IBM Software Group

IBM® Rational® Web Developer V6.0
IBM® Rational® Application Developer V6.0
Overview

@business on demand.

This presentation will provide an overview of the new features of IBM Rational Web Developer and IBM Rational Application Developer V6.0.

Goals

- Understand the contents, history, and position of IBM Rational Application Developer

- Introduce the new features of IBM Rational Application Developer V6.0

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The goals of this presentation are to understand the history and position of IBM Rational Web Developer and IBM Rational Application Developer in comparison with the WebSphere Studio products as well as other products within the IBM Rational product suite. The presentation will also introduce the new development features of IBM Rational Web Developer and IBM Rational Application Developer V6.0. There are many new and exciting features which simplify all aspects of application development for WebSphere Application Server v6.0 and WebSphere Portal v5.0 and v5.1.

IRADv6_Overview.ppt

Agenda

- Overview and Product Architecture

- Main Features

- Summary and References

The agenda for this presentation will start with an overview of the themes and architecture for IBM Rational Web Developer and IBM Rational Application Developer. It will also discuss the new enhancements which can be seen throughout the different wizards and editors. The presentation will then take a brief look at the new features available in IBM Rational Web Developer and IBM Rational Application Developer before the summary and reference section.

Section

Overview

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This section of the presentation will be an overview of the product architecture and main themes.

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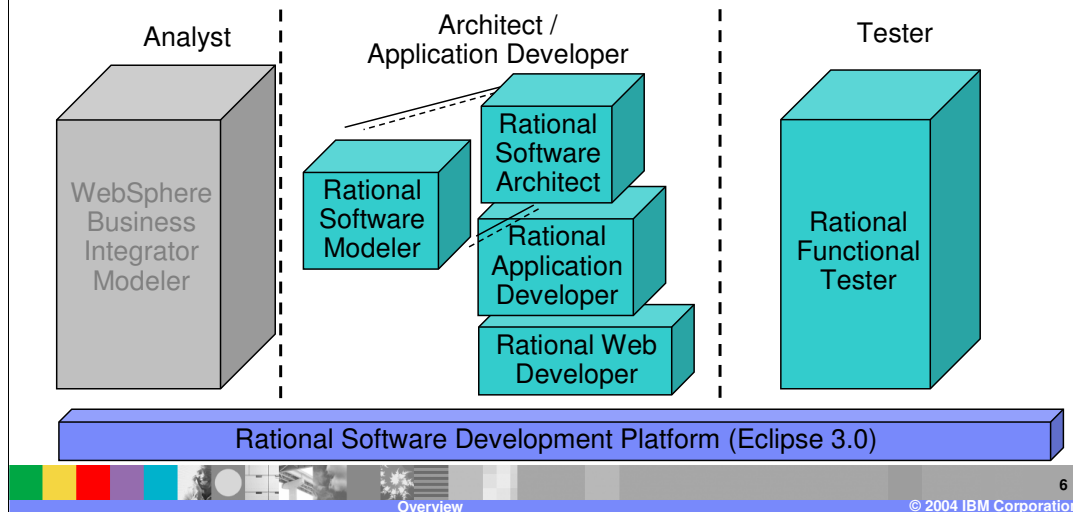
IBM

IBM Rational Application Developer

- Rational Application Developer is the new development tool for applications destined for IBM® WebSphere® Application Server

  ▶ Supports applications developed for WebSphere Application Server V5.0, V5.1, and 6.0

V5.0

V6.0

WebSphere Studio Application Developer → Rational Application Developer

WebSphere Studio Site Developer → Rational Web Developer

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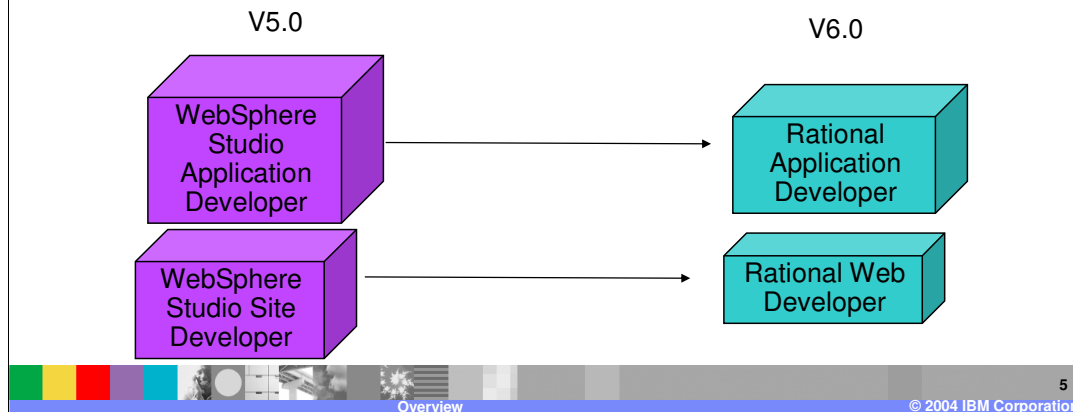
When IBM acquired Rational Development Corporation, IBM complemented its software portfolio with a world class set of design, modeling, development, and test tools.   It was only natural to move the WebSphere Studio family of products under the IBM Rational brand and begin integrating the great capabilities of WebSphere Studio with the quality tools in Rational, providing a complete, seamless development environment. IBM Rational Web Developer and IBM Rational Application Developer are the follow-on products for WebSphere Studio Site Developer and WebSphere Studio Application Developer. These products extend the tools and functionality of WebSphere Studio and include many of the best development features of the Rational products. IBM Rational Web Developer and IBM Rational Application Developer are the new development tools for applications destined for WebSphere Application Server as support is provided for developing Java™ 2 Enterprise Edition (J2EE) 1.2, 1.3, and 1.4 applications. WebSphere Application Server V6.0 is the platform which fully supports J2EE 1.4 applications and IBM Rational Web Developer and IBM Rational Application Developer support deployment to WebSphere Application Server V6.0 as well as deployment to WebSphere Application Server V5.0 and V5.1.
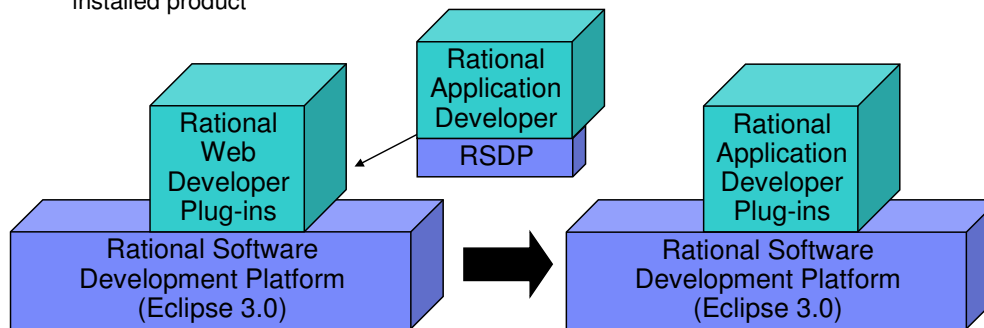
Rational Software Development Platform

