iSeries AD - WDSc 5.0:
State Of The Union

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WDS for iSeries
New World
New Servers
New Tools

▶ This presentation reviews the tools and features of IBM WebSphere Development Studio Client for iSeries (Development Studio Client is the short form). It is a level setting presentation. Its purpose is two fold. First to describe the strategy and technology that forms the foundation of Development Studio Client. Second to overview the tools included in Development Studio Client.

Disclaimer

Acknowledgement:

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

Build Community!

Build Excitement!

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- ▸ The IBM iSeries AD team is committed to refocusing the iSeries programming community around a single common set of technologies and tools that all developers have and all developers use.
- ▸ The iSeries Application Development team at IBM Toronto brings to you the RPG, COBOL, C, C++ compilers; the traditional toolset like PDM and SEU, and then new generation of workstation-based tools. Since the year 2000, The iSeries AD team has been working towards a strategy to re-energize AD on iSeries, returning the iSeries to its historical position as the world's most productive operating system for application development. Much as it was in 1988 when all developers had and used RPG/COBOL, PDM and SEU. This also extends to the business partner community that supplies tools: the goal is a technology and tool common base that business partners complement versus compete with. This is as opposed to the client/server years where there were numerous competing technologies and tools, none of which were compatible with each other.

- This slide tells what IBM's strategy is to reach its goals of building community and building excitement.
- The new packaging is WebSphere Development Studio Client for iSeries. The new technology is Eclipse. The new tools is Eclipse based tools. The new UI is a Web browser instead of a 5250 green screen or even a client/server GUI. Emphasize that these new Eclipse based tools make it easy to convert 5250 user interfaces into Web user interfaces, and to build new Web user interfaces on top of new or existing business logic.

New Packaging: V5R1

V5R1: 5722-WDS

V4R5: 5769-WDS

WebSphere Development Studio

- RPG
- C
- COBOL
- C++
- ADTS

Free Upgrade with SS!

Host

Client

WebSphere Development Tools

- VAJava
- CODE/400
- WebSphere Studio
- VARPG
- WebFacing

WDT

(UNLIMITED LICENSES)

Can buy separately as a Workstation PID

...he next generation of e-business.

- This was the May 2001 re-packaging of all host compilers and tools, and all workstation tools.
- There is only one AD product sold by IBM, for iSeries, as of V4R5. This is WebSphere Development Studio (=WDS), and it includes all four host compilers, all traditional tools (ADTS = PDM+SEU+SDA+RLU+DFU+AFP+CGU), and unlimited licenses of the workstation-based toolset named WebSphere Development Tools.
- Existing AD customers with a subscription can upgrade to WDS free of charge and that without a subscription, there is an upgrade fee. New licenses of WDS are priced very competitive compared to the combined prices of all constituent products. As of V5R1, there is no way to purchase the compilers or tools individually.
- Workstation-based products were bundled into a single installable product and that these tools were previously available separately, with the exception of WebFacing, which was totally new for the V5R1 of WDT.
- For customers of WDS, they receive a single copy of WDT but the right to install it on as many workstations as desired, as long as it used by iSeries developers.
- For consultants who do not have an iSeries of their own, but still wish to have the client tools, WDT was also made available as a non-iSeries product so it can be purchased "off the shelf" from IBM Direct. This solved a long-standing problem with CODE and VisualAge RPG, which were out of the reach for this important customer set.
- WDS has been a huge success, with over 60,000 licenses sold in less than the first year.
- Just as every development machine used to have PDM and SEU, every development machine will now have all the modern AD tools from IBM.
- This ubiquity is especially important for business partners who build and sell software. These BPs are now free to build it using any of the technologies or tools in WDS, and can assume their customers will have the tools required to tailor everything from RPG to Java and Web user interfaces. This effectively raises the lowest common denominator to a level unparalleled by any other operating system.

CODE/400

✓ Next Generation of ADTS:

new SEU

- **CODE Editor**
  - ► Language aware editing for RPG, COBOL, CL, C, C++, DDS, Java, VARPG
  - ► Program Verifiers for RPG, COBOL, DDS
    - ✓ Quaranteed clean compile, first time
  - ► Language Reference manuals online, F1 enabled

new PDM option 14

- **CODE Remote Compile**
  - ► Remote Compile with Error Feedback
  - ► GUI Compile Options Dialogs

new SDA, RLU

- **CODE Designer**
  - ► WYSIWYG design of DSPFs, PRTFs, PFs

new STRDBG

- **CODE Distributed Debugger**
  - ► Remotely debug RPG, COBOL, CL, C, C++, Java

new PDM

- **CODE Project Organizer**
  - ► Random filtered access to QSYS and local files

Eclipse

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- ► All of the V5R1 tools are not discussed in this slide since they are covered later i nthe context of the new release. However, since CODE and VisualAge for RPG are predominately unchanged in the new release, they are briefly described in this slide.
- ► CODE is the follow-on to the traditional toolset. All the primary tools in ADTS have been rewritten to run on Windows but have seamless access to iSeries resources
- ► The new SEU is the CODE Editor, an awesome editor that dramatically improves productivity over SEU, and increases programmer moral --- such as RPG in color!
- ► The CODE Editor includes extra-special support for all the strategic languages on iSeries. It also includes a built-in copy of the compilers for RPG, COBOL and DDS! These program verifiers can be launched from the editor and run locally on the workstation. They do all the error checking that the compiler does. This means the first actual compile on the iSeries is always clean, guaranteed!
- ► The CODE Remote Compile support means users can invoke the compiler from within the editor. If there really are errors left (for example, the Program Verifier was not used) then those errors are presented in an error list window. To position the editor to the error, the user can double click on the error. This is a major productivity gain of the PDM and SEU support for editing and compiling.
- ► The CODE Designer is a new SDA and RLU. Help users imagine being able to drag and drop fields in SDA! This can be done with the CODE Designer!
- ► The CODE Distributed Debugger debugs iSeries applications from the workstation. It supports all the strategic iSeries languages and is a full function debugger. It also is easily invoked from the CODE Editor.
- ► The CODE Project Organizer is the follow-on to PDM. Like PDM the user can get lists of libraries, objects and members, and launch tools from the list. Further the list can be subset, and the user can define user actions.

VisualAge RPG

✓ VARPG: Client and GUI RPG!

RPG on Windows!

- **VARPG Compiler and Runtime**
  - ► In synch with V4R4 RPG IV (V5R1 to come)
  - ► Compile and run on Windows or
  - ► Compile and run as Java (run anywhere!)
- **VARPG Debugger**
- **VARPG GUI Builder**

RPG with GUI!
  - ► Visually layout Graphical User Interface
  - ► Program event logic ... in RPG
- **CODE Editor**
  - ► Shared with CODE/400

Portable RPG!
- **Non-Visual projects supported too**
  - ► Possible to write %100 portable business logic in RPG!

Convert VARPG to Java!

Eclipse

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- ► This slide describes VisualAge for RPG
- ► VisualAge RPG is a port of RPG IV to Windows, so the user can build, compile, run and debug RPG on Windows. While the program runs on Windows, all access to data is seamlessly directed to the iSeries DB2/400 database. This is painless client/server.
- ► Support for green screen display files has been removed and in its place support added for event-driven GUI.
- ► If users have a desire for a GUI versus a Web user interface, than VARPG is the single most productive way to create such a GUI for RPG programmers.
- ► As a bonus, VARPG supports the ability to compile Windows GUI applications into a Java application or applet. This makes it completely portable to any operating system that supports Java! However, it will always talk back to an iSeries to get data.

New Packaging

Build Community!

✓ Common tools for entire community
✓ BPs/ISVs can pre-req. No stack price $

Build Excitement!

✓ Best-of-breed tools for modern apps
✓ WebFacing: RPG->Web in minutes !
✓ Massive enhancements to compilers

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- ► 'So how does the May 2001 WebSphere Development Studio re-packaging help meet the strategic goals?" It helps build community by ensuring the entire community has the same common set of tools and technologies, so there is no fragmentation. This ubiquity helps BPs and ISVs build applications using their preference of technologies, free in the knowledge their customers will have the tools required to tailor the application.
- ► This re-packaging builds excitement by putting extremely cool, modern and compelling tools on every iSeries programmers desk. For example, RPG in COLOR! SDA with a mouse! Drag and drop GUI and Web! No more "SEU" syndrome.
- ► The introduction of WebFacing in 2001 meant the ability to very quickly and painlessly produce a Web application from a 5250 application. More on WebFacing will be presented later. V5R1 was more than just tools. It was an immense release for compiler enhancements too, proving that RPG and COBOL are not only "not dead", but alive and thriving in the e-business world!

Some History . . . June 2002!

New Technology

#1. Integrated Development Environment

RPG / COBOL	**+**	Java / Web	**+**	Web Facing

= Next Release of WDT

New Tools

#2. New Tools for New Technology

+	XML	**+**	Web Services	**+**	DBA

Eclipse

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► In June 2002, IBM announced and shipped the next release of the client WDT tools. This new release was the first step in the strategy to collapse all the client tools into a single integrated development environment, versus having separate loosely-integrated tools. This new IDE technology revolutionized iSeries AD and introduced a new IDE with built-in tools for RPG and COBOL development, for Java development, for Web development and for WebFacing. These were entirely new tools in the IDE that iSeries developers have never had before in any flavor: tools for XML, tools for Web Services and tools for database analysts.
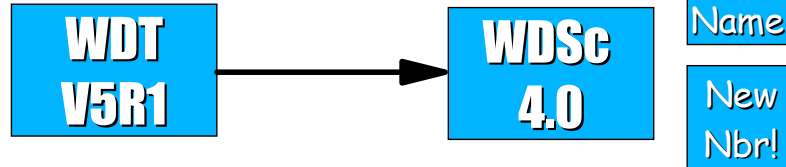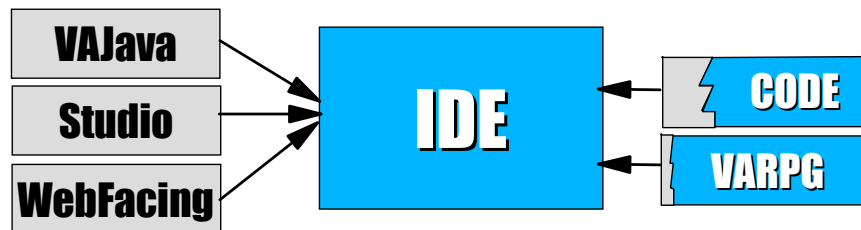
Some History . . . June 2002!

iSeries AD, IBM Toronto

WDT V5R1 becomes WDSc 4.0

WDT V5R1 → WDSc 4.0

New Name!

New Nbr!

WDSc was the first phase of tool implosion!

VAJava → IDE ← CODE

Studio → IDE

WebFacing → IDE ← VARPG

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- ▸ The new release of WDT had a new name to better reflect the client part of WDS and was called WebSphere Development Studio Client, or WDSc.
- ▸ There was a new number and this new number was not tied to the operating system. It was instead tied to the current release of WebSphere Application Server that it supported. This was important as the client tools targeted multiple releases of OS/400, so having a release number that was tied to the release number of OS/400 lead to confusion as to what release of OS/400 was required to use these tools.
- ▸ As mentioned in the previous slide this new release was the first step in the strategy to rewrite all the individual client tools within the old WDT as new tools built-in to a common and powerful integrated development environment. Note that not all the old WDT tools have been completely re-written yet but all of VisualAge for Java, WebSphere Studio and WebFacing have been, and these tools are now only available within the IDE. For CODE and VisualAge RPG, only part of their functionality is currently available within the IDE, and so they continue to be shipped with WDSc, but are launchable from within the IDE for convenience. All of CODE and VisualAge RPG will be rewritten to be part of the IDE and at that time their "classic" versions will no longer be shipped.
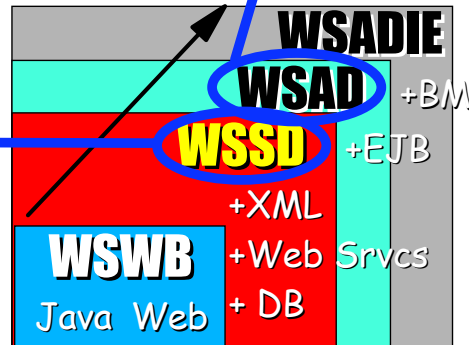
WS Workbench

✓ **WebSphere Studio Workbench is:**
- **Superset of eclipse. Not for sale**
- **Basis of all IBM AD products. Eg:**
  - ► WebSphere Studio Site Developer
  - ► WebSphere Studio Application Developer
  - ► WebSphere Studio AD Integration Edition
- **Available to IBM Business Partners**
  - ► Via IBM PartnerWorld:
    - ✓ To build/test plugins
    - ✓ To create products

Advanced

Standard

Each product is a different "configuration" of WebSphere Studio
  - ► Refers to product family

WSADIE
WSAD   +BM
WSSD   +EJB
         +XML
WSWB   +Web Srvcs
Java Web + DB

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- ► Shows that WebSphere Studio Workbench (WSWB) is basis of all new IBM Eclipse based products that is available for free for BP products. Note the products available and how they build on each other:
- ► WebSphere Studio Site Developer Advanced (WSSDa) builds on the Eclipse Java tools and adds tools for Web development, XML development, Web Services development and Database development.
- ► WebSphere Studio Application Developer (WSAD) builds on WSSDa, and adds tools for EJB and additional J2EE development.
- ► This is WSAD Integration Edition (WSADIE) builds on WSAD and adds tools for Java Connector Architecture, Business Modelling and WorkFlow.

WDSc Standard Version 5.0

New Technology, New Tools

✓ **New IDE is based on WSSD**

| WDSc | = | WSSD | + | iSeries Tools |

WebSphere Development Studio Client 5.0

✓ **WSSD is based on eclipse!**

| WSSD | = | eclipse | + | Web, XML, DB Tools |

WebSphere Studio Site Developer

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Eclipse

- ▸ IBM created a comprehensive toolset to help you leverage the iSeries system and take advantage of business opportunities faster.
- ▸ This suite inherits improved Web and Java development capabilities from WebSphere Studio Site Developer, Version 5.0.
- ▸ You can create, test, deploy, and maintain sophisticated e-business applications with little Java, Web, or Web Services programming knowledge.

