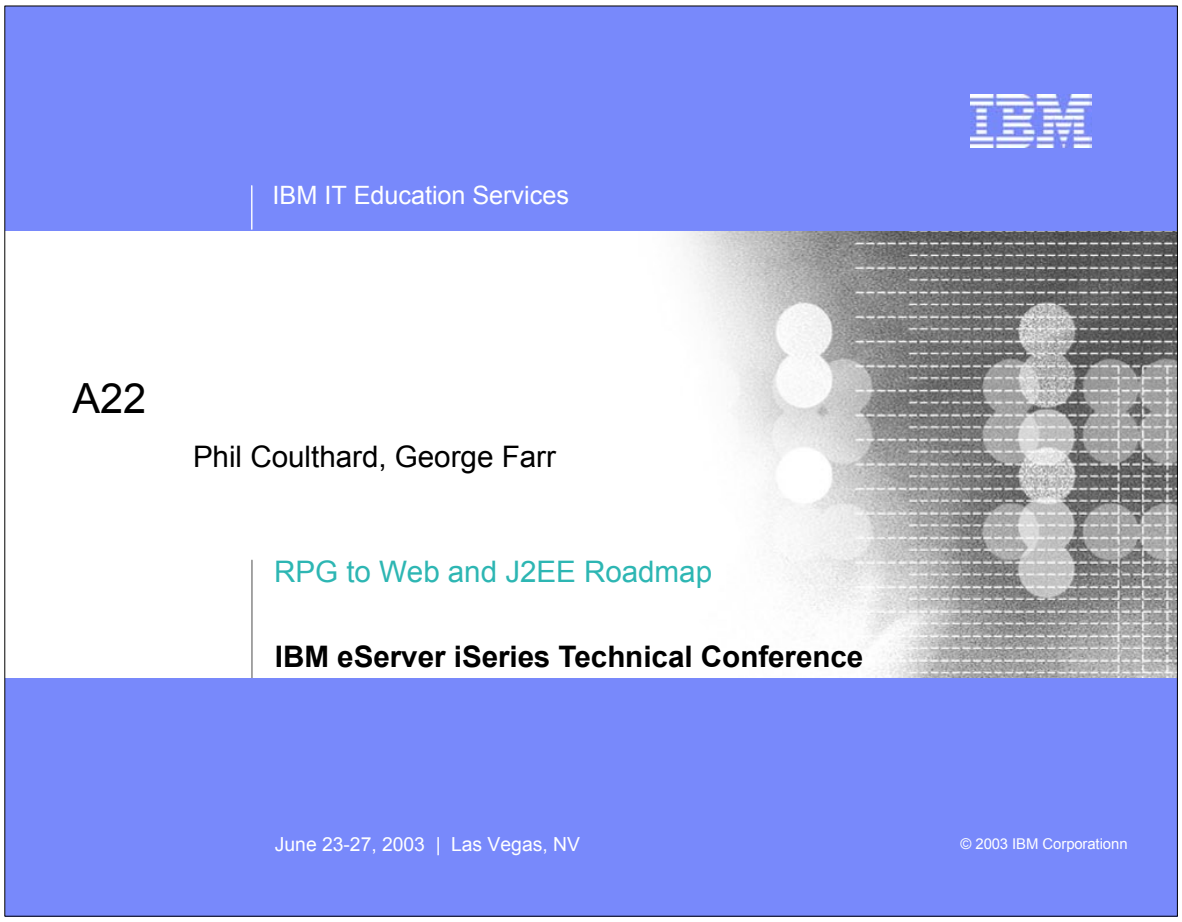

IBM IT Education Services

A22

Phil Coulthard, George Farr

# RPG to Web and J2EE Roadmap

**IBM eServer iSeries Technical Conference**

June 23-27, 2003 | Las Vegas, NV

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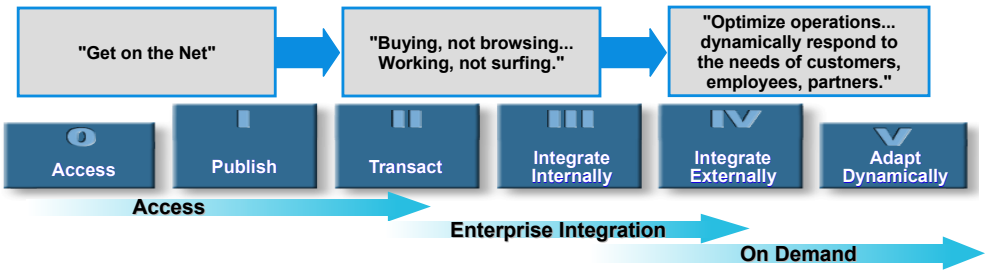
# Phases of e-business adoption

*From accessible to adaptable*





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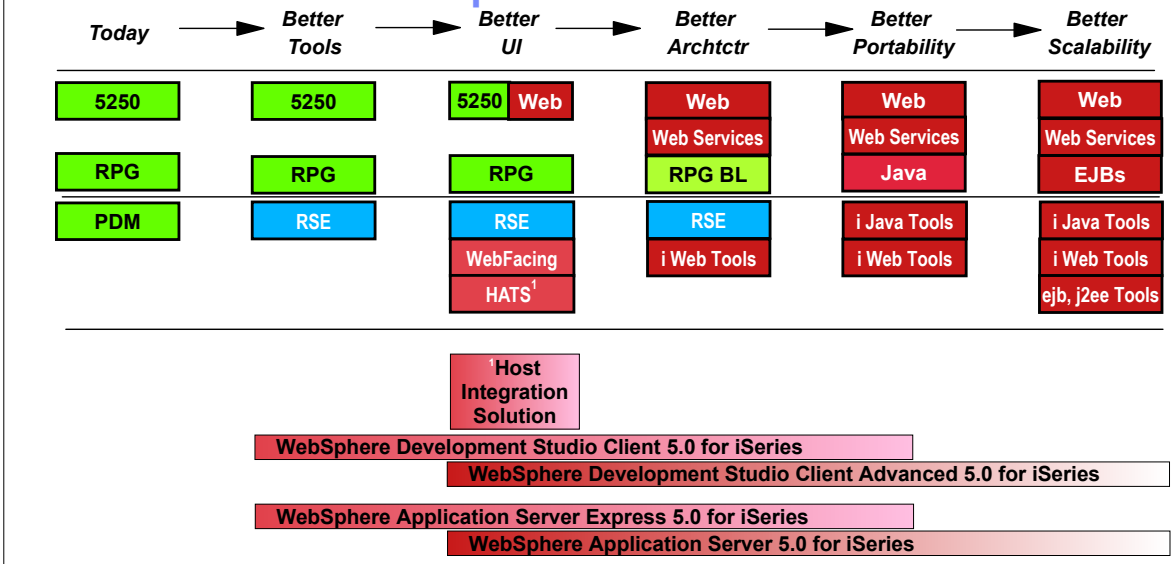
# J2EE iSeries Roadmap At A Glance





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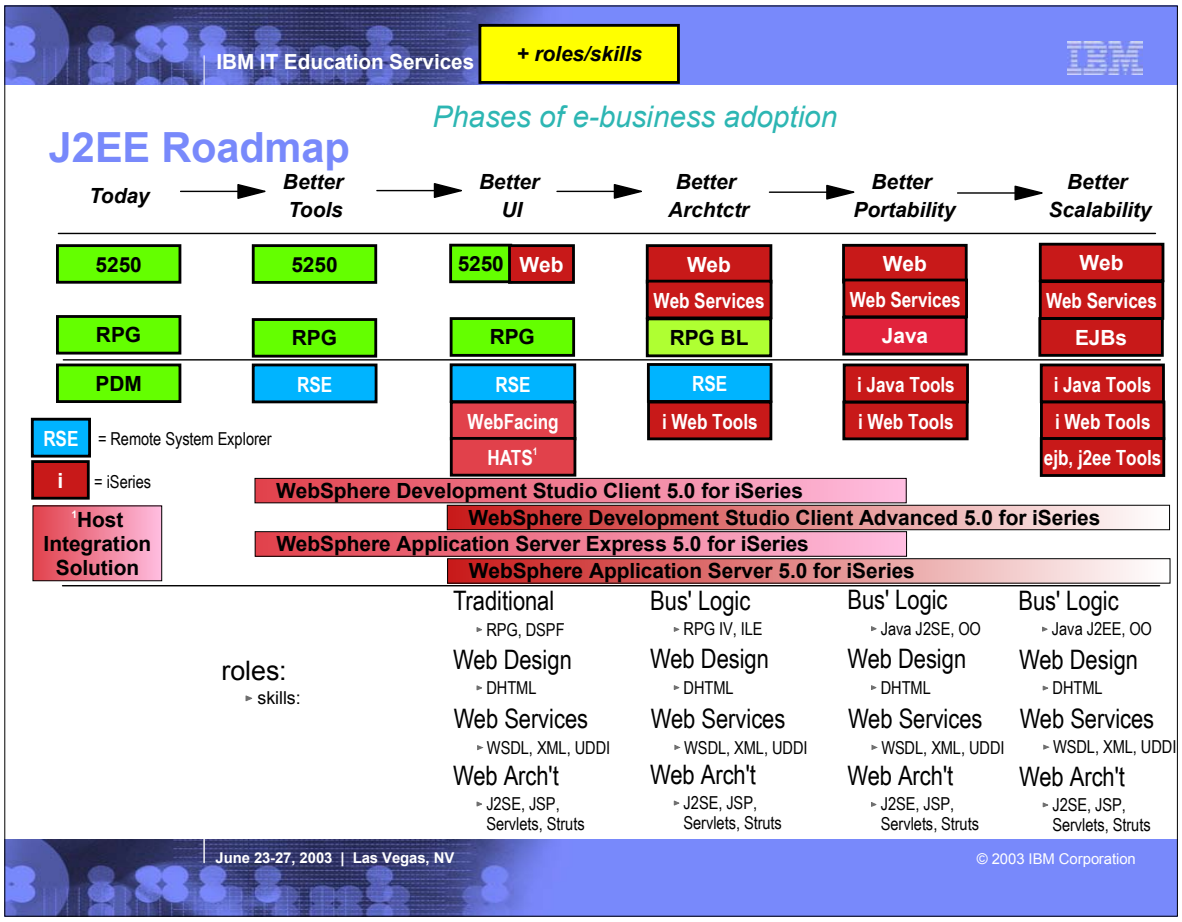
- Moving from RPG all the way to Java 2 Enterprise Edition is a very long jump, but luckily there is no need to attempt it in a single leap.
- Here we will present a roadmap with discreet, do-able steps that will move your applications and developers on a path to the future.
-
- Each step in the roadmap will be discribed in more detail in subsequent slides, but we offer here a quick overview:
- 1. Today. Most people are starting from a base where they are building and maintaining green-screen 5250 applications, using 5250 traditional tools like PDM, SEU and SDA.
- 2. Better Tools. The first step to modernization is modern tools to do the same development work. The Remote System Explorer in WebSphere Development Studio Client offer exciting new tools for the development of RPG, COBOL, C,C++, CL and DDS. This step increases the productivity of what you are doing today, and helps attrack and keep new programmers. It also introduces the same IDE that is used for all the other steps.
- 3. Better UI. There is often an urgent business need for alternative user interface to a green screen. For most applications, that need is best addressed with a Web user interface. The WebSphere Development Studio Client product that has the RSE also has WebFacing, which will convert your DSPF DDS source into Web page source (JavaServer Pages) in a Web application. The deployed Web application then runs your application without change, but in a Web browser. The converted results can be customized to improve the results. In addition to WebFacing, the IBM Host Access Transformation Server product can be used to instantly transform, at runtime, any 5250 or 3270 sessions into Web pages. The resulting Web pages can also be customized in HATs. In both cases, since the underlying applications are not changed, they continue to be maintained and enhanced as before, perhaps using the RSE "better tools".
- 4. Better Architecture. This is the big step where we now actually attempt to create something new, possibly from scratch or cut and paste. This could be a new Web application or enhancement, or a new Web service that exposes some functionality beyond the iSeries. In either case, it involves authoring non-interactive business logic in RPG or COBOL (using RSE say) and then using the iSeries Web Tools in WebSphere Development Studio Client to put a Web user interface or Web Service front end on the business logic. The separation of the business logic from the user interface is a better architecture allowing re-use of that logic in many ways.
- 5. Better Portability. In this step we move from writing the business logic in RPG or COBOL, to writing it in Java. However this is simple standard edition Java, not enterprise edition Enterprise Java Beans. Database access is done with SQL via JDBC. The iSeries extensions to the eclipse Java tools, in WebSphere Development Studio Client, make it easy to deploy Java code to the iSeries and run, debug and profile it there.
- 6. Better Scalability. Finally, for those requirement highly scalable Web applications, or who want the full OO and functional power of J2EE, the J2SE Java code is replaced with Enterprise Java Beans and Message Driven Beans. The tools for these are in the advanced version of WebSphere Development Studio Client.