- Rational Application Developer and Rational Web Developer are part of a set of products in support of the complete application development lifecycle

Analyst | Architect / Application Developer | Tester

WebSphere Business Integrator Modeler

Rational Software Modeler

Rational Software Architect

Rational Application Developer

Rational Web Developer

Rational Functional Tester

Rational Software Development Platform (Eclipse 3.0)

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Overview

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The IBM Rational products offer support for the different roles which are involved in the overall development lifecycle. From analysts to architects, application developers to application testers, IBM Rational provides the products which meet the specific needs of individuals at the appropriate times. For business analyst who are knowledgeable on the processes of the business, industry trends, market conditions, and costs, the WebSphere Business Integration Modeler provides the capabilities for analysts to build business processes. Within the definition of these business processes, they will be able to add in factors which will affect the outcome and then simulate the execution in order to test out different scenarios. IBM Rational Web Developer and IBM Rational Application Developer are the cornerstone of the development tools. These products provide a rapid application development environment and developers can quickly and easily build J2EE applications.   The main difference between IBM Rational Web Developer and IBM Rational Application Developer is that Rational Web Developer is primarily target at developers who build J2EE web applications which do not involve Enterprise JavaBeans. IBM Rational Application Developer includes the full set of tools for building a complete J2EE 1.4 application which includes Enterprise JavaBeans. The differences will be explained in more detail later in the presentation. Built on top of Rational Web and Application Developer is the IBM Rational Software Architect product. This product includes all of the functionality of IBM Rational Web Developer and IBM Rational Application Developer as well as complete modeling tools for applications. With this product, applications can be designed and the underlying components can be generated. The IBM Rational Software Modeler product is a subset of the Rational Software Architect product and is targeted at application architects who are focusing on the architecture of applications and not in need of a complete set of development tools. For application testing, the IBM Rational Functional Tester product is available. It is focused on Java and Web application testing and it provides capabilities to updated test cases as the application changes.   All of these products are built on the Rational Software Development Platform which is based on the IBM implementation of the Eclipse version 3.0 project along with additional capabilities. There are many new features which all of the Rational products pick up, just for being built on Eclipse v3.0.

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Platform Architecture

- Rational Software Development Platform provides a single base for Rational V6.0 products
  - Contains the common components for Rational V6.0 products
  - Installed once per system with the first product
  - Based on Eclipse 3.0
- Installations of multiple products is greatly simplified
  - Additional products only install plug-ins
  - Products will upgrade existing installation if containing additional functionality of an installed product

Rational Application Developer

RSDP

Rational Web Developer Plug-ins

Rational Software Development Platform (Eclipse 3.0)

Rational Application Developer Plug-ins

Rational Software Development Platform (Eclipse 3.0)

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With version 6.0 of the Rational products, a new architecture is used for installation. This architecture greatly simplifies the installation, especially when multiple version 6.0 products are installed on the same system.   The Rational Software Development Platform, which is based upon Eclipse 3.0 and contains different Eclipse projects, will be installed onto the system only once when the first Rational V6 product is installed.   When any other Rational V6 product is installed on the system, only the plug-ins which make up the product will be installed on the system. The Rational Software Development Platform or Eclipse 3.0, will not be installed a second time. The plug-ins will be registered with the Rational Software Development Platform and available whenever the Rational Software Development Platform is started. If a particular product is to be installed which contains the plug-ins from a product which is already installed, the Rational Software Development Platform will be upgraded with the new product. All of the products installed on the system will have the same capabilities of the Rational Software Development Platform with the benefit of a reduced installation size.   For maintenance, a single installation of the Rational Software Development Platform is also much easier to update.

Main Themes of V6.0 Tools

- Broaden Appeal
  - ▸ Improve User Assistance and ease of learning
  - ▸ Progressive disclosure of tools and capabilities
- Increase Productivity
  - ▸ Rapid Web and Portal Application Development
  - ▸ Rapid Deployment to WebSphere Application Server V6
- Extend Integration
  - ▸ Integration of Rational technology to enhance the application development lifecycle and increase productivity
  - ▸ Make Portal a first-class deployment target
- Maintain Standards and Middleware Currency
  - ▸ J2EE 1.4, WebSphere Application Server V6

IBM Rational Web Developer and IBM Rational Application Developer extend upon many of the strengths of the past Rational and WebSphere Studio products. These improvements can be classified into four areas: Broaden Appeal, Raise Productivity, Extend Integration, and Maintain Standards and Middleware Currency. There are numerous new features which will be covered later in the presentation and are examples of each of these improvements. Let's look briefly at a summary and some examples of each of these improvements.

Broaden Appeal – You will find that IBM Rational Web Developer and IBM Rational Application Developer includes samples, examples, and other information which allows developers to quickly begin building enterprise-class applications. Education and instruction material on the Rational Unified Process, a proven software development process, is available through convenient views within the product. You will find planning, coding best practices, and testing methodologies, all at the developer's fingertips. There is also integration with the Internet which opens IBM Rational Application Developer to the complete set of resources available on the web.   As a means to improve the ease of use and simplify development, many of the components and tools which are included with IBM Rational Web and Application Developer are hidden initially. Upon first selection, the full capabilities of the tool are loaded including views, perspectives, and icons.   There is also background task support which allows developers to continue working as files are validated and compiled. As another means of simplifying the development environment, preferences and settings from one developer can be exported and imported by another developer.

Increase Productivity – Any tool can be viewed as a way to raise productivity, however when it comes to IBM Rational Web and IBM Rational Application Developer, raising productivity is an understatement. There are many wizards and editors which provide a visual development experience to simplify the design and development through the generation of the underlying components. There is also new support for annotated programming through XDoclet tags which allows developers to reduce the number of artifacts they must maintain and also allows developers to specify deployment information directly in the source code. At deployment time, the appropriate artifacts are created and the deployment information is specified in the appropriate J2EE deployment descriptor. With WebSphere Application Server V6.0, there is support for bundling the definition for required resources with the application. The definition is read at installation time and the resources are created on the server. This raises productivity as the resources can be defined just once and not on each runtime where the application is installed.

