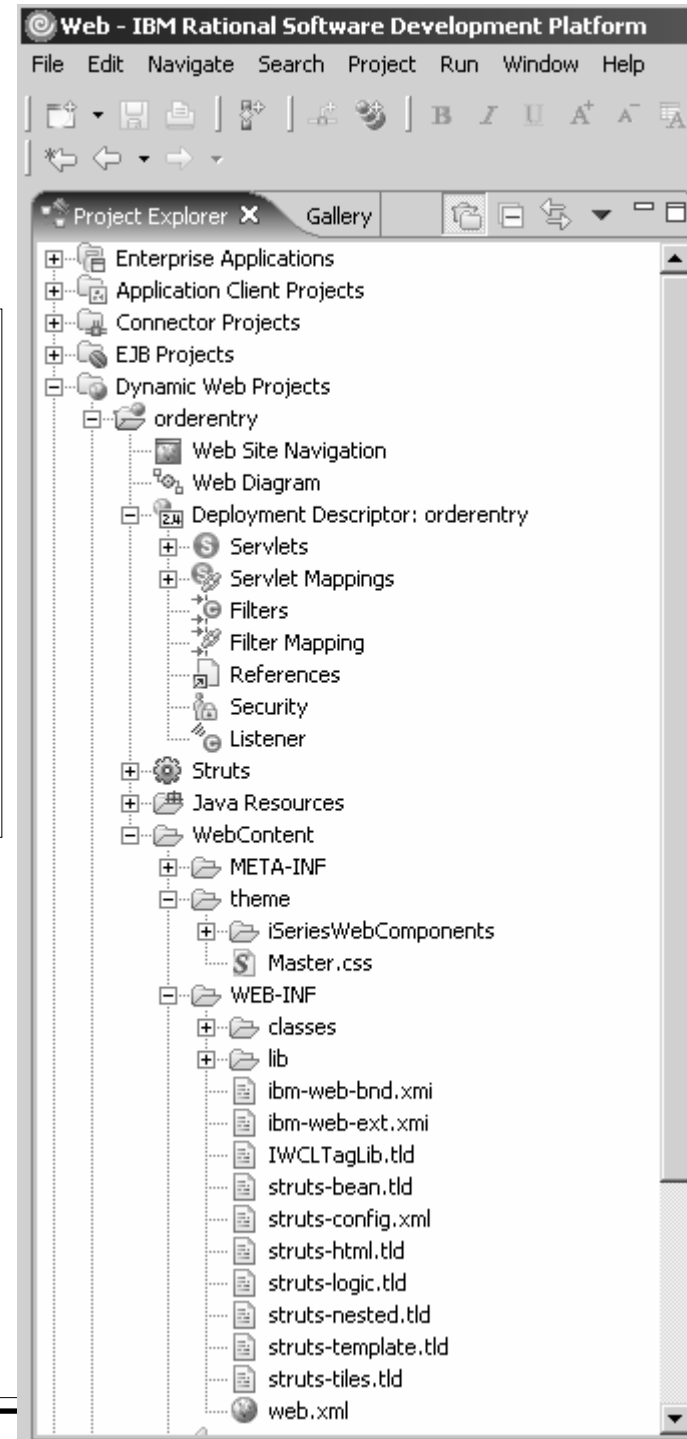
< Back Next > Finish Cancel

< Back Next > Finish Cancel

< Back Next > Finish Cancel

Web projects

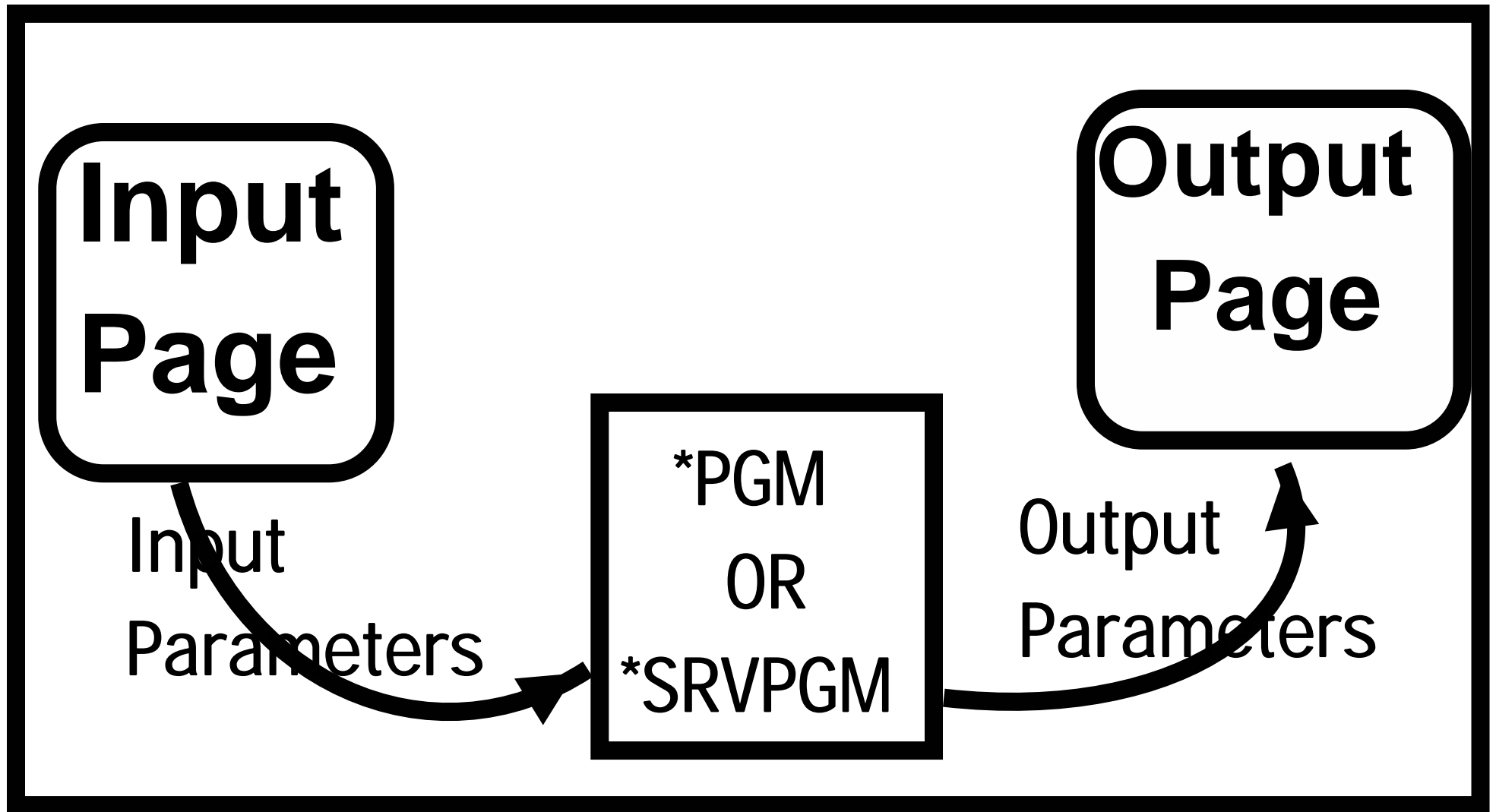
Web application structure is created from information provided in New Dynamic Web Project Wizard



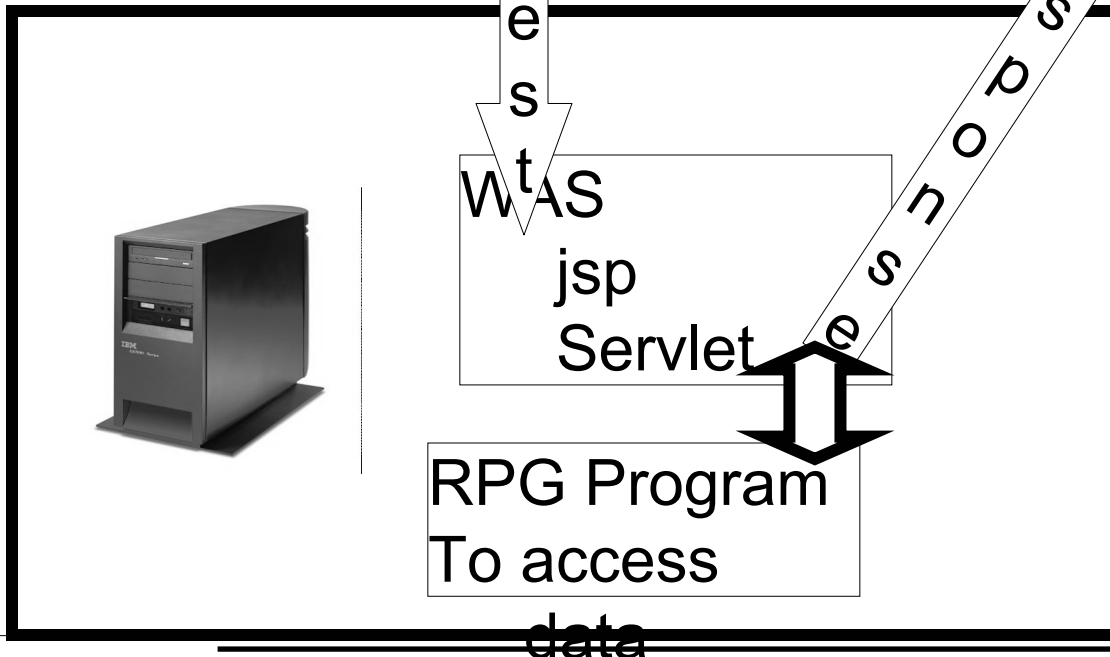
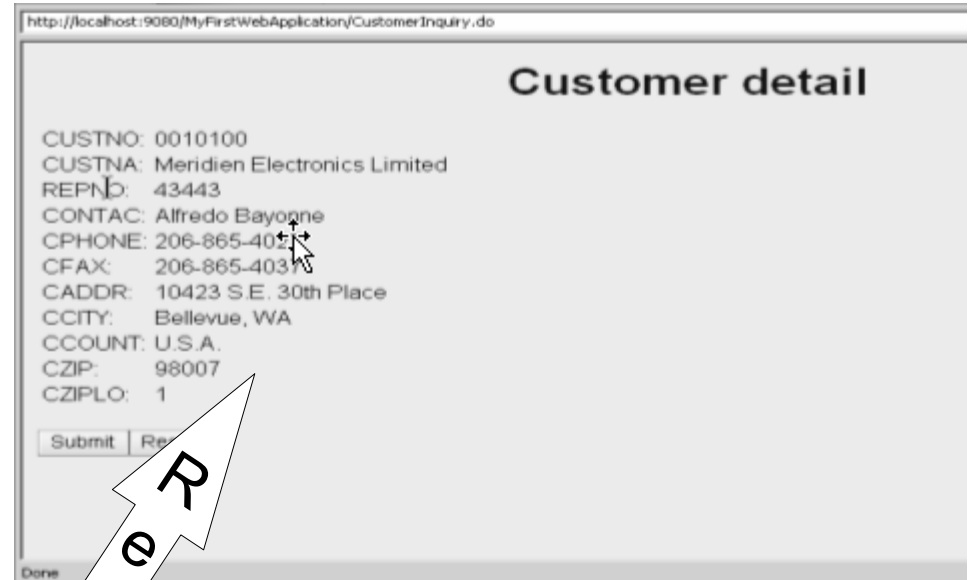
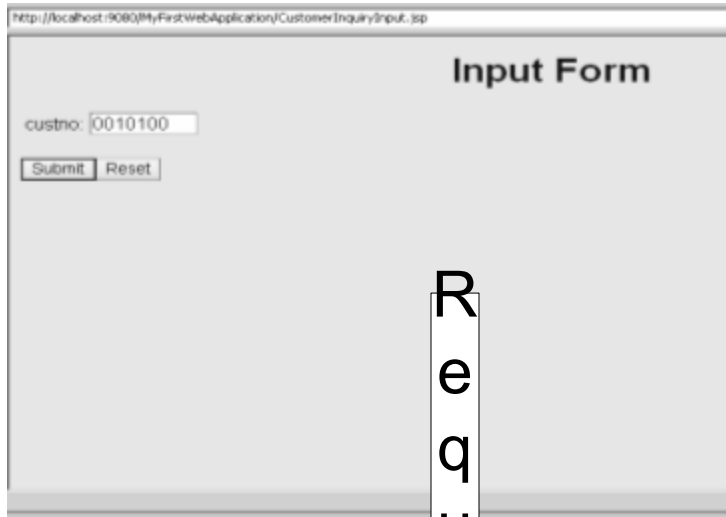
Web Tool for iSeries