- This flavor of the roadmap adds in the skills needed for each step in the roadmap

# Important URLs for Learning

| | |
|---|---|
| ClassRoom: | **IBM Education:**<br>http://www-3.ibm.com/services/learning/us/catalog/<br>**IBM eServer Campus**<br>http://www-1.ibm.com/servers/eserver/education/index.html |
| Internet: | **IBM Education:**<br>http://www-3.ibm.com/services/learning/us/elearning/<br>**IBM eServer Campus**<br>http://www-1.ibm.com/servers/eserver/education/index.html<br>**IBM eServer Enablement**<br>http://www-1.ibm.com/servers/enable/nav2/i/index.html<br>**IBM Java Education WebSite:**<br>http://www-106.ibm.com/developerworks/views/java/tutorials.jsp<br>**IBM Web Lecture Services for iSeries:**<br>www.ibmweblectureservices.ihost.com/ibm/iseries_plus<br>**Sun Self-Study:**<br>http://www.java.sun.com -> Education -> Tutorials |
| Docs, books: | **IBM eServer Enablement**<br>http://www-1.ibm.com/servers/enable/nav2/i/index.html<br>**IBM WDS Self-Study:**<br>http://www.ibm.com/software/awdtools/wds400 -> Training -> Self Study<br>**MC Press and IBM Press Books:**<br>http://www.mc-store.com<br>**IBM Redbooks:**<br>http://www.ibm.com/redbooks<br>**Struts Self-Study:**<br>http://jakarta.apache.org/struts/resources/index.html |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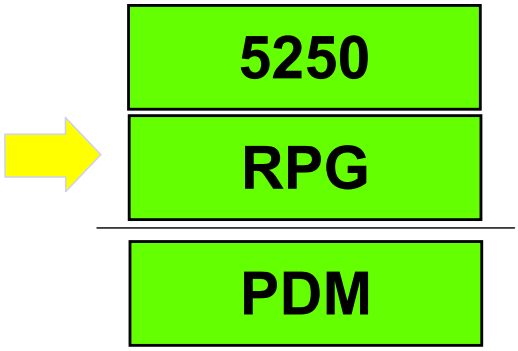
## Today

- The majority of iSeries developers are still:
  - creating or enhancing 5250 "green screen" applications
  - using the traditional host-based development environment of PDM, SEU, SDA, RLU, DFU and the system debugger





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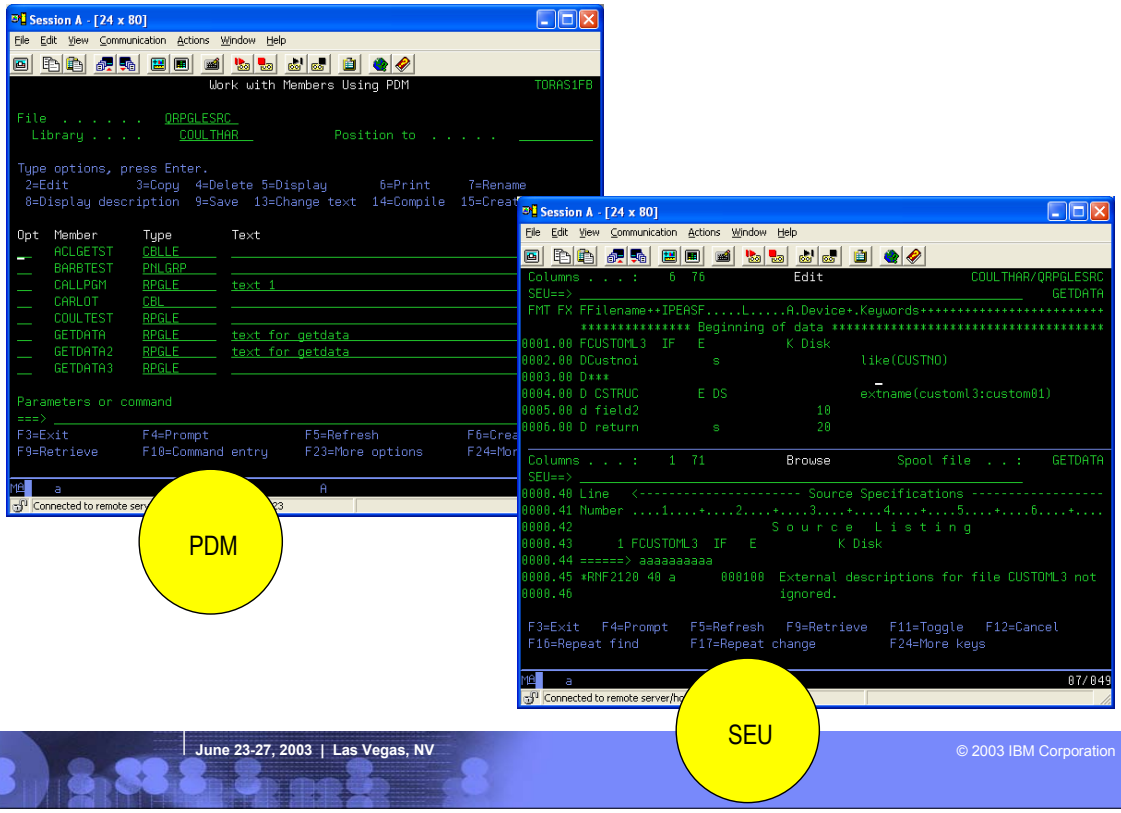
- This step is where many iSeries development shops and ISVs are today.
- They are using green screen tools to build or enhance green screen applications.

# RSE



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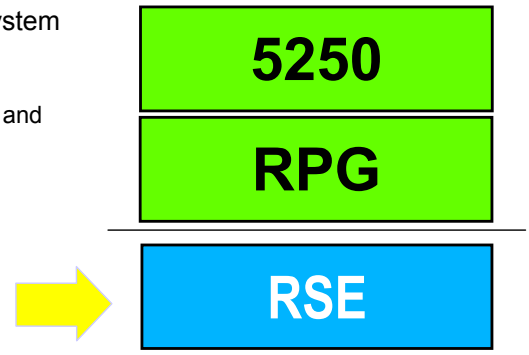
- This is a picture of the Remote System Explorer.
- The whole collection of views and editors is called the Remote System Explorer perspective. Users can open multiple perspectives and flip between them using the icons in the bar on the left.
- The primary view within the RSE perspective is the Remote Systems perspective, from which you create connections to remote iSeries, Unix, Windows or Linux systems. The picture shows a connection to an iSeries system explanded, and you see that you are able to work with iSeries Objects, Commands, Jobs and IFS files. Use iSeries Objects to work with OS/400 objects and member ala PDM.
- As you select objects in the Remote Systems view, the property sheet in the lower left shows information about the selected object, some of which is directly editable there for convenience.
- There are a rich set of right-click actions for all object types and members, including for source members the option to open the member in the RSE editor, as shown. Beyond what IBM supplies, users can define their own user defined actions.
- The editor is rich in function, exceeding SEU while still retaining SEU features like entering D in the prefix area to delete a line. The editor comes with syntax-checking and cursor-sensitive F1 language help. It also has a program verifier built-in for RPG, COBOL and DDS which does a full error check, reporting the results in the iSeries Error List as shown. Double clicking on an error in the error list positions the cursor in the editor at the offending line, and optionally inserts the error lines for context, as shown here. The same error feedback is used when the member is remotely compiled.
- Also shown is the outline view which offers an at-a-glance hierarchical view of the source member currently active in th editor. This is handy for program understanding and navigation.
- The editor also support content-assist for RPG: this allows you to press Ctrl+Spacebar to get a list of options appropriate for where the cursor is... eg, in the opcode area you get a list of valid opcodes, plus help for each, and select one to insert it at the cursor.
- In the bottom you see there are tabs for some of the many other views, such as the iSeries Table View which is an alternative to the tree view, offering a sortable table view very consistent with PDM. Like PDM this is also where the command line exists for entering and running OS/400 commands. The iSeries Commands Log show the log of all explicitly or implicitly run commands for this session.
- Like all Eclipse perspectives, users can re-arrange the views to fit their preferences.

# Step 1. Better Tools

- Moving from iSeries application development to Eclipse Integrated Development Environment
- **Remote System Explorer** provides iSeries system access from the Eclipse IDE in WebSphere Development Studio Client for iSeries
  - 21st century follow-on to PDM, SEU, SDA, RLU and system debugger
- Value Proposition
  - Improves the productivity of iSeries application development over host 3GL tools
  - Provides easy access to advanced application development tools from IBM and vendors
  - Attract and retain RPG/COBOL skills
- Education Enablement
  - Introduction to WDSc
  - Remote System Explorer and iSeries Projects
  - Extending the RSE for ISVs and BPs





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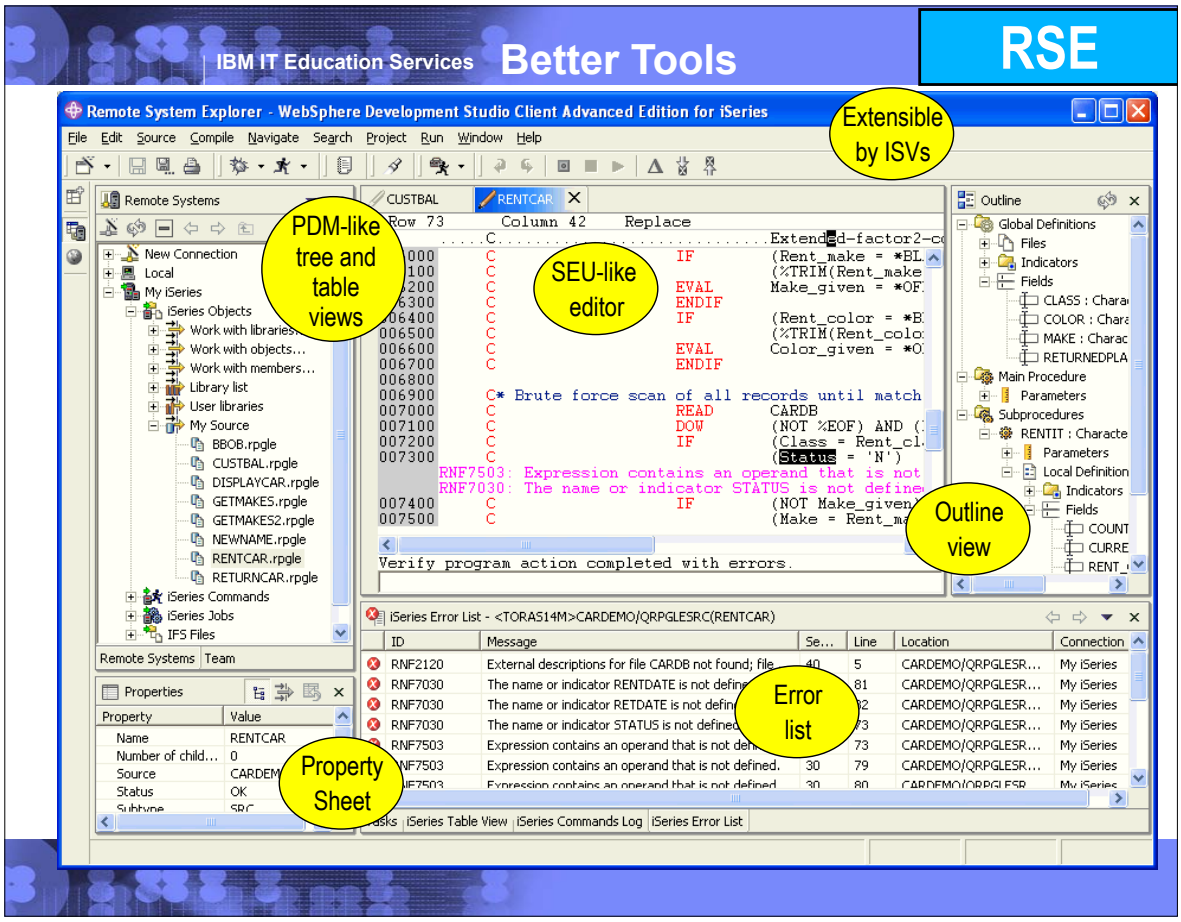
- This is the first step in the roadmap.
- It does not involve any change to the applications that are written. Rather, it simply replaces the traditional tools with more exciting and modern tools.
- The Remote System Explorer is the follow-on to PDM, SEU, SDA, RLU and the system debugger. It offers higly productive follow-ons these tools and more, all highly integrated with each other and the Integrated Development Environment of Eclipse.
- The RSE is also the 21st century PDM in the sense that is the point of integration for all iSeries tools vendors, many of whom have already released plug-ins to complement IBM's functionality with additional capability.
- The RSE comes with WebSphere Development Studio Client.
- By learning and using the RSE, PDM programmers will not only become more productive, but also familiar with using workstation-based tools. Programmers gain transferrable skills that can later be applied to the other eclipse-based tools in WebSphere Development Studio Client.
- Using RSE also opens up a world of opportunities to use the next generation of 3rd party tools that are being built on top of Eclipse.
- Further, the RSE works not only with OS/400 files, commands and jobs, but also with IFS files and QShell commands, and with Linux LPAR files and commands. That is, from a Windows workstation you can remotely access and edit remote files and run remote commands. Indeed, it can even work with the files and commands in any remote Unix, Windows or Linux system, as well as with your local Windows files and commands. Eventually, as technologies like Java and Web are explored this consistent support across file systems and command shells will be important.
-
- Delta Skills Needed:
- - Remote System Explorer
- - Eclipse