WSSD

WebSphere Studio Site Developer

✓ **Roughly =**
- **classic VAJava Pro**
+ **classic WebSphere Studio Standard**
+ **new WAS 5.0 Test Environment**
+ **new tools for Servers, XML, Web Services and Database design**

WebSphere Studio Site Developer

Team			WAS Test Environment				
Projects	Plugin	Java	Web	AppSrvr	WebSvc	XML	DB
UI F/W	Tools	Tools	Tools	Tools	Tools	Tools	Tools

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Eclipse

▸ This slide further describes the components of WSSDa and what it is roughly equivalent to:

▸ Roughly equivalent to the old VisualAge for Java professional-edition product plus the old WebSphere Studio standard-edition product, plus a new test environment for WebSphere Application Server 4.0, plus new tools for application servers, XML, Web Services and Database design. The "old" VisualAge for Java and WebSphere Studio products are now at end of life, and no longer sold by IBM. They are replaced by WSSDa.

WDSc 5.0 Standard!

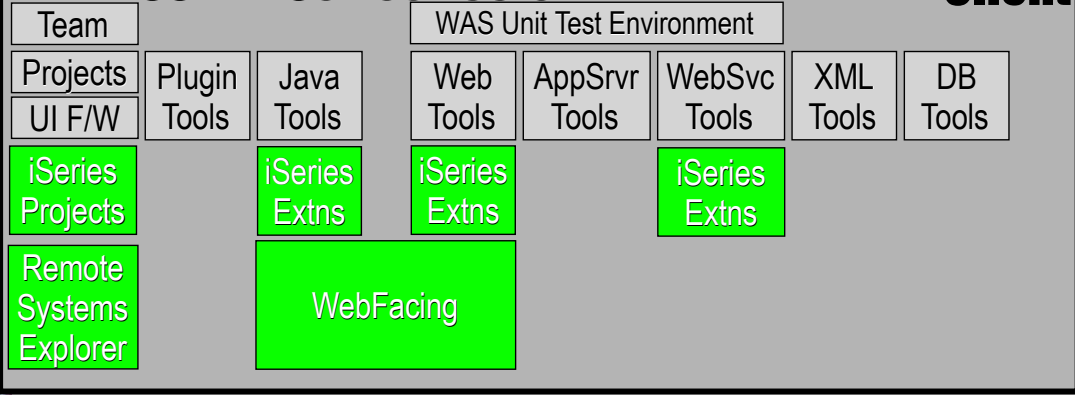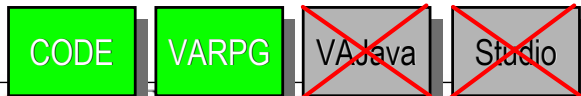iSeries AD, IBM Toronto

WebSphere Development Studio

RPG   C   ADTS
COBOL   C++

Host

WDSc

WSSD + iSeries Tools

Client

Team Projects UI F/W

Plugin Tools

Java Tools

WAS Unit Test Environment

Web Tools | AppSrvr Tools | WebSvc Tools | XML Tools | DB Tools

iSeries Projects

iSeries Extns

iSeries Extns

iSeries Extns

Remote Systems Explorer

WebFacing

CODE   VARPG   VAJava   Studio

IBM *e*-server. For the next generation of e-business.

Eclipse

- ▸ Standard delivers:
- ▸ WebSphere Studio Site Developer, V5 for e-business development:
- ▸ Powerful Java, Web, Web Services, XML, and database tools that speed the creation, testing, and deployment of sophisticated e-business applications
- ▸ A builder for visually constructing Web applications based on the open-source Struts standard
- ▸ iSeries Extensions:
- ▸ Enhancements for Web, Web Services, and Java development including extensions to the Struts builder
- ▸ IBM WebFacing Tool for cost-effectively Web-enabling 5250 applications
- ▸ Integrated file, project, edit, compile, and debug environment for iSeries development
- ▸ Seamless integration with best-of-breed tools from IBM and key iSeries partners
- ▸ CODE - Classic version
- ▸ VisualAge RPG - Enhanced classic version to create event-driven GUI RPG applications for Windows or Java GUI-capable clients or browsers
- ▸ Distributed debugger - Classic version for multilanguage, multitier e-business applications
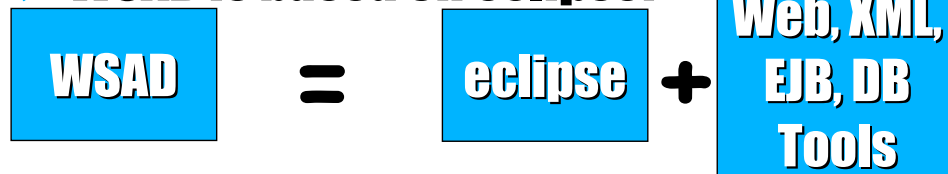
WDSc Advanced Version 5.0

iSeries AD, IBM Toronto

New Technology, New Tools

✓ **New IDE is based on WSAD**

| WDSc | = | WSAD | + | iSeries Tools |

WebSphere Development Studio Client 5.0

✓ **WSAD is based on eclipse!**

| WSAD | = | eclipse | + | Web, XML, EJB, DB Tools |

IBM *e*server. For the next generation of e-business.

- ‣ This is the advanced edition of the WDSC product.
- ‣ This suite inherits improved Web and Java enterprise development capabilities from WebSphere Studio Application Developer, Version 5.0.
- ‣ You can create, test, deploy, and maintain sophisticated e-business and J2EE applications with little Java, Web, or Web Services programming.

WSAD

WDSc Advanced !

✓ **Roughly =**
- **VAJava Pro & WebSphere Studio Standard**
- **new WAS 5.0 Test Environment**
- **new tools for Servers,**
- **XML tools**
- **Web Services**
- **Database design tools**
- **Profiling tools**
- **tracing tools**
- **EJB tools**
- **Struts builder**

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▸ WebSphere Studio Application Developer goes beyond basic Eclipse technology to provide end-to-end support for J2EE application development and is optimized for WebSphere Application Server deployment. This scalable product can easily extend support for other IBM middleware and non-IBM application servers via plug-ins, or integrate with third-party tools seamlessly to meet your evolving development challenges.

▸ Updates and new functions for Java, Web services, XML, Database, Test, and Analysis, and Web components including Struts support

▸ Improved application performance with profiling and tracing tools to detect, isolate, and fix performance issues early in the development cycle

▸ iSeries specific extensions to the Struts builder makes it easy to visually construct Web applications based on the open-source Struts standard that accesses iSeries programs
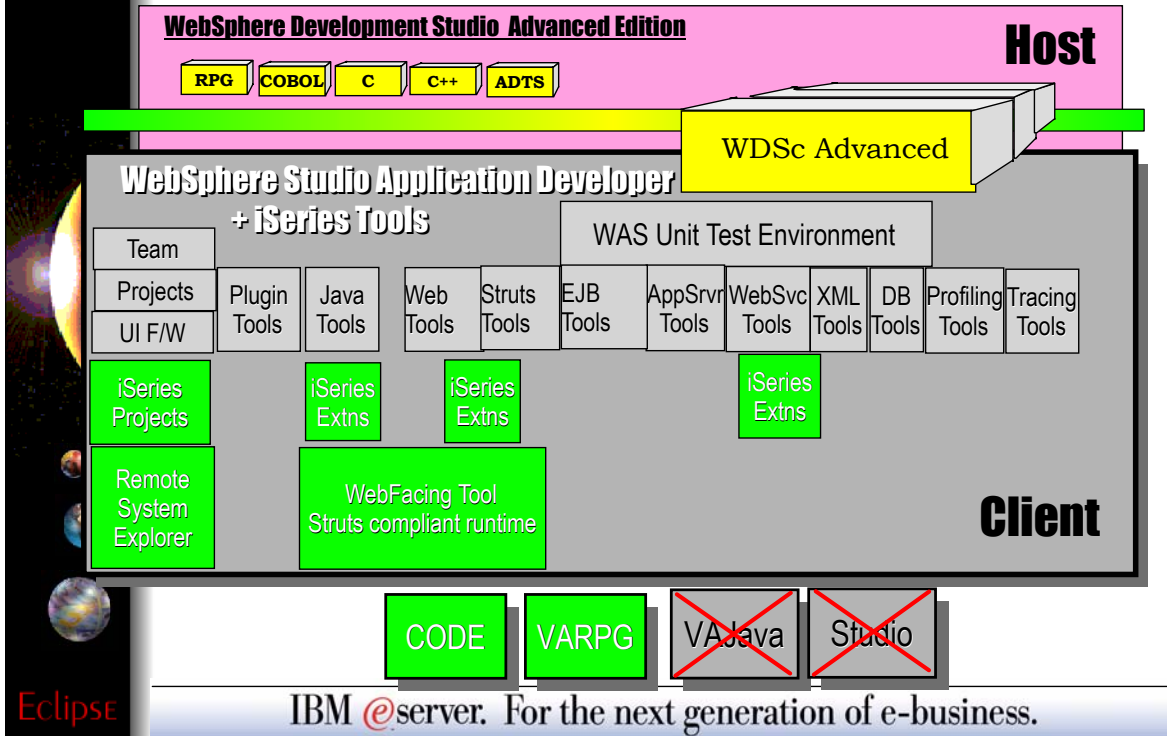
- Advanced delivers:
  - WSAD V5 for e-business development:
    - Powerful Java, Enterprise Java Beans (EJB), Web, Web Services, XML, and database tools
    - A builder for visually constructing Web applications based on the open-source Struts standard
    - Enhancements for Web, Web Services, and Java development including extensions to the Struts builder
  - iSeries Extensions:
    - IBM WebFacing Tool for cost-effectively Web-enabling 5250 applications
    - An iFrame portlet and sample
    - Integrated file, project, edit, compile, and debug environment for iSeries RPG, COBOL, CL, and Data Description Specifications (DDS) development
    - Seamless integration with best-of-breed tools from IBM and key iSeries partners.
  - Cooperative development environment (CODE)
  - VisualAge RPG
  - Distributed debugger

What's new in Version 5.0

- WebFacing Tool enhancements for scalability, performance and ease of conversion
- Significantly enhanced support for iSeries file systems, projects, editing, compiling and debugging inside the Eclipse IDE
- Wizards generate robust Struts-based Web apps that can be easily extended using a new visual development environment
- Supports open standards such as J2EE, XML, SOAP, WebServices, WSDL and Struts
- Improved interfaces to integrate 3rd party tools to the new IDE
- New customizable views of tools and data to help organize your work.
- Concurrent support for WAS 3.5.6, WAS 4.0, WAS 5.0, WAS Express 5.0 and Tomcat
- Unit test environment for WAS 4.0, WAS 5.0 and WAS Express V5
- JDK 1.3, JSP 1.2, Servlet 2.3
- Web: Visually construct MVC-based Web applications
- Web services: Support for UDDI V2 and discovery via Web Service Inspection Language (WSIL)

Eclipse

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► eclipse ... The base!

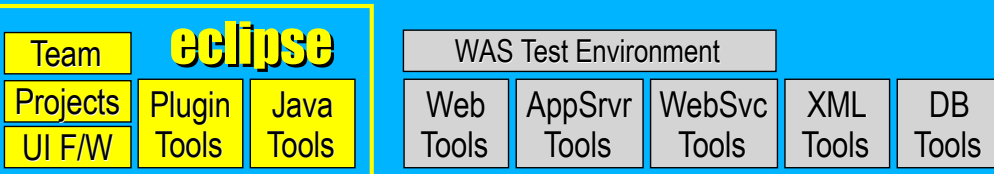IBM @server. For the next generation of e-business.

Eclipse

eclipse

✓ **eclipse is the IDE technology engine**
- fully open-source @ www.eclipse.org
- created by IBM
- *huge* interest: > 500,000 downloads
- written in Java
- easily extended by plugins

WebSphere Studio Site Developer Advanced

eclipse

Team			WAS Test Environment				
Projects	Plugin	Java	Web	AppSrvr	WebSvc	XML	DB
UI F/W	Tools	Tools	Tools	Tools	Tools	Tools	Tools

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- ► Eclipse is what WSSDa, and hence WDSc, are based on. The points describe how IBM developed Eclipse and donated (approx $40 million) it to the open source community. Its available to anyone as a free download including source code from www.eclipse.org. The downloads continue to grow as the excitement in the development community and tool community for Eclipse intensifies.
- ► Eclipse is written in Java, and can be extended by tools also known as plugins that are also written in Java. Out of the box, Eclipse offers an IDE that has built-in support for teams and projects and a robust and revolutionary user interface framework. It also has tools built-in to create eclipse plugins.
- ► Further, there are extensive and very powerful tools built-in for developing Java applications with eclipse. So, if all the user wants is the world's best Java toolset, then all that is needed is Eclipse. The price can't be beat!

Eclipse

What is eclipse.org?

The eclipse.org Consortium was formed to deliver new-era application development tools. Industry leaders Borland, IBM, Merant, QNX Software Systems, Rational Software, RedHat, SuSE, TogetherSoft, and WebGain form the initial eclipse.org board of directors. These companies plan to release Eclipse Platform compatible product offerings.

In the Eclipse Platform, code access and use is controlled through the Common Public License[1], which allows individuals to create derivative works with worldwide re-distribution rights that are royalty free.

As with other open source communities, eclipse.org brings together the broad participation needed to establish, refine, and promote high-quality shared software technology. More than 1,200 individual developers from over 150 leading software tool suppliers in 63 countries have already participated in the eclipse.org community.

Some components of eclipse.org downloads may be governed by license terms other than the CPL.

Board members

For more information about member organizations and their support for Eclipse.org, click the following links.