- ✦ Wizards to help create iSeries RPG/COBOL web applications
 - Interaction wizard to build web application
Struts based
 - JSF tooling
 - WebService wizard to build an iSeries WebService
 - JCA wizard to build an iSeries Java Connector Architecture (JCA) connector

An interaction



Build this simple interaction



data

Using the Interaction wizard

- ✦ Interaction wizard specific for iSeries development (not extendable)
- ✦ Steps involved
 - ✦ Create a dynamic web project
 - ✦ Create Runtime configuration
 - iSeries server
 - User id/password
 - Library list setup
 - ✦ Create Interaction
 - ✦ Input screen
 - ✦ Program interface (PCML)
 - ✦ Output screen

New standard framework java server faces (jsf)

- **Wait something better than STRUTS is here**
- A new standard framework fully supported in WDS*c*
 - Tool support for jsf
 - Page designer
 - Binding support of data beans and UI controls
 - Web diagram editor for jsf
 - Quick edit for small pieces of Java code

Java Server Faces (jsf)

- A specification and reference implementation for web applications
 - Components
 - Events
 - Validators & converters
 - Navigation
 - Back-end-data integration

- Standard

- Allows for extended tool support

Web Page Development

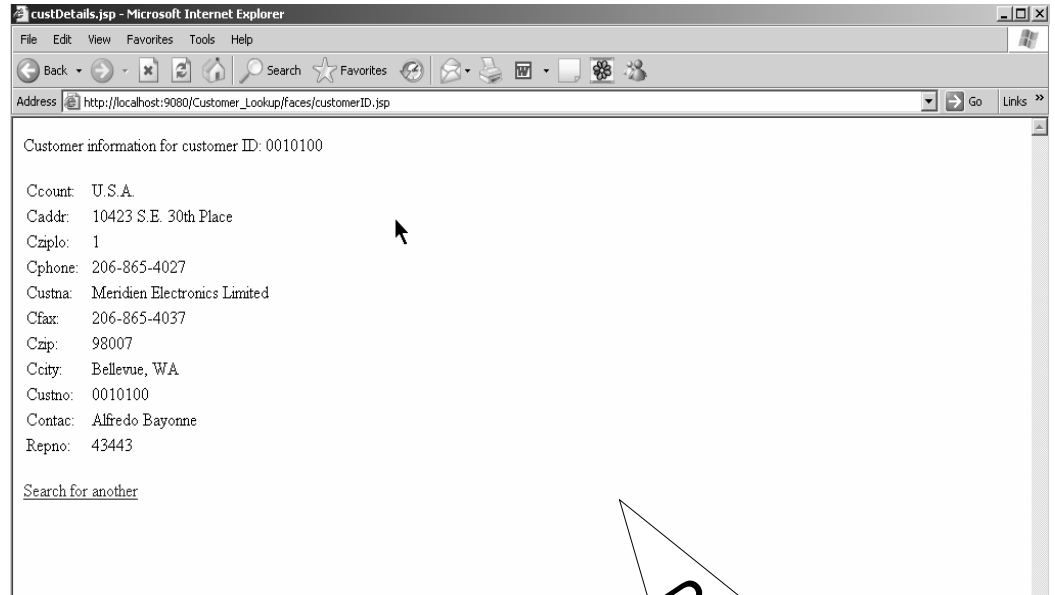
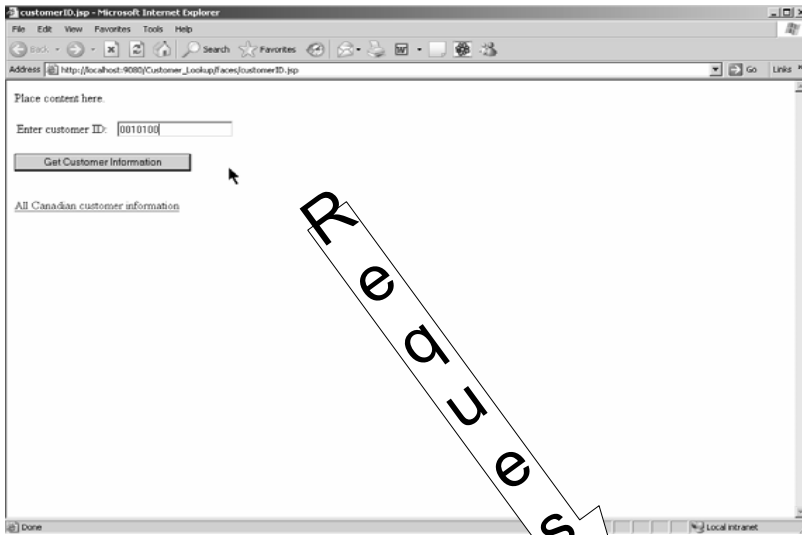
- JSF contains a collection of UI components to make Web page development easier
 - Each component has extensive properties for customizing look and behavior of component
 - Components can be bound to variables for automatically:
 - Displaying the value of variable
 - Assigning value to a variable on page submit
 - Components have associated “events” which you can write code for
 - JavaScript for client side events
 - onclick, ondblclick, onkeypress, ...
 - Java code for server side events
 - Value Changed, Command, ...

Creating a jsf based web application

■ Using

- Web diagram editor
- jsf controls and associated tools
- Program call wizard
- Jsf Data tools

Build this jsf web application



Request

Response



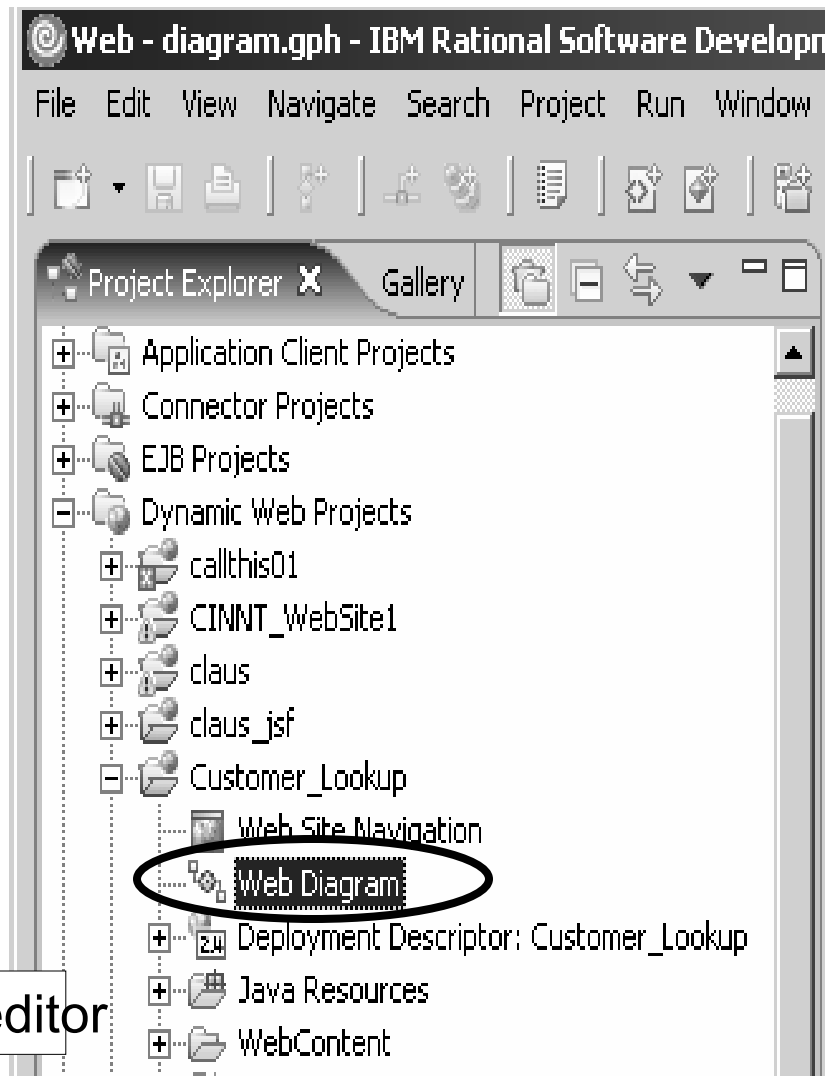
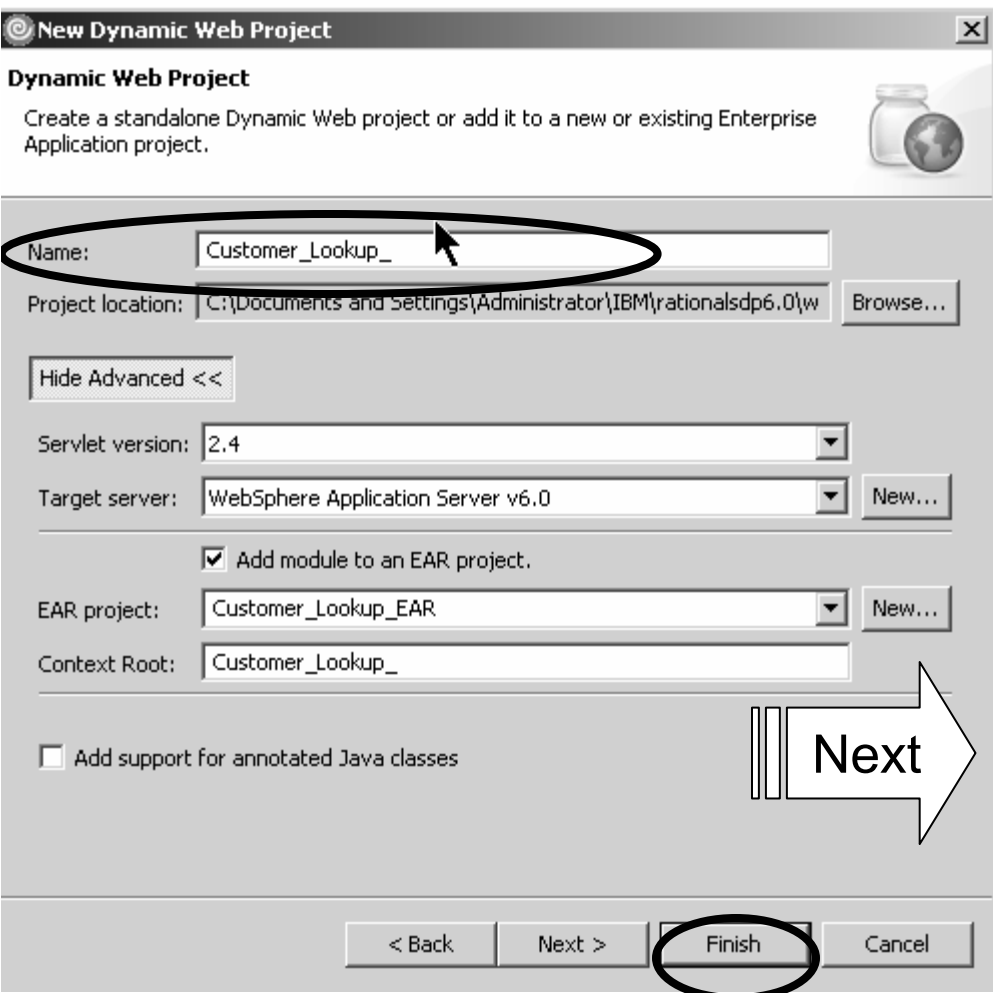
RPG Program
To access



jsf
Validation
Conversion and put values from UI control into Program call bean
Use Program call bean to invoke program
Get return values from Program call bean into bound UI controls