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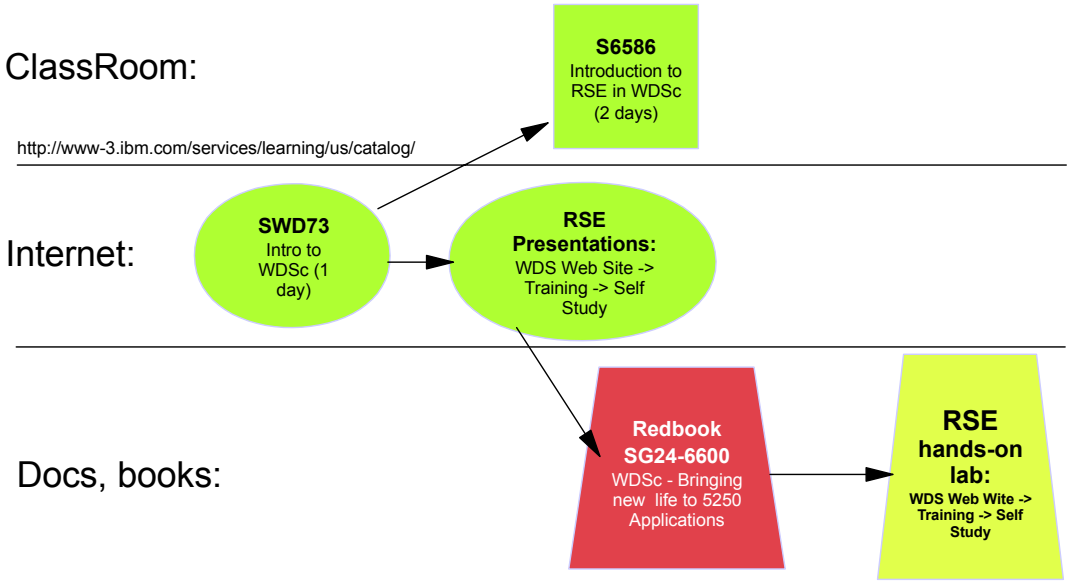
# Learning "Better Tools"




WDS Web Site = http://www-3.ibm.com/software/awdtools/wds400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# Related Tech Conf Sessions for Better Tools

| Session | Title | Presenters |
|---|---|---|
| A34 Mon 3:30 Pavilion 1 | Hot New Tools for RPG/CBL | Phil Coulthard |
| A35 Tue 10:30 Pavilion 1 | Hot New Tools for RPG/CBL - demo | George Farr |
| J14 Tue 1:30 Conf 11/12 | **Lab:** Hot New RPG Tools | Don Yantzi, Phil Coulthard, Claus Weiss |


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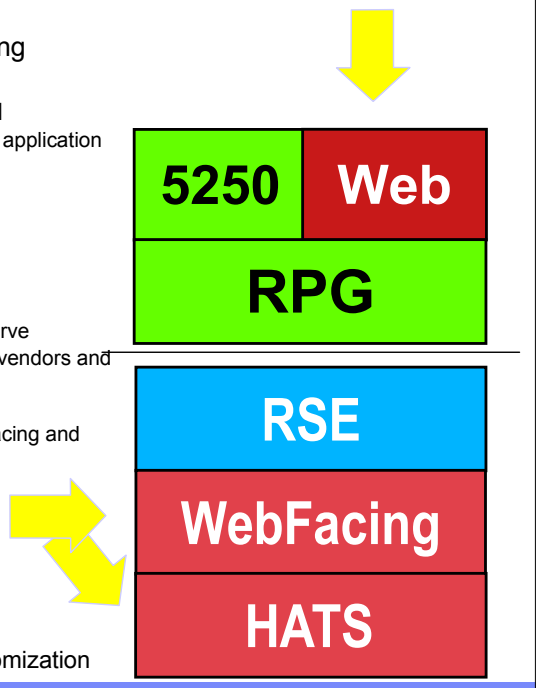
# Step 2. Better UI

- Create a browser based GUI interface to existing iSeries 5250 applications
  - Nearly instant conversion of 5250 UI to a Web UI
    - At development time for WebFacing. Application by application
    - At runtime for HATS. Session based
    - Iteratively refinable for both WebFacing and HATS
  - No impact to underlying application logic
- Value Proposition
  - Web UI offers:
    - ease of use characteristics and reduced learning curve
    - easy access to applications for remote employees, vendors and partners
    - expanded market reach for ISV solutions
    - elimination of interactive cycles, when using WebFacing and new iSeries servers, reducing cost of solution
- Education Enablement
  - WAS Express for iSeries education
  - WebFacing Tool and/or HATS education
    - plus WebFacing Tool service provider offerings
  - Introduction to J2EE Web applications
  - Introduction to Dynamic HTML for effective customization





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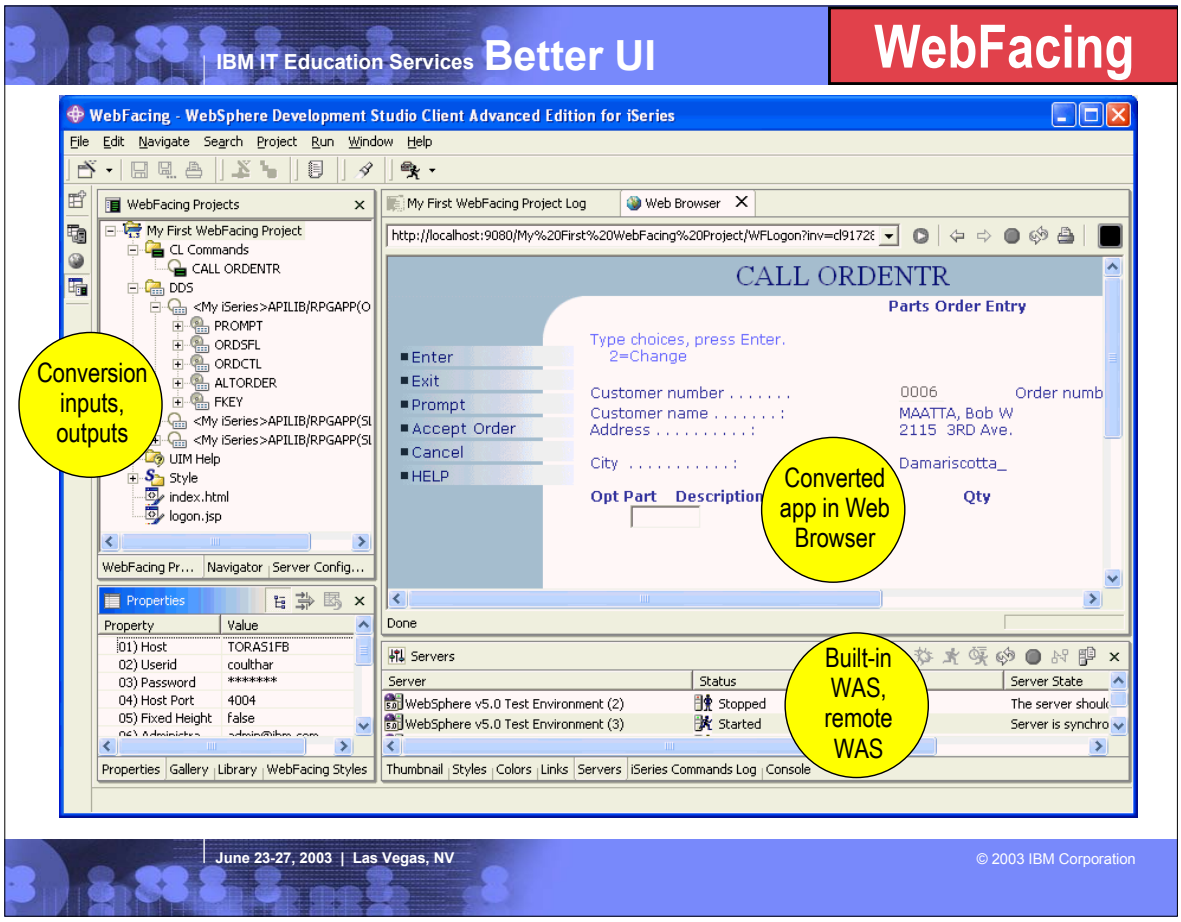
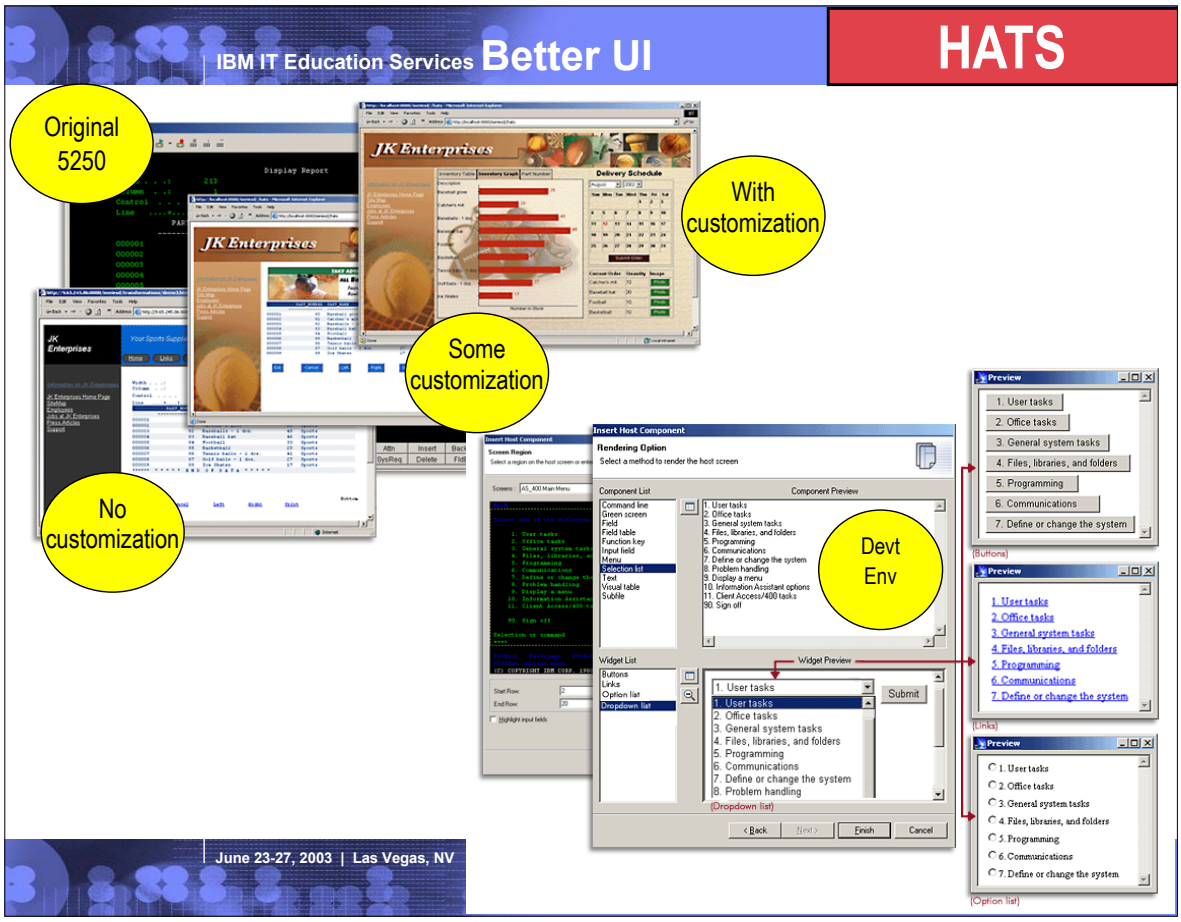
▸ After leveraging better tools, it is time to use more tools to get a better UI for existing 5250 applications.
▸ The IBM options for doing this are WebFacing and Host Access Transformation Server (HATS).
▸ Both options produce a Web user interface from a 5250 user interface, with no impact to the underlying application logic. Both produce UIs that run on WebSphere Express or higher, on any OS that will run WAS.
▸ The WebFacing option converts the DSPF DDS source at development time, into a Web application with JavaServer Pages. The conversion is refinable by using the CODE Designer tool to add Web Settings (special comments) to the DDS source which affect the result of the conversion. For example, fields can be hidden or replaced with HTML tags, where the tag contents are derivable from the field contents. For example, you can send an IFS image file name to a hidden 5250 field and convert that to an HTML image tag to show the image in the Web page. The CODE Designer is the follow-on to SDA, offering a 5250 WYSIWYG view of the application UI.
▸ WebFacing is part of the WebSphere Development Studio Client, and leverages the tools in it including the Remote System Explorer for the RPG and DDS logic.
▸ WebFaced applications don't produce a 5250 datastream. Rather, the OS/400 runtime intercepts the data written by the application to the record formats, and sends the data to the WebFacing servlet which inserts it directly into the generated JSPs.
▸ WebFaced apps do not use interactive cycles, when run on the new iSeries 8x0 servers announced in January 2003.
▸ There is no runtime fee for WebFaced applications.
▸ HATS converts the 5250 or 3270 datastream at runtime, into a native Web user interface that also runs in WebSphere. Because it is a runtime conversion, it is truly plug and go, instantly tranforming any and all screens to run in the Web.
▸ HATS developers can easily and iteratively refine the conversion results to improve the resulting Web user interface.
▸ HATS is a separately purchased product, which includes its Eclipse-based development environment.
▸ Often, HATS is used to convert all screens, both system and application, into a Web UI. Then WebFacing is used on an application by application basis where source is available and the non-interactive competitive advantage is needed. Where source is not available, or there is very extreme iteration of the 5250 application, HATS is used and its tools are leveraged to iteratively refine the result.
▸ HATS also has excellent integration with WebSphere Portal.
▸
▸ Delta Skills Needed:
▸ - WebFacing Tool
▸ - HATs
▸ - Introduction to Web applications
▸
▸ Skills that will help:
▸ - HTML
▸ - JavaScript