▶ IBM is not alone with Eclipse and there is a growing list of large companies in the open-source consortium. The latest list is at www.eclipse.org for the latest list.
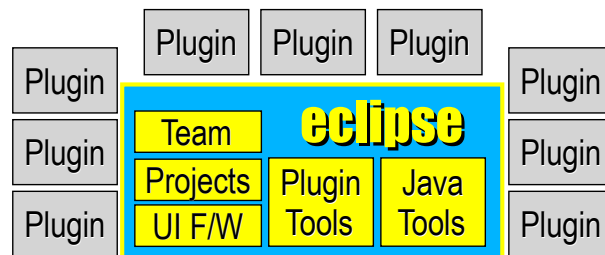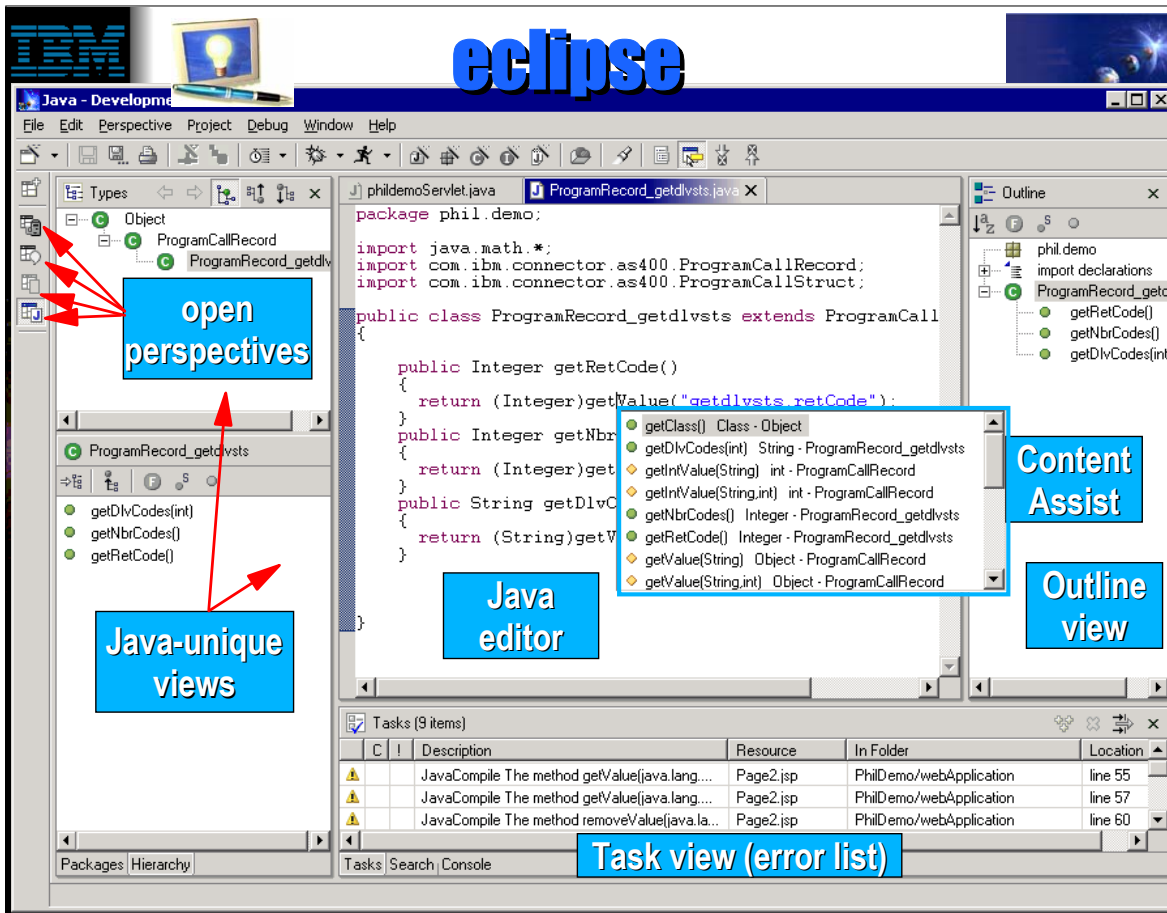
eclipse

✓ **eclipse plus plugins = product**
- although its a great Java IDE as is!

✓ **eclipse will be basis of many products**
- from IBM, BPs, ISVs, anyone!

✓ **eclipse is a huge opportunity**
- for writing + selling plugins

		Plugin	Plugin	Plugin		
Plugin			**eclipse**			Plugin
Plugin		Team				Plugin
Plugin		Projects	Plugin	Java		Plugin
		UI F/W	Tools	Tools		

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- With the exception of the built-in Java tools, Eclipse itself is not that interesting. It only gets interesting when the user adds to it some plugins (eg tools) that do something interesting. So an Eclipse-based product is Eclipse plus a number of interesting plugins.
- IBM is building numerous such Eclipse-based products such as WSSDa and WDSc.
- Because Eclipse is free and business partners are free to include it in their products, there will be many other Eclipse-based products from other companies too, including Rational and TogetherSoft.
- For business partners or software developers who write and sell AD tools, Eclipse is a fantastic opportunity. By writing plugins for Eclipse, those plugins can be sold to any developer using any product based on eclipse,or even just the raw Eclipse as downloaded from www.eclipse.org
- This opportunity is not lost on iSeries tool vendors, who are all looking at offering Eclipse plugins for their tools.
- This will result in a rich offering of third party plugins for developers to choose from, all of which extend their core WDSc development environment. Emphsize that this means one community, one core development platform, many IBM and 3rd party tools which is builds community and excitement!

eclipse

- ▸ Here is a screen shot of Eclipse which shows the Java perspective, which includes many views, and the editor, for Java.
- ▸ The Java perspective is the active perspective, however see the bar on the left, where there are a number of other perspectives open. Switching to another perspective is easy by simply selecting it from the bar. Opening a new perspective is also easy using the Perspective pulldown and that all the views within a perspective can be moved to a new location by dragging and dropping.
- ▸ When dragged on top of an existing view, a tabbed notebook is created to hold the multiple views. As well any view can be maximized to full screen by double clicking on its title bar.
- ▸ Common views (outline, task, properties which is not shown) are supplied by Eclipse and appear in most perspectives

► **RPG and COBOL Tools**

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Eclipse

WDSc: RPG and CBL Tools

✓ Remote Systems Explorer Perspective

- **Random drill-down or filtered access to remote:**
  - ▶ QSYS Libraries, Objects and Members
  - ▶ IFS Folders and Files
  - ▶ Linux, Unix, Windows and Local Folders and Files
- **Remote command execution of**
  - ▶ QSYS Commands and QSHELL Commands
  - ▶ Linux, Unix and Windows Commands
- **Exploration of Jobs in QSYS**

✓ iSeries Projects and Perspective

- **For structured, project-based development**
- **Local team-sharable project**
- **Holds source files, members and save files**
- **Each project associated with an iSeries and library**
  - ▶ Push action to copy local files to associated library

IBM @server. For the next generation of e-business.

Eclipse

- ▶ There are two explicit areas of functionality for RPG and COBOL developers, each with their own perspective, for iSeries programmers. These are the Remote Systems Explorer and the iSeries Projects which also has its own perspective and views. An iSeries project unlike RSE allows RPG and COBOL developers to fully exploit the power of Eclipse, while developing applications targeted to run on iSeries.
- ▶ An iSeries project contains folders and files that exist in the local file system, yet can be shared and synchronized among a team, if an Eclipse-compliant repository is used such as Rational's ClearCase or the free and open-source product CVS or Concurrent Versioning Systems, or the MKS Integrity. CVS is available on the distribution CDs for the Linux LPAR on iSeries. In the near future, the remaining iSeries change management vendors will also be available as repository options.

iSeries AD, IBM Toronto

✓ Remote Systems Explorer Perspective

- **Manages connections to remote systems**
  - ► Where you create/manage connection information
  - ► Connections subsequently used in all iSeries tools
  - ► Start by using the New Connection wizard
    - ✓ Connection appears in tree view
    - ✓ Expand it to see "subsystem" -> functional groupings

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► Create and manage connections to multiple systems. This feature also allows multiple server connections to the same system, each with its own independent job environment.

► Within each connection, subsystems define particular functionality. Filters are used within each subsystem filter and view only the requested objects. For iSeries connections, three subsystems are provided, each containing predefined filters. These are the Job, Object, and Command Subsystems.

WDSc: RPG and CBL Tools

Remote Systems View:
- Shows all existing connections
- Expand to drill down
- Right click to do actions

Commands View:
- Logs all commands and results
- Can type in command to run it remotely
- Choose connection to run it in
- Easily recall commands

New Connection Wizard

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▸ The Remote System Explorer is an Eclipse perspective with many views to help developers work with resources in a remote system.
▸ The primary view is the Remote Systems tree view, where remote system resources are explored, similar to the Windows Explorer.
▸ There is also a commands view, or shell, for entering commands to be run remotely, and for logging the results of all commands. There is also a Properties view, which is common throughout Eclipse. It shows interesting information about the object currently selected in the primary view. There is an iSeries Error List view where errors are shown after performing a remote compile.

WDSc: RPG and CBL Tools
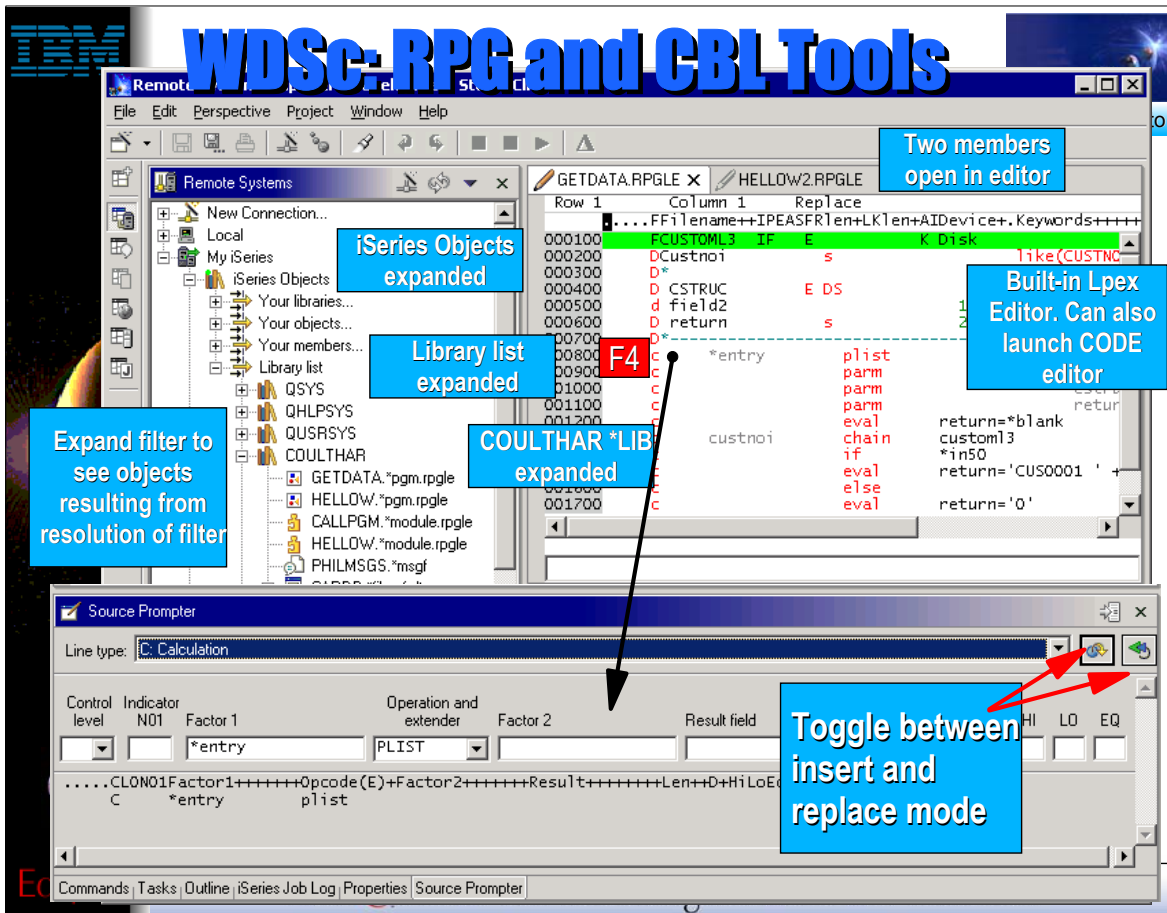
- There is a dedicated perspective named the Remote Systems Explorer containing views and editors specifically for the task of RPG/COBOL development. This slide shows the Remote Systems Explorer (RSE) being used to access members on an iSeries identified by a connection. The RSE is similar in functionality to PDM.
- Filters can be used to get immediate access to specific libraries, objects or filters
- In this case, the one default filter for the library has been expanded, resulting in a list of libraries. From that a particular source file has been expanded resulting in a list of source members. Two of the source members have been opened for editing (using a popup menu action, not shown).
- Emphasize that there are two choices for the editor: the built-in LPEX editor (shown) and the classic CODE editor, which is launched in a separate window.
- The built-in LPEX editor includes a number of functions per language, including support for F4 to prompt an RPG specification.

iSeries Projects

iSeries Projects - Development Studio Client

File Edit Perspective Project Window Help

iSeries Navigator

- My Project
  - NEWFILE
    - NEWMBR
  - QDDSSRC (Local/Remote)
    - ABCDEF.dspf (Local/Remote)
    - CUSTOMER.pf (Local/Remote)
    - CUSTOML3.lf (Local/Remote)
    - MYSTUFF.dspf (Local/Remote)
    - SIMPLEDSPF.dspf (Local/Remote)
    - TESTTYPES.pf (Local/Remote)
  - QRPGLESRC (Local/Remote)
    - CALLPGM.rpgle (Local/Remote)
    - GETDATA.rpgle (Local/Remote)
    - HELLOW2.rpgle (Local/Remote)
  - CUSTOMERO.*file.pf-dta (Remote)
  - DATADICTO.*file.pf-dta (Remote)
  - QRPGSRC.*file.pf-src (Remote)
  - TESTTYPES.*file.pf-dta (Remote)
  - TESTTYPES2.*file.pf-dta (Remote)
  - TESTTYPES3.*file.pf-dta (Remote)
  - TESTTYPES4.*file.pf-dta (Remote)
  - TESTTYPES5.*file.pf-dta (Remote)
  - TESTTYPES6.*file.pf-dta (Remote)
  - TESTTYPES7.*file.pf-dta (Remote)
  - CALLPGM.*module.rpgle (Remote)
  - CUSTOML3O.*file.lf (Remote)
  - GETDATA.*pgm.rpgle (Remote)

iSeries Navigator | Navigator | Bookmarks

Local Member: /My Project/QRPGLESRC/CALLPGM.rpgle

iSeries Project navigator:
- ►local files and members
  - Use Push popup menu action to copy from project to library
  - Use Build to build project
  - Use Team->Sync to copy to/from team repository
- ►remote objects, files and mbrs
  - Use Add to Project to copy from library to project

(Remote) =>
- ►only exists in associated library

(Local/Remote) =>
- ►exists locally and in associated lib

(Local/Remote) =>
- ►conflict between local and remote

otherwise =>
- ►only exists locally

Project, Source File, Mbr

Device+.Keywords++++++++++++++++++++++
Disk
        like(CUSTNO)
        extname(customl3:custom01)
   20
----
custnii='0010100'
'GETDATA'
                custnoi
                cstruc
                return
*INLR = *ON

or choose favorite editor

Value
true
5/5/02 12:27 PM
CALLPGM.rpgle
/My Project/QRPGLESRC/CALLPGM.rp
1222

Remote Systems Explorer to work with objects in remote library

Property Sheet to show properties of selected local or remote object

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- ► Now it is time to turn our attention to the second major area of support for RPG and COBOL programmers in WDSc.
- ► This is the iSeries projects support.
- ► There is a special project type designed to hold source that is destined to be compiled and run on an iSeries. There is a wizard for creating a new iSeries Project.
- ► There is a special perspective for working with iSeries projects.
- ► An iSeries Project is a typical Eclipse project. This means it contains folders and files that are in the local file system of the IDE, but these can be synchronized with a central repository for team support.
- ► Since the files are local, there are actions to support "pushing" those files up to an iSeries library, where they become source members. This is done prior to compiling or "building" the source for the purpose of testing.

iSeries Projects...