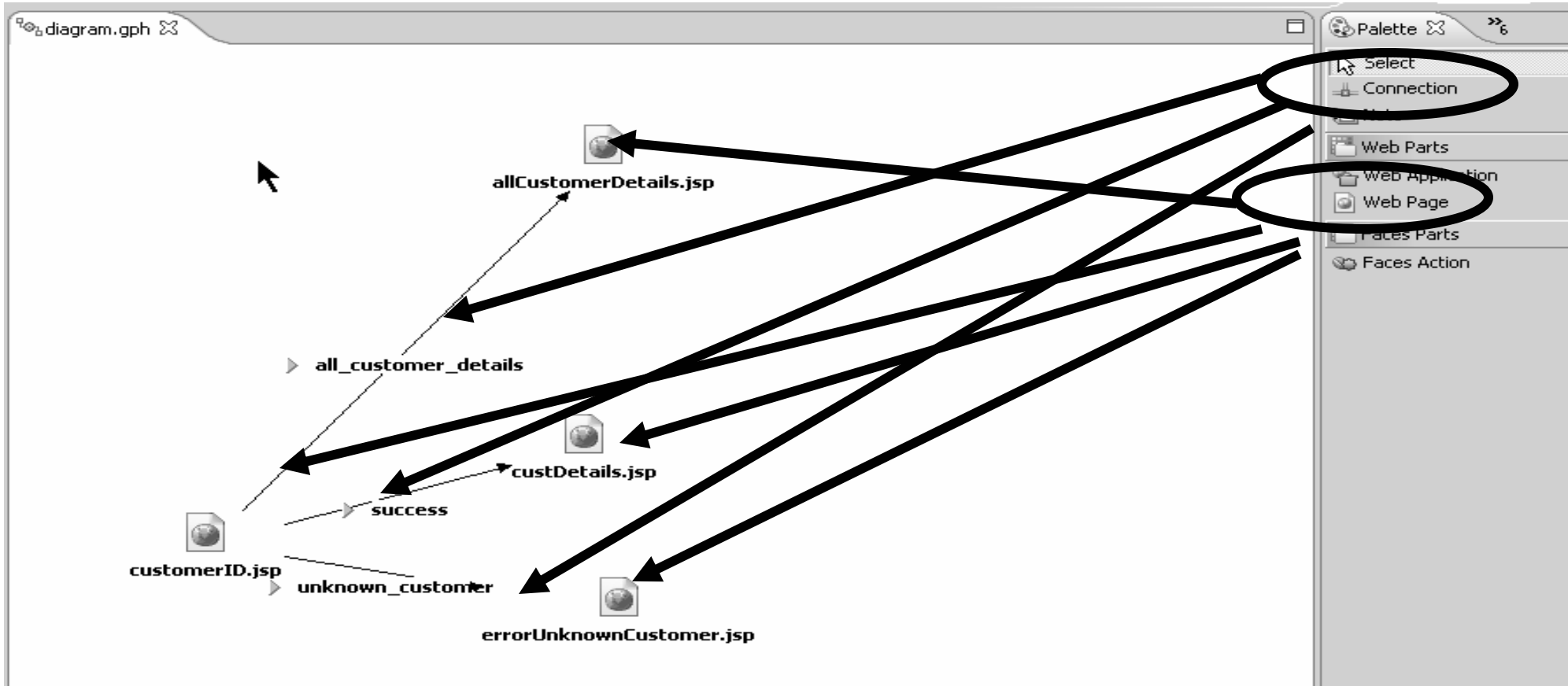
-data

Create a Web project



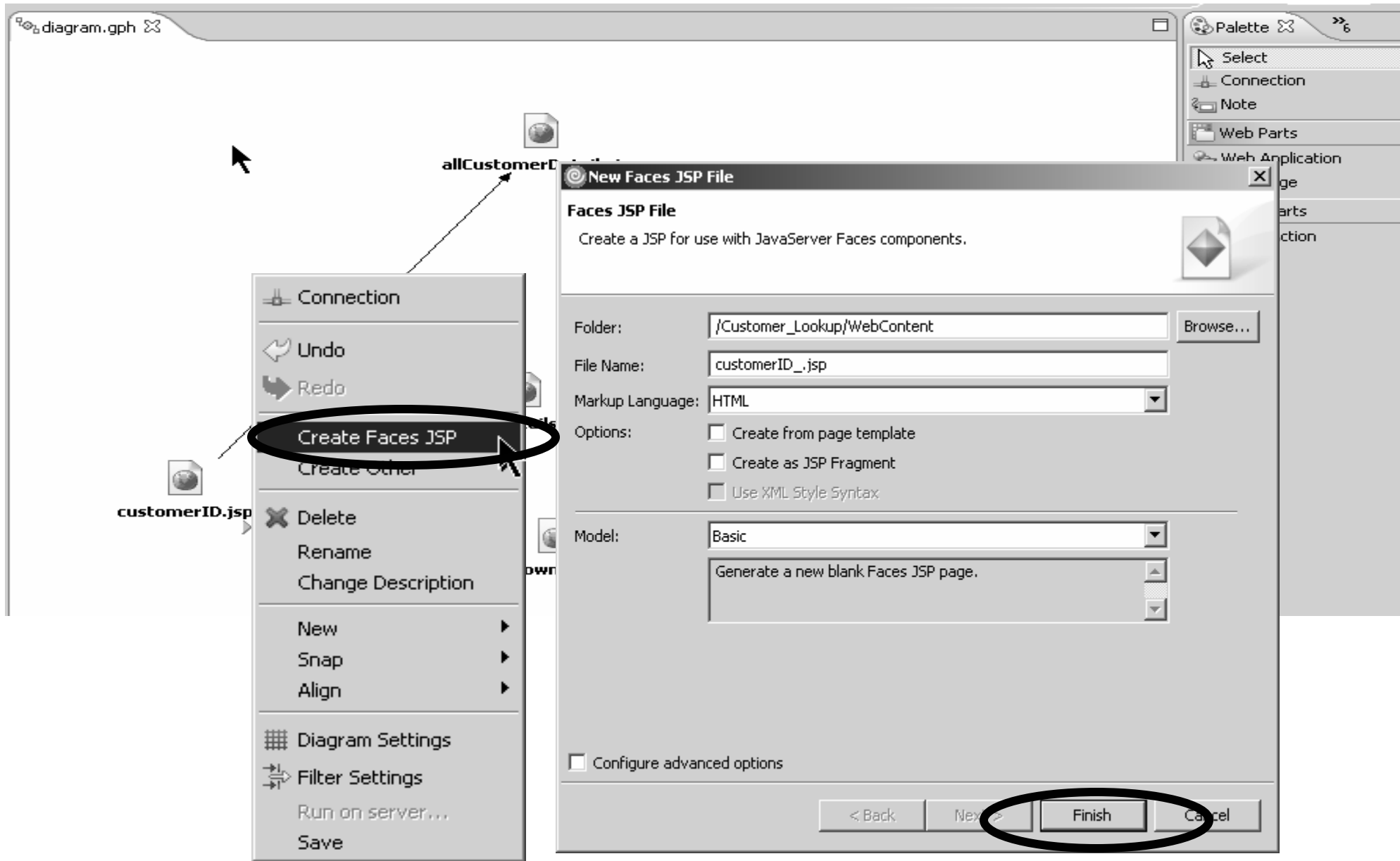
Create project and invoke WebDiagram editor

WebDiagram editor



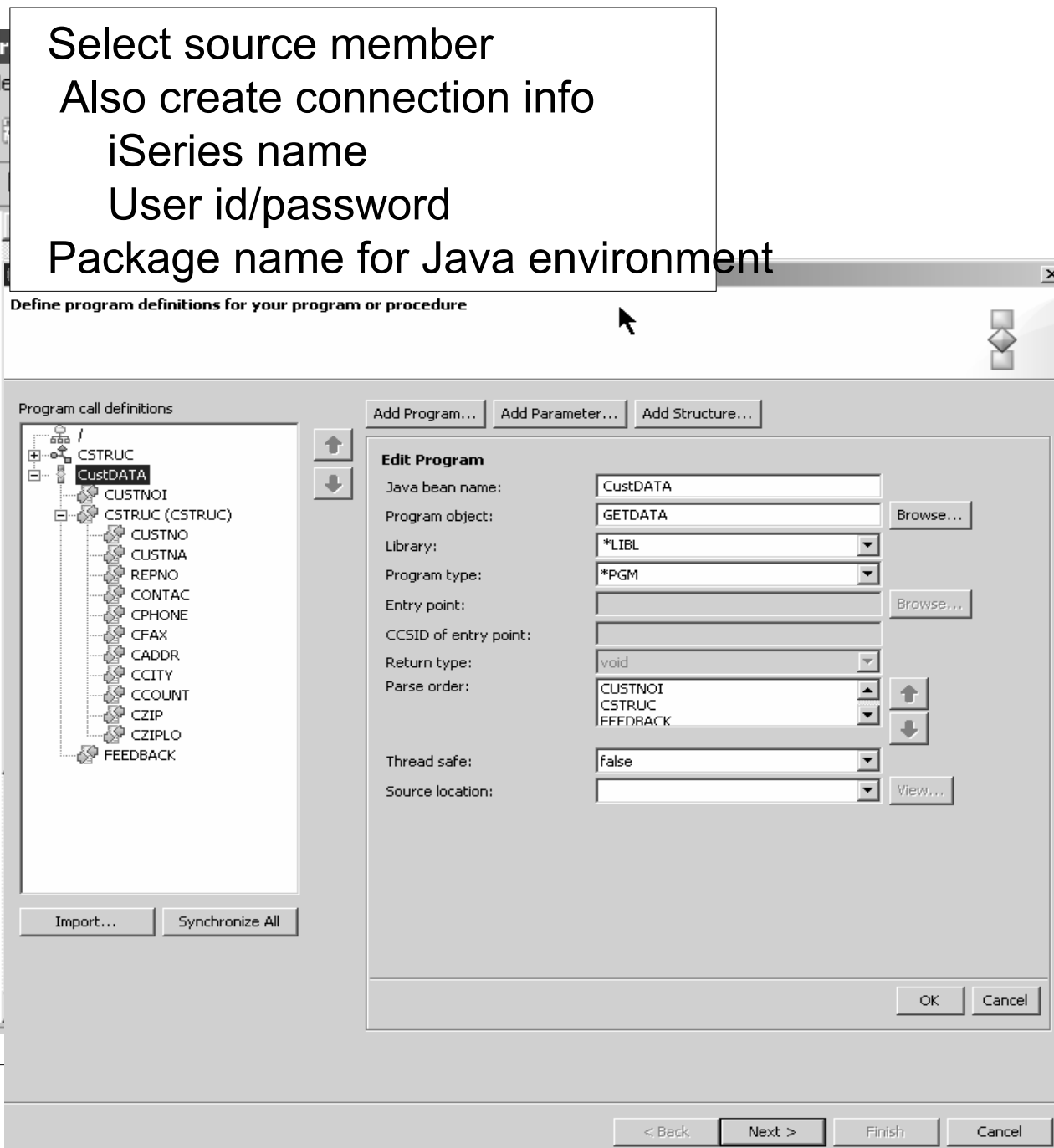
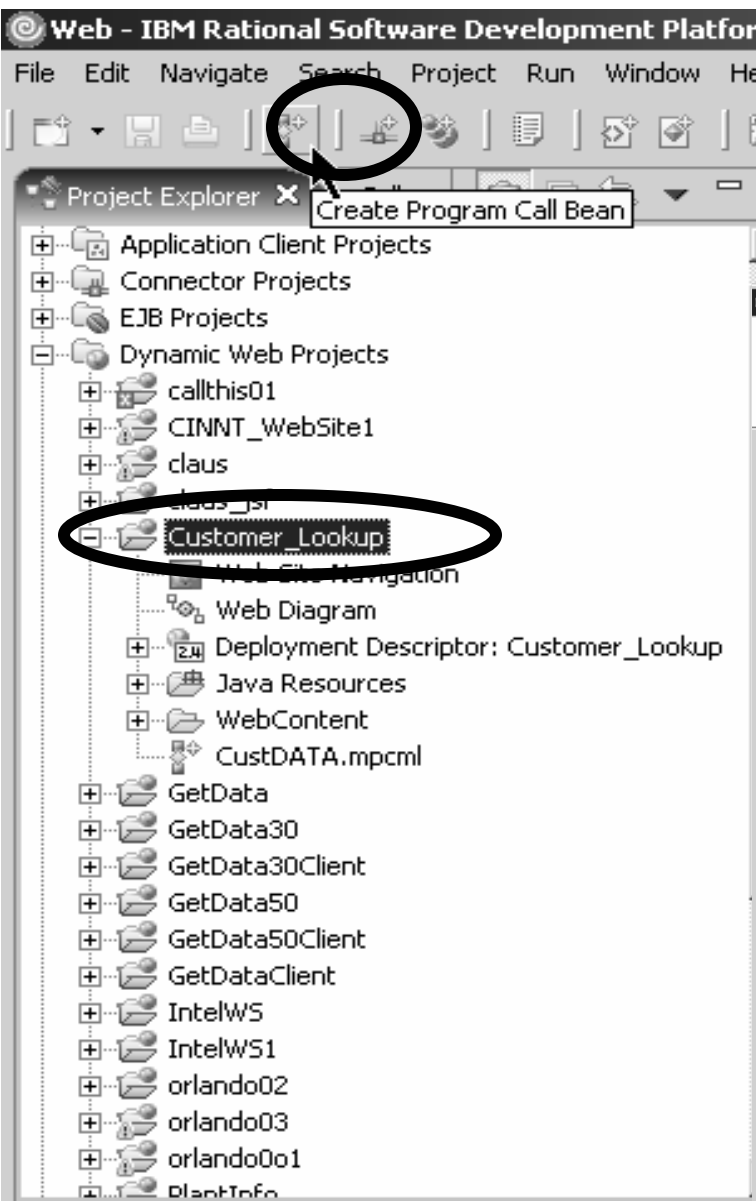
Create design of application layout
web pages and connections between pages with conditions