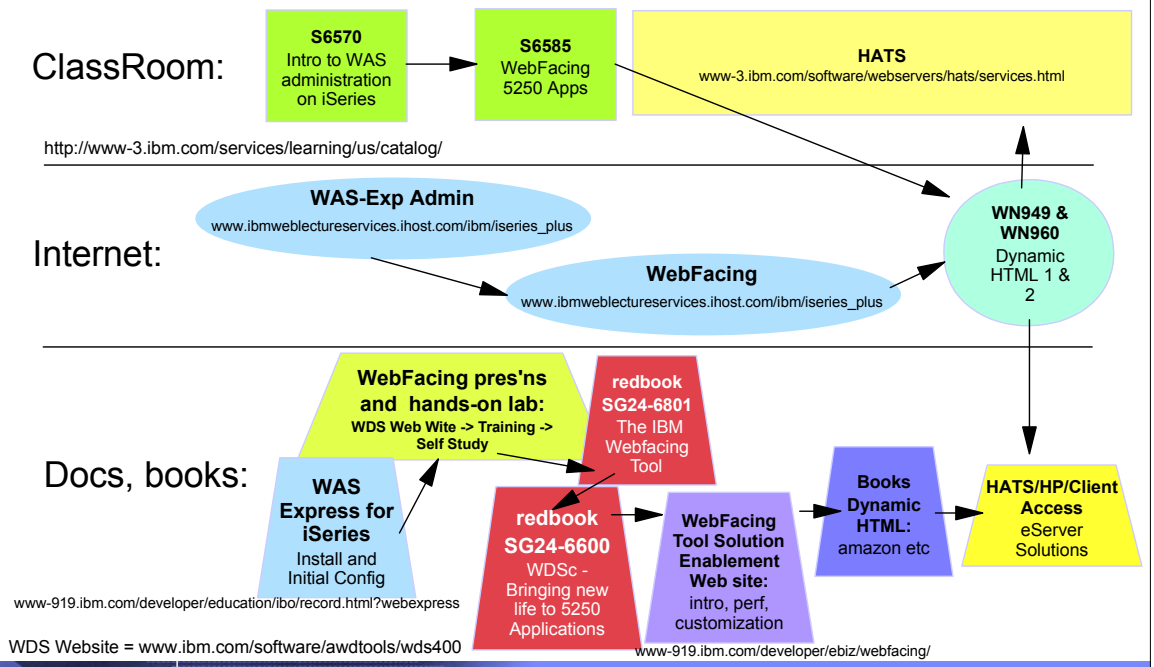



- This is a screen capture of the WebFacing development environment inside WebSphere Development Studio Client.
- The whole collection of views and editors is called the WebFacing perspective. Users can open multiple perspectives and flip between them using the icons in the bar on the left.
- Developers use a wizard to create a WebFacing project, specify the DDS and UIM Help Panel members to be converted. The resulting project allows editing access to the original DDS, as well as the generated files.
- It is very easy to test the converted output within the tool, but simply right clicking on the project and selecting "Run on Server". This runs the built-in and pre-configured copy of WebSphere (choice of 4.0, 5.0 or 5.0 Express).
- The view at the bottom right shows the built-in copies of WebSphere, and allows developers to easily start, stop and publish to them. It also easy to use the same view to manage remote instances of WebSphere Application Server.
- When running a WebFaced application within the tool, the user interface of the WebFaced application is shown in the built-in Web browser, as we see here.




- This shows the result of using HATS.
- The pictures on the left show a green screen with no customization, with some customization and finally with significant customization. As can be seen, there is much built-in customization capability in HATS, including the ability to turn subfiles into graphs, and to insert calendar date-pickers.
- The pictures on the right show the Eclpise-based development environment for HATS, used for customization. The customization requires no HTML skills, and can be done using easy to use wizards and dialogs.
- Like WebFacing, HATS leverages the built-in test environment for WebSphere to simplify seeing the results.

# Learning Better User Interface





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- Standup Class
  - HATS (Face-to-face) Education, find the info at
    - http://www-3.ibm.com/software/webservers/hats/services.html
- Web-based Distance Learning
  - WebSphere Express Admin w/WDSc V4
    - Register at http://www.ibmweblectureservices.ihost.com/ibm/iseries_plus
  - WebFacing for iSeries w/WDSc V4
    - Register at http://www.ibmweblectureservices.ihost.com/ibm/iseries_plus
- Resource avenue
  - WebSphere Application Server - Express for iSeries -- Install and Initial Configuration - IBP http://www-919.ibm.com/developer/education/ibo/record.html?webexpress
  - The eServer Solutions Enablement IBM WebFacing Tool web site page http://www-919.ibm.com/developer/ebiz/webfacing/
    - Downloadable labs
      - WAS Express Lab
      - WebFacing Customization and Deployment Lab
      - WebFacing Customiztion Lab
    - IBM WebFacingTool performance paper
      - http://www-919.ibm.com/developer/ebiz/webfacing/papers.html
  - Book
    - Dynamic HTML: Difinitive Reference, by Danny Goodman, Publisher: O'Reily

# Related Tech Conf Sessions for Better User Interface

| Session | Title | Presenters |
|---|---|---|
| J12 Mon 10:30 Pavilion 6 | WebFacing Your iSeries Applications | Claus Weiss |
| J13 Mon 1:30 Conf 11/12 | **Lab:** WebFacing an iSeries Application | Don Yantzi, Class Weiss, Phil Coulthard |
| A08 Mon 1:30 Ballroom D | A Critical Look at ReFacing Tools | Doug Fulmer |
| J13 Tues 8:30 Conf 11/12 | **Lab:** WebFacing an iSeries Application (repeat) | George Farr, Don Yantzi, Claus Weiss |
| J16 Wed 8:30 Pavilion 1 | Introduction to HATS | Rick Hardison |
| J11 Wed 3:30 Conf 11/12 | **Lab:** WebFacing (repeat) | Claus Weiss, Don Yantzi |
| J15 Thur 8:30 Pavilion 10 | Advanced WebFacing Q and A | Claus Weiss |
| J12 Thur 3:30 Ballroom E | WebFacing Your iSeries Apps (repeat) | Claus Weiss |


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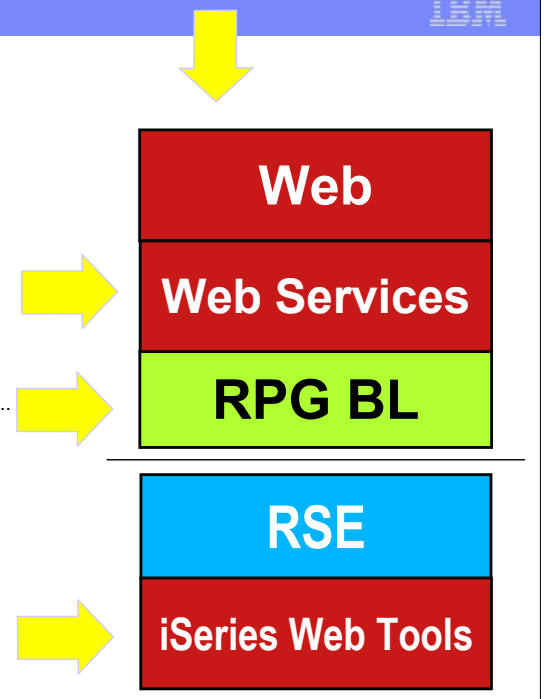
# Step 3. Better Architecture

- Create new iSeries e-business solutions
  - Using Web and Web services tools in WDSC
    - Use RPG / COBOL for the business logic
    - Use iSeries Web Tools to generate the rest
- Value Proposition
  - Properly architected new Web apps offer:
    - easier to maintain and re-use the business logic
      - easier to keep up with increasing demands
    - easier to support multiple interfaces: Web, phone, ...
    - support for business-to-business via Web services
  - iSeries Web Tools offer:
    - focus on business logic, not J2EE plumbing
    - re-use of SDA skills in Web page development
- Education Enablement
  - Introduction to ebusiness
    - J2EE Web application artifacts, architecture,terms
    - Introduction to Struts framework for Web apps
    - Introduction to Web Services
  - Tools
    - iSeries Web tools, Struts tools, Web Services tools including iSeries Program Call wizard
  - WAS /WAS Express education