- Conflict Detection
  - ► Remote source changes are shown in the iSeries project with different file icon
  - ► User is warned before pushing local changes to remote system if remote source has changed
- Build Styles
  - ► Presupplied:
    - – Command
    - – CL Build Style
  - ► Integrated error feedback
- ISV Integration Support
  - ► APIs for ISVs to create and manipulate iSeries projects
  - ► ISVs can provide:
    - – Additional pages to the new iSeries project creation wizard
    - – Additional build styles
- Integration with RSE
  - ► Create projects from the RSE
  - ► Add members to existing projects
  - ► Program verifiers
  - ► Remote Systems LPEX Editor

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- ► The iSeries Projects support now includes significant enhancements:
- ► New extension points for Business Partners to leverage
- ► Enhancements for build support, including monitoring of the build steps and error feedback
- ► The text description is now captured for iSeries files and members imported into an iSeries project
- ► Based on last modified timestamps, visually identify when local and remote copies of the same member are in conflict, and offer resolution support when the local member is pushed to the remote server

What's new in Version 5.0!

Remote System Explorer...

- Editing
  - ► Remote Systems LPEX Editor
    - – Syntax checking
    - – Context sensitive help
    - – Outline view
    - – Code assist
    - – Indentation view
    - – Program verifiers
  - ► Ability to use any Workbench editor on any remote source
    - – Remote Systems LPEX Editor, Java editor, XML editor, SQL editor
- Debug
  - ► iSeries remote debugging integrated into the Workbench
- Enhanced iSeries table view
  - ► More PDM like user interface and actions
- Drag and Drop support
  - ► Ability to copy members and files between different hosts and system types!
- Disconnected development support via iSeries projects
- User defined actions
  - ► More functionality and substitution variables

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► The RSE enhancements include:
► Enhanced support for library list manipulation
► User-defined actions that support all PDM substitution variables
► PDM-like table-view
► Easy enablement for working offline using iSeries projects
► The option to securely save passwords between sessions
► SSL for more secure communications
► Support for searching source members for text strings
► Graphical wizards for creating libraries, source files and members, data areas, data queues, and message files
► Message files that can be expanded in the Remote Systems tree view
► Actions to create, edit, and delete messages
► Support for the new iSeries iASP capability
► Performance enhancements for retrieving lists and for editing
► Extensive support for dragging and dropping
► The built-in editor available in RSE has been significantly enhanced to include many more of the classic CODE editor capabilities.

- Remote Searching
  - ► Search remote members for specific text strings
- More support for accessing remote Linux, Unix and Windows systems
  - ► Table view
  - ► User defined actions
- Much, much more
  - ► Save passwords, message file support, environment variables, ...

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► **BPs, ISVs, and eclipse . . .**
Great business opportunity for all!

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- Extending the Workbench
  - ▶ "Plugins" provide a mechanism for IBM and other software tool vendors to add functions to the Eclipse Workbench and sell them as products
    - Ability to add new functions to the Workbench
    - XML Tools, WebFacing, Remote Systems Explorer
    - Ability to extend existing functions provided by other vendors
    - iSeries extensions to Web Tools
    - SCM providing VCM adapters for source change control
- Extension points
- Business partners can provide their own plugins for Eclipse
- Softlanding, Aldon to provide VCM adapters to integrate with their existing source change systems... Other are working on it too.
- We have provided extension points in our code (RSE) for business partners to extend what we are doing
- Huge opportunity for BP

Eclipse

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► **Java Development Tools (JDT)**

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WDSc: Java Tools

iSeries AD, IBM Toronto

✓ **Java Development Tools (JDT):**

- **Choice of Java level**

```
assert(String,boolean)  void - Assert
assert(boolean)  void - Assert
assertEquals(Object,Object)  void - Assert
assertEquals(String,Object,Object)  void - Assert
assertEquals(String,boolean,boolean)  void - Assert
assertEquals(String,byte,byte)  void - Assert
assertEquals(String,char,char)  void - Assert
```
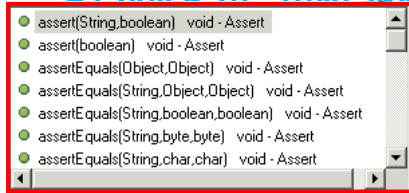
- t-in and offered as default

- va development s
  - ✓ Package view and Hierarchy view:
  - ✓ Outline view: m

```
assertTrue(boolean)  void - Assert
AssertTest - junit.t    Asserts that a condition is true. If it isn't it throws an AssertionFailedError
                        @deprecated use assertTrue
```

- ► **Java Editor**
  - ✓ Content Assist: Ctrl+Space bar to get list of classes or methods
  - ✓ JavaDoc shown as hover help
  - ✓ F3 to open selected class
- ► **Refactoring support**
  - ✓ Rename updates all references
- ► **Incremental compile**
  - ✓ When Ctrl+S pressed in editor
  - ✓ Or on demand via Build Project action

```
Packages                    ▼  ×
⇦  ⇨  ⇧
   JUnit
      junit.extensions
      junit.framework
      junit.runner
      junit.samples
         AllTests.java
         SimpleTest.java
         VectorTest.java
      junit.samples.money
```

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Eclipse
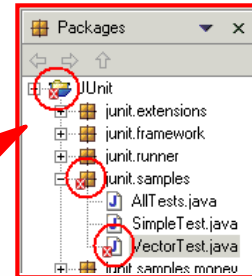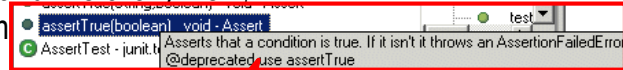
- ► By default JDT uses the IBM JRE 1.3 that is shipped with the Workbench however the user is able to switch this to any JDK that is installed on the local system.
- ► Java projects have an associated builder that knows how to compile Java classes. Properties for a Java project include the build path where the user specifies other projects, and jar files that are required for this project (i.e. sets up the classpath.)
- ► Refactoring support gives the user the ability to easily restructure their code without having to manually update other classes that are affected by the changes. Whenever a Java class is saved, the source is automatically compiled.
- ► Here you see examples of the content assist and JavaDoc hover help available in the Java editor.
- ► The packages view is also shown. The packages view flags classes that contain compile errors with a red x.

Java Tools Not There

✓ **Not all VAJava function is available <u>yet</u>:**

- **Visual Composition Editor... coming soon**
- **DataBase Beans**
  - ► Actually, there are replacements! Just no visual metaphor
  - ► See com.ibm.db.beans: DBSelect, DBProcedureCall, DBModify
  - ► Also a Database access wizard in Web Tools
- **SQLJ support**
- **Stored Procedure Builder**

✓ **For VAJava migration...**

- ► **www.ibm.com/software/wsdd**
  - ✓ "VisualAge for Java coexistence with WebSphere Studio Application Developer"
  - ✓ http://www7b.boulder.ibm.com/wsdd/library/techarticles/0110_searle/searle.html

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Java Tools for iSeries

✓ iSeries extensions for Java

- **Import and export from/to remote system**
- **Remote Compile and Run**
- **Remote Debug**
- **Program Call wizard**
- **Toolbox for Java built-in**
  - ► As an Eclipse Java project (ie: easy to add to classpath of your project!)
  - ► Integrated help
  - ► Runnable samples
- **Supplied Java-beans**
  - ► Swing GUI beans (dspf-like functionality)
  - ► DFU beans (database access)
  - ► Object list beans (lib, obj, mbr, field, record lists)

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- ► iSeries-specific extensions to Java tools:
- ► Export and Import to/from IFS, via common remote system frame-work support
- ► Special Java "compile" action/view for remotely compiling Java classes
- ► Special Java run action/view for remotely running Java applications
- ► Special Java debug action/view for remotely debugging Java applications
- ► Program Call wizard to 'wrapper' any *PGM/SRVPGM as a Java Bean
- ► Previously supplied Java beans: datafile updates (DFU), object lists (PDM), and Swing formatting

✓ Program Call Wizard

- **Given signature of *PGM or *SRVPGM proc:**
  - ► Generate Java Bean to call it
- **Steps:**
  - ► 1. Select Java/Web/WebFacing project
  - ► 2. Select package
  - ► 3. Use File->New->Other...
    - ✓ ...iSeries Java Program Call Bean
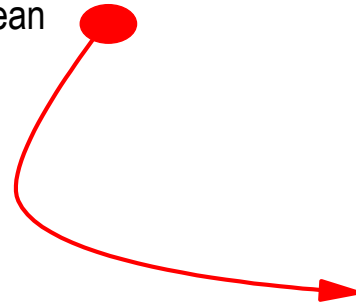
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- ► Here we step through the very popular Program Call wizard, which has been significantly enhanced from its old VisualAge for Java days.
- ► Using this wizard is easy.
- ► First, within any view that lists projects, select a project to contain the generated Java code. You are allowed to select from Java, Web or WebFacing projects. Only these types of projects support Java. Second, select the Java package within that project, into which the Java code will be generated. You must pre-create such a package if you don't have one. Third, launch the program call wizard, by using the File->New->Other menu item. In the resulting wizard, select the iSeries Java and then Program Call Bean
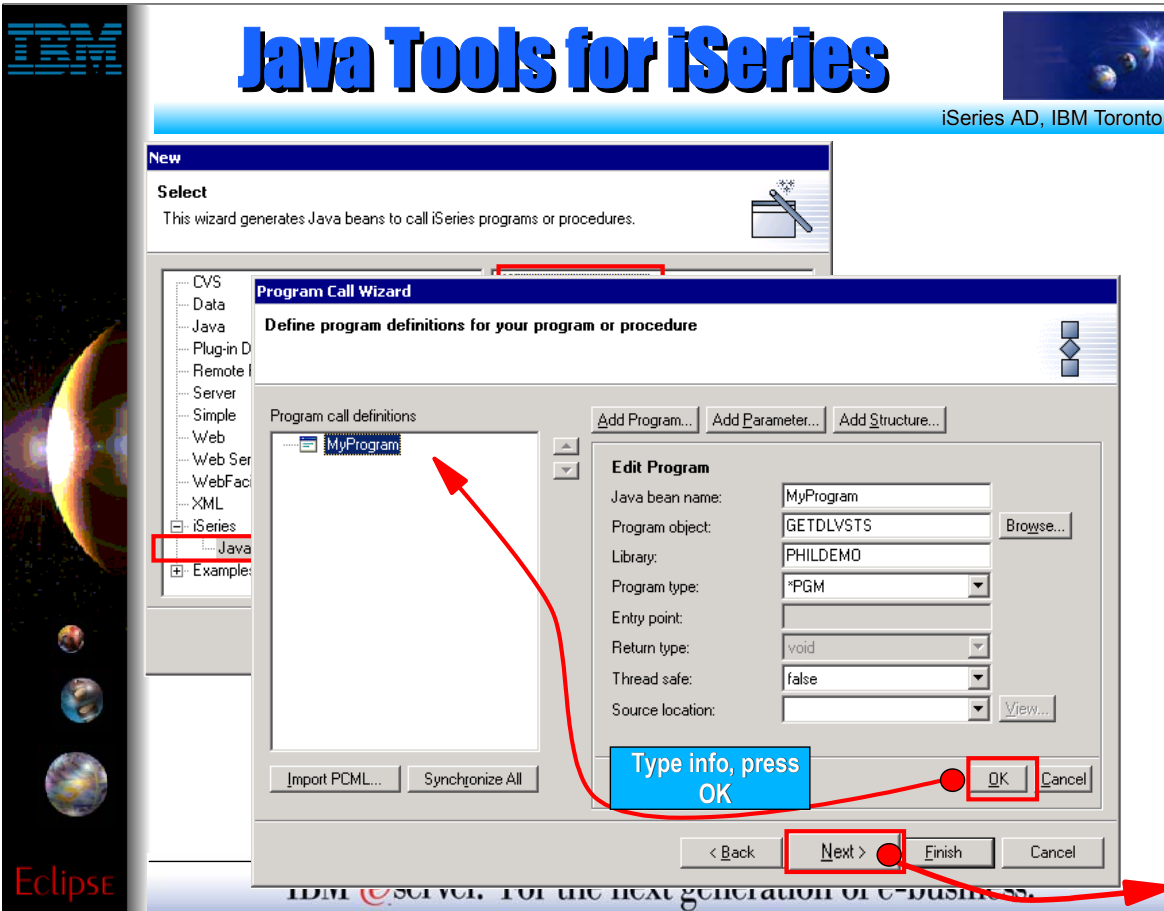
- ▸ On the File->New->Other wizard selection page, select the Program Call Bean wizard and press Next.
- ▸ In the Program Call wizard, enter the program or ILE procedure to be called from Java. This must be a non-interactive program or procedure.

