



The Next Generation of Development Tools

WebSphere

| The Fastest Way to e-business |

The Eclipse Project

- Eclipse is an open extensible Universal Tooling Platform
- Universal Tooling Platform has been open sourced:
 - ▶ Licensed via Common Public License
 - ▶ Managed via the Eclipse Project (www.eclipse.org)
- IBM contributed \$40M software/R&D as initial Eclipse technology
- Enables customers to develop, customize and integrate tools and repositories via open standards
 - ▶ Provides frameworks for tool builders to focus on tool development (not infrastructure)
- Initial consortium members include:
 - ▶ IBM, Rational, Merant, QNX, RedHat, SuSE, TogetherSoft, WebGain, and Borland



The WebSphere Studio WorkBench

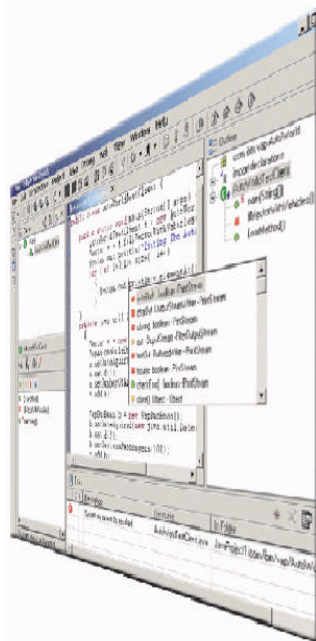
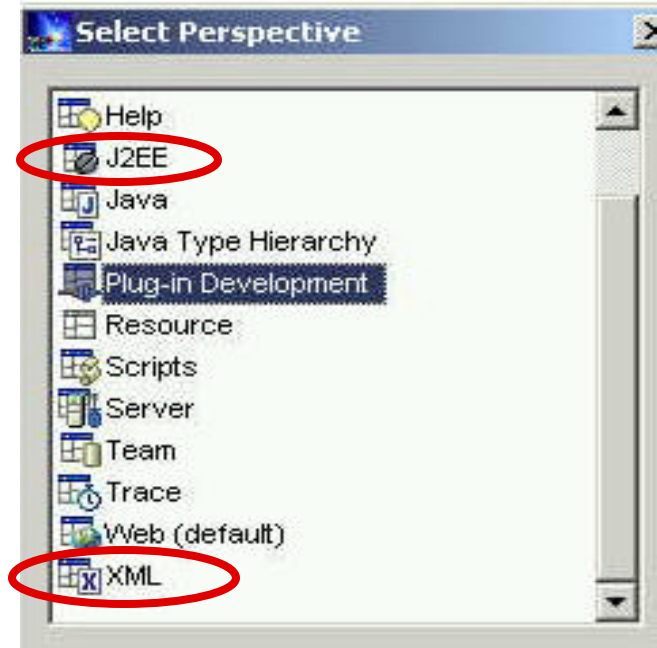
- **The WebSphere Studio Workbench is IBM's commercially supported implementation of Eclipse**
 - ▶ **Foundation for the new WebSphere Studio family of tools**
 - e.g. WebSphere Studio Application Developer
 - ▶ **First AD integration platform to fully embrace open technologies, adopting the open approach that has been so successful for Apache, J2EE and Linux**