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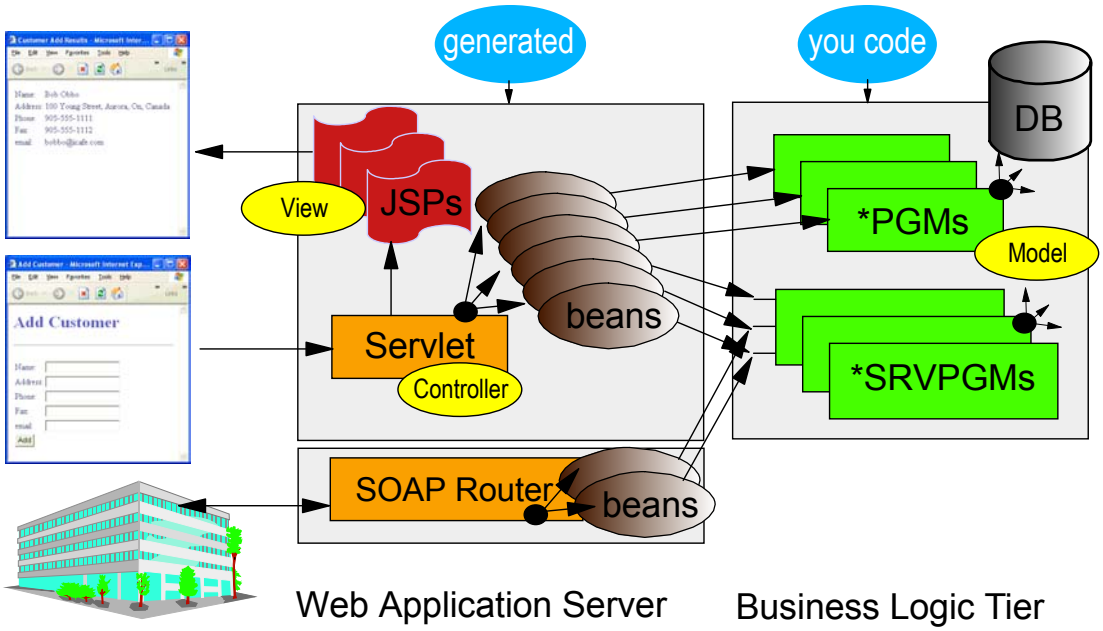
▸ This is the first step that involves developing new logic.
▸ In this step, we right RPG or COBOL business logic to drive a new Web user interface, or that is exposed to the world as a Web Service.
▸ The business logic is written with the RSE (from the Better Tools step), and then the iSeries Web Tools are used to generate the Web user interface and controller logic, or the Web Service. Both of these come in WebSphere Development Studio Client.
▸ The iSeries Web Tools includes a wizard that, given the information needed to call an existing program or procedure, will generate Java logic to make that call, and then the Web Services wizard is used to turn that Java logic into a Web Service. A Web Service allows functionality in the form a remote function call to be exposed to others who can call it from any other system, without knowing or caring what the service is written in or what operating system it runs in. Web services can be used within a company to get complete re-use of key functionality, or between companies for business to business communications.
▸ For Web user interfaces, the iSeries Web Tools also contain a Web Interaction wizard that will generate an input Web page and output Web page for the input and output parameters of a program or procedure, and all the Web application glue needed to do the binding. The Web pages are functional, and ready to be visually improved by Web designers, if desired.
▸ To help iSeries programmers move from SDA to the Page Designer for building Web pages, the iSeries Web Tools also come with a number of Web controls, known as visual custom tags, that leverage SDA skills. For example, the label and entry field controls support edit code and edit words, and entry fields support validity checking and even database referencing. The necessary HTML and Javascript is generated for you.
▸
▸ Delta Skills needed:
▸ - RPG IV or ILE COBOL
▸ - ILE
▸ - Web Services and Web Services tools in WebSphere Development Studio Client
▸
▸ SKills that will help:
▸ - Separating business logic from UI logic
▸ - Writing modular logic
▸ - Struts

## Architecture of Better Architecture





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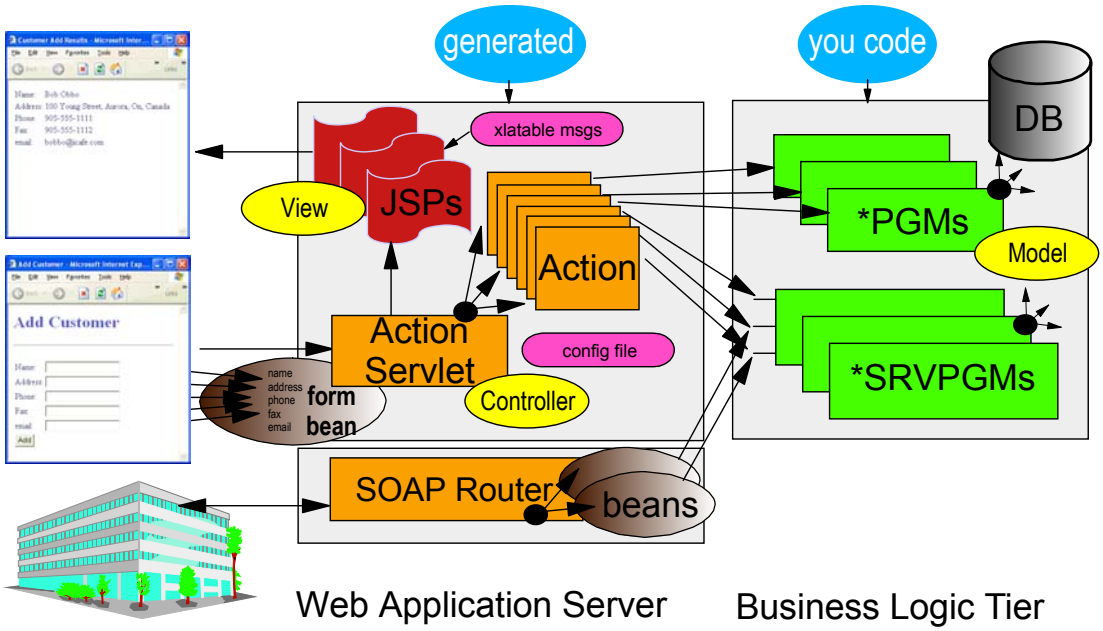
- This is the architectural picture of a Web application
- The second tier, the Web application tier, consists of a single servlet that acts as a controller deciding which business logic java bean (not an EJB!) is to be called for a given input request. The job of the business logic java bean is to invoke the actual business logic on the 3rd tier, which for us is an RPG or COBOL program or procedure. The user inputs are passed to the business logic, and results are returned. The controller servlet then decides what Web page (JavaServer Page) to show next and passes control to it, passing it business logic java bean that now contains the results. The results are inserted into the JSP and the resulting page is shown to the user.
- For Web Services, the caller calls a generated client which in turn calls the SOAP router which finds the appropriate Java bean to call. Again, this java bean is just a wrapper of the program or procedure business logic.

# Better Architecture

## Even Better Architecture with Struts



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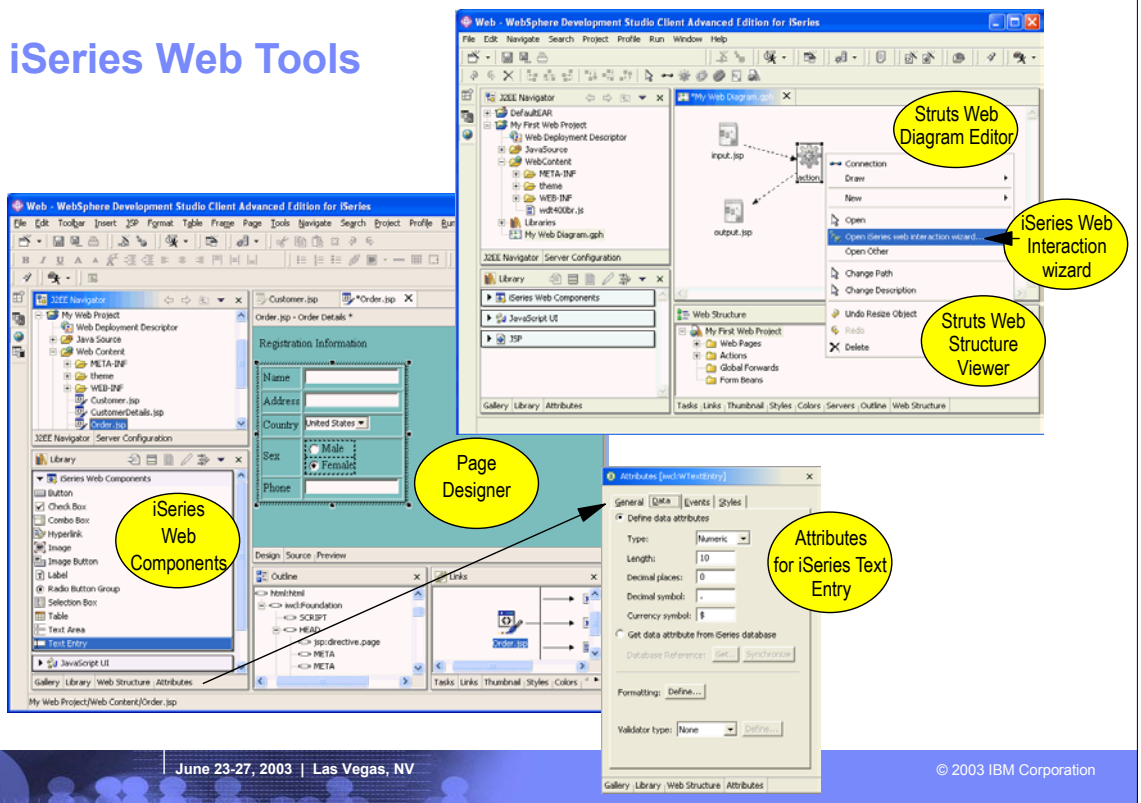
- Here we enhance the architect to leverage the very popular open-source Web application framework called Struts. This is the preferred way to build a Web application.
- With Struts, the servlet is supplied, and what needs to be coded are Action classes in Java, which in turn call the actual business logic. The base Action class is supplied by Struts. The decision about which Action to invoke for a given Web page form, and which JSP to show next, is guided by a Struts config file. This allows the flow to be changed without changing the code. Struts also makes it easier to be build internationalized Web pages by using externally described text.
- Stuts also simplifies the processing of the user input by using "form bean" to capture all the user input from the input page: for each input field in the input page, the data is copied to a property in the bean with the same name as the field. This bean is then passed to the Action, which can pass it on to the business logic.
- The iSeries Web Tools includes tooling for Struts, and will generate everything in the Web application tier, after you pictorially "layout" the application flow. Again, this allows the iSeries developer to focus on the RPG or COBOL business logic, using their existing skills.
- For information the Struts framework see www.jakarta.apache.org

# Better Architecture

## iSeries Web Tools



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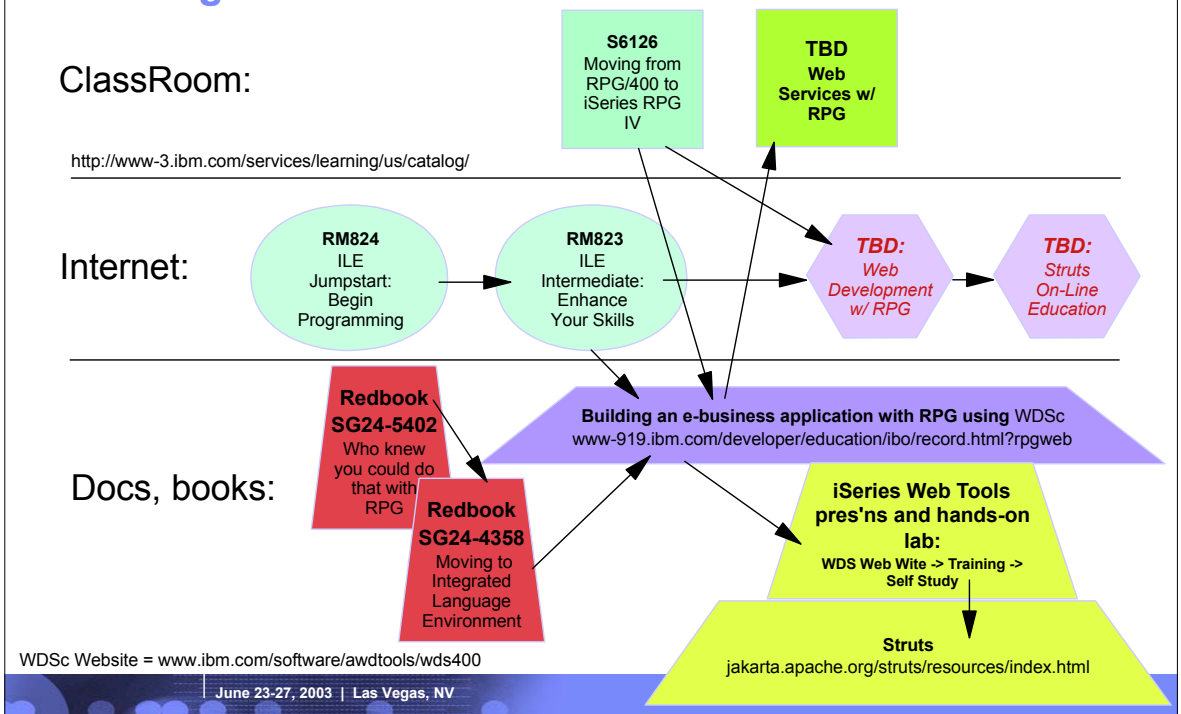
- This shows a bit of the iSeries Web Tools.
- The picture in the upper right shows the Web Diagram editor where you layout your flow, dropping icons representing Web pages and Actions. Then you use the iSeries Web Interaction wizard, per Action, to identify the program or procedure business logic to call, and the Web pages and Action are generated for you.
- The picture in the lower left shows the Page Designer being used to create a new page or enhance a generated one. The Library palette in the lower left shows the iSeries-friendly Web components that can be dragged and dropped to the Web page designer. Also shown is the Attribute view for a selected entry field iSeries Web component. As you can see, its supports attributes for data type, length and decimal places, as well as edit code/word formatting and compare and range validity checking. This is all similar to display files and SDA, but in this case JavaScript is generated versus DDS.