Enter Parameter Info

iSeries AD, IBM Toronto

Add Program... Add Parameter... Add Structure...

Define parameters

Add Parameter

Parameter name:
Data type: character
Structure name:
Length:
Precision:
Count: **> 0 for array**
Usage: input & output
Initial value:

☐ Advanced...
Specify database reference field   Specify...
Show database field definition   Show...

Define and name structure

Add Structure

Structure name:
Count:
Usage: input & output
Output size:
Min. version:
Max. version:
Offset:
Offset from:

Be sure to press OK for each parameter / structure

Builds up parameter list

Program call definitions
MyProgram
  retCode
  nbrCodes
  dlvCodes

Next >

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▸ Use the Add Parameter and Add Structure buttons to describe all the parameters to the program or procedure, including data type, length and decimals. Most importantly, specify if the parameters are input, output or both with respect to what the program does with the parameters (read, write or both)

▸ When all parameters are described, press Next to continue to the next page of the wizard.

Final Page

Program Call Wizard

Create iSeries Program Call Java bean and PCML file
Specify the location where the Java bean and PCML file to be generated.

Folder: `/PhilJavaDemo` **Where to generate Java class** Browse...

Package: `customer.demo` Browse...

PCML file name: `MyProgram` **Where to generate PCML file**

Generate Java beans and a PCML file for:
☑ Java application
☑ Web services ← **Select Web Services to generate Java code optimized for use in the Web Services wizard**

These files will be generated by the wizard:

```
MyProgram.pcml
MyProgram.mpcml
MyProgramServices.java
MyProgram.java
```

Summary of files that will be generated

To change parameters later:
● **Return to wizard**
● **Use Import PCML... button**

The class path of the specified project will be automatically updated.
Generated Java beans require the following JAR files at compile time and run time:
ECLIPSE_HOME/plugins/com.ibm.etools.iseries.toolbox/runtime/jt400.jar
ECLIPSE_HOME/plugins/com.ibm.etools.iseries.webtools/lib/wdt400rt.jar
ECLIPSE_HOME/plugins/com.ibm.etools.websphere.runtime/lib/xerces.jar
ECLIPSE_HOME/plugins/com.ibm.etools.websphere.runtime/lib/j2ee.jar

Runtime files you will need to deploy with your code

< Back   Next >   Finish ●   Cancel

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▸ Finally, confirm where you want the Java code to be generated, including the Program Call Markup Language (PCML) file that is also generated.
▸ If you desire for the generated Java bean to be used as a Web Service, select the Web Services checkbox. This generates a Java bean that is easily consumable by the Web Services wizard.
▸ Notice how the wizard will automatically update your project's classpath to include the necessary AS/400 Toolbox for Java jar files so that your generated code will compile.
▸ Finally, press Finish to generate your Java bean!!

Generated Java Bean

Java - Development Studio Client

File Edit Perspective Project Debug Window Help

Packages: PhilJavaDemo

- customer.demo
  - Customer.java
  - MyProgram.java
  - MyProgramResult.java
  - MyProgramServices.java
  - MyProgram.mpcml
  - MyProgram.pcml
- JRE_LIB - E:\WDSC\WSSD\
- ECLIPSE_HOME/plugins/con
- ECLIPSE_HOME/plugins/con
- ECLIPSE_HOME/plugins/con
- ECLIPSE_HOME/plugins/con

MyProgram.java

```java
package customer.demo;

import java.math.*;
import com.ibm.as400.access.*;
import com.ibm.connector.as400.ProgramCallBean;
import com.ibm.connector.as400.ProgramCallRecord
import com.ibm.connector.as400.ProgramCallStruct

public class MyProgram extends ProgramCallBean
{

    public MyProgram()
    {
        super();
        setPcmlName("customer.demo.MyProgram");
        setProgramName("MyProgram");
    }


    public Integer getRetCode()
    {
```

Outline

- customer.demo
- import declarations
- MyProgram
  - MyProgram()
  - getRetCode()
  - getNbrCodes()
  - getDlvCodes(int)
  - invoke()
  - setConnectionData(AS400)
  - setConnectionData(String, String, String)
  - getAS400Object()
  - setLibraryList(String[])
  - disconnect()
  - setTraceEnabled(boolean)

► **setConnectionData(...)**
  ► to identify signon info
► **setLibraryList(...)**
  ► to set runtime library list
► **setXXX(...)**
  ► to set input parameters
► **invoke()**
  ► to run program
► **getXXX(...)**
  ► to get output parameters

Adds required files to project classpath

Example using gen'd bean

```java
package customer.demo;
public class TestMyProgram
{
    public static void main(String[] args)
    {
        MyProgram test = new MyProgram();
        test.setConnectionData("MYSYSTEM", "MYUSERID", "MYPASSWORD");
        test.setLibraryList(new String[] {"PHILDEMO"});
        test.invoke();
        int nbrResults = test.getNbrCodes().intValue();
        System.out.println("Nbr Codes: " + nbrResults);
        for (int idx=0; idx<nbrResults; idx++)
        {
            System.out.println(" code " + idx + ": " +
                                test.getDlvCodes(idx).trim());
        }
    }
}
```

Eclipse

► Here we see the result of the Program Call wizard.
► The selected Java package in the upper left now contains all the generated Java classes, one of which is shown in the editor in the middle view.
► To use the generated Java bean, you write Java code to instantiate it and call the important methods in it, which are listed in the information box in the lower right. An example of Java code to use the bean is shown in the lower middle information box.

► **Web Tools**

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✓ Web projects

- **J2EE-defined folder structure for Web Apps**
- **Superset of Java projects (inherits Java Tools)**
- **Automatic creation/maintainence of web.xml file**
- **Editor support**
  - ► Create/Edit/Validate/Debug JSP and HTML files
  - ► Images and animation
  - ► Cascading Syle Sheets (CSS)
- **Import/Export from/to a variety of sources**
  - ► HTTP/FTP/WAR/EAR
- **Link viewing and management**
  - ► Converting links, flagging broken links, and fixing up links as linked resources are moved or renamed

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► WebSphere Development Studio client is based on WebSphere Studio Site Developer advanced, which contains many tools for Web Developers.

WDSc: WSSDa Web Wizards

✓ Java Bean Web Pages Wizard

- **Input: Java Bean**
- **Output:**
  - ▶ Input JSP page prompting for input properties
  - ▶ Output JSP page displaying output properties
  - ▶ Servlet that ties them together

✓ Database Web Pages Wizard

- **Input: SQL Query Statement (sub-wizard)**
- **Output:**
  - ▶ Input JSP page prompting for input parameters
  - ▶ Output JSP page displaying output data
  - ▶ Servlet that ties them together

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▶ You can create a Web applications from database queries and beans using these wizards
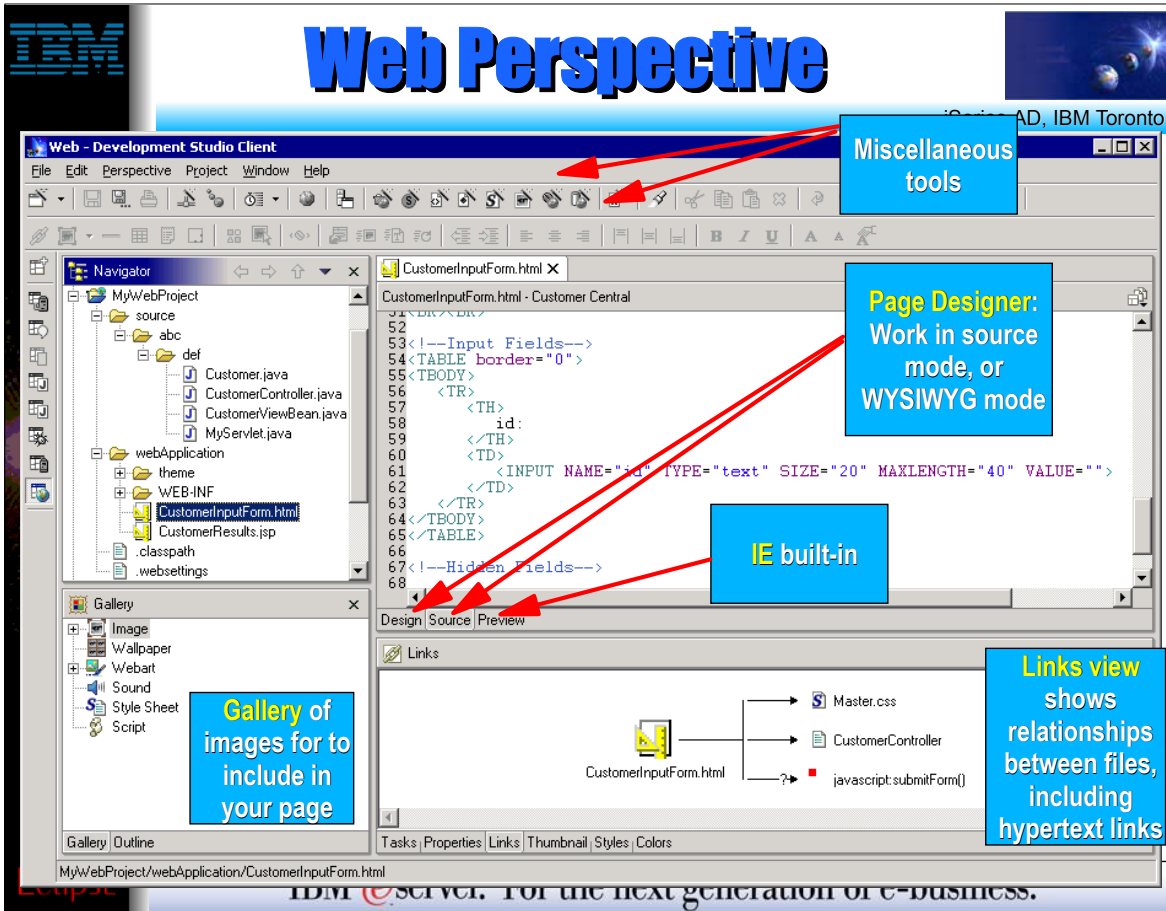
Web Perspective

▸ The Web perspective contains views and editors optimized for Web development tasks. Tools include a project navigator, a Page Designer editor that includes support for source editing or WYSIWYG editing, and preview mode via a built-in copy of Internet Explorer, a links view to show the relationships of all the files in a project, and a gallery of pre-supplied images, audio and so on, and other editors for cascading style sheets, logos and animated gifs.

▸ The Web Tools are inherited from WSSDa and are both a superset, and small subset, of the functionality previously offered in WebSphere Studio.

WDSc: Run On Server

✓ **Run On Server**

- **Now this is VERY COOL!**

✓ **When ready to test your Web app**

- **Right click on initial html or jsp file**
  - ▶ or whole project, which implies the index.html file
- **Select "Run on Project"**
- **Wait for the magic...**

✓ **Your Web application will run!**

- **Opens Server perspective**
  - ▶ Publishes it to built-in copy of WAS
  - ▶ Starts built-in copy of WAS
  - ▶ Brings up a Web Browser
  - ▶ **Runs your application!!**
    - ✓ Tip: you can set breakpoints in your Java code!

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▸ For example, assuming an existing Web Customer Inventory RPG application, to test this, we can select our .jsp input page in our Web project in the Web perspective in the workbench
▸ Right mouse click on it and select Run on Server from the popup window
▸ The built-in WAS test environment will start
▸ The built-in browser will show the input page
▸ Key in a valid customer number
▸ Press the Submit push button
▸ The customer number will be sent to the RPG program
▸ If the number was valid the customer data stored in our database will be displayed
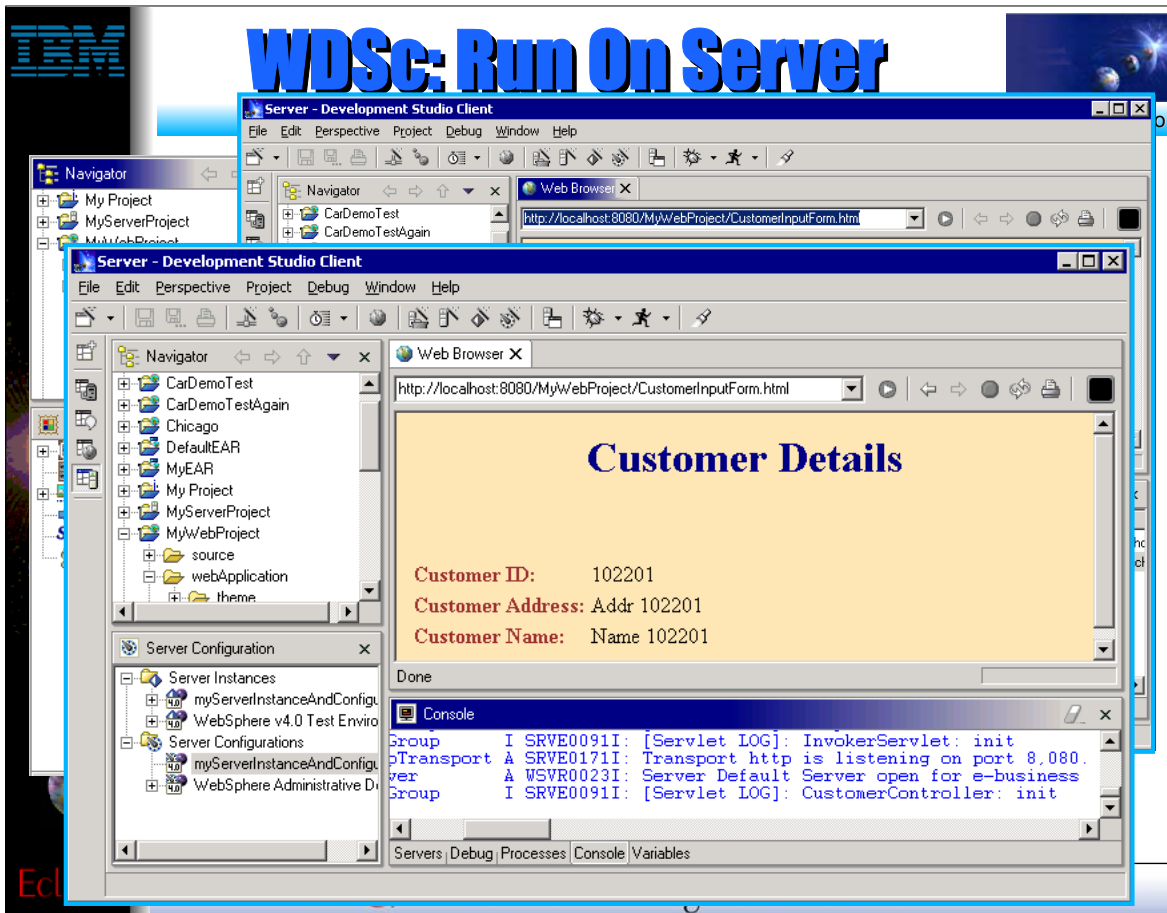
▶ Here we are, the Result page is displayed

WDSc: iSeries Web Tools

✓ Tools optimized for iSeries developers!