WebSphere Studio Workbench

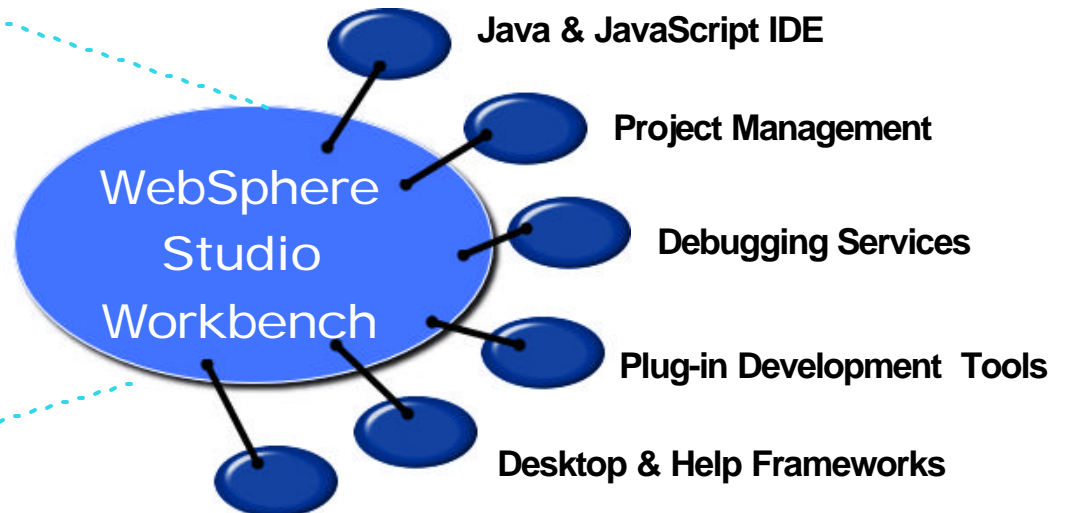
An Open Tool Integration Platform

A personalized, extensible development platform organized via developer

"Perspectives"



Products built with Eclipse inherit these capabilities plus **'plug-ins'** built by others



Local & Team (CVS) Resource Management

Workbench - Key Features

■ Customizable Perspectives

- ▶ Promote role based development (Web Developer, Java Developer, DBA, etc)