Create webpages from diagram as .jsp files



Create program call bean

Select source member
 Also create connection info
 iSeries name
 User id/password
 Package name for Java environment



Create Web page design and binding

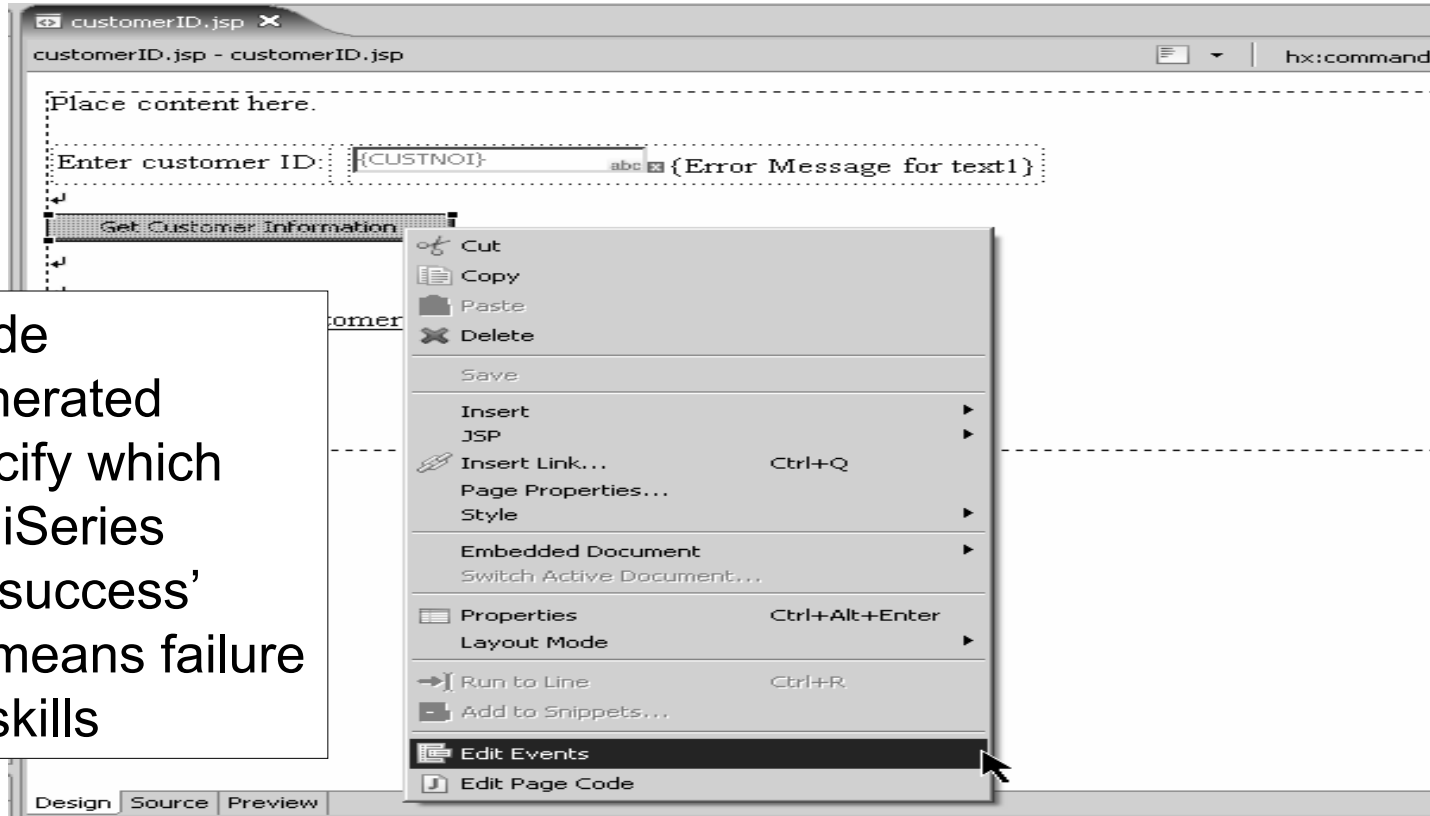
Created by Program call wizard

The screenshot displays the IBM Rational Software Development Platform interface. On the left, the Project Explorer shows a web project with various files and folders. The main workspace is divided into several panels:

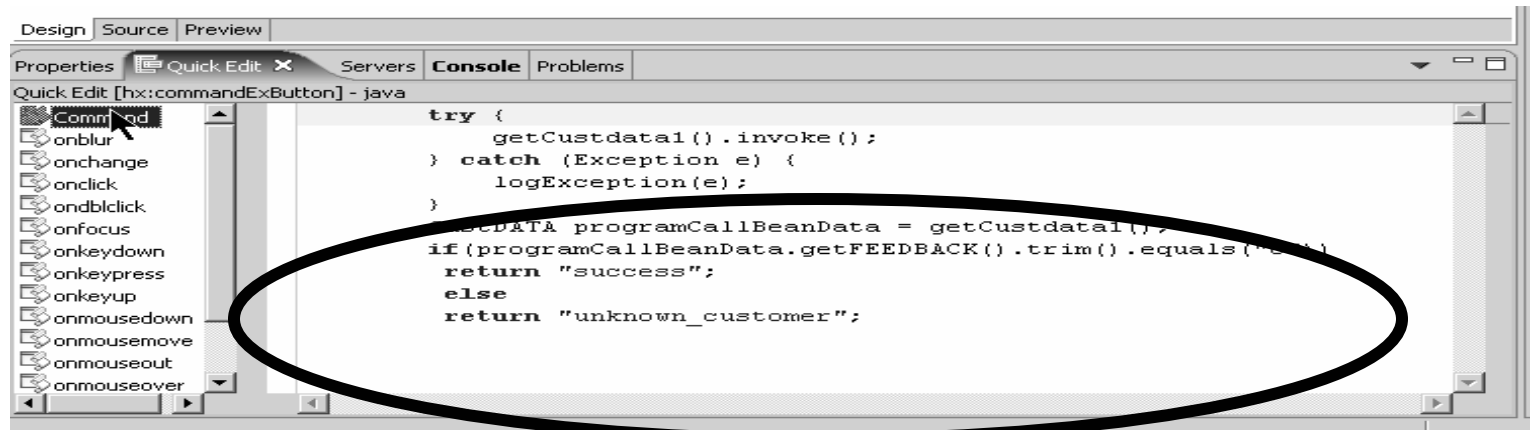
- Select JavaBean:** This dialog is used to choose a JavaBean class. The 'Add new JavaBean' radio button is selected. The 'Name' field contains 'custdata_', and the 'Class' field contains 'CustDATA'. The 'Scope' is set to 'session'. A 'Make this JavaBean reusable' checkbox is checked. The 'Advanced' tab in the Options dialog is selected.
- Options:** This dialog allows for configuring the bean's options. The 'Submit button' checkbox is checked, and the 'Label' field contains the text 'Get Customer Information'.
- Faces Managed Beans:** A list of managed beans is shown at the bottom. The bean 'custdata (pcwbeans.CustDATA)' is selected and highlighted.

Add program call bean for binding to UI
 Creates input field bound to CUSTNOI
 Submit button to invoke program call

Add rules for submit button and map return code to forward condition



Beginning of code automatically generated
 But have to specify which return code from iSeries program means 'success'
 And which one means failure
 Very little Java skills required



Bind UI and java bean properties

The screenshot illustrates the process of binding a UI control to a JavaBean property in IBM Rational Software Development Platform. The main window shows a JSP page with a form titled "Get Customer Information" containing an input field for "Enter customer ID:" and a button "All Canadian customer information".

The **Insert JavaBean** dialog is open, with the **Configure Data Controls** tab selected. The **Select Method** sub-dialog is also open, showing a list of methods from the `pcwbeans` bean. The `getCUSTNOI()` method is selected, and its signature is displayed: `getCUSTNOI() (String) - pcwbeans.GETDATA`. The **Fields to display** section shows `CUSTNOI` selected.

The **Scripting Variables** window shows the list of variables available for the page. The `CUSTNOI (java.lang.String)` variable is selected, indicating the binding between the UI control and the JavaBean property.

The **Properties** window shows the **Input behavior in browser** section, which includes options for `Control is disabled`, `Control is read-only`, and `Auto-advance to next field`. The `Auto-advance to next field` option is checked, and the `After user types` field is set to `1` character.