- **Web Interaction wizard**
  - ▶ **Input**: *PGM or ILE proc parameter information
  - ▶ **Output**:
    - ✓ Input JSP page prompting for input properties
    - ✓ Output JSP page displaying output properties
    - ✓ Java Bean for calling the *PGM or ILE procedure
    - ✓ Servlet that ties them together

- **Host Information wizard**
  - ▶ Set runtime information such as library list and sign-on information, to be used by glue generated by all Web Interaction wizards for this Web project

- **Visual Custom Tags (Web GUI Widgets)**
  - ▶ Web GUI Widgets that support DSPF-like attributes such as error checking by datatype, and edit-code and edit-word

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- ► The Web interaction wizard now generates a Web application based on a Struts runtime
- ► iSeries Web Tools Run-time Configuration wizard captures information such as server name, userid, password, and library list used by Web applications
- ► Visual Custom Tags (VCTs) replace the ActiveX Design-Time Controls (DTCs). VCTs can be used and rendered in the HTML Designer
- ► VCTs provide the controls such as textField, label, dropDown, pushButton, and so on.

iSeries Web Interaction Wizard
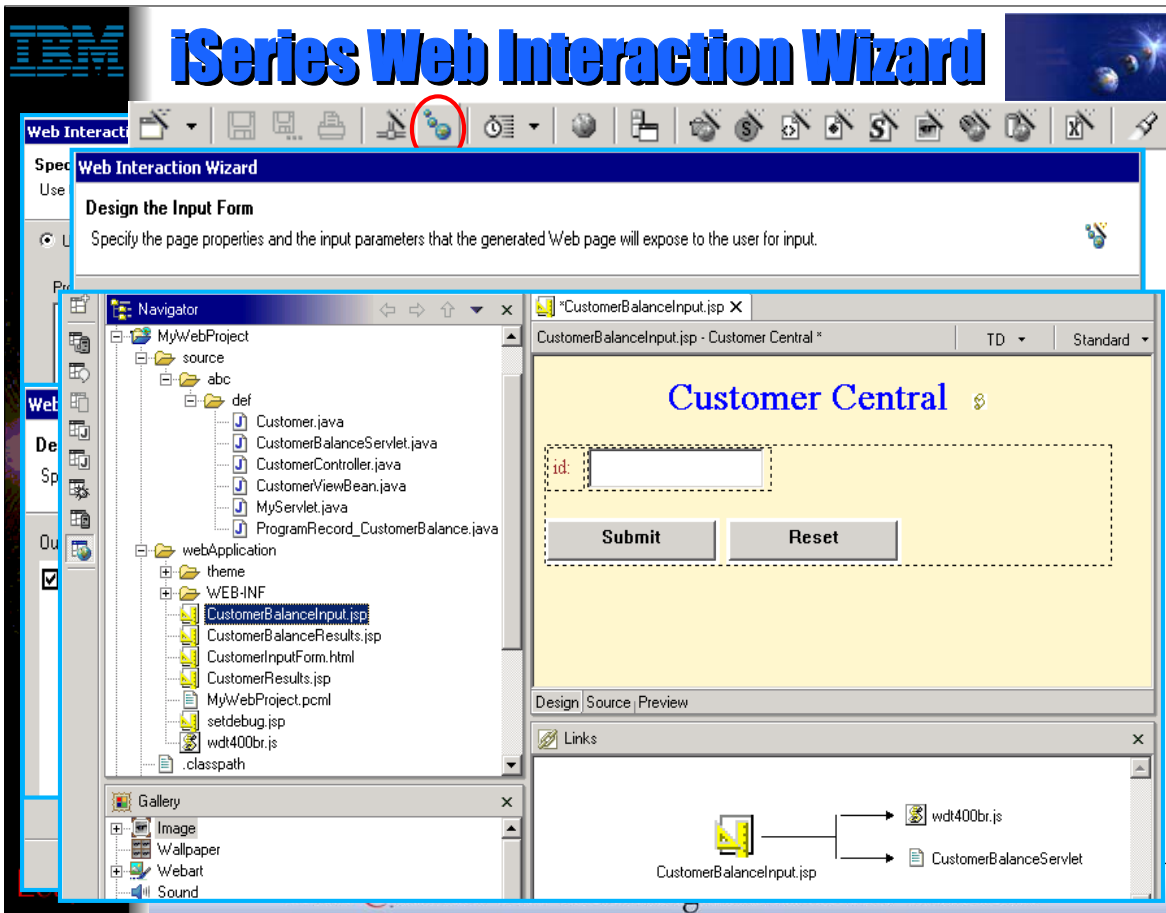
- ► We have a choice of having the Interaction Wizard creating our User Interface or designing it ourselves.
- ► In this example we decide to design the Input page using the Interaction wizard.
- ► We add a background and heading
- ► We add a form tag to the Input page. The form contains an entry field for data entry and a submit push button to send a request with the data in the entry field to a server.
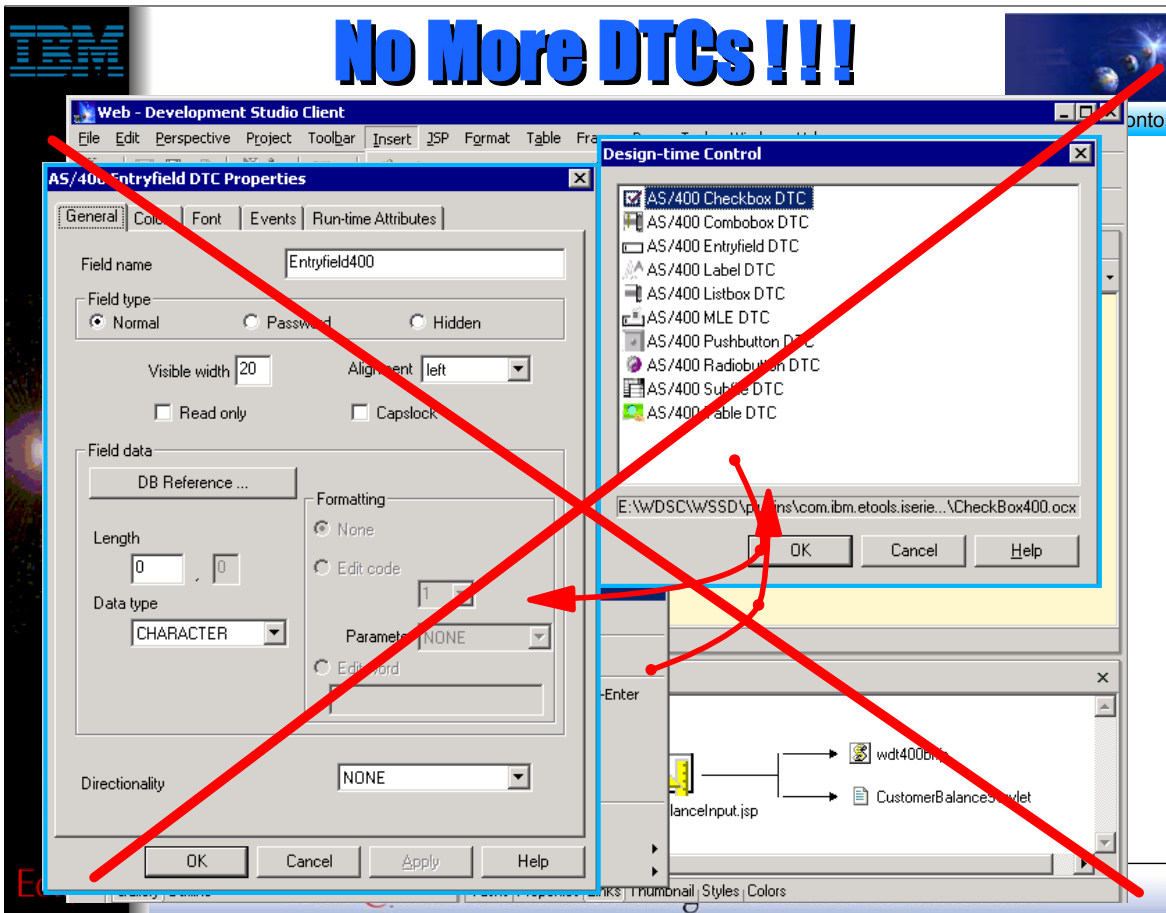
No More DTCs ! ! !

▶ Now we use Visual Custom Tags (VCTs) to provide the controls such as textField, label, dropDown, pushButton and so on.

VTCs ... No more DTCs

iSeries AD, IBM Toronto

IBM eserver. For the next generation of e-business.
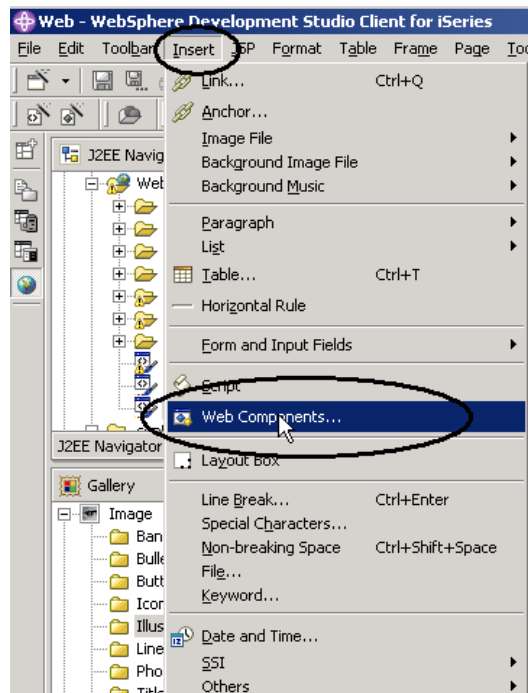
▶ Visual Custom Tags bring some of the power of DDS to Web pages.

VTCs ... No more DTCs
Same selection . . . Better look!

iSeries AD, IBM Toronto

Web Components

- Text Entry
- Label
- Button
- Image Button
- Combo Box
- Selection Box
- Check Box
- Text Area
- Radio Button Group
- Image
- Hyperlink
- Table

OK   Cancel
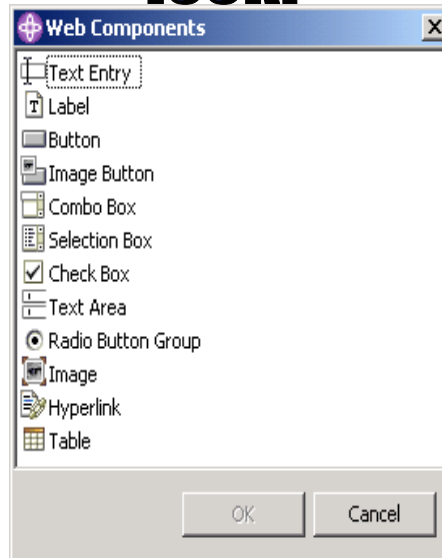
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▸ VTCs can be used and rendered in the HTML Designer
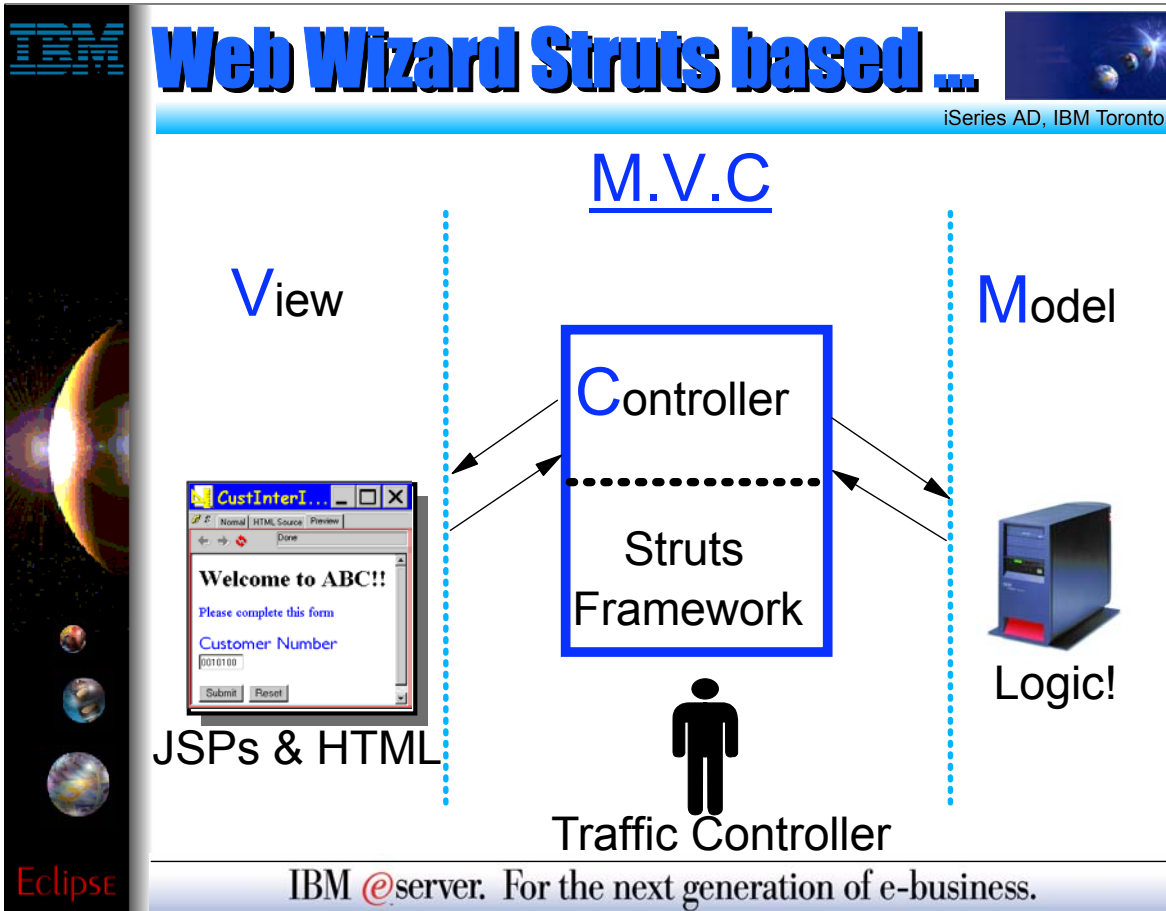
▸ Struts-based Model View Controller that allows you to map out and visually construct Web-based applications