- ▶ Reduces the learning curve
- ▶ Perspectives use same project artifacts

■ Highly pluggable and integrated tooling platform

- ▶ Provide excellent multi-level vendor integration
- ▶ ISVs can provide plugins to workbench to integrate their tools into the core platform

■ Support for popular features

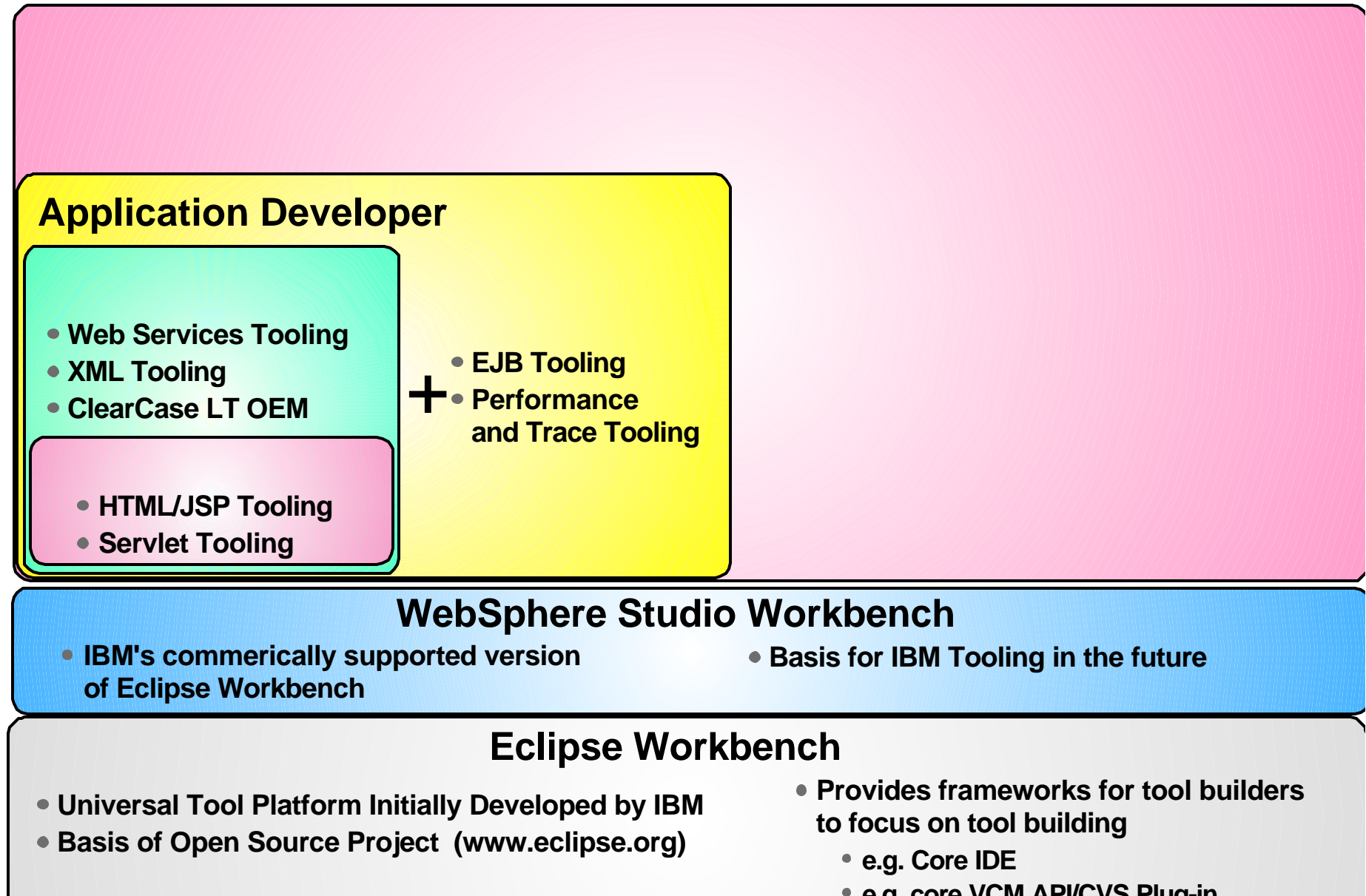
- ▶ ANT (automated builds), JUnit (unit testing), etc.