Jsf entry field validation

The screenshot displays the IBM WebSphere Development Studio Client interface for editing a JSP page named 'customerID.jsp'. The main design area shows a form with an input field and a button labeled 'Get Customer Information'. The input field is highlighted with a black oval. Below the design area, the 'Properties' panel is visible, showing the configuration for the selected 'h:inputText' component. The 'Validation' section is expanded and highlighted with a black oval, showing the following settings:

- Validation Required
- Minimum length: 7 (characters)
- Maximum length: 7 (characters)
- Constraint: Digits Only (^[0-9]+\$)
- Display validation error messages in an error message. When value is invalid, redisplay page with error.
-

The 'Validation' section in the Properties panel is also highlighted with a black oval. The 'Design' tab is selected at the top of the Properties panel.

Creating the error page

The screenshot displays the IBM WebSphere Development Studio interface. The main editor window shows a JSP page with the following content:

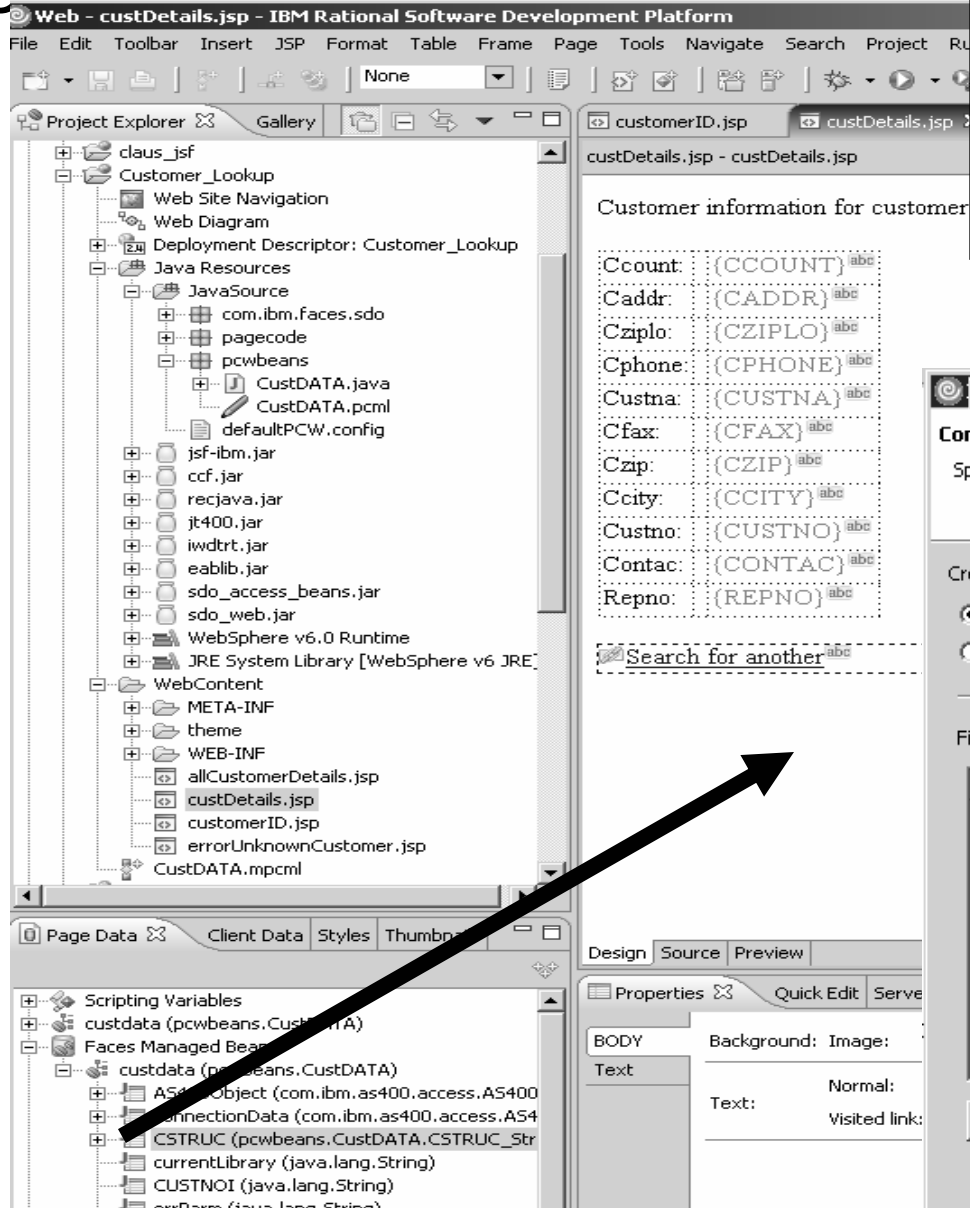
```
Sorry customer ID, {CUSTNOI} abc, we not found in the database
```

Below the message is an `outputText` control and a `Try again` button. A large black arrow points from the `outputText` control in the editor to the `Output` tag in the right-hand palette. The palette also shows other tags like `Output - Formatted Text`, `Image`, and `Label`.

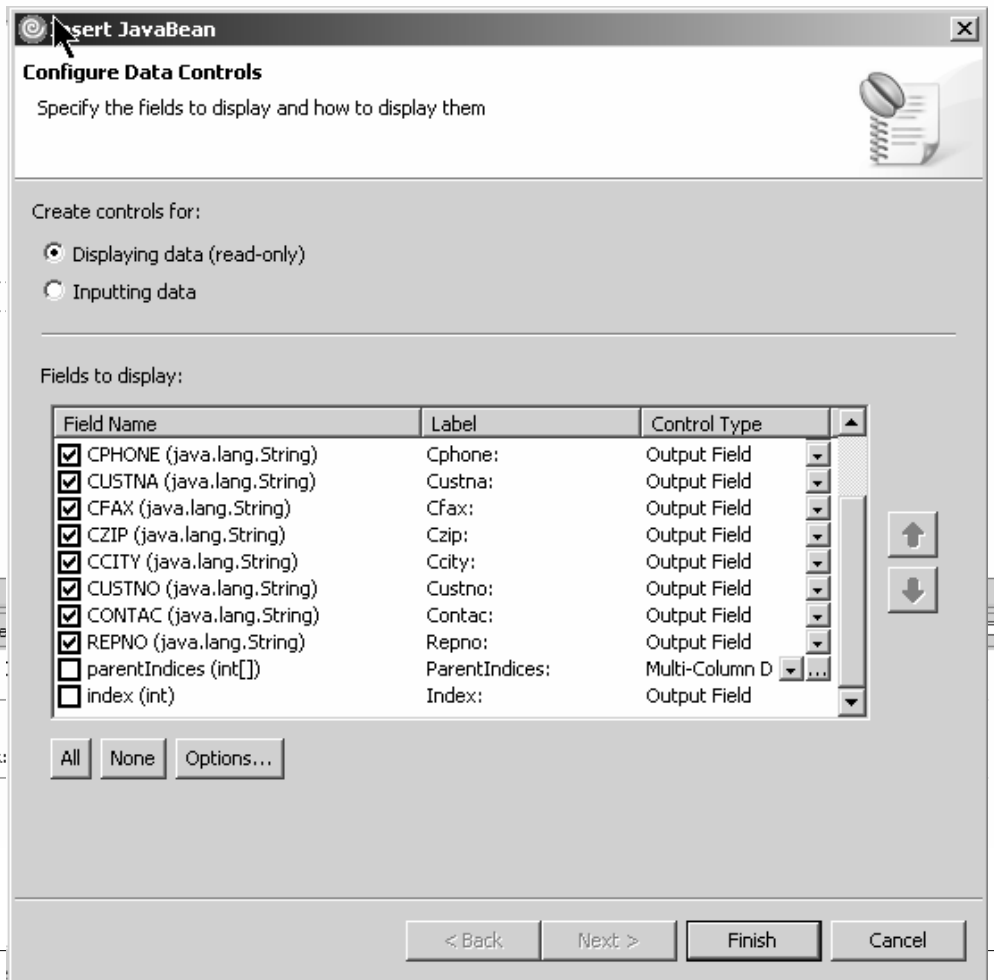
In the bottom-left corner, the 'Page Data' window shows a tree of scripting variables. The variable `custnoI` is selected, and a context menu is open with the option `Bind to 'text3'` highlighted.

Create an output text control
in the error message
Then bind it to the custnoi
field so it gets filled at runtime
with its value

Creating the customer detail page



Drag structure from bean to designer
 Select fields to be shown
 Fields get added to page and are bound to bean



Run it

The screenshot displays the IBM Rational Software Development Platform (RSDP) interface on the left and a Microsoft Internet Explorer browser window on the right. The RSDP shows a project named 'customerID.jsp' with a 'Run' menu highlighted. The browser window shows the URL 'http://localhost:9080/Customer_Lookup/faces/customerID.jsp' and a form with a text input field containing '0010100' and a 'Get Customer Information' button. The browser also displays a link for 'All Canadian customer information'.

Result Detail and error pages

The image displays two overlapping Microsoft Internet Explorer browser windows. The left window, titled 'custDetails.jsp - Microsoft Internet Explorer', shows a successful lookup result for customer ID 0010100. The right window, titled 'errorUnknownCustomer.jsp - Microsoft Internet Explorer', shows an error message for a customer ID that was not found in the database.

Left Window: Customer information for customer ID: 0010100

- Ccount: U.S.A.
- Caddr: 10423 S.E. 30th Place
- Cziplo: 1
- Cphone: 206-865-4027
- Custna: Meridien Electronics Limited
- Cfax: 206-865-4037
- Czip: 98007
- Ccity: Bellevue, WA
- Custno: 0010100
- Contac: Alfredo Bayonne
- Repno: 43443

[Search for another](#)

Right Window: errorUnknownCustomer.jsp

Sorry customer ID,0010109 , we not found in the database

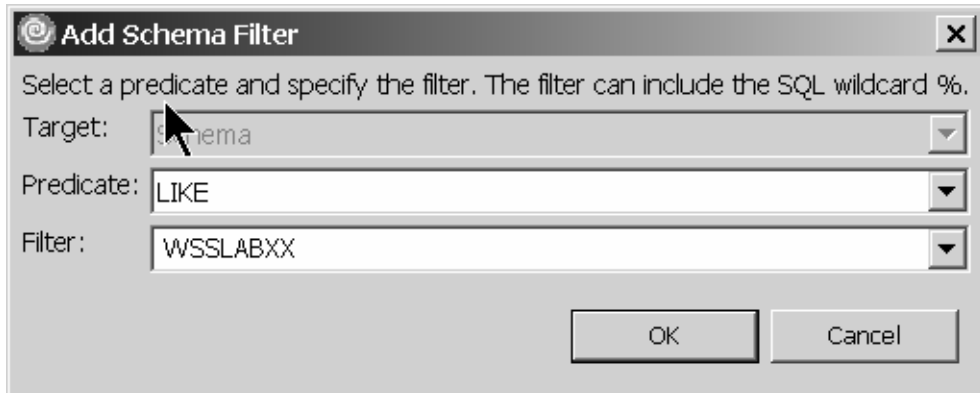
[Try again](#)