▶ **Web Services Tools**
▶ **XML Tools**
▶ **Database Tools**

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WDSc: Web Service Tools

✓ **Consume/Construct Web services:**

- **Discover**
  - ► Browse UDDI registry to locate existing services
  - ► Generate Java Bean Proxy for existing services
- **Create/Transform**
  - ► Create new Web services from Java Beans, databases
    - ✓ Including Java Beans output from iSeries ProgramCall wizard
- **Deploy**
  - ► Deploy Web service to WebSphere or Tomcat for testing
- **Test**
  - ► Built-in test client allows for immediate testing of local/remote Web services
- **Publish**
  - ► Publish Web services to UDDI registry

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► Web Services Tools are industry-leading and can be used to discover, generate, deploy, test and publish Web services.

► All Web services support is based on open standards such as UDDI V2, Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL), and new support for Web Services Inspection Language (WSIL)

WDSc: XML Tools

iSeries AD, IBM Toronto

✓ XML Perspective and XML Tools

- **XML Editor**
  - ▶ For creating and viewing XML files
- **DTD Editor**
  - ▶ For creating/viewing Document Type Definitions
- **XML Schema Editor**
  - ▶ For creating, viewing and editing XML Schemas
- **XML to XML Mapping Editor**
  - ▶ To map one+ source XML files to a target XML file
- **XSL Trace Editor**
  - ▶ To visually step through an XSL transform
- **XML and SQL Query Wizard**
  - ▶ To create an XML file from an SQL query
- **RDB to XML Mapping Editor**
  - ▶ To map one+ relational tables to a target XML file

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- ▸ 1. An editor for creating and visualizing XML files. This editor includes a wizard to generate a Java bean to parse and generate the XML.
- ▸ 2. DTD Editor: An editor for creating Document Type Definitions, with minimal DTD skills. DTDs can be deduced from sample XML files. This editor includes a wizard to generate a Java bean to parse and generate any XML conforming to the DTD.
- ▸ 3. An editor for creating XML Schemas, which are replacing the older DTDs, with minimal XML Schema skills. Schemas can be deduced from sample XML files or DTDs. This editor includes a wizard to generate a Java bean to parse and generate any XML conforming to the schema.
- ▸ 4. A mapper tool that takes two XML DTDs or Schemas and allows you to map the tags and attributes from one to the other. The result is an XSLT file, that when run in an XSLT engine will map an XML file to an output XML file. XSLT is a standard language for defining XML mappings, and there are many engines that can "run" XSLT. Such an engine is supplied in WDSc and WAS.
- ▸ 5. An XSLT trace editor. This will "run" and XSLT and map one XML file to another. You can single-step through the transformation and see the output being generated
- ▸ 6. A wizard that will generate an XML file from an SQL query. This can be a static one-time only operation, or you can generate a Java bean that will do this at runtime.
- ▸ 7. A wizard that maps database tables to target XML tags and attributes. This then generates code that turns queries into XML and turns XML into database updates.

► The first thing to note about the XML editor is that is has two different views; design and source. These views are kept synchronized so you can switch between them while editing without having to save the file first.
► The XML editor adds some actions to the workbench toolbar. If performance becomes an issue when editing XML documents you can turn off the grammar contstraint checking.
► This will prevent the editor from performing live grammar checking. To check grammar you can then either save the file or use the validate XML file action.
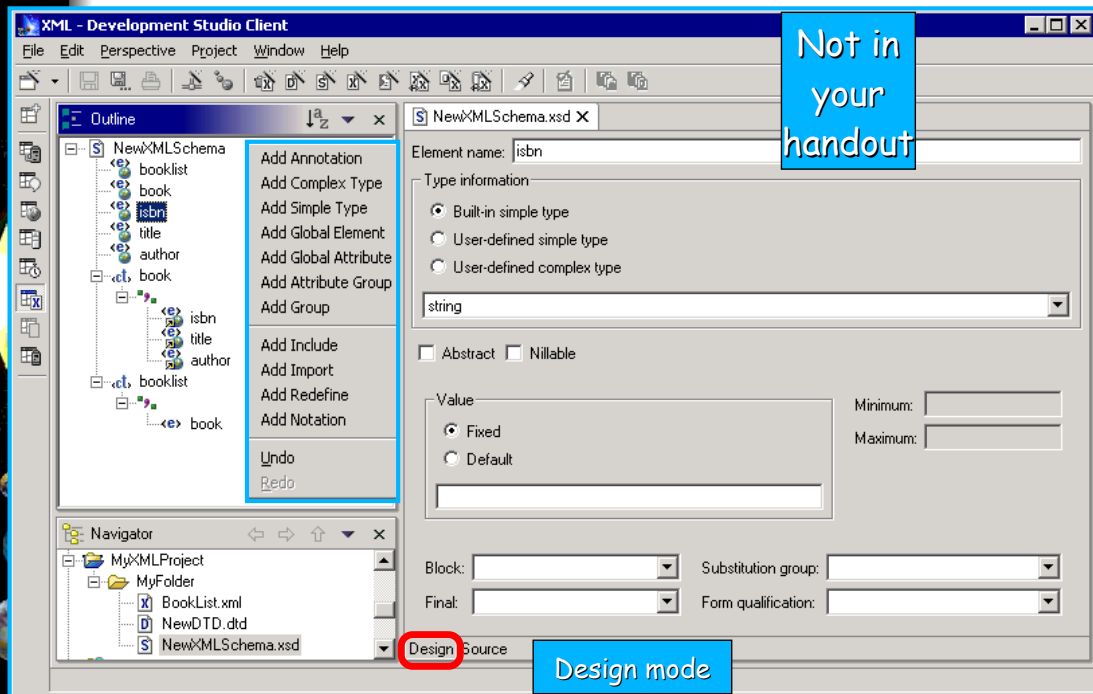
► Here we see the XML Schema editor. The outline of the schema is shown on the left, and the popup menu contains actions for editing the selected nodes. The right is the Schema editor that allows editing of the selected schema node, either in design mode (shown) or source mode (shown in next slide).

Source mode

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WDSc: XML-to-XML Editor

iSeries AD, IBM Toronto

✓ XML-to-XML Mapping Editor

- ▸ Here we see the XML-to-XML mapping editor. In the upper right we see an outline of the mappings. In the middle we see the input xml on the left, and the output xml on the right. To map two tags or attributes, select one on the left, and one on the right, and select the map button from the toolbar in the view at the bottom.
- ▸ That bottom view shows the mappings so far.
- ▸ Once the nodes have been mapped, right click and select "Generate XSLT" to generate the XSLT that captures the mapping data.
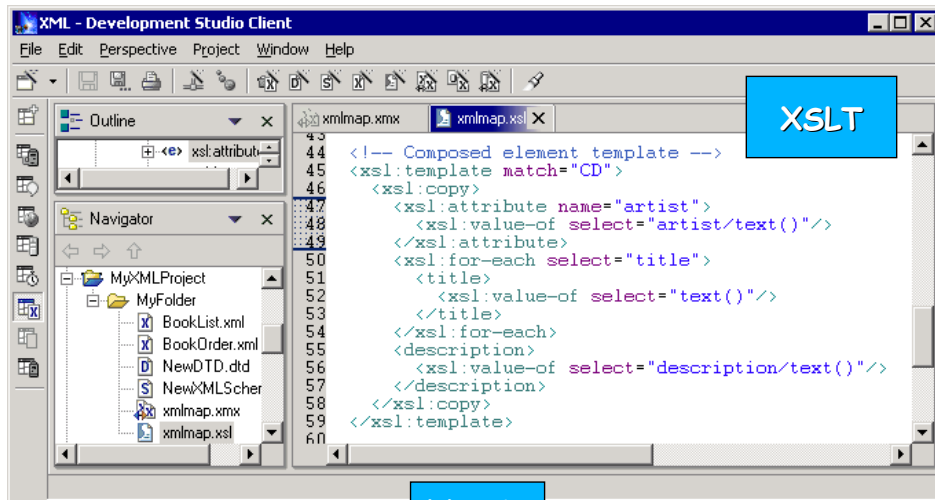
WDSc: XML-to-XML Editor

iSeries AD, IBM Toronto

✓ XML-to-XML Mapping Editor

XML - Development Studio Client

File Edit Perspective Project Window Help

Outline

⊞ <e> xsl:attribut

Navigator

MyXMLProject
  MyFolder
    BookList.xml
    BookOrder.xml
    NewDTD.dtd
    NewXMLScher
    xmlmap.xmx
    xmlmap.xsl

xmlmap.xmx   xmlmap.xsl

XSLT

```
43
44  <!-- Composed element template -->
45  <xsl:template match="CD">
46    <xsl:copy>
47      <xsl:attribute name="artist">
48        <xsl:value-of select="artist/text()"/>
49      </xsl:attribute>
50      <xsl:for-each select="title">
51        <title>
52          <xsl:value-of select="text()"/>
53        </title>
54      </xsl:for-each>
55      <description>
56        <xsl:value-of select="description/text()"/>
57      </description>
58    </xsl:copy>
59  </xsl:template>
60
```

Not in your handout

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Eclipse

WDSc: Database Tools

✓ Database Tools:

- **Relational Schema Center**
  - ▶ Provides views geared for DBAs to
    - ✓ Create Databases
    - ✓ Create Tables/Views/Indexes/Keys
    - ✓ Generate DDL
  - ▶ Online and offline support for working with databases
    - ✓ Metadata generated as XMI
- **SQL Query Builder**
  - ▶ Visually construct SQL statements
    - ✓ Insert, update, delete, select supported
    - ✓ Metadata generated as XMI
- **SQL/XML mapping**

Eclipse

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- ► WebSphere Development Studio Client inherits a set of database tools from WSSDa:
- ► 1. A perspective for working with database definitions to create/import database definitions, including tables, views, indices and keys. The user can continue to work on the definition until complete, then generate SQL Data Definition Language (DDL) statements to create a database conforming to the definition. This allows the user to work on the database definition offline, then connect and upload it to the server.
- ► 2. A wizard for building SQL Data Manipulation Language (DML) statements or query statements, with minimal SQL skills
- ► 3. A SQL to XML mapping wizard, already described as part of the XML tools, but also available in the Data perspective.

► **WebFacing**

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WebFacing: Before/after

iSeries AD, IBM Toronto
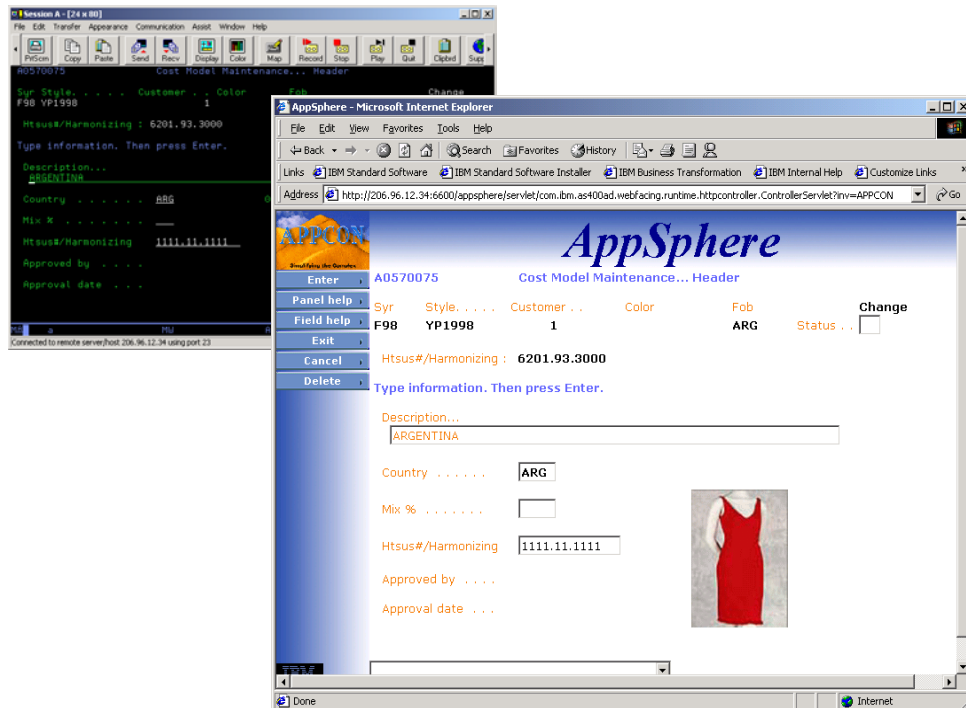
- ▸ This slide shows the before and after screens of Web-enabling at application.
- ▸ This example shows an application WebFaced using one of the pre-defined styles
- ▸ An image has been added using the WebSettings feature of CODE Designer
- ▸ WebSettings are set using CODE Designer prior to performing DDS conversion
- ▸ WebSettings are stored in the DDS as comments

WebFacing

✓ What it is:

- **Development Tool**
  - ► Converts DSPFs to Web UI
- **Runtime Intercept**
  - ► Redirect *PGM 5250 I/O to Web UI

✓ What is not:

- **5250 datastream converter!**
  - ► No 5250 datastream ever created
  - ► *PGM raw data buffers fed directly to Web UI
  - ► Conversion hit at development time, not runtime

✓ Why:

- **For BPs/ISVs to quickly convert to Web**
  - ► No limitation to customization of output
  - ► No-cost runtime, ubiquitous tool

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Eclipse

- ► WebFaced application can still be run on a 'green screen'
- ► Not a screen scraper - no data stream is constructed
- ► Typically no changes are required to the program
- ► Conversion process converts record formats to JSPs and Java beans
- ► Program READ/WRITE is intercepted by WebFacing run-time
- ► WebFace run-time merges data passed by the program with the JSPs then sends the JSPs to the browser

...WebFacing

✓ WebFacing and Eclipse

- **V5R1:**
  - ► first IBM tool based on Eclipse!
  - ► "first edition" status

- **V4.0 WDSc:**
  - ► "First edition" status is over!
  - ► Inherits and leverages all Web and Java tooling
  - ► Leverages built-in WebSphere Test Environment
  - ► Optimized for 4.0 of WAS
  - ► Many functional and performance enhancements

- **V5.0 WDSc:**
  - ► "Second edition"
  - ► More later . . .