Workbench Integration Levels

- **Different levels of integration are available in the Workbench**
 - ▶ **Most other tools only provide invocation and some API support:**

	Levels of Integration	Example
Invocation	Integration is through invocation of registered applications on resource types	Tool A is launched from workbench based on file extension
API	Tools interact with other tools through platform APIs	Tool A invokes Tool B through Tool B APIs
Data	Integration is achieved through data sharing	Tool A changes a UML model which automatically changes implementation in Tool B
UI	Tools and their user interfaces are dynamically integrated with the workbench at runtime	Tool A runs as embedded view in workbench

WebSphere Studio Application Developer



Workbench - Java IDE Features

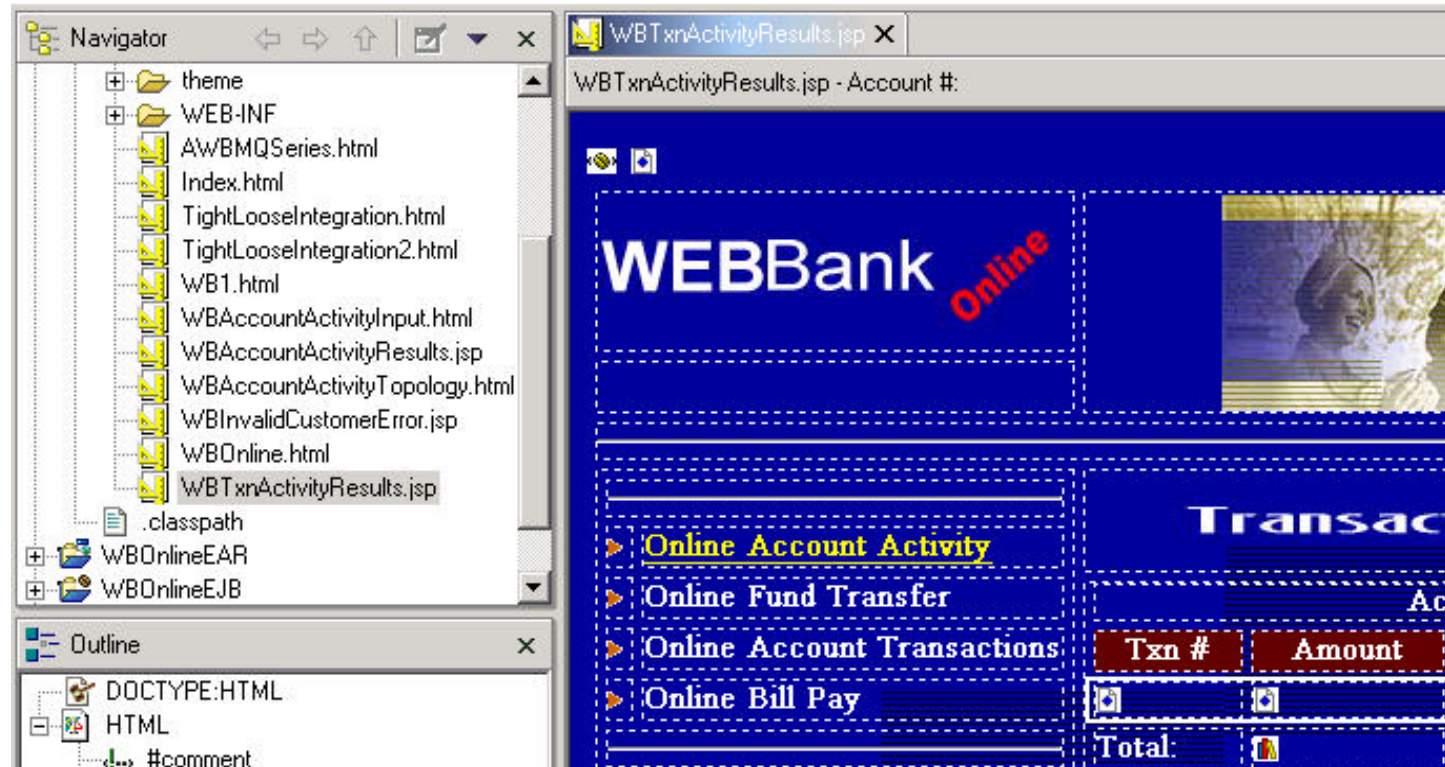
- **Ships with JDK 1.3**
- **Pluggable JRE support (per project)**
 - ▶ Specify JRE and rt.jar for running/building/debugging
- **Incremental Saves**
- **Java Snippet support (Scrapbook)**
- **Task Sheet (All Problems Page)**
- **Code Assist**
- **JDI based debugger**
 - ▶ One debugger for local/remote debugging
- **Run code with errors**
- **Refactoring Support**
 - ▶ Rename/move support for method/class/packages
 - ▶ Fixes all dependancies for renamed element
 - ▶ Method Extraction