Display list of records using Relational record list control

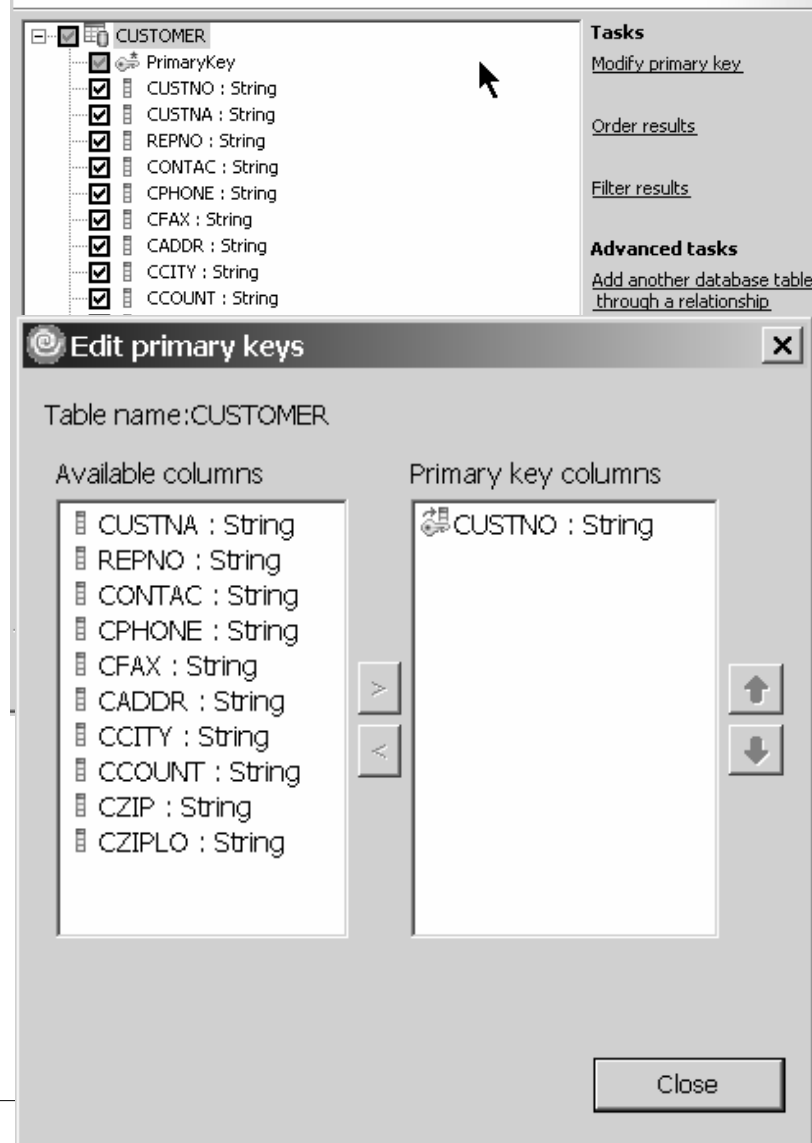
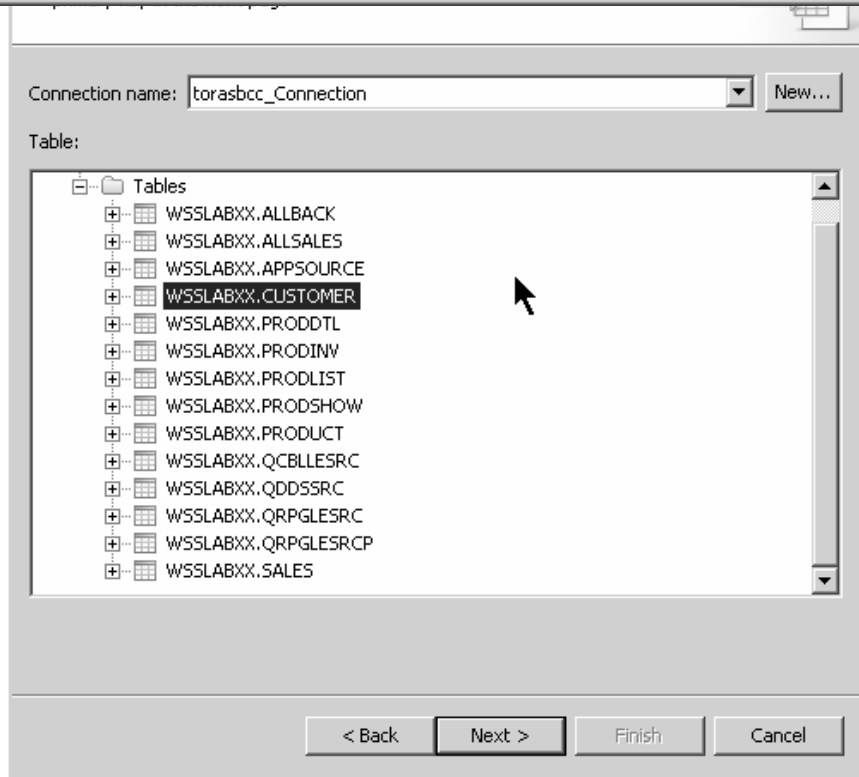
The screenshot displays the IBM WebSphere Development Studio Client V6.0.1 interface. The main window shows the 'Add Relational Record List' wizard, which is currently on the 'Specify connection parameters' page. The wizard is titled 'New Database Connection - s400aDataBaseConnection'. The 'Specify connection parameters' page includes a tree view of database managers, with 'AS/400 Toolbox for Java' selected. The 'Connection URL details' section shows the following fields: Database (empty), Host (s400a), Port number (empty), JDBC driver class (com.ibm.as400.access.AS400JDBCDriver), Class location (D:/ProgramFiles/IBM/Rational/SDP/t), and Connection URL (jdbc:as400:s400a;prompt=false). The 'Specify user information' section shows User ID (wslabxx) and Password (***). A 'Test Connection' button is visible. The 'Add Relational Record List' wizard is on the 'Name' page, with the name 'canadianCustomers' entered. The 'Scope' is set to 'session' and the 'Key' is 'canadianCustomers'. The 'Add data controls' checkbox is checked. A callout box with the text 'Drag Relational record list Fill out wizard pages' is positioned over the wizard. A large black arrow points from the 'Add Relational Record List' wizard to the 'New Database Connection' wizard. The right-hand side of the interface shows the 'HTML Tags' palette, which includes various controls such as 'Data Table', 'Panel - Group Box', 'Panels - Tabbed', 'Panel - Menu Bar', 'Command - Button', 'Command - Hyperlink', 'Link', 'Input', 'Input - Text Area', 'Rich Text Area', 'Input - Password', 'Check Box', 'Check Box Group', 'Radio Button Group', 'Combo Box', 'List Box - Single Select', 'List Box - Multiple Select', 'File Upload', 'Output', 'Output - Formatted Text', 'Image', 'Label', 'Page Template', 'Web Site Navigation', 'Data', 'Web Service', 'EJB Session bean', and 'Relational Record List'. The bottom of the interface shows the 'Properties' palette with fields for 'Background: Image', 'Color', and 'Link'.

Drag Relational record list
Fill out wizard pages

Identify iSeries data base file



Filter for library
 Select database file
 Specify primary key
 Almost done



Specify the data to be shown

List page has been created
Specify SQL Query conditons
Specify sort etc
The run it

The screenshot shows the IBM Rational Software Development Platform interface. The main window displays a web page titled 'allCustomerDetails.jsp' with a table of customer information. The table has columns: Custno, Custna, Repno, Contac, Cphone, Cfax, Caddr, Ccity. The data is currently empty, showing placeholders like {CUSTNO}.

A 'Conditions' dialog box is open, showing a condition set to 'By columns'. The 'Column' is set to 'CCOUNT' and the 'Value' is '%Canada%'. The 'Order by' list shows 'CUSTNA' selected.

The 'Pages Managed Beans' panel shows 'canadianCustomers (Service Data Object)' selected, with a 'Configure' button highlighted.

Running the query

allCustomerDetails.jsp - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Print Mail News RSS Feeds

Address http://localhost:9080/Customr_Lookup/faces/customerID.jsp

The following information for Canadian customers was retrieved:

Custno	Custna	Repno	Contac	Cphone	Cfax	Caddr	Ccity	Ccount	Czip	Cziplo
0011300	Burnham Trading Inc	41480	Efrem Helassie	613-225-0753	613-225-0753	91 Baseline Road	Trenton, Ontario	Canada	C6B 9S3	2
0013400	Communications Fournier	13497	Larry Schweyer	514-534-2953	514-534-2977	3162 Rue Ste Catherine	Montreal, Quebec	Canada	E6P 2S3	1
0012200	Communications-R-U's Corporation	22004	Jack Deauson	416-695-3455	416-695-3458	82 Royal York Road	Toronto, Ontario	Canada	M7G 5C1	2
0012300	Danton Industries	98989	Jack Vance	905-316-2245	905-316-2255	78 John Street	Markham, Ontario	Canada	M0J 8G4	1
0012100	DaSilva Novelties	17506	Henry Goldsmith	416-484-2766	416-484-2795	926 Danforth Avenue	Toronto, Ontario	Canada	M5R 6C1	2
0012500	Diplomat Sales and Liquidations	00488	Jim Doe Wan	905-369-1234	416-343-1027	Gerrard Square, 54 Gerrard St.	Toronto, Ontario	Canada	M3S 6F0	1
0012600	Down Under Electronics Supplies	42167	John Riley	416-694-1459	416-694-1469	206 Queen Street East	Toronto, Ontario	Canada	M3S 6G7	2
0012700	Dunsten Electronics Inc.	60585	Kersi Copper	416-633-1027	416-633-1029	1298 Victoria Park Avenue	North York, Ontario	Canada	M0K 8F4	2
0012800	Elite Communications	26489	Marilyn Myerson	416-343-2077	416-343-3079	257 Queen Street East	Toronto, Ontario	Canada	M8Y 3K9	2
0013000	Fantastic Future Supplies	63445	Mary Goodbar	905-316-4545	905-316-4572	Markham Place, 500 Steeles Ave E.	Markham, Ontario	Canada	M9U 6M1	2
0013500	Gallery Sales and Liquidations	64616	Mostafa Egoury	416-961-2722	416-961-2752	73 University Avenue	Toronto, Ontario	Canada	M9K 6G7	1
0015300	Holiday Sales	14915	William Riso	905-891-5677	905-891-5697	305 Appleby Line	Mississauga, Ontario	Canada	M9B 7F5	1
0909090	I&B&M&A&B	12345	Mr. Customer	416-448-9809	416-448-4545	1150 E&A Ave	North York	Canada	M1M 2N2	1
0010400	ProLine Building Supplies	13300	Bud Dobbs	905-403-4055	905-403-4059	73 Marchwood Road	Burlington, Ontario	Canada	D8G 3V6	2
0010200	Royal Hardware Supplies	20527	Arnie Podell	905-619-2045	905-619-2073	Maple View Plaza, 256 New St.	Ajax, Ontario	Canada	L8D 4S6	2
0011600	Sudbury Radio and TV	01900	Gary Morehouse	705-522-5044	705-522-5047	7 North Road	Sudbury, Ontario	Canada	P7G 5A3	2

Done Local intra

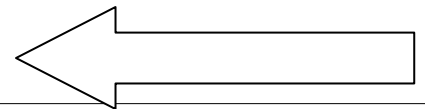
WebSphere Test Environment

A full copy of WAS 6.0 is embedded in the IDE

- ▶ Integrated with Server Tools to enable instant and dead-easy testing of Web projects within WDS.
- ✓ Standalone all-in-one testing
- ✓ No dependency on WAS installation or availability
- ✓ No dependency on an external database
- ▶ Provides the ability to debug live server-side code
- ▶ Supports configuring multiple Web applications
- ▶ Supports multiple servers that can be configured and run at the same time
- ▶ Provides access to the profiling feature that is available in the workbench
- ▶ Provides the ability to version Server Tools server configurations
- ▶ Provides access to the WAS Administration Client

WebTools agenda

- ▶ WDS overview and AD roadmap
- ▶ Website creation
- ▶ Webpage templates
- ▶ Designer for static WebPages
- ▶ Designer for Web objects
- ▶ Tool for Cascading Style Sheets
- ▶ Tools to create WebApplications
 - ▶ Interaction wizard
 - ▶ Java server faces tooling
- ▶ Tools to create WebServices