Extend Integration – As mentioned earlier, IBM Rational Web Developer and IBM Rational Application Developer includes some of Rational's best development features. As mentioned earlier, the Rational Unified Process is at developers' fingertips through context sensitive views. Developers can also visualize Java and data using UML and generate the underlying components. Applications can be analyzed for coding practices, potential bugs, and uncalled code. The analysis results can then be viewed and with the help of IBM Rational Application Developer, updates can be made quickly. To go along with the Application Analysis features, Component Testing features are also included to formally unit test applications. Different test patterns can be created for Java classes, EJBs, and Web Services and test data can be specified and then executed in a controlled manner with the results displayed in a convenient view. Not only is there integration with Rational products, there is also integration with WebSphere Portal. In the past, the Portal Toolkit has been the primary development tool for creating portlet applications and was a separate installation onto WebSphere Studio. Now with IBM Rational Application Developer, the features of the Portal Toolkit are now included by default and have been integrated with the Web, Struts, and JavaServer Faces tools.   IBM Rational Application Developer now provides a first-class portal and portlet development environment.

Maintain Standards and Middleware Currency – IBM Rational Web and Application Developer provides enhanced support for the J2EE 1.4 specifications as well as WebSphere Application Server V6.

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Section

Main Features

In this next section the main features of IBM Rational Web Developer and IBM Rational Application Developer V6.0 will be discussed.

Support for J2EE 1.4

- Full support for building J2EE applications
  - Wizards include J2EE 1.4 options
  - Deployment Descriptor Editors updated for J2EE 1.4
- New standard APIs available for development
  - Servlet 2.4, JSP 2.0, EJB 2.1
- J2EE 1.2 and 1.3 applications can be migrated to J2EE 1.4
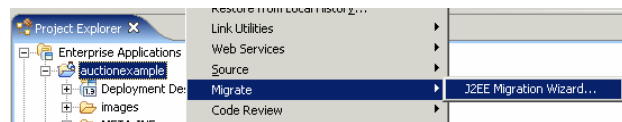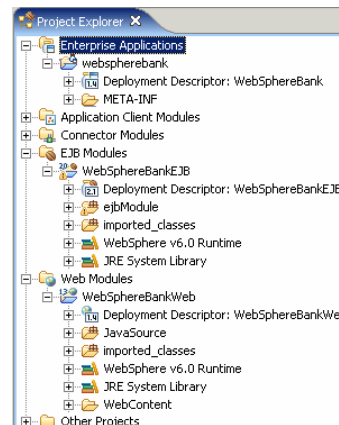
Complete J2EE 1.4 development is supported in the version 6.0 products and allows developers to begin using the latest J2EE APIs. The different creation wizards and deployment descriptor editors have been updated with the appropriate capabilities to create J2EE 1.4 artifacts and prepare them for deployment into the WebSphere environment. New options under the Servlet 2.4 specification can be specified for Filters and Listeners. There is additional support within the Page Designer for using the JavaServer Pages Standard Tag Library or JSTL under the JSP 2.0.   Simple Tag Handlers which provide a straight-forward lifecycle and interface can also be used. There are visual indicators throughout the development environment which indicate the appropriate J2EE level of different artifacts.   Additional icon indicators can also be enabled through the workspace Preferences.

Developers can begin using J2EE 1.4 immediately in their existing applications by using the J2EE Migration Wizard. This wizard has been updated to migrate J2EE 1.2 or 1.3 applications to J2EE 1.4. The wizard will not alter any code, however, it will update the deployment descriptors of the different modules to J2EE 1.4. The wizard allows developers to choose which modules within an Enterprise Application should be migrated. If you migrate a module which is shared in multiple applications, it will be necessary to migrate any application projects which include the module.

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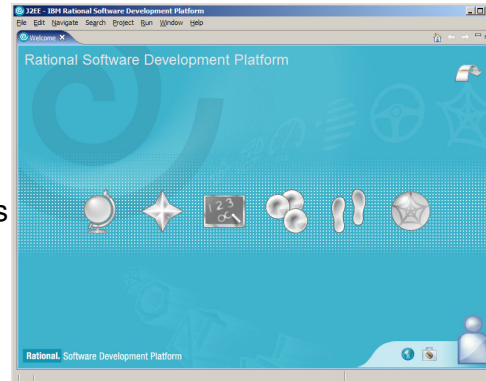
As mentioned previously, one of the main themes for IBM Rational Web Developer and IBM Rational Application Developer is to broaden the appeal to new developers. To help developers get started, every new workspace will start with a Welcome perspective. The Welcome perspective contains links which help developers new to Eclipse, Rational, and J2EE development, to quickly get started. There is a link to an Overview of the product and another link to information on what is new in the product compared to pervious WebSphere Studio versions. A section on tutorials and samples provides education examples for developers to follow. For further assistance, the First Steps section walks a developer through the steps to begin developing enterprise applications. Finally, there is a link for additional information hosted on the Web. Besides these convenient ways to quickly get started, the development environment has been simplified for new developers. The number of options first available to a developer is limited to a basic set of Web and J2EE tools and helps reduce the number of choices and complexity for a new developer. When certain operations are performed by the developer, full support for a particular set of features will be enabled and all the wizards, editors, and views will be available. When starting a wizard, opening a view or opening a perspective, a "Show All" option is available and will list all of the different features for selection. The different features can also be enabled or disabled through the Preferences for the workspace. Besides simplifying the development environment, performance is also improved as only those plug-ins for the enabled features are loaded.

Web Services

- Build and consume Web Services
  - ▸ EJB and Java bean JSR 101/109 Web Services

- Support for setting conformance levels
  - ▸ WS-I SSBP 1.0 (Simple SOAP Basic Profile 1.0), and WS-I AP (Attachments Profile 1.0)

WS-I Compliance	
WS-I SSBP compliance level	Suggest compliance ▼
WS-I AP compliance level	Ignore compliance ▼

- Generate JAX-RPC handlers with wizard
  - ▸ Skeleton handler generated and deployment descriptors updated

- Secure Web Service requests/responses with WS-Security
  - ▸ Security values specified in J2EE deployment descriptor editors

- Integrated SOAP Monitor available for viewing Web Service traffic
  - ▸ Integrated into creation wizard
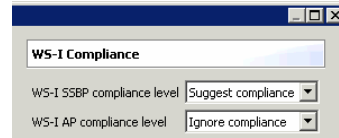
Besides the updates for the JSP, Servlet, and Enterprise JavaBeans APIs, the J2EE specification has been updated with Web Services capabilities. A number of specifications around Web Services using JAX-RPC are included in the J2EE 1.4 specification. These specifications define the programming and deployment model to enable Web Services.   IBM Rational Application Developer includes support for turning Enterprise JavaBeans and JavaBeans into Web services available through SOAP/HTTP and to create clients which call Web services through SOAP/HTTP. There is also support for creating providers and consumers which use the support provided by IBM WebSphere Application Server for communicating through SOAP/JMS.