Web Tooling Features

- **Import Web Sites via HTTP/FTP Import**
- **HTML/JSP Editor (Visual/Source)**
- **WAR Import/Export**
- **Links View (Relations)**
 - ▶ **View HTML/JSP and all links referenced in HTML/JSP**
- **Parsing/link management**
 - ▶ **Automatically fix links when resources are moved/renamed**
- **Built-in JSP Source Debugging**
- **Servlet Wizards for creating servlets from:**
 - ▶ **JavaBean, SQL Query**
 - ▶ **Simple Servlet Generation**
- **Site-Style and Template Support**
- **Web Perspective provides the useful views for**

HTML/JSP Editing: Page Designer

- **Built in Page Designer can be used to customize the generated HTML/JSP**
 - ▶ **Design, Source, Preview modes**
 - ▶ **Code Assist available in Source view**



Web Services Development

■ Easily Consume/Construct Web Services:

▶ Discover

- Browse UDDI registry to locate existing web services
- Generate JavaBean Proxy for existing web services

▶ Create/Transform

- Create new Web Services from JavaBeans, databases, etc.

▶ 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

XML Tooling

- **Built-in XML Tooling provides integrated tools/perspectives to create XML based components:**
 - ▶ **DTD Editor**
 - Visual tooling for working with DTDs
 - Create DTDs from existing documents
 - Generate an XML Schema from a DTD
 - Generate JavaBean(s) for creating/manipulating XML documents
 - Generate an HTML form from a DTD
 - ▶ **XML Schema Editor**
 - Visual tooling (Design/Source) for working with an XML Schema
 - Generate DTDs from an XML Schema
 - Generate JavaBean(s) for creating/manipulating XML documents
 - ▶ **XML Source Editor**
 - DTD/Schema validation
 - Code Assist for building XML documents

XML Tooling

■ Additional XML Tools:

▶ XML Mapping Editor

- Generate XSL to map XML between DTDs/Schemas

▶ XSL Trace Editor

- Trace XSL transformation

- Examine relationships between the result node, the template rule, and the source node

▶ XML from Relational Databases

- Generate XML, XSL, XSD from an SQL Query

▶ RDB/XML Mapping Editor

- Map columns in a table to elements and attributes in an XML document
- Generate a Database Access Definition (DAD) script to compose/decompose XML documents to/from a database
 - DAD is used with DB2 XML Extender