# Learning Better Architecture






- Stand up class
- Web based
- Resource avenue
  - Building an e-business application with RPG using WebSphere Development Studio for iSeries - LAB (WDSc4.0- update July to WDSc5.0
    - http://www-919.ibm.com/developer/education/ibo/record.html?rpgweb
    -
    -
  - Struts:
    - http://jakarta.apache.org/struts/resources/tutorials.html

►

# Related Tech Conf Sessions for Better Architecture

| Session | Title | Presenters |
|---|---|---|
| A09 Mon 8:30 | XML for RPG Programmers | Susan Gantner |
| A52 Tue 1:30 Ballroom E | RPG IV: Beyond V5R1 | George Farr |
| J08 Tues 3:30, Ballroom D | ebusiness for iSeries Programmers | Phil Coulthard |
| J10 Wed 8:30 Pavilion 2 | Web Tooling | George Farr, Claus Weiss |
| A30 Thur 1:30 Ballroom F | XML Tooling | Don Yantzi |
| J06 Thur 3:30 Ballroom D | Web Tooling Beyond the Basics | Don Yantzi |

See also:

-RPG IV and ILE sessions by Jon Paris and Susan Gantner
-XML sessions by Leonardo Llamas
-WebSphere Application Server presentations by Yessong Johng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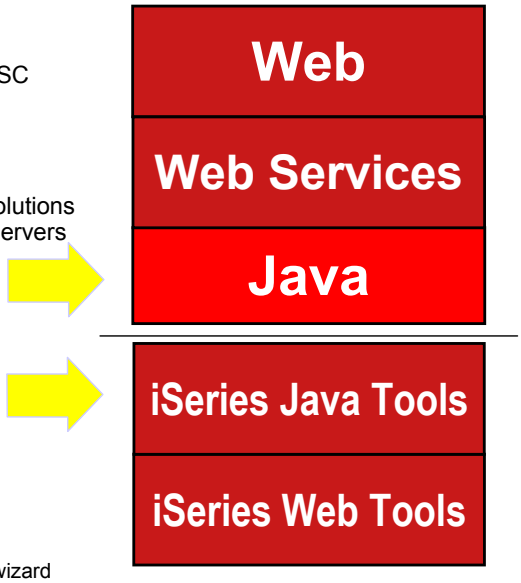
# Step 4. Better Portability

- Create new portable e-business solutions
  - Using Java, Web and Web services tools in WDSC
    - Even the business logic is written in Java
    - not EJBs though (that's the next step)
- Value Proposition
  - Allows developers / ISVs to create e-business solutions that are object oriented and portable to multiple servers
  - Expand the market for ISV solutions
- Education Enablement
  - Java
    - Introduction, Advanced, iSeries Toolbox, OO
  - Detailed e-business (including Java code)
    - How to write Servlets and JSPs, JavaScript, HTML
    - Struts, including writing Struts actions
    - Web Services, XML parsing
  - Tools
    - iSeries Java Tools, iSeries Web tools, Struts tools
    - Web Services tools including iSeries Program Call wizard
    - XML Tools
  - WAS
    - beyond Express





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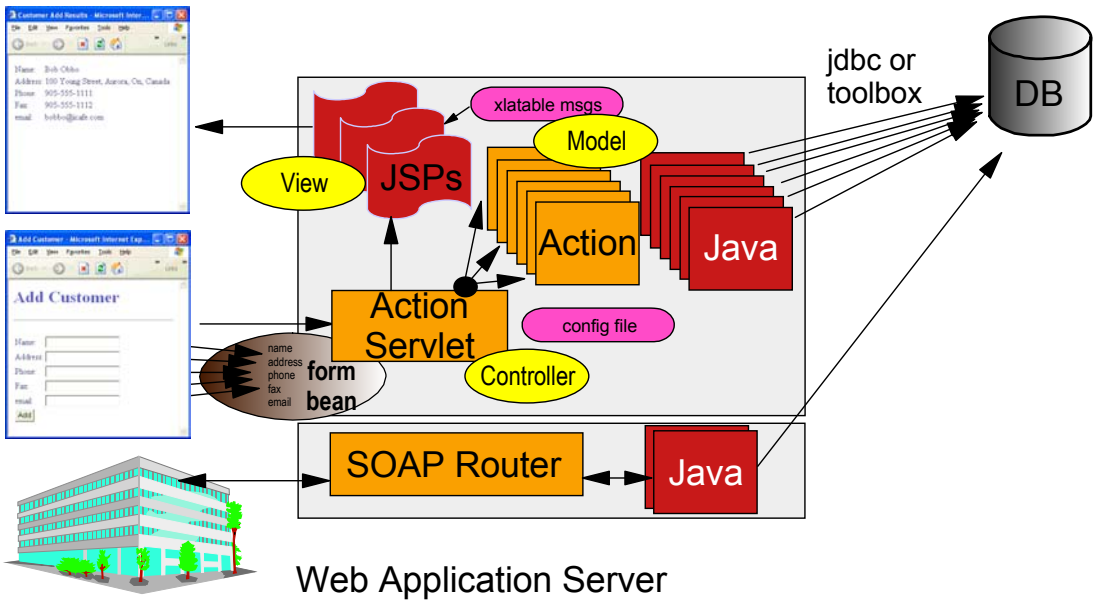
▸ In this step, the business logic is written in J2SE Java, versus in RPG or COBOL. The remainder of the application is the same as in step 3.
▸ This change allows the business logic to be ported and deployed to any server, versus only an iSeries server. This in turn allows ISVs to extend the market for their applications.
▸ This change also allows usage of OO and many industry tools and standards, such as design patterns and UML.
▸ For this step, the Java tools and their iSeries extensions will be used, in WebSphere Development Studio Client.
▸
▸ Delta Skills needed:
▸ - Java introduction
▸ - Advanced Java: JDBC, etc
▸ - iSeries Toolbox for Java
▸ - Java Tools and iSeries Java Tools in WDSC
▸
▸ SKills that will help:
▸ - OO and UML
▸ - Design Patterns
▸ - Rational Rose
▸ - SQL

# Better Portability





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- In this picture we see the architecture, enhanced now to use Java for the business logic.
- In this picture, the Java business logic runs in the second tier, but it is also possible to run it on the third tier using technology like Remote Method Invocation.
- Basically, each Action calls one or more Java classes to do the business logic. It is not recommended the business logic is actually placed into the Action class.
- The Java code will probably use JDBC to access data

# Learning Better Portability

## ClassRoom:

**S6184**
Java for RPG programmers

**N1942**
OO Analysis and Design

**JA321**
Developing OO Apps w/ Java (for Procedural Developers)

**JA341**
Developing/Testing OO applications w/ Java

**S6191**
iSeries Toolbox for Java

**(optional)**
**S6138**
Developing iSeries Applications using SQL

**S6137**
Accessing iSeries Database w/ Java

*Next Page*

http://www-3.ibm.com/services/learning/us/catalog/

## Internet:

**Java for RPG Programmers**
iSeries U
Audio Session

**Java Programming Tutorials**
iSeries U

**Misc Programming Self-Study**
iSeries U
www.ibm.com/java
-> education

TBD
Database Access

*Next Page*

**iSeries university -** www.ibm.com/iseries/institute

## Docs, books:

**Books**
Java for RPG Programmers
**or**
Java for OS/390 and AS400 COBOL Programmers
plus
**Student Workbook**
www.mc-store.com

**Sun's Java Tutorial**
java.sun.com/docs/books/tutorial/

*Next Page*

**WDSc Product Tutorials**
WDS Website: click on Training then Self-Study

WDS Website = www.ibm.com/software/awdtools/wds400



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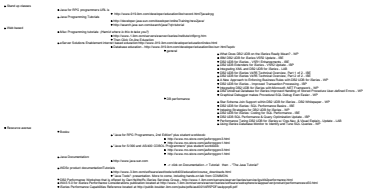
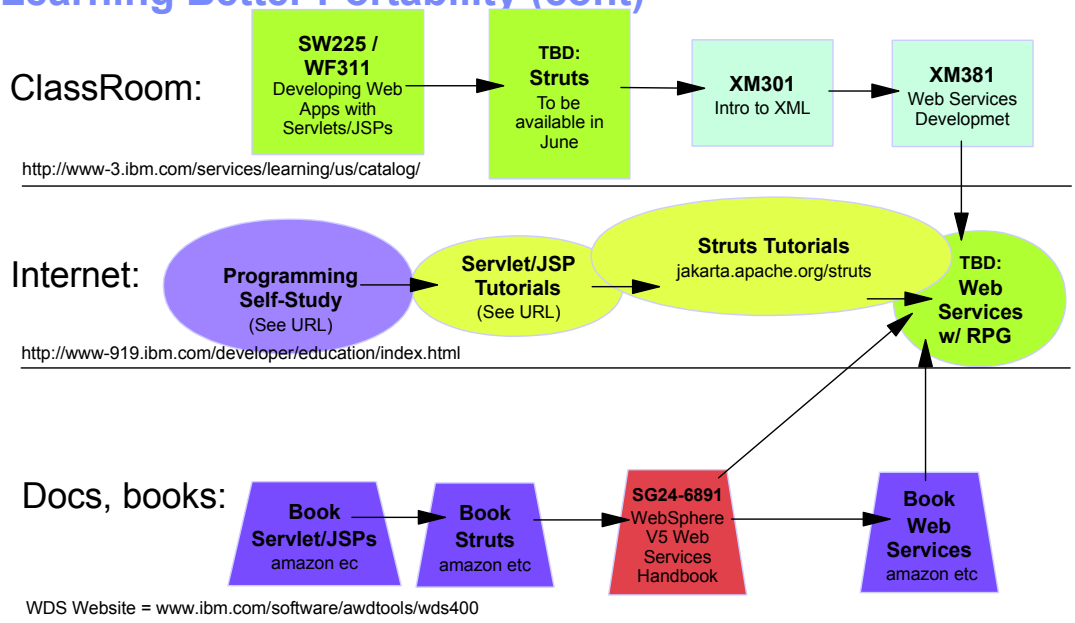


# Learning Better Portability (cont)



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- Stand up class
- Web Based
  - Programming Self study from Solutions enablement education web site http://www-919.ibm.com/developer/education/index.html
    - WebSphere Application Server v5 for iSeries – Install and Initial - IBP
    - Web Environment on the iSeries Server Using WebSphere Application Server (WAS) 4.0 - IBP
    - Integrating JTOpen into WebSphere Studio Application Developer - WP
    - snoopWAS - WP (was 4.0)
    - Deploying A Web App. to WebSphere Application Server 4.0 using WebSphere Studio AD - WP
  - Servlet/JSP Tutorials
    - Building Dyanamic Web Sites
      - https://www6.software.ibm.com/reg/devworks/dw-wesdynweb5-i?S_TACT=103AMW10&S_CMP=WSDD
    - http://search.java.sun.com/search/java/?qt=Servlet+JSP+tutorial
  - Struts Tutorials
    - https://www6.software.ibm.com/reg/devworks/dw-lextreme19-i
- Resouce avenue
  - Addition to the Internet based education we had listed in the whitepaper format of the roadmap. http://www-919.ibm.com/developer/education/index.html
    - Intro to XML eIBP http://www-919.ibm.com/developer/education/ibo/record.html?xmlitech
    - hands on XML lab (downloadable lab) http://www-919.ibm.com/developer/education/ibo/record.html?xmlhand
    - Integrating XML and DB2 UDB for iSeries (downloadable lab) http://www-919.ibm.com/developer/education/ibo/record.html?intxml
    - Using PCML with Java to call iSeries or AS/400 APIs and Legacy Applications WP http://www-919.ibm.com/developer/education/ibo/record.html?pcmlwp
  - Books
    - Servlets and Java Server Pages - ISBN: 0-1308934904
    - Struts in Action - ISBN: 1-930110-50-2
    - Developing Java Web Services - ISBN: 0-471-23640-3

# Related Tech Conf Sessions for Better Portability

| Session | Title | Presenters |
|---|---|---|
| A28 Mon 1:30 Pavilion 6<br>A29 Tues 8:30 Pavilion 6 | Java for RPG/CBL Programmers 1<br>Java for RPG/CBL Programmers 2 | George Farr<br>Phil Coulthard |
| J10 Wed 8:30 Pavilion 2 | Web Tooling | George Farr, Claus Weiss |
| A32 Thur 8:30 Ballroom F | Java Tooling | Don Yantzi |
| A30 Thur 1:30 Ballroom F | XML Tooling | Don Yantzi |
| J06 Thur 3:30 Ballroom D | Web Tooling Beyond the Basics | Don Yantzi |