There is also support for verifying Web Services for compliance with the WS-I specifications. The WS-I Simple SOAP Basic Profile and WS-I Attachments Profile together define a standard format for Web services communication.   Within IBM Rational Web Developer and IBM Rational Application Developer, different levels can be set for the WS-I Profiles and enforced as Web service providers and consumers are created. Compliance with these profiles is very important especially when working with Web Services in a heterogeneous environment.

Handlers are defined under the JAX-RPC specification as a way to work with SOAP headers in messages. A JAX-RPC handler wizard is included to assist developers with getting started with handlers. The wizard will generate a skeleton handler and register the handler in the deployment descriptor. A developer can then add the appropriate functionality to the handler.

Security is an important concern with Web services and IBM Rational Web Developer and Application Developer provides the ability to secure Web services. Web service providers and consumers can be enabled with authentication information and secured with XML encryption and XML digital signatures.

A final enhancement around Web Services helps in problem determination of Web services. SOAP/HTTP traffic for servers which are registered as test environments, can be viewed and verified for WS-I compliance. This can be very helpful when working in a heterogeneous Web service environment to determine if requests or responses are compliant.

Portal Application Development

- First class support for Portal application development
  - ▸ Available as an install option; not a separate install
  - ▸ Includes WebSphere Portal V5.0.2.2 Test Environment

- Developers can yield the benefits of Model-View-Controller architecture within Portal applications
  - ▸ Build Portal applications based upon JSF or Struts

- New Portal Site Development available for WebSphere Portal V5.0.2.2
  - ▸ Customize the layout and navigation of a portal page with new Portal Designer
  - ▸ Create Themes and Skins visually for Portal applications
  - ▸ Import and Deployment Wizards for Portal Page and Portlets

- Wired Portlets can be created for linking portlets together in WebSphere Portal

IBM Rational Application Developer V6.0 is now a first class portal and portlet development environment. For Portal development in the past, a separate toolkit was required to be installed on WebSphere Studio. This often led to problems as specific versions of the Portal Toolkit were required for specific versions of WebSphere Studio.   With IBM Rational Application Developer V6.0, there is an option to install the Portal Toolkit capabilities as part of the IBM Rational Application Developer installation. An option is also available from the Launchpad for installing WebSphere Portal V5.0.2.2 as a test environment.   WebSphere Portal v5.1 is also included with the media pack and can be installed through a separate launch pad.
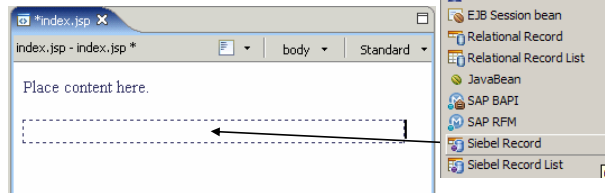
The new install option is just the beginning of the Portal support in IBM Rational Application Developer. Portlet developers can quickly build Portlet applications with Struts or JavaServer Faces and take advantage of the benefits of the Model-View-Controller architecture. With the tools in IBM Rational Application Developer, developers can focus on the problem the applications is solving rather than the complexities of the technologies and architectures is hidden.

For development of applications destined for WebSphere Portal V5.0.2.2, a new Portal Designer has been included which allows the layout and navigation of Portal pages to be created and customized. Portal pages can be customized with themes or skins and updated with new style sheets. Developers may also create their own themes and skins. These capabilities are specific to the development aspects around Portal pages and not a replacement for administrative portlets.

New capabilities are also available for Portal developers to wire portlets together by defining output properties and request parameters on a source portlet. When installed, a wire-enabled portlet can be connected to other portlets.

IRADv6_Overview.ppt

Portal Application Development (cont.)

- Create Portlets for Business Process Tasks
  - Integration with business processes running on WebSphere Business Integration Server Foundation

- Create, update, delete SAP and Siebel records in JSF/Portal applications for WebSphere Portal V5.1
  - Utilizes JSF/SDO to work with SAP and Siebel systems

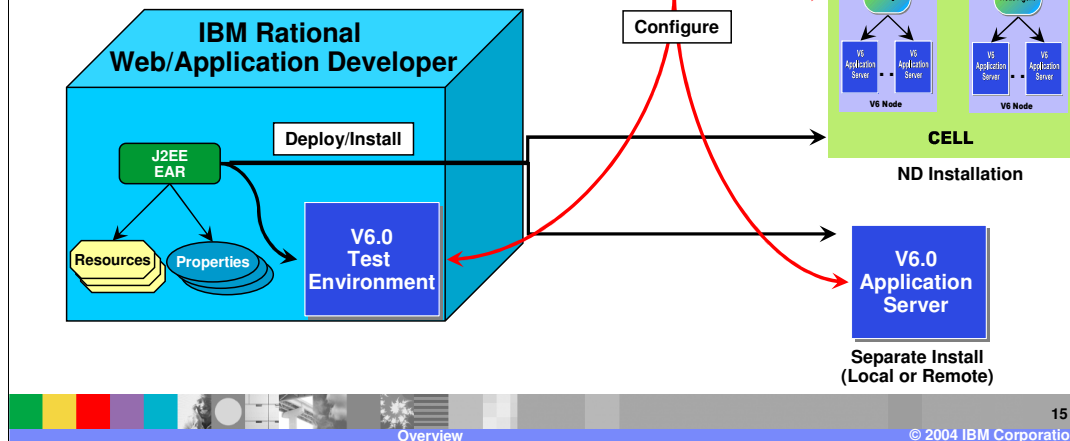- Portal tools option only available in IBM Rational Application Developer and above

Palette
- HTML Tags
- JSP Tags
- Crystal Reports Faces ...
- Faces Components
- Portlet
- Click-to-Action Output Property
- Click-to-Action Output Properties...
- Person Link
- Page Template
- Data
- Web Service
- EJB Session bean
- Relational Record
- Relational Record List
- JavaBean
- SAP BAPI
- SAP RFM
- Siebel Record
- Siebel Record List

*index.jsp
index.jsp - index.jsp *   body   Standard

Place content here.

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Overview   © 2004 IBM Corporation

There are even more Portlet and Portal development capabilities and enhancements from previous versions of the Portal Toolkit. New integration is provided with IBM Rational Application Developer which allows portlets to be developed which interact with BPEL business processes running on WebSphere Business Integration Server Foundation. Development can add the ability to view and complete work items, which are created in a business process, into portlets. These portlets are only supported on WebSphere Portal V5.1.