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WebFacing Phase 2...

Not in your handout

✓ **Major focus on client-side performance**

- **More efficient HTML and JavaScript**
  - ► Faster download and rendering time

✓ **Major focus on client-side styling**

- **Web-site style and application-area style**
  - ► Easier to imbed WebFaced app in corporate style
  - ► Much better IBM-supplied styles for both
  - ► Better use of cascading style sheet
    - ✓ Much easier to do application-wide tailoring

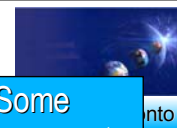The end of "First Edition" status. WebFacing is rockin' now!

more...

Eclipse

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WebFacing Phase 2...

Some enhancements require Service Pack 1

✓ Major focus on function

- All *common* keywords supported
- Support for UIM help panels for F1 support
- Support for function keys (being pressed)
- Option to tie-in corporate logon page with single or repeated signon

✓ Major focus on co-existence

- Support for
  - ► IBM WebSphere Edge Server and Work Load Management
  - ► Policy Directory (front ending WAS clusters)
- Co-existence with other Web modules in same Web session

Not in your handout

Eclipse

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What's new in WebFacing 5.0 ?

- ► **Ability to generate Struts based WebFacing applications**
- ► **Support Function keys displayed in DDS Window**
- ► **Conversion is faster based on the new RSE communication layer**
- ► **Automatic configuration for setting the WebFacing Web Application to use the unicode UTF8 encoding scheme for multi-lingual support**
- ► **Support for WRKSPLF**
- ► **Ability to override or add function keys ot support additional actions not defined in the RPG or COBOL application**
- ► **Enable DDS Conversion for supporting user written JSP Custom Tags**
- ► **New Styles view in the WebFacing perspective in the IDE**

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- ► IBM WebFacing Tool integrates with Web, Java, and iSeries tools. It also includes several features that improve the extensibility and customizability of the Web applications generated by the IBM WebFacing Tool:
- ► An optional open-source Struts infrastructure
- ► Conversion time extension points
- ► Command key action overrides for user-defined actions
- ► Support for displaying and printing iSeries spool files
- ► The iFrame portlet that makes it easy to add existing Web applications (including IBM WebFacing Tool applications) to the WebSphere Portal environment

► **What about RPG?**

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RPG IV . . .

- ● 31 digit support
- ● Allow Char. Parms for built-ins
- ● IFS Source File Support
- ● Lib qualified access to data areas
- ● PCML generation
- ● Short form operators
- ● I/O enhancements

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```
Sorted by item number
---------------------
item# votes %%% cost description
    1    6   3%  $10 H-spec keyword EXTDEFS to use the internal format
                     of ext fields.
    2   52  29%  $30 RANGE and VALUES keywords.
    3   15   8%  $25 SORTA arr1 {: arr2 ...} WITH key_arr1 {: key_arr2 ...}
    4   25  14%  $ 5 Extender on SORTA to reverse the order of sorting.
    5   53  30%  $ 5 DEBUG(*RETVAL) to allow debugging of procedure return v
    6   24  13%  $ 5 OPTIONS(*VARTYPE) to bypass type match of procedure par
    7   91  51%  $10 New BIFs %TESTD, %TESTT, and %TESTZ.
    8   35  19%  $50 Allow dynamic resizing of arrays and multi-occurrence D
    9   33  18%  $ 5 Format change on a LIKE define for numerics.
   10   24  13%  $10 New keyword, RECPREFIX, to prefix record-format names.
   11   11   6%  $10 DIM(*FIT) with overlay field.
   12   27  15%  $50 Multiple-dimension arrays (expressions only).
   13    5   2%  $40 SPECIAL files to handle all I/O opcodes, including keye
   14   29  16%  $ 5 %OFFSET builtin function returns offset of subfield.
   15   20  11%  $20 Multiple array element initialization.
   16   28  15%  $10 Keyword EXTDESC, like EXTFILE, but used at compile time
   17   12   6%  $20 Dynamic specification of basing variable, ie "p->var".
   18   21  11%  $20 Option *ZEROFILL on %EDITC to include leading zeros.
   19   12   6%  $20 Option to edit negative numbers using parentheses.
   20   18  10%  $10 ALIAS name support for externally described data struct
```

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Possible items for V5R3 . . .

■ *The selected items are:*

➜ Allow dynamic resizing of arrays and multi-occurrence DS.

➜ Conversion of date/time/tstamp to numeric using %INT, %DEC.

➜ Second parameter on %TRIMx - char to trim.

➜ Option to pass trimmed string as parameter.

■ *If time permits, high priority:*

➜ Allow EXTPGM to be coded without a parameter.

➜ LEAVE-WHEN & ITER-WHEN: single-statement conditional leave or it

➜ DEBUG(*RETVAL) to allow debugging of procedure return values

■ *If time permits, lower priority:*

➜ Procedure name overloading based on parm types.

➜ EVALC move corresponding from one data structure to another.

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► **Summary of WDSc**

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Why WDSc ?

► iSeries to become a premier e-business server

► Deliver AD tool set to support the rapid expansion of e-business applications for iSeries

  ► Web-enable existing 5250 applications

  ► Build new e-business applications

  ► Port existing e-business applications from other servers

► Integrate all of the iSeries application development tools, IBM and non-IBM to a common IDE

► Optimize and simplify J2EE application development

► One comprehensive intergrated iSeries host product

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Why WDSc ?

- **Consolidates all of the key iSeries AD tools into one pervasive, attractively-priced product**
  - over 75 K copies of WDS shipped since 05/2001
- **Leverages Eclipse to deliver an integration platform for all iSeries tools, both IBM and 3rd party**
- **iSeries extentions to make it easy to leverage and extend iSeries programs for Web, Web-services and Java development.**
- **WebFacing Tool is the easiest, quickest and most cost effective way to create a Web interface to 5250 apps**
- **WebSphere Development Studio Advanced Edition extends the WDS value proposition for creating sophisticated J2EE applications**

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Our Strategy . . .

- Continue to consolidate the iSeries AD tools to the Eclipse IDE
  - Consistant IDE for traditional and e-business development tools
    - Ease of learning, ease of use
    - Both IBM and 3rd party tools
- Leverage the advancement in the WebSphere Studio / Eclipse tools to deliver value to the iSeries development community
- Continue to enhance our tools to make it easier for iSeries developers to move to an e-business footing
  - leveraging and extending iSeries legacy assets to create complex Web services solutions and portal solutions
- Leverage Eclipse plug-ins to deliver value to all of the other development tools
  - Remote Systems Explorer delivers system access to all development tools that are ecilpse enabled

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Integrations and ISVs!

- **All of the IBM iSeries application development tools are consolidated in WebSphere Development Studio for iSeries**
- **Continue to leverage other WebSphere tools for use for iSeries development**
  - ► Host Access Transformation Server (HATS)
  - ► WebSphere Application Monitor
  - ► WebSphere Workload Simulator
- **Key iSeries tools vendors (ISVs) are integrating to WebSphere Development Studio for iSeries**
  - Source control management tool vendors
    - **Aldon**
    - **MKS**
    - **SoftLanding**
  - Impact analysis - AbStract Probe
  - Lansa
  - **Working with iSeries partners to deliver:**
    - New Web-enabled iSeries solutions
    - Web-enabling services to partners and customers
    - e-learning for our e-business development tools

Eclipse

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New Technology, Tools

IBM

Eclipse

Build Community!

✓ **Single IDE for the whole family!**
- iSeries and non-iSeries
- Traditional RPG+COBOL
- Modern e-business
- Young and young-challenged

Build Excitement!

✓ **Build/re-purpose awesome apps!**
✓ **Use awesome tools!**

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- So how does WDSc contribute to the strategy set by IBM for iSeries AD?"
- First, it helps build community by delivering to every iSeries programmer a single integrated development environment that can be used for all development needs, from traditional to e-business. Indeed, for most cases these are the same tools that the non-iSeries community uses as well, so WDSc not only integrates all the factions in the iSeries community, but brings to the iSeries community into the larger development community!
- Because WDSc is built on Eclipse, and hence easily extended, iSeries business partners will now be building plugins to WDSc, to complement the IBM tool stack instead of competing with it. So this further extends the community to the business partner world. This truly is the new PDM for the 21st century! This is where developers of all disciplines will spend their day, and what business partners will target as the new defacto standard base.
- Second, WDSc is built on truly revolutionary technology, and allows developers to build revolutionary applications, either from scratch or by leveraging existing skills and code. As traditional iSeries developers start to discover the delights of Web development, for example, or even RPG development with modern tools, they get excited. And that excitement spreads to their team and their customers. This is the same for business partners, who have an exciting new channel to exploit with exciting new versions of their tools. There is no other operating system that offers such a wealth of leading edge tools!
-

Standards

✓ Industry Standards Supported

- **By WSSDa, WSAD and WDSc:**
  - ▶ EJB 1.1
  - ▶ Servlet 2.2
  - ▶ JSP 1.1
  - ▶ JRE 1.3
  - ▶ Web Services Definition Language (WSDL) 1.1
  - ▶ Apache SOAP 2.1
  - ▶ XML DTD 1.0 10/2000 Revision
  - ▶ XML Namespaces 1/99 Version
  - ▶ XML Schema 5/2001 Version
  - ▶ HTML 4.01 (other levels should work)
  - ▶ CSS2 (PageDesigner displays a subset)

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▶ WDSc is all about keeping up with industry standards, most of which IBM wrote or contributed heavily to.

QUOTES

► Quotes

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QUOTES

► ASC Inc

► Chris Wilson, Director, Programming/Operation Tools

- ✓ "Eclipse is perhaps the single best idea we've seen out of IBM in years. By leveraging it's experience with Java, IBM has created a plugin shell that has a real chance of replacing Microsoft's Visual Studio as the standard IDE in the industry. Despite its youth, Eclipse is the most powerful Java IDE we have ever encountered."
- ✓ "WDSC combines an outstanding industry standard version control in CVS with tools like our ABSTRACT impact analysis to finally create a true graphical development environment for the iSeries platform."

► LANSA Inc

► Bill Benjamin, Vice President, Business Development

- ✓ "The goal of Eclipse to provide a seamless interface where developers can leverage tools from multiple vendors is a great idea and is something that will add value to our customers. Eclipse is a great way to make it easy for iSeries customers to integrate WebSphere and leading development tools like LANSA".

Eclipse

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QUOTES

► SoftLanding Systems

► Mark Phippard, Director of Development

✓ "Finally, an IDE done right! SoftLanding is very excited about the new Eclipse-family of IDE's, including WDSc. We believe that these IDE's represent a major step forward for our customers and all iSeries customers and business partners. We are excited about the technology and are firmly committed to contributing plug-ins for our TurnOver change management product and to provide the best possible support for all Eclipse-based development."

► Republic Indemnity of America

► Bob Cancilla, IT Director. Also runs www.ignite400.org

✓ "I have never been so impressed with a product as I am with what I am seeing in here. This is one of the most totally incredible products I have ever seen in 30 years in the business."

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QUOTES

► # Mid-Comp International

► Robert A. Hare, WebSphere Team Development Manager

✓ "It is very important in the development of our web enablement projects to have all developers working from a common work bench. Using the WDSc allows all areas of development to come together from RPG maintenance and modifications to java code generation. The WebFacing tools and wizards that generate Java allow legacy programmers to be far more efficient helping bring the WebApplication to the client faster."

► # Aldon Computer Group

► Dan Magid, Vice President

✓ "Aldon Computer Group is pleased to be working in partnership with IBM to integrate Aldon Affiniti with the Eclipse open source workbench. Aldon Affiniti's integration with Eclipse provides an easy way for developers to combine the powerful, unified multi-platform change management system of Aldon Affiniti with the wide range of developer tools available through Eclipse."

Not in your handout

Eclipse

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More Information

✓ Information Sources

1. **www.ibm.com/software/ad/iseries**
   - ► As of June 4th

2. **www.eclipse.org**
   - ► Eclipse and information about eclipse

3. **www.ignite400.org**
   - ► Introduction to eclipse article

4. **eServer iSeries magazine, July issue**
   - ► 3 articles on WDSc

5. **www.ibm.com/websphere/developer**
   - ► WebSphere Developer Domain
   - ► Many articles on eclipse and WSWB and WebSphere Studio configurations

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Ordering WDSc

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✓ If you don't have WDS / WDT:

1. Have iSeries serial #? Order 5722-WDS
2. No iSeries? Buy WDT client PID.

✓ If you have WDS and WDT:

1. Order refresh feature of 5722-WDS:
   ▶ 2655
   ▶ Announced in June 4th RFA 36640

✓ If you have WDT client PID:

1. You will get WDSc 4.0 automatically
   ▶ Handled by Passport Advantage

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