What Are Web Services

- Function that can be programmatically invoked over a network

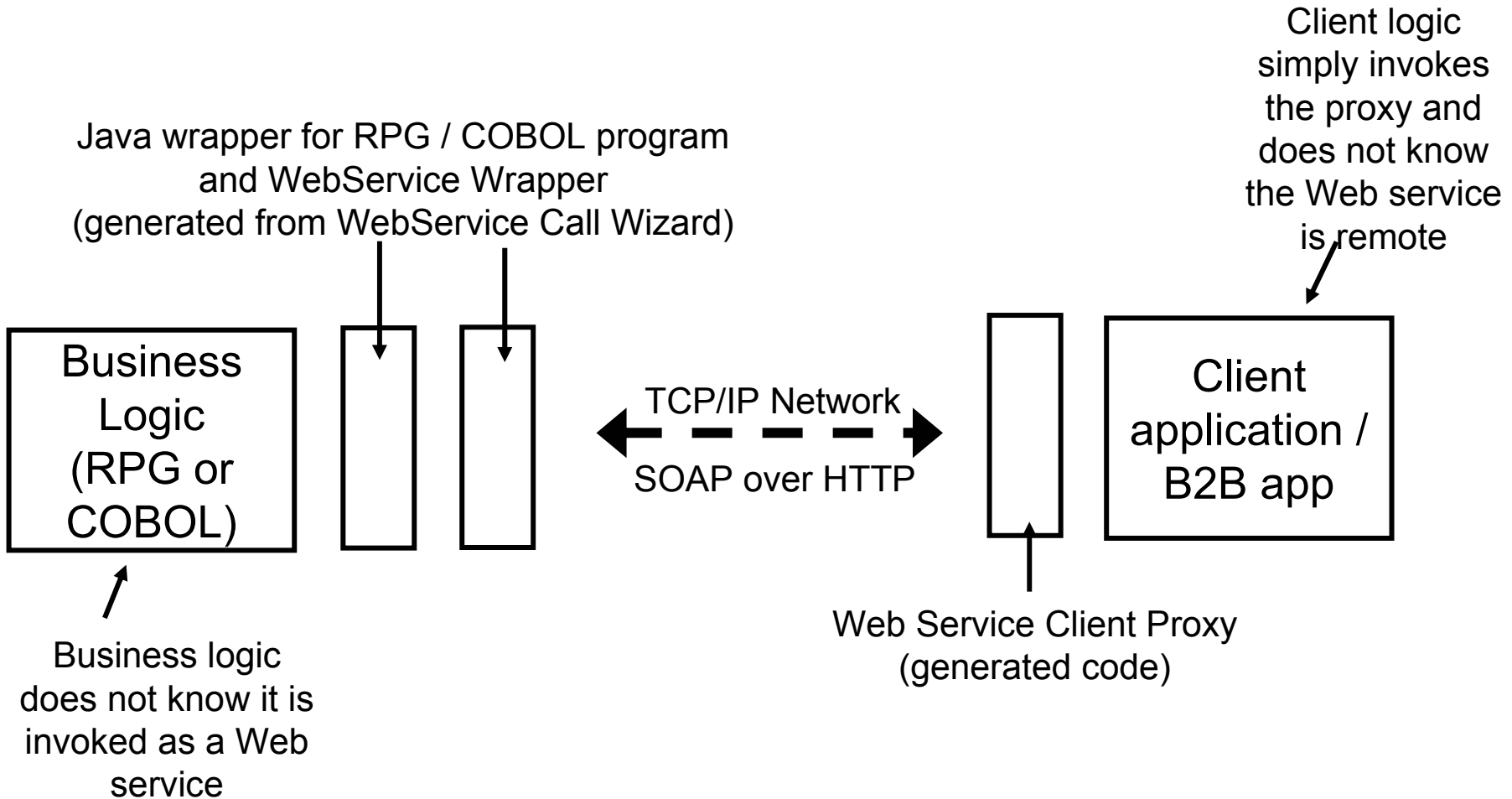
- Basically remote procedure calls built on open standards and proven technologies
 - Lots of new standards around Web services to ensure interoperability in heterogeneous environments
 - Underlying implementations built on proven technologies like
 - XML
 - HTTP
 - Messaging middleware
 - Security standards

Why use Web Services

- **Because:**

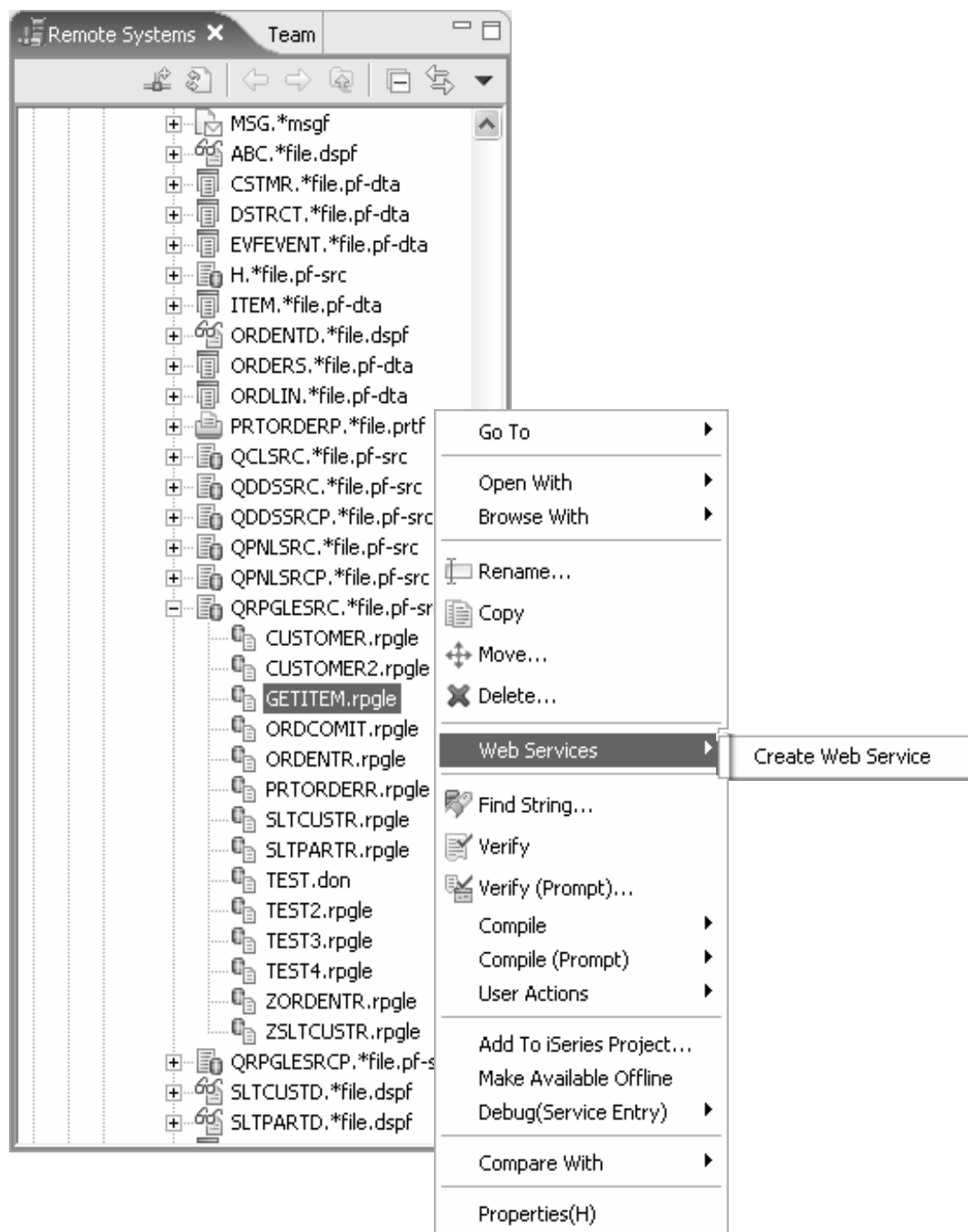
- They are the latest hype
- They are hot
- They are cool
- They are useful
- Somebody asks you to provide one for a certain task
- Somebody provides one and asks you to use it

RPG/COBOL Program as Service Provider



System i5 Web Services Tools (new in V6.0.1)

- Single wizard to convert i5/OS program or service program procedure into a Web Service
 - Generates all required code for deploying Web Service to WebSphere Application Server
- Automatically determines program (or procedure) parameters when invoked from RSE
- Just point to RPGIV/ILE COBOL program source
- Go thru a couple of wizard pages and WSDL for the program or procedure will be generated



Tools

▪ **Web Services Tools in WDS**

– **Create**

- **Web services from:**
 - **ILE RPG/COBOL source**
 - **Java Beans**
 - **Enterprise JavaBeans (advanced edition only)**
 - **SQL Queries**
 - **DB2 Stored Procedures**
 - **DB2 XML Extender calls**
- **Web service client proxy given a WSDL document**

– **Test**

- **Test your Web services in the WebSphere test environment**
- **Generate test code to test generated Web service client proxies**

– **TCP/IP Monitor**

- **Useful for debugging SOAP messages between provider and consumer**

WebService Wizard

Use Remote Systems Explorer to select member

Select member
From popup select WebService option

Remote System Details | Tasks | iSeries Tab

File WSSLABXX/QRPGLESRC (8 Members)

Name	Type	Attribute	Properties	Last modified	Created
GETDASOL	RPGL	SRC		October 5, 2003 11:...	April 22...
GETDATA	RPGL	SRC		October 17, 2003 4:...	Octobe...
GETDATAS	RPGL	SRC	OK	April 10, 2004 3:55:...	Octobe...
GETDSSOL	RPGL	SRC	OK	April 10, 2004 3:56:...	Octobe...
SUBFILEPR	RPGL	SRC	OK	February 28, 2005 ...	Februa...
WDSCSRV	RPGL	SRC	OK	February 28, 2005 ...	Februa...
WDSCSRV2	RPGL	SRC	OK	February 28, 2005 ...	Februa...

Web Service Wizard

- Click Finish & Done!
- Drop-Dead Simple!

Web Service

Web Services

Review your Web service options and make any necessary changes before proceeding to the next page.

Service

Web service type: iSeries Program Web Service

Start Web service in Web project

Launch the Web Services Explorer to publish this Web service to a UDDI Registry

Generate a proxy

Client proxy

Client proxy type: Java proxy

Test the Web service

Monitor the Web service

< Back **Next >** Finish Cancel

Default is iSeries Web Service type

The Java bean proxy will provide a remote procedure call interface to the Web service

We will test the Web service after it is created

We will monitor the SOAP traffic for this Web service

We could select Finish here and test the Service
But lets specify some more details

Configuring the Web Service- Edit Program/Parameters

-File name shows the Program source file the wizard was launched from (valid types incl. ILE RPG, COBOL, PCML)

-**Browse files** to select a different file

-The default Runtime configuration is taken from the System i5 connection

-**Edit** to change the configuration

-**Browse** to choose an existing configuration (.config file)

- Selecting the Program (**CUSTINFO**), you can change the Library, Program type, Program Object etc. (in most cases the defaults are sufficient)

- Expand the program to see program parameters

- Selecting a parameter (e.g. **IN_CID**), you can change Usage type, CCSID

Web Service

Object Selection Page

Object Selection Page

File name: R:VICE/QRPGLESRC(CUSTINFO) Browse files...

Runtime configuration: CUSTINFO Edit... Browse...