There is also new integration options as portlet developers can now create portlets for interacting with Enterprise Applications such as SAP and Siebel. Portlets can be created which display records and lists of records from SAP and Siebel systems. Through the use of JavaServer Faces and Service Data Objects, components can be added to portlets which allow records to be displayed, created, edited, and deleted as well as listed. These components greatly increase the different integration within an enterprise These portlets are also only supported on WebSphere Portal V5.1.

As a final note, the Portal Development capabilities are only available in IBM Rational Application Developer and above.

Deployment and Testing for WebSphere V6.0

- Deployment, Testing, and Administration steps identical for all WebSphere V6.0 servers
  - Test Environment
  - Separate Installation
  - ND Environment

Admin Console

IBM Rational Web/Application Developer

J2EE EAR

Resources   Properties

Deploy/Install

V6.0 Test Environment

Configure

V6 Deployment Manager

V6 Node Agent   V6 Node Agent

V6 Application Server V6 Application Server   V6 Application Server V6 Application Server

V6 Node   **V6 Node**

CELL

ND Installation

V6.0 Application Server

Separate Install (Local or Remote)

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With the support for development of J2EE 1.4 applications and WebSphere Application Server V6.0, IBM Rational Web Developer and IBM Rational Application Developer V6.0 includes a full version of WebSphere Application Server V6.0 as a test environment. This test environment is available as an option when IBM Rational Web Developer and IBM Rational Application Developer are installed. In past versions of WebSphere Studio, there were limitations in what WebSphere servers applications could be deployed to from the development environment. There were also issues that arose as applications were moved from the test environment to the production WebSphere Application Server. Applications which ran successfully in the test environment would fail in production because of different configurations or other deployment options which were different between the two servers. With IBM Rational Web Developer and IBM Rational Application Developer, those limitations and differences have been removed.   For any server, whether it is the WebSphere V6.0 Test Environment included with the product or a separate installation of WebSphere Application Server V6.0, deployment and administration is the same as every WebSphere Application Server V6.0 is treated the same way. Configuration is performed through the Administrative console and deployment is performed using the SOAP connector port. Deployment is also available to a single server in an Network Deployment installation or cell.   Other support is provided to simplify deployment of changes to applications as WebSphere fine-grain update capabilities is used to only deploy those parts of the application which have changed and restart specific parts of the application as needed to load the changes.

Annotation-based Programming

Create an Enterprise Bean

Create an Enterprise Bean

Select the EJB type and the basic properties of the bean.

- ○ Session bean
- ○ Message-driven bean
- ○ Entity bean with bean-managed persistence (BMP) field
- ○ Entity bean with container-managed persistence (CMP)

EJB project:	WebSphereBankEJB
Bean name:	Customer
Source folder:	ejbModule
Default package:	com.ibm.webpshere.sample.bank.ejb

☑ Generate an annotated bean class

- ▪ EJB and Web resource can be created with annotations which follow proposed XDoclet standard (JSR 175)
- ▪ Number of required development resources reduced as code is generated at deploy time
- ▪ Simplifies development

```
package com.example.wrd;
/**
 * @ejb.bean name="Hello" type="Stateless" view-
   type=remote jndi-name="HelloBean"
 */
public class Hello {
    /**
     * @ejb.interface-method view-type=remote
     */
    public String hello(String name) {
      return "Hello: " + name;
    }
}
```

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New support is included for annotation-based programming in IBM Rational Web and IBM Rational Application Developer. Annotation-based programming allows developers to use special tags to define application and deployment information in Java resources.   The deployment environment is responsible for generating the correct resources and deployment information from the tags before installation into the production environment. Annotation-based programming allows developers to focus on the development tasks at hand and not need to fully understand or manage all of the different artifacts and deployment information in the different places. Information can be specified in one location for the resources without searching for the correct location within deployment package. The tags, which are based on the XDoclet project, can be added to Enterprise JavaBean and JavaBean files using content assist. When the artifact is saved, the appropriate artifacts are generated in the project and the appropriate deployment information is added or updated in the deployment descriptor.

Development with UML

- Visualize EJBs, Java classes, and Database schemas visually for easier understanding
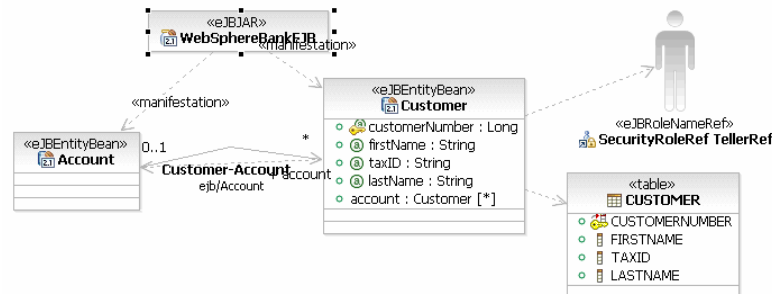

- New Topic, Browse, and Sequence diagram views available for viewing class relationships and method interaction
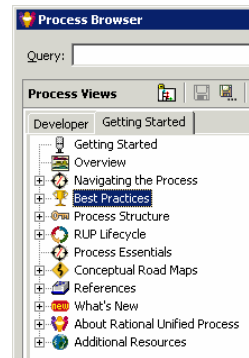- Available in Rational Application Developer and above

WebSphere Studio included support for developing applications with a UML visual editor. The editor provides a familiar interface for developers who are accustom to working with UML notation.   Existing Java classes and Enterprise JavaBeans could be visualized in a diagram to understand the relationships, hierarchies, and dependencies.   Java classes and Enterprise JavaBeans could also be modeled with the UML visual editor, however the modeled artifact was directly connected to a Java artifact and different from the typical UML modeling which is independent of the implementation. The UML visual editor in WebSphere Studio really provided a different editor for a Java and J2EE artifact using UML. In IBM Rational Application Developer V6.0, the same support for editing Java and J2EE artifacts with UML is included as well as Topic, Browse, and Sequence diagram views.   J2EE attributes such as security role references can be viewed or added to an application through a UML diagram.   Data mappings for Enterprise JavaBeans can also be viewed in the UML visual editor.   Data schemas, not mapped to Enterprise JavaBeans, which are imported into a workspace or connections to live databases can also be viewed in the UML visual editor.