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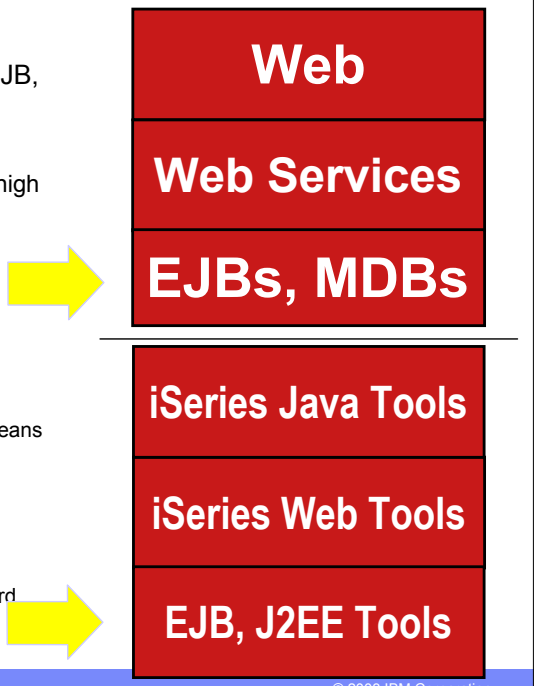
# Step 5. Better Scalability

- Create portable, highly scalable, fully J2EE compliant, e-business solutions using J2EE, EJB, Java, Web and Web services tools
- Value Proposition
  - Allows developers / ISVs to create solutions for high volume, high transaction rate e-business environments that are portable across multiple servers.
  - Developers can create portable J2EE compliant solutions
- Education Enablement
  - J2EE
    - Including Enterprise JavaBeans, Message Driven Beans
    - J2EE services like JMS
    - J2EE security, LDAP and JNDI
  - Tools
    - EJB and J2EE tools in WDSC
    - iSeries Java tools, iSeries Web tools, Struts tools
    - Web Services tools incl'g iSeries Program Call wizard
    - XML Tools
  - WAS 5.0 and Network Deployment





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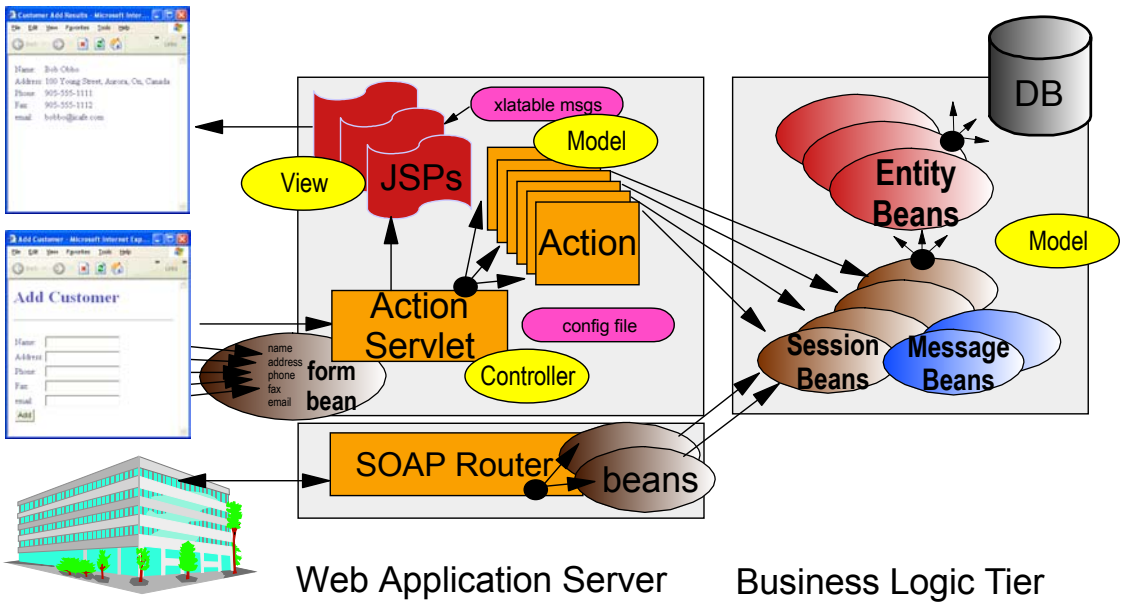
▸ In this final step, the J2SE Java logic is replaced with full blown J2EE Enterprise Java Beans and Message Driven Beans.
▸ This allows full exploitation of the power of J2EE, for functionality and object oriented concepts. It also allows exploiting the J2EE developer community.
▸ The fact the EJBs run on the third tier also means the application will scale very high, and with the proper use of session beans can even be sprayed over numerous servers.
▸ For this step, the tools used are in the WebSphere Development Studio Client Advanced edition, for creating EJBs and managing their persistence to the database.
▸
▸ Delta Skills Needed:
▸ - J2EE: EJBs, MDBs
▸ - WDSC/WSAD EJB and J2EE tools
▸ - transactions

## Better Scalability





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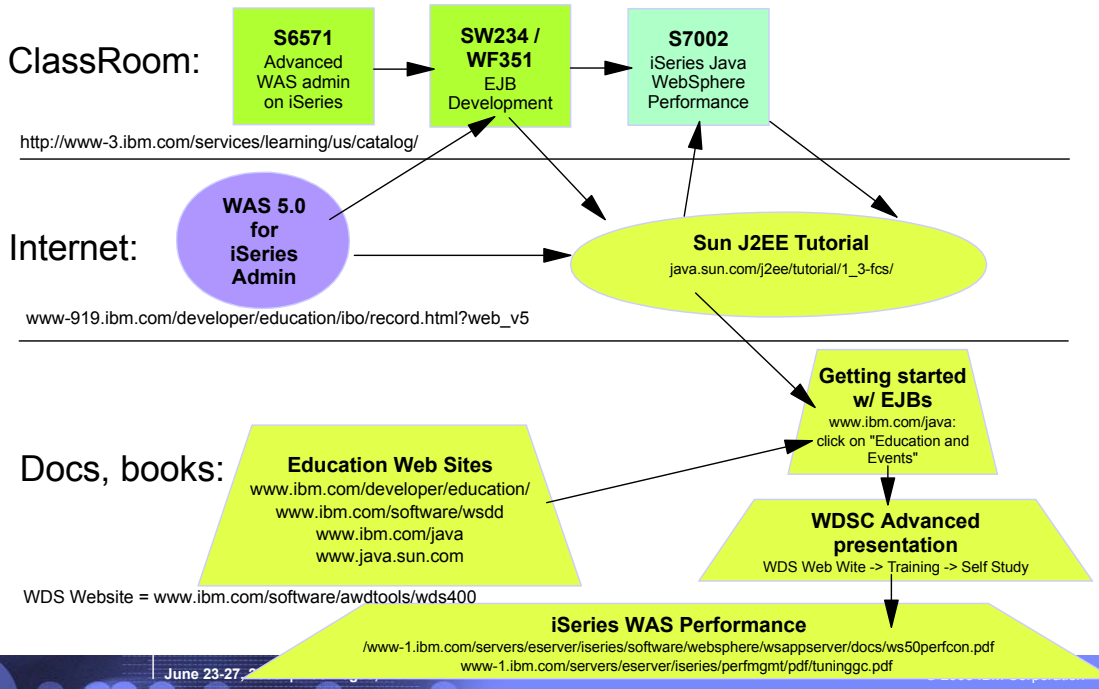
- Here we see the architecture enhanced to have EJBs and MDBs in the third tier.
- The idea is the Entity Beans are persisted to the database, and then session beans are used to "front end' the entity for a particular application. The message driven beans are used if the Java Messaging Service is used for asynchronous message support.
- The session bean proxies are called from the Action classses in the second tier.
- Similarly, a session bean proxy can be exposed as a web service

# Learning Better Scalability






- Stand up classes
- Web Based classes
  - "WebSphere Application Server v5 for iSeries – Install and Initial IBP http://www-919.ibm.com/developer/education/ibo/record.html?web_v5
  - "The J2EE Tutorial"
    - http://www.java.sun.com -> click on Documentation -> Tutorial
- Resource avenue
  - Education Web Sites:
    - http://www-919.ibm.com/developer/education/
    - www.ibm.com/software/wsdd
    - www.ibm.com/java
    - www.java.sun.com
  - Getting Started with EJBs
    - www.ibm.com/java: click on "Education and Events"
  - iSeries Performance
    - iSeries Performance Capabilities Reference -
      - http://www-1.ibm.com/servers/eserver/iseries/perfmgmt/resource.htm
    - WebSphere Application Server 5.0 for iSeries Performance Considerations -
      - http://www-1.ibm.com/servers/eserver/iseries/software/websphere/wsappserver/docs/ws50perfcon.pdf
    - Tuning Garbage Collection for JavaTM and WebSphere on iSeries -
      - http://www-1.ibm.com/servers/eserver/iseries/perfmgmt/pdf/tuninggc.pdf
    - Solutions enablement
      - WebSphere MQ and Java Messaging Service for iSeries Introduction http://www-919.ibm.com/developer/education/ibo/record.html?webmq
  - Portal
    - Installing WebSphere Portal Enable for iSeries Version 4.1 http://www-919.ibm.com/developer/education/ibo/record.html?wpsinstall
-

# Related Tech Conf Sessions for Better Scalability

| Session | Title | Presenters |
|---|---|---|
| J06 Thur 3:30 Ballroom D | Web Tooling Beyond the Basics | Don Yantzi |
| J05 Thur 3:30 Pavilion 10 | Analyzing WAS Environment for Perf | Leonardo Llamas |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## J2EE Advanced Options

- other great things to explore...
  - WebSphere Portal Server
  - WebSphere Commerce Suite
  - WebSphere MQ for iSeries
  - WAS ND
  - WebSphere Personalization for iSeries
  - Domino
  - Tivoli Access Manager