■ Built in XML perspective provides the useful views for the XML developer

Team Support

- **CVS plug-in provided in base WorkBench**
- **ClearCase LT plug-in/ClearCase LT OEM bundled with higher-end tool packages**
 - ▶ **WebSphere Studio Advanced Site Developer**
 - ▶ **WebSphere Studio Application Developer**
- **Workbench design is a pluggable adapter based configuration**
- **Open framework allows any SCM provider to add adapter to integrate their SCM into the Workbench**

Four Levels of Team Development Integration

■ Version and Configuration Management (VCM)

- ▶ plug-in architecture allows VCMs to seamlessly integrate into the Workbench
- ▶ ISVs write the VCM plug-ins
- ▶ ISVs responsible for support (both plug-ins and their SCM software)
- ▶ ISVs that will be supplying VCM plug-ins:
 - Merant PVCS, Serena eChangeman, MKS SourceIntegrity, Starbase Starteam, Telelogic Continuus, CA CCC/Harvest

■ WebSphere Studio Workbench API integration

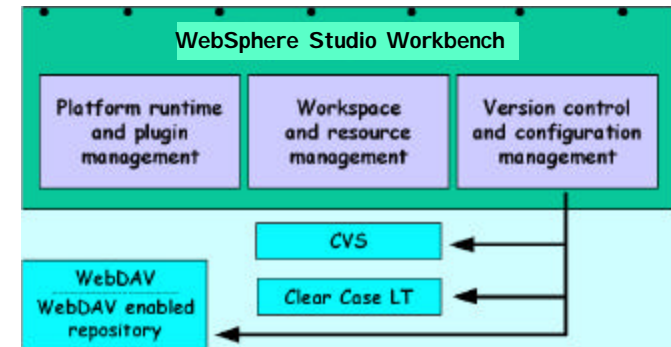
- ▶ to expose SCM functions beyond the basic VCM plug-in functionality
- ▶ ISVs that will be supplying plug-ins:
 - Rational ClearCase

■ WebDAV enabled repositories (future)

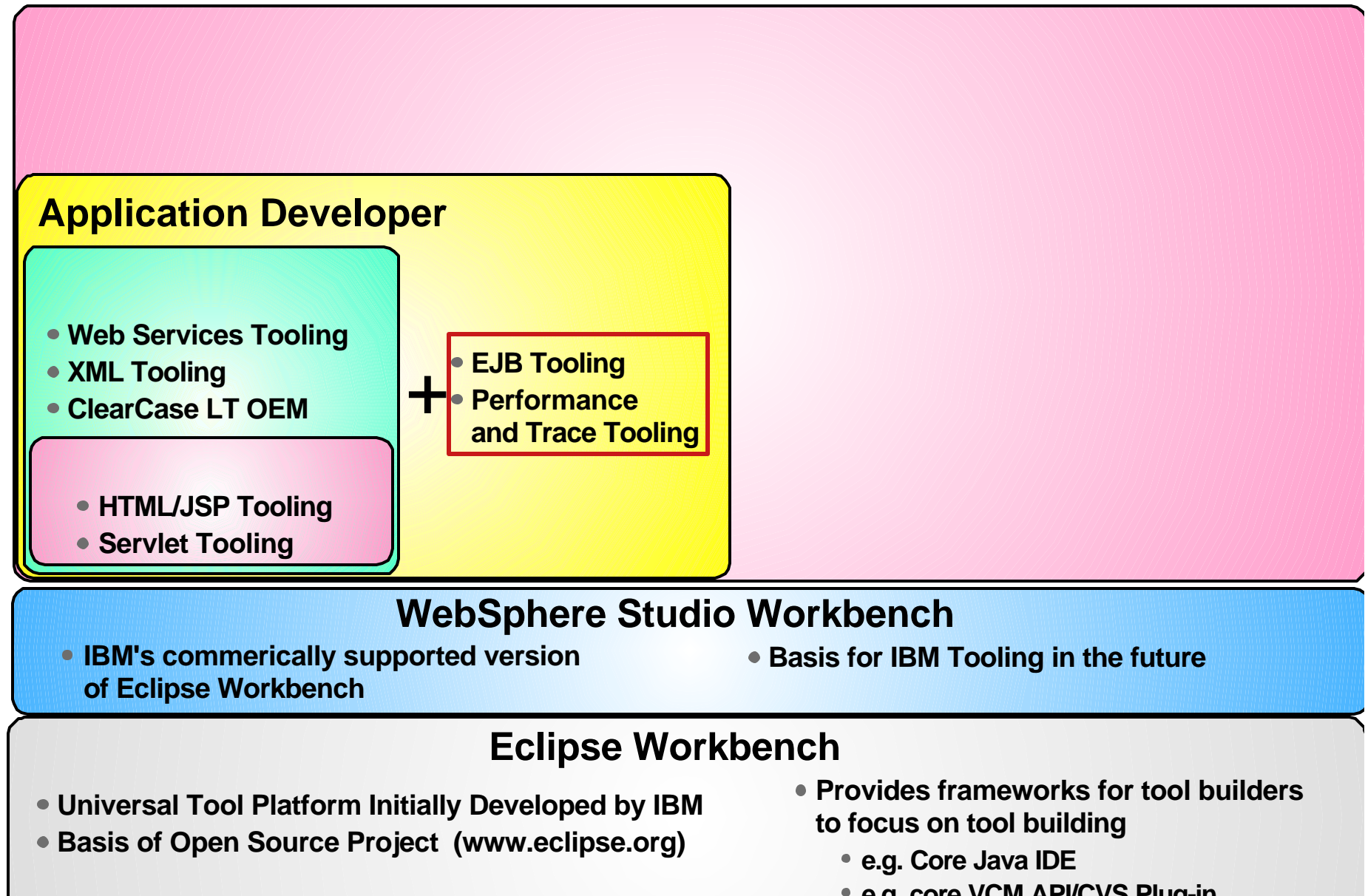
- ▶ plug-in directly into the Workbench
- ▶ no need to write plug-ins