Rational Unified Process

- Process Browser offers search over Rational Unified Process concepts, guidelines and best practices for software development
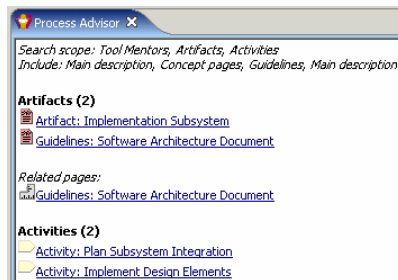
- Process Advisor view displays specific Rational Unified Process information for the current task

- Available in IBM Rational Application Developer and above

For those developers who are familiar with the Rational Unified Process or are looking for a set of guidelines and best practices in developing and architecting applications, IBM Rational Application Developer now includes a Process Browser and Process Advisor for the Rational Unified Process. The Process Browser is launched from IBM Rational Application Developer as a separate window and allows developers to search for specific information on best practices and application development lifecycle. Besides searching over information included with the installation, there are also links to resources on the Web. The Process Advisor is a view in IBM Rational Application Developer and will provide links to Rational Unified Process information based upon the current task or context.

Application Analysis

- Applications can be reviewed for coding practices

- Problem, Example, and Solution information available for each improper coding practice
- Only available in IBM Rational Application Developer and above

Besides links to the Rational Unified Process, there is also new support for analyzing applications against sets of rules to check on J2EE and J2SE best programming practices.   Java code in applications can be checked for coding practices for garbage collection, performance, scalability, portability, serialization, and thread usage. When code is analyzed, a list of rule violations, warnings, and recommendations will be displayed. For each listed problem, a description is provided along with an example of the problem and a solution for the example. When selecting a particular problem, the source file containing the problem will be displayed and for many of the problems, a solution can be applied by selecting the margin marker.

IBM Rational Application Developer also allows developers to create their own rules based on templates. The templates allow developers to specify exceptions and methods which should not be called as well as other restrictions around package usage and method invocations.

Rapid Web Development

- Struts
  - New wizards, improvements to the Web Diagram Editor to create Struts artifacts, and improved integration with Portal

- Page Templates allow common and consistent look, feel, and layout to web applications
  - Page Template fragments now available with support for nesting Page Templates

- Web Site Designer
  - Group support for applying Page Templates and creating navigation bars

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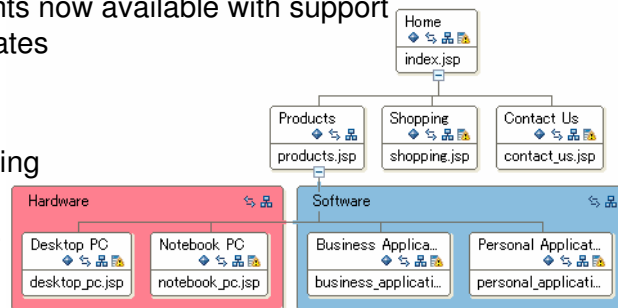
WebSphere Studio facilitated rapid web development with support for Struts and model-view-controller design, page templates for building pages quickly with a consistent format, and a Web Site Designer for managing the design of multiple pages and the creation of navigation bars within pages in a web site. Each of these rapid web development tools have been enhanced in IBM Rational Web Developer and IBM Rational Application Developer. For Struts, there are improvements in the Web Diagram Editor for visually building Struts applications as well as improved integration with Portal. New wizards are also provided for creating different Struts artifacts. The Page Template support has been improved to allow for page template fragments to be created and page templates to be nested allowing for a finer level of granularity in defining consist looks and design within JSP and HTML files. The Web Site Designer has also been improved as groups of pages can updated with page templates and different pages can be grouped for creation of navigation bars. These enhancement are just a small part of the overall rapid development capabilities available for building Web applications.
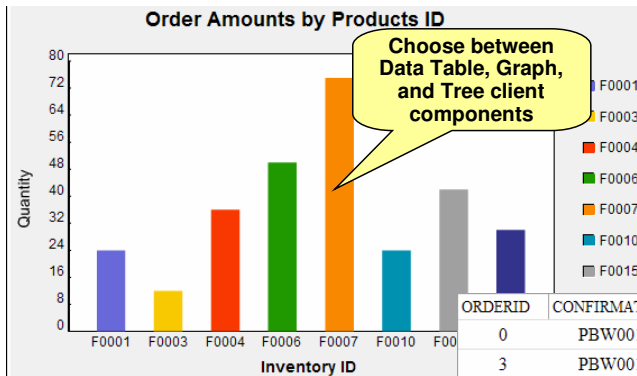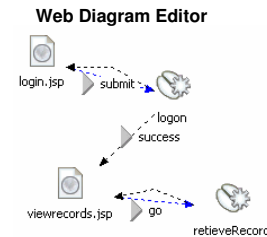
JavaServer Faces or JSF provide an exciting and easy way to build web applications which follow the model-view-controller architecture. With JavaServer Faces, developers can build web applications with pre-built components that provide robust user interfaces. Official support for JavaServer Faces was provided with WebSphere Studio V5.1.2. This support included a number of IBM components, also based on JSF, for building more robust web applications which feature client data caching. With client data caching components, application performance can be greatly improved by reducing the number of trips a client must make to a server as data is retrieved once and displayed in different tabular and graphical formats. With IBM Rational Web Developer and IBM Rational Application Developer, the JavaServer Faces support has been improved with new development capabilities using the Web Diagram editor and enhancements to the client data caching components. With the Web Diagram editor, JSF applications can be built in a visual manner by creating the different JavaServer Faces pages, events, and navigation through the editor and then the different artifacts generated. For the client data component enhancements, there is new integration with Portal applications and applications which are built with Enterprise Generation Language.

Service Data Objects (SDO)

- Service Data Objects offers a common API for working with data across different heterogeneous datastores
  - ▸ Access to different datastores becomes transparent as access is through mediators

- Developers can focus on real problems rather than spend time learning low level data access APIs