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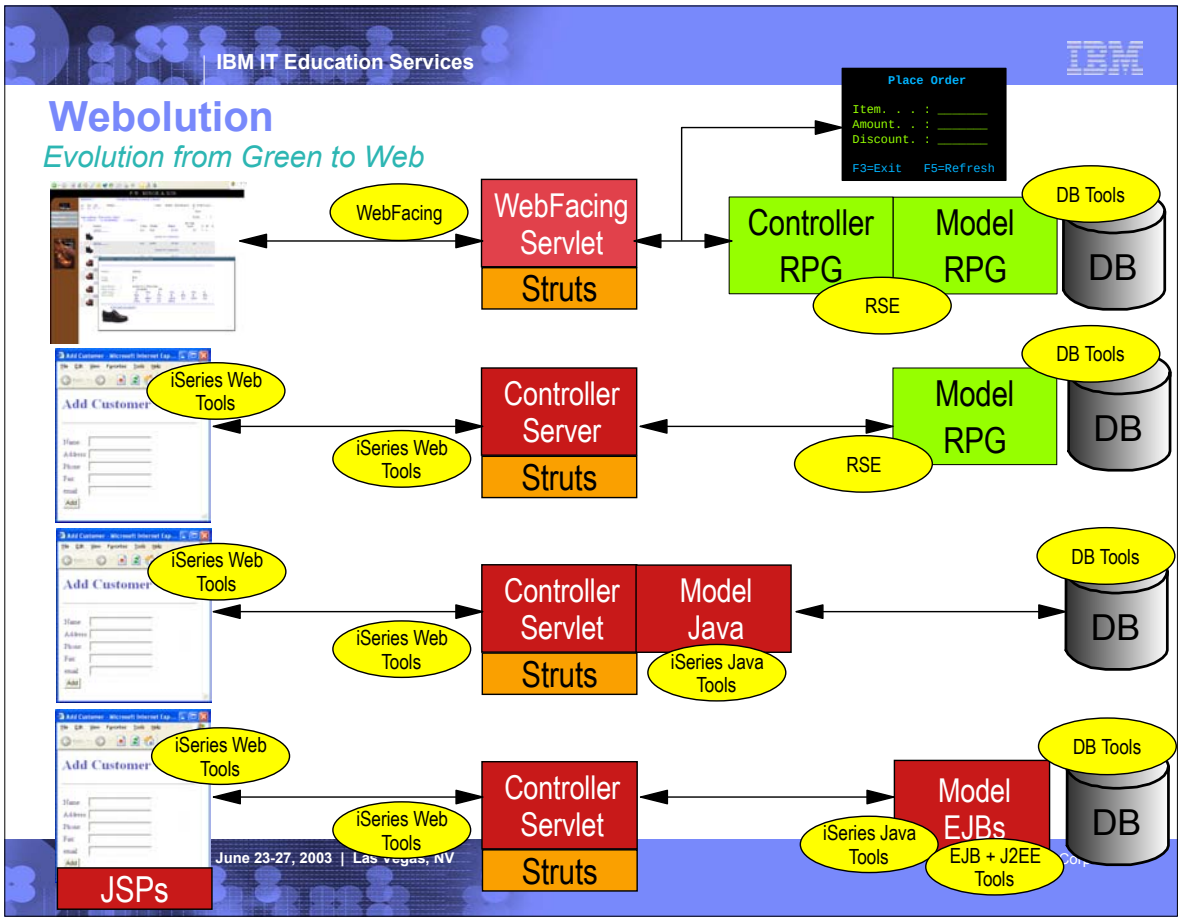
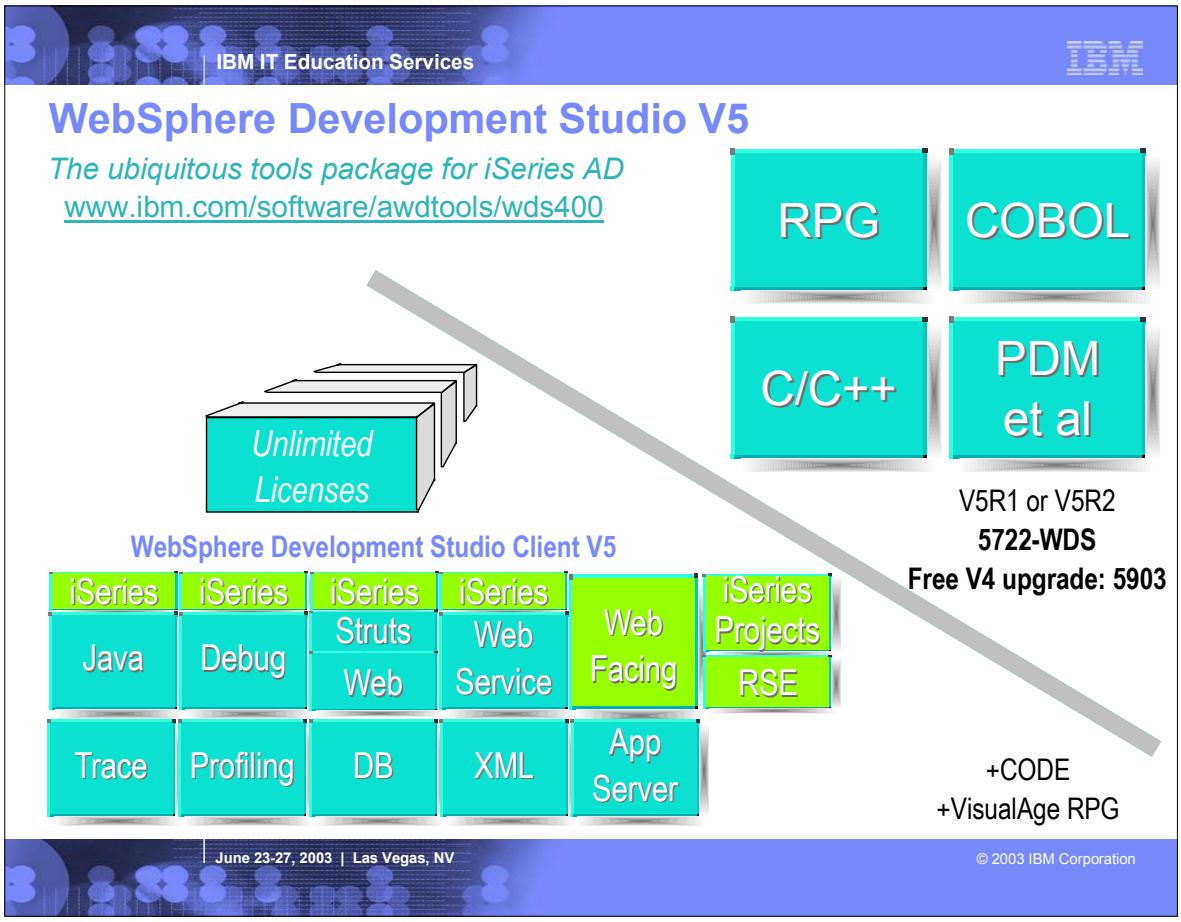
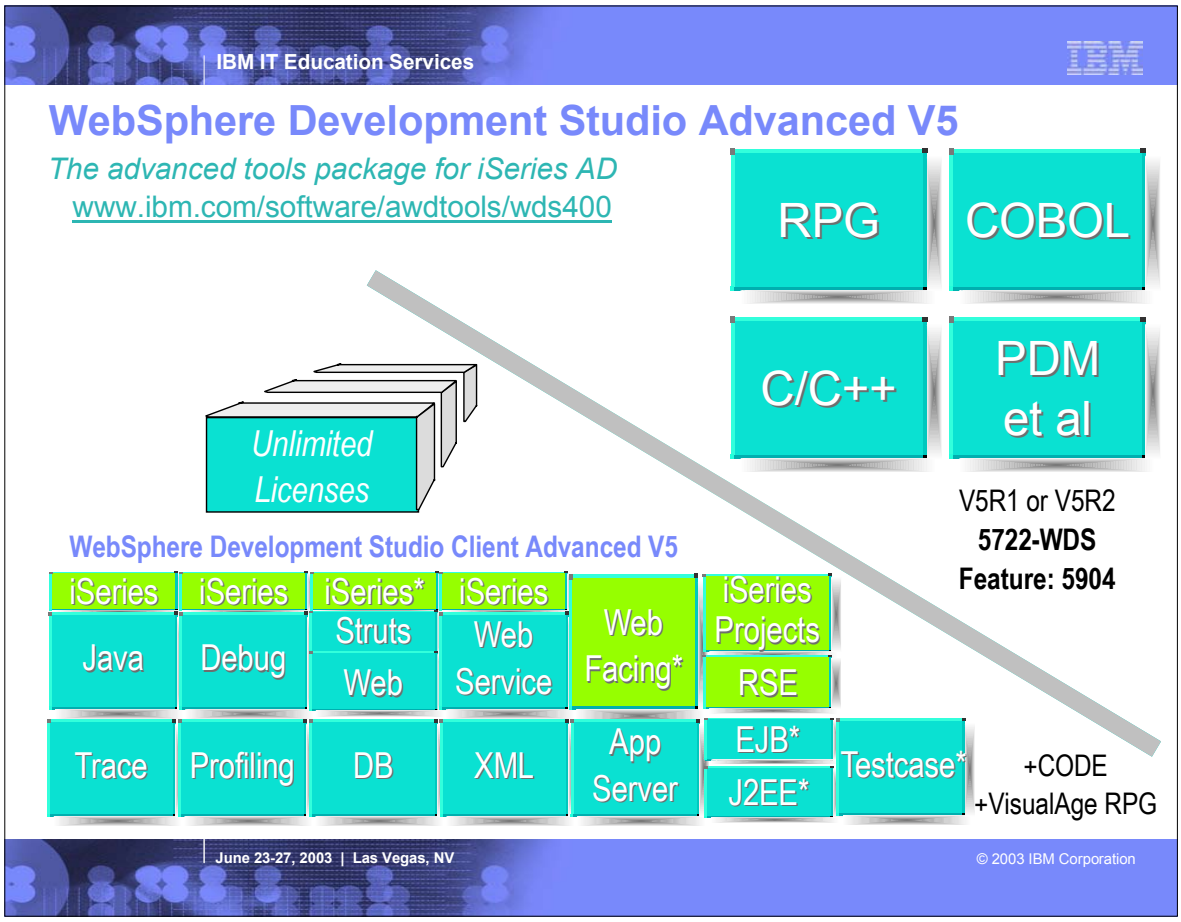
- Once the roadmap is mastered, the doors are open for many other technologies and products to be used and exploited.




- This shows picturally the evolution of a green screen application
- row 1: a green screen app with but a green screen and a converted Web UI via WebFacing/HATs
- row 2: this is the better architecture step, with RPG pure business logic driving the struts contoller logic
- row 3: this is the better portability step, with the RPG business logic replaced with J2SE Java logic on tier 2
- row 4: this is the better architecture step, with EJBs replacing the J2SE Java logic that runs on tier 3
-
- The yellow boxes show the tools used for each part of the application




- WebSphere Development Studio V5 comes with the host compilers and tools, and offers unlimited licenses of WebSphere Development Studio Client V5 (standard).
- WebSphere Development Studio Client is a superset of WebSphere Studio Site Developer V5 (blue), with iSeries-unique extensions added (green)
- - there are iSeries extensions to the Java tools for accessing, exporting to and runningon iSeries
- - there are iSeries extensions to the debugger to allow debugging of RPG, COBOL, C, C++ and CL
- - there are iSeries extensions to the Web tools to allow creating Struts actions with RPG/CBL business logic, and for creating Web pages leveraging SDA skills
- - there are iSeries extensions to the Web Services tools to allow creating a Web Service from RPG/CBL business logic
- - there is WebFacing, for creating a Web user interface from a 5250 user interface
- - there is the Remote System Explorer or RSE for managing, editing, compiling and debugging RPG, COBOL, DDS, CL, C and C++
- - there is the iSeries Projects support for iSeries offline and team based development




- The WebSphere Development Studio Advanced offering is priced higher than standard, but offers for that price unlimited licenses of WebSphere Development Studio Client Advanced.
- WebSphere Development Studio Client Advanced V5 is a pure superset of standard, and of WebSphere Studio Application Developer V5 (blue), with iSeries-unique extensions added (green).
- The tools that are unique or uniquely enhanced for Advanced are shown with an asterisk:
- - the iSeries Web Tools supports a Java Connector Architecture (JCA) for calling RPG and COBOL (you can still call these in standard, but without the industry-standard JCA support)
- - WebFacing supports struts and spool file management and printing uniquely in advanced
- - the EJB, J2EE and Testcases tools are unique to advanced (and inherited from Application Developer)

| Session | Title | Presenters |
|---|---|---|
| J09 Mon 8:30 Pavilion 11 | iSeries AD Strategy | George Farr, Phil Coulthard |
| A22 Mon 10:30 Pavilion 1 | RPG to Web/J2EE Roadmap | Phil Coulthard, George Farr |
| J12 Mon 10:30 Pavilion 6 | WebFacing Your iSeries Applications | Claus Weiss |
| A28 Mon 1:30 Pavilion 6<br>A29 Tues 8:30 Pavilion 6 | Java for RPG/CBL Programmers 1<br>Java for RPG/CBL Programmers 2 | George Farr<br>Phil Coulthard |
| J13 Mon 1:30 Conf 11/12 | **Lab:** WebFacing an iSeries Application | Don Yantzi, Class Weiss, Phil Coulthard |
| A21 Mon 3:30 Pavilion 11 | Add Your Own Tools to WDSC | Don Yantzi |
| A34 Mon 3:30 Pavilion 1 | Hot New Tools for RPG/CBL | Phil Coulthard |
| J13 Tues 8:30 Conf 11/12 | **Lab:** WebFacing an iSeries Application (repeat) | George Farr, Don Yantzi, Claus Weiss |
| A35 Tue 10:30 Pavilion 1 | Hot New Tools for RPG/CBL - demo | George Farr |
| A52 Tue 1:30 Ballroom E | RPG IV: Beyond V5R1 | George Farr |
| J14 Tue 1:30 Conf 11/12 | **Lab:** Hot New RPG Tools | Don Yantzi, Phil Coulthard, Claus Weiss |
| J08 Tues 3:30, Ballroom D | ebusiness for iSeries Programmers | Phil Coulthard |
| J10 Wed 8:30 Pavilion 2 | Web Tooling | George Farr, Claus Weiss |
| A37 Wed 10:30 Ballroom E | Hot New AD Tools for Linux and WDSC | Don Yantzi |
| A19 Wed 1:30 Pavilion 1 | Introduction to VisualAge RPG | Claus Weiss |
| J11 Wed 3:30 Conf 11/12 | **Lab:** WebFacing (repeat) | Claus Weiss, Don Yantzi |
| A32 Thur 8:30 Ballroom F | Java Tooling | Don Yantzi |
| J15 Thur 8:30 Pavilion 10 | Advanced WebFacing Q and A | Claus Weiss |
| A30 Thur 1:30 Ballroom F | XML Tooling | Don Yantzi |
| J12 Thur 3:30 Ballroom E | WebFacing Your iSeries Apps (repeat) | Claus Weiss |
| J06 Thur 3:30 Ballroom D | Web Tooling Beyond the Basics | Don Yantzi |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