Program call definitions

- OUT_DS
- CUSTINFO**
 - IN_LNAME
 - IN_CID
 - OUT_STATU
 - O_DS (OUT...
 - OUT_CII
 - OUT_FN
 - OUT_LN
 - OUT_AC

Java bean name: CUSTINFO

Program object: CUSTINFO

Library: *LIBL

Program type: *SRVPGM

Entry point: CUSTINFO

CCSID of entry point:

Parse order: OUT_STATUS
O_DS

Thread safe: false

Configuring the Web Service- Runtime Configuration

Signon information is defaulted from System i5 connection

Alternatively, can use the Program Call Java Connection Architecture connector for signon and connection management (advanced product only)

iSeries Web Service Runtime Configuration

Configure Authentication

Specify how the program call runtime should connect and authenticate

Specify signon values

Host name: TORASCGM

User ID: ERICDP

Password: *****

Enable password encoding

Use program call JCA connector

JNDI name:

< Back Next > Finish Cancel

Testing the Web Service

After wizard completes, the generated Test Client JSPs are run on the server (selected option "Test the Web service" in the wizard)

Select one of the methods to test, then enter the input data, Customer ID "0001"

Click "Invoke" and the results of the Web service are displayed, Customer ID "0001" is associated with Annie O!

- As you will see shortly, there are many different ways to test the Web service

Web Browser x

http://localhost:8080/ServicesPro/TestClient.jsp

Methods

- [custinfo \(iseries.wsbeans.c\)](#)
- [custinfo_XML \(iseries.wsbeans.c\)](#)

Inputs

inputData:

iN_LNAME:

iN_CID:

Invoke Clear

returnp:

oUT_STATUS:

o_DS:

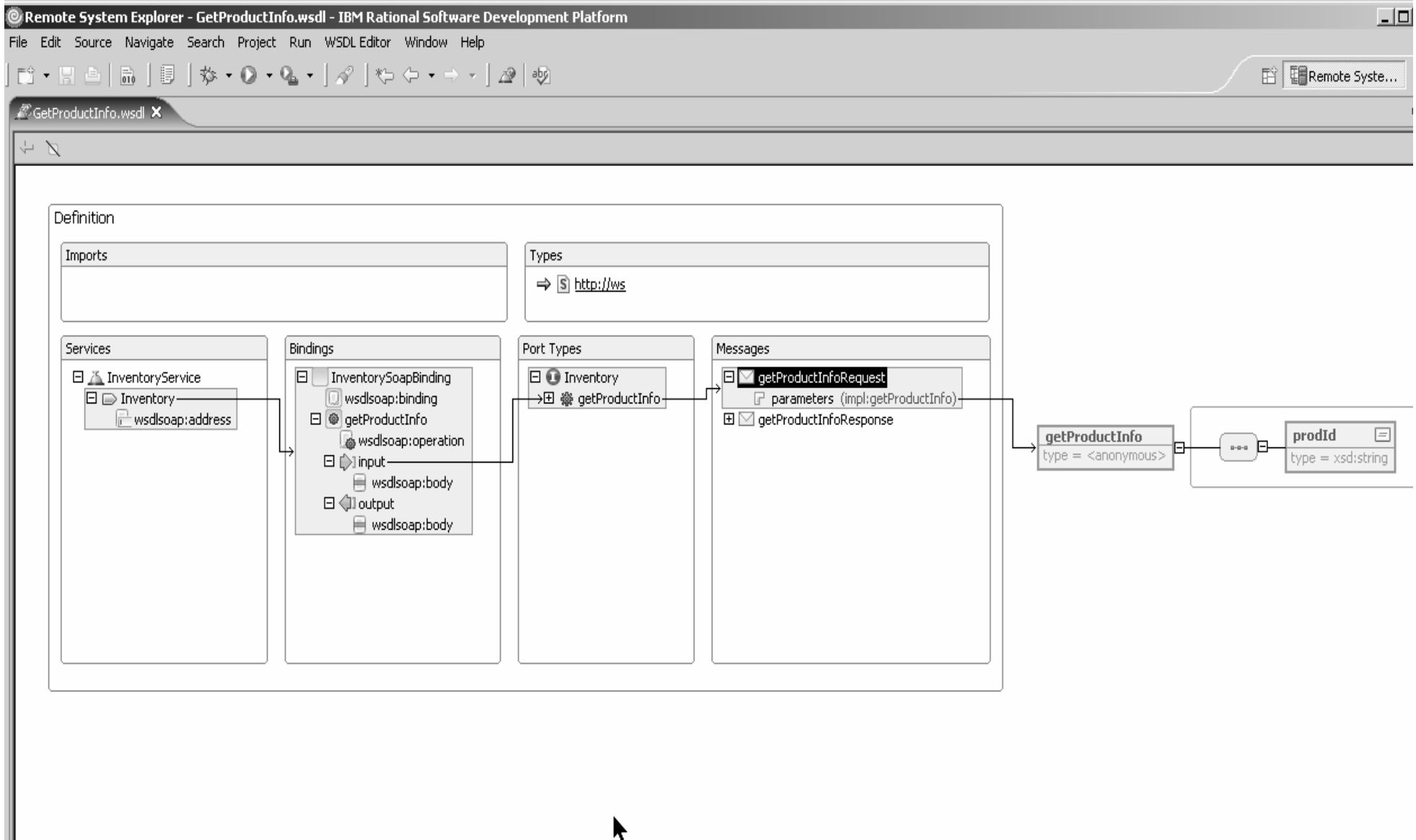
rEC_FOUND: 1

oUT_STATE: IO

oUT_FNAME: Annie O

oUT_COMMENTS: 00001

WSDL editor in WDS Sc (graphical view)

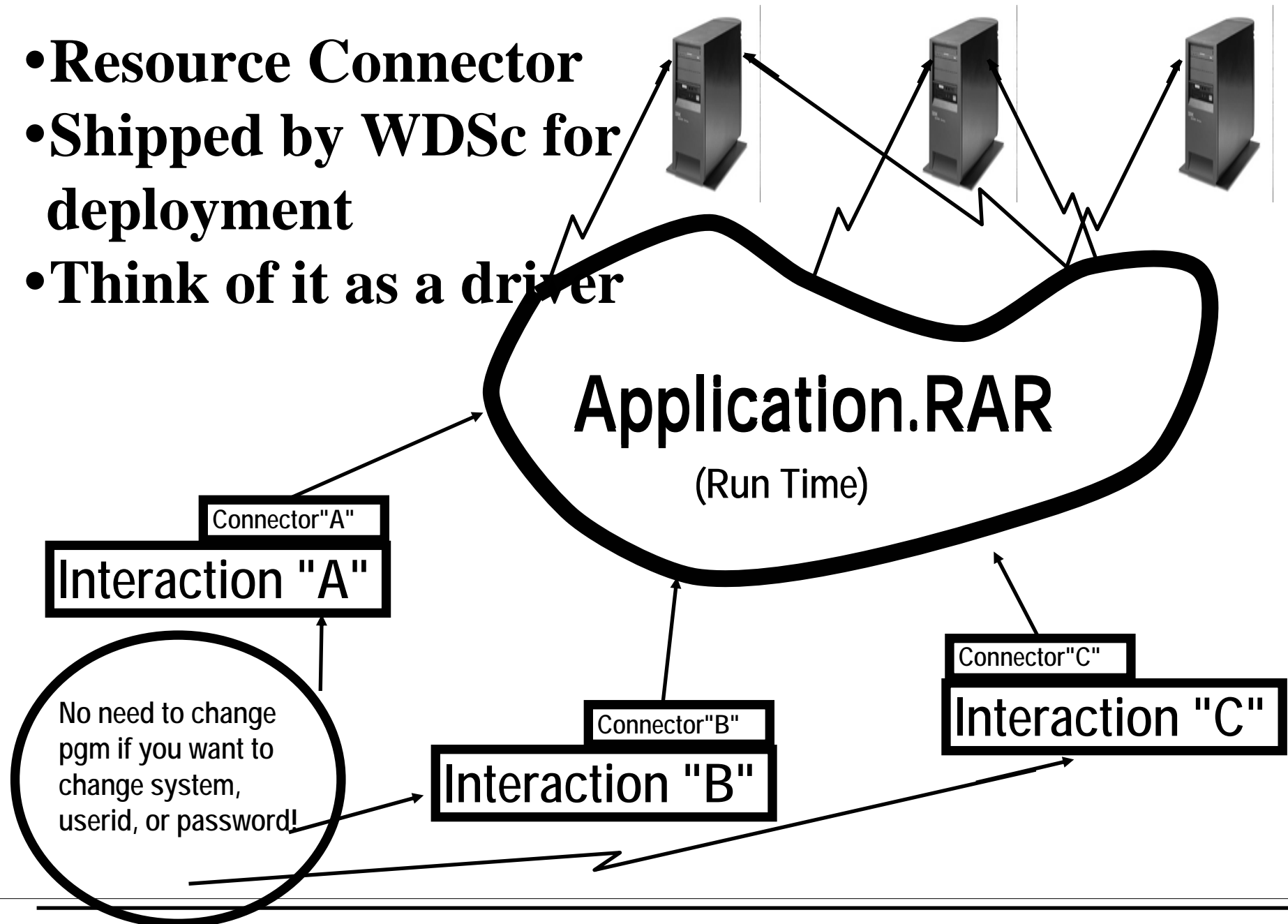


Web Tool for iSeries

- ✦ Wizards to help create iSeries
RPG/COBOL web applications
 - Interaction wizard to build an RPG web application
 - WebService wizard to build an iSeries WebService
 - JCA wizard to build an iSeries Java Connector Architecture (JCA) connector
- 

What is JCA Connectors?

- **Resource Connector**
- **Shipped by WDS** for deployment
- **Think of it as a driver**



Creating a connector

- Use runtime configuration dialog
- Check JCA checkbox
- Specify JNDI name

iSeries Web Tools Run-time Configuration

Specify the run-time configuration for program call of iSeries Web development tools

iSeries host name: torascgm

User ID: weiss

Password: *****

Prompt for iSeries user ID and password

Runtime library list

Library: Add

Library	Library Position
WEISS	*LAST
GUIDESWSS	*LAST

Remove

Move Up

Move Down

Current library: *USRPRF

Initial command:

Display detailed runtime errors

Use program call JCA connector

Specify the JNDI name: MyFirstWebApplication

Finish Cancel

SUMMARY

- ▶ **System i5 web tools, at a glance**
 - **Tools optimized for System i5 developers!**
 - ▶ **Web Interaction wizard (deprecated using STRUTS framework)**
 - ▶ **Jsf tools with iSeries support**
 - ▶ **Use Program call bean**
 - ▶ **Use direct access to data base**
 - ▶ **New and enhanced Web Service wizard**
 - ✓ **Make your system i5 programs available as a Web Service**
 - ▶ **JCA wizard**
 - ✓ **Create connectors for you system i5 programs**

More Information?

► Information Sources

- **www.ibm.com/software/awdtools/iSeries**
 - For iSeries Application Development
- **www.eclipse.org**
 - Eclipse and information about eclipse
- **www.ignite400.org**
 - Introduction to eclipse article
- **www.ibm.com/software/info1/websphere/partners/series.jsp**
 - WebSphere on iSeries home page for BPs
- **eServer iSeries magazine, July 2002 issue**
 - 3 articles on WDS*c*
- **www.ibm.com/websphere/developer**
 - WebSphere Developer Domain
 - Many articles and tutorials on technology and tools, including eclipse and WSWB and WebSphere Studio configurations

Disclaimer

Acknowledgement:

- This presentation is a collaborative effort of the IBM Toronto AS/400 Application Development presentation team, including work done by:

► *Phil Coulthard, George Farr, Claus Weiss, Don Yantzi*

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eServer	IBM (logo)	System i5
	iSeries	

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