- Available for use in Web and EJB components

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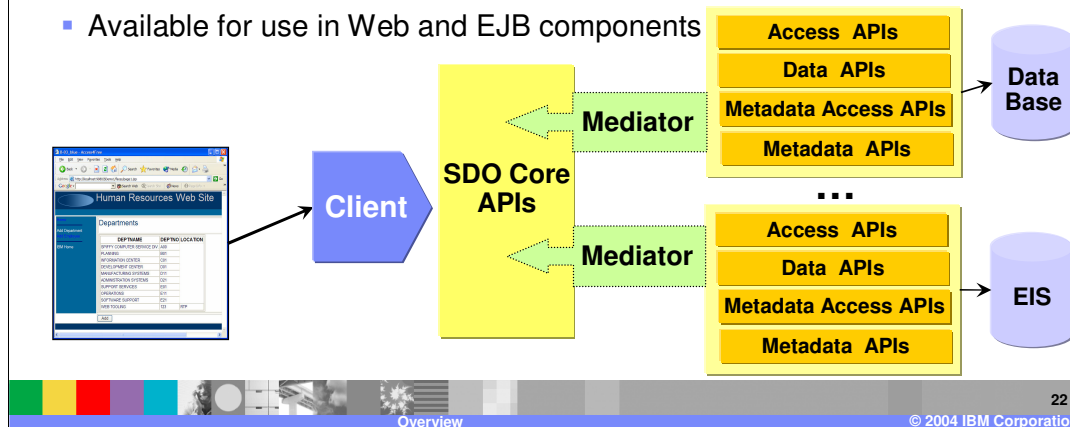
For J2EE developers, there are numerous options available for storing application data. Unfortunately, each of these data stores uses a different programming model and requires a different set of APIs to retrieve data. Developers are forced to understand the specifics for each data store. IBM and BEA have worked together to simplify data store access with the definition of Service Data Objects. Service Data Objects provide a common API for developers to work with data objects in a consistent manner which come from different data stores. This allows developers to spend more time focusing on the real problems rather than learning different APIs. With IBM Rational Web Developer and IBM Rational Application Developer, these APIs can be used in Web and Enterprise JavaBean components. Components are provided which developers can drop onto JavaServer Pages or JavaServer Faces pages and connected to data stores without even becoming familiar with the Service Data Objects APIs. The Service Data Object support in IBM Rational Web Developer and IBM Rational Application Developer replaces the support for WebSphere Data Objects which was included in WebSphere Studio V5.1.2.

Component Testing

- Easy creation, execution, and maintenance of dynamic unit tests for J2EE components
  - ▸ Java classes
  - ▸ Enterprise JavaBeans (1.1, 2.0, and 2.1)
  - ▸ Web Services (J2EE or .Net based)
- Based on JUnit framework and open source Hyades project
- Test patterns available for defining complex unit test cases
- Test data can be stored in separate data pool table for flexible test case definition
- Available in Rational Application Developer and above

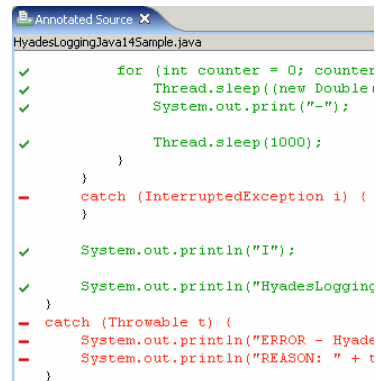| Action	Type		New Test Data		
		In	Expected	Actual	
▤ object = new GaussianIntegerRandomG...	xy				
object	© com.ibm.rational.ct.sampl...				
<expected exception>	© Throwable		no exception	no exception	
▤ object.reset()	xy				
<expected exception>	© Throwable		no exception	no exception	
▤ object.setMinMax(min, max)	xy				
min	© int	-10			
max	© int	10			
<expected exception>	© Throwable		no exception	no exception	
▤ retValue = object.generateNumber()	xy				
retValue	© int	0		6	
<expected exception>	© Throwable		no exception	no exception	

As mentioned earlier, there is extended integration in IBM Rational Web Developer and IBM Rational Application Developer with historical Rational tools compared to WebSphere Studio. Developers now have the ability to unit test applications from within the development environment. IBM Rational Application Developer includes the capabilities for testing Java classes, Enterprise JavaBeans, and Web services. Enterprise beans compliant with the 1.1, 2.0, or 2.1 specification levels can be unit tested and Web services hosted on a J2EE or Microsoft ® .Net ® server can also be unit tested. These capabilities are based on the JUnit framework and the open source Hyades project. IBM Rational Application Developer includes wizards and editors for creating the framework for testing different components. After the framework has been created, developers can use test patterns to create test cases with different values for testing and results to be expected. Test data can also be imported into the test cases to simplify the values which should be tested.   When tests are executed, the results will be displayed with details on which tests passed and failed.

Profiling Tools

- Enhanced Memory Analysis features help locate memory leaks in heap dumps

- New Thread Analysis view for monitoring thread state for locks

- New ProbeKit feature allows for easy profiling at key points in the application using byte-code instrumentation

- Robust summary and detailed code and line execution statistics with Code Coverage feature

Annotated Source

HyadesLoggingJava14Sample.java

```
            for (int counter = 0; counter
                Thread.sleep((new Double
                System.out.print("-");

                Thread.sleep(1000);
            }
        }
        catch (InterruptedException i) {
        }

        System.out.println("I");

        System.out.println("HyadesLogging
        }
    catch (Throwable t) {
        System.out.println("ERROR - Hyade
        System.out.println("REASON: " + t
    }
```
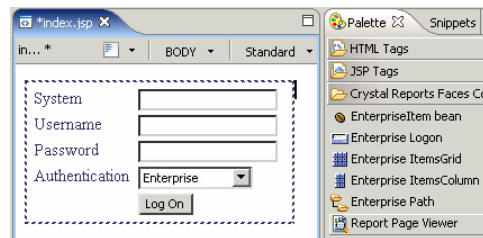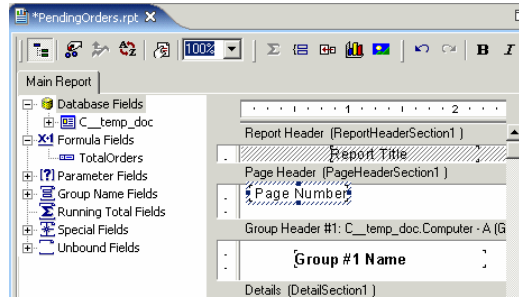
Profiling applications is a very important, and often overlooked, part of application development.   Profiling can help developers recognize and isolate a variety of performance problems before these issues become critical in a production environment. IBM Rational Application Developer provides a complete set of tools which help identify memory leaks, performance bottlenecks, excessive object creation, and exceeding system resource limits. These tools are enhancements of the profiling support in WebSphere Studio and include new memory and thread analysis support. Through the use of different views developers can visualize and understand runtime behavior in order to identify ways to improve the performance and correctness of an application. There is new support for performing byte-code instrumentation of applications which allows specific profiling code to be enabled within an application without recompiling the classes to be profiled. There is also new support for measuring code coverage within an application. Specific statements can be viewed for execution results as well as summary reports which provide percentages on the amount of code which is executed. Profiling is possible for both stand-alone Java applications and applications running on local or remote WebSphere Application Server V6 installations.

Crystal Reports, a product of Business Objects ®, is the industry leader in report application capabilities. For Enterprise Applications and Enterprise Information systems which are rich with information, Crystal Reports provides a means for clients to view the information and perform analysis.   IBM Rational Application Developer includes the support for designing Crystal Reports using the visual Report Designer and adding reports to Web applications. Using JavaServer Faces, components can be dropped on web pages which not only display reports but also provide integration with enterprise systems. The capabilities for designing reports and using Crystal Reports in applications is installed by default when IBM Rational Application Developer is installed. Crystal Enterprise v10 Professional and Embedded servers, with licenses for development and testing, are also included with IBM Rational Application Developer and can be installed through a separate option from the Launchpad.

Enterprise Generation Language (EGL)

- High level programming language for developing business logic
  - ▶ Easy language for non-Java developers for building applications

- Independent of implementation to hide the complexities of the technology
  - ▶ Encourages Rapid Application Development

- Runtime code generated for appropriate platform
  - ▶ Java (included with IBM Rational Application Developer)
  - ▶ COBOL

Run COBOL

Generate

Run Java

Generate

Develop EGL

z/OS
iSeries

WebSphere Application Server
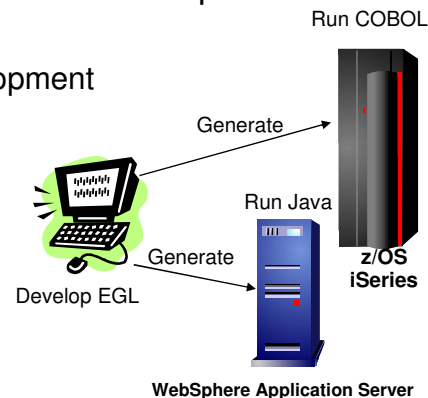
WebSphere Studio V5.1.2 included support for IBM's Enterprise Generation Language. Enterprise Generation Language, or EGL, is a proven, high-level 4GL language that procedural developers, unfamiliar with Java, can use to quickly build data-driven Web applications and business logic. EGL shields the developer from needing to understand the implementation details such as data access and allows developers to spend more time developing the business logic. Developers write applications in EGL and the development environment generates the appropriate code for execution in a production environment. Developers can also step through EGL applications during debugging rather than the generated code. Used in conjunction with JavaServer Faces (JSF), EGL allows developers to build dynamic Web applications without having to learn the Java language. This capability allows a new class of developers to apply their existing business domain expertise and use their skills as procedural developers, to build dynamic Web applications.

IBM Rational Application Developer includes enhancements to the EGL support which was included with WebSphere Studio. There is new integration with JavaServer Faces and the ability to use client data components to name a few.

Additional Enhancements

- Database Tools
  - ▸ Many enhancements around SQL tools, SQLJ, and importing, exporting and deploying stored procedures and user-defined functions
- XML
  - ▸ Enhancements to WSDL, XML Schema, and XPATH editors
- XSLT
  - ▸ New debugging capabilities allow developers to debug XSLT called from Java and Java called from XSLT
- WebSphere Programming Model Extensions
  - ▸ Snippet and Deployment Descriptors included to enable applications

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Besides the many enhancements discussed already, there are numerous other enhancements in IBM Rational Web Developer and IBM Rational Application Developers. Within the Database tools, there are enhancements in the SQL and SQLJ development tools, and importing and exporting of stored procedures and user-defined functions for modification. There are enhancements to the XML tools which simplify the creation of WSDL and XML schema files. There are improvements to the XPath editor in XSL files which allows for XPath statements to be defined easier and tested as the statements are created. For debugging of XML transformations or XSLT, there is new integration with the Java debugger which allows XSLT debugging to seamlessly switch between Java and XSLT debugging and provide many familiar Java debugging operations to XSLT debugging. Finally, there is support for the WebSphere Programming Model Extensions. Applications can be enabled with the WebSphere Programming Model Extension support and the different APIs for things such as Asynchronous Beans, Dynamic Query service, Scheduler, and Calendars can be used within applications.

Summary: V6 Tools and Features

IBM Rational Application Developer – Full J2EE Development Tools

IBM Rational Web Developer – Web Development Tools

- Full development environment
- Support for J2EE 1.2, 1.3, 1.4 Web based application - Support for JSF, Struts frameworks, SDO tools
  - No EJB development

- Server support (WebSphere Application Servers V5.0, V5.1, V6.0, Tomcat 5.0. WebLogic Server 6.1, 7.1, 8.1 via WebLogic Toolkit – available separately)
- Visual Java GUI builder
- Web Diagram Editor
- Site designer
- Page templates
- XML tools
- Web services tools
- Database tools
- Enterprise Generation Language (EGL) tools
- Debugger

Application Server Toolkit (AST)

- Tool for assembly, deployment (EJB, Web Services) and debug J2EE applications
  - No development support
- Java Development tool
- WebSphere Rapid Deployment
- Support for Enhanced EAR
- Server Tools – support for remote server

- Full J2EE 1.4 support
- Portal and portlet development
- UML visual editors
- Static and runtime analysis
- Extended debugging and profiling
- Component test automation
- ClearCase LT for team integration
- Rational Unified Processing (RUP) integration
- Crystal Enterprise V10 Professional and Embedded

Eclipse 3.0

- Universal Tool Platform - provides frameworks, services, tools for tool builders to focus on tool building
- Java Development Tools
- Core Workbench technology basis for all IBM Tools

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As a summary for the different support provided with IBM Rational Web Developer and IBM Rational Application Developer, this slide clearly shows the different content. IBM Rational Web Developer includes those capabilities which are of interest of Web application developers. IBM Rational Application Developer includes all of the capabilities of IBM Rational Web Developer plus additional development support such as Portal application development, UML visual editors, application analysis, extended debugging and profiling, component testing, integration with ClearCase and the Rational Unified Processing. There is also support for designing reports with Crystal Reports and adding reports to the Web applications. Both of these products also include the capabilities of the Application Server Toolkit which is packaged with the WebSphere Application Server V6 and provides packaging and deployment tools for administrators. All of these products are built on the Rational Software Development Platform foundation which is based on Eclipse 3.0.

Section

Summary and Reference

Overview

This final section provides the summary to the presentation.

Summary

- IBM Rational Web Developer and IBM Rational Application Developer extends upon the features of WebSphere Studio Application Developer

- New support for J2EE 1.4, JSF, SDO, Portal, Modeling, Deploying, Profiling, and Testing

- A complete development environment for applications targeted to WebSphere Application Server V6.0

In summary, this presentation has focused on the new features of IBM Rational Web Developer and IBM Rational Application Developer as they continue to support the capabilities of WebSphere Studio and provide enhancements and new features.   There is new support for developing J2EE 1.4 applications , Web applications with JavaServer Faces, applications with Service Data Objects, and Portal applications. There are also new support for modeling, deploying, profiling, and testing applications. With all of these capabilities, IBM Rational Web Developer and IBM Rational Application Developer is the primary development environment for WebSphere Application Server V6.

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Overview

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