■ File System integration

- ▶ Microsoft Visual Source Safe (uses SCCI not supported in Application Developer)

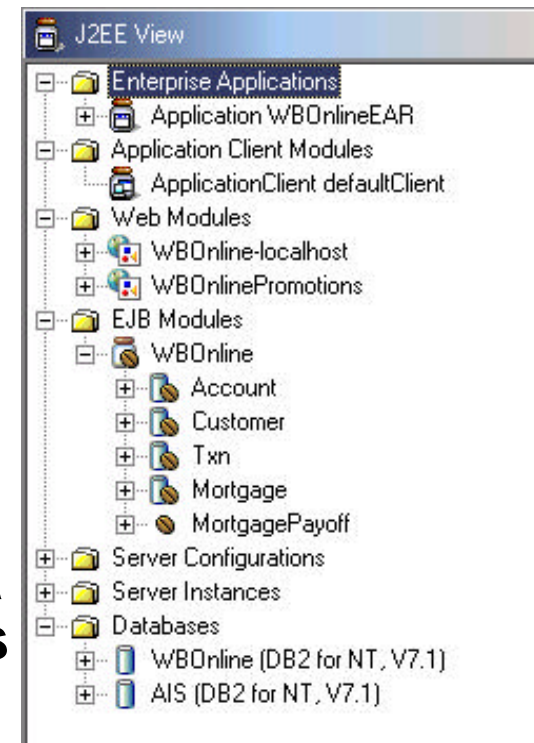


WebSphere Studio Application Developer



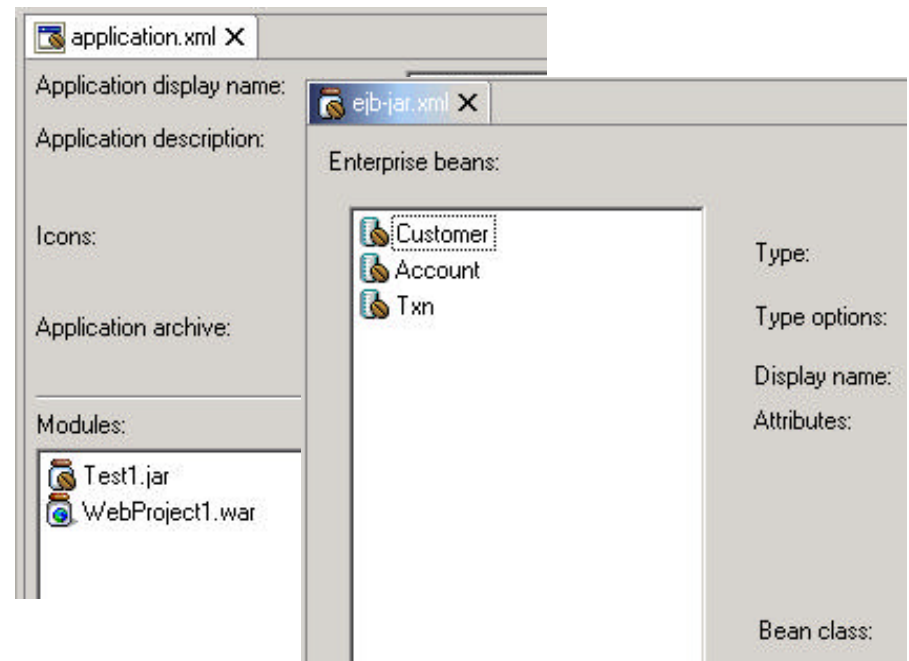
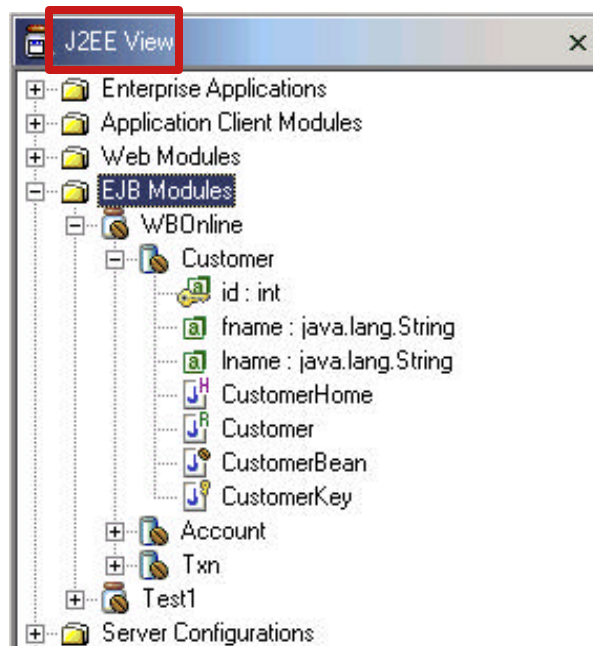
J2EE Workbench Components

- **J2EE Perspective provides the primary view for working with J2EE components**
 - ▶ Enterprise Applications (EAR)
 - ▶ Application Client Modules
 - ▶ Web Modules (WAR)
 - ▶ EJB Modules
 - ▶ Unit Test Configurations
 - ▶ Unit Test Instances
 - ▶ Databases
 - Data Perspective allows developer to gather DB schema information for doing O/R maps



J2EE Tooling

- **J2EE Tooling provides facilities to easily work with J2EE Resources (EAR, WAR, EJBs, etc.)**
 - ▶ **Visual tools for modifying J2EE Deployment Descriptors (application.xml, ejb-jar.xml, web.xml, etc.)**
- **Built-in EJB Tooling provides facilities to easily build session/entity EJBs**
 - ▶ **Simplifies server and client EJB development and testing**



EJB Development - O/R Mapping Approaches

- **Bottom Up**
 - ▶ **Map existing databases tables to EJB entities**
- **Top Down**
 - ▶ **Wizard creation of EJBs**
 - ▶ **Generate Database/Tables from EJB Entities**
- **Meet in the Middle**
- **O/R Mapping**
 - ▶ **Associations with cardinality (1:m, m:m, etc), Inheritance, etc.**

O/R Mapping to EJBs

- **Visual Mapping Editor allows for mapping between EJBs <-> Tables**

The screenshot displays the Visual Mapping Editor interface, which is used for mapping between EJBs and database tables. It is divided into three main sections:

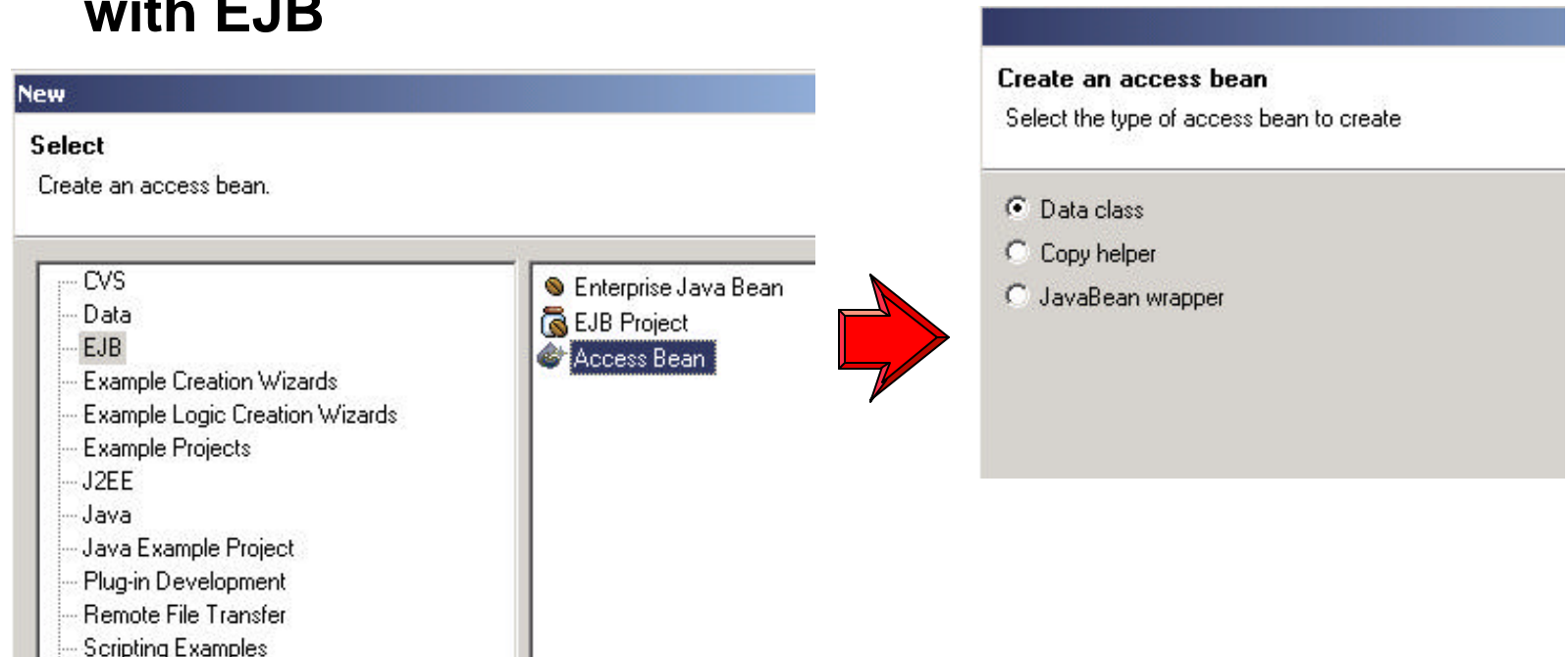
- EJB View:** Shows the EJB structure for 'WBOOnline'. It includes entities 'Customer', 'Account', and 'Txn'. The 'Txn' entity is expanded to show its attributes: 'txn_number', 'amount', 'txn_type : java.lang.String', 'txn_date', 'fk_acct_id_acct_number', and 'account : Account'.
- Database View:** Shows the database schema for 'AIS'. It includes tables 'ACCOUNT', 'CUSTOMER', and 'TXN'. The 'TXN' table is expanded to show its columns: 'ACCT_NUMBER : INTEGER', 'TXN_NUMBER : INTEGER', 'AMOUNT : DECIMAL(10, 2)', 'TXN_TYPE : CHARACTER(1)', 'TXN_DATE : DATE', and 'FK_ACCT_ID : ACCOUNT'.
- Mapping Summary View:** A table summarizing the mapping between EJBs and Tables.

EJBs	Tables
WBOOnline	AIS
Customer	CUSTOMER
Account	ACCOUNT
Txn	TXN

EJB Development - Access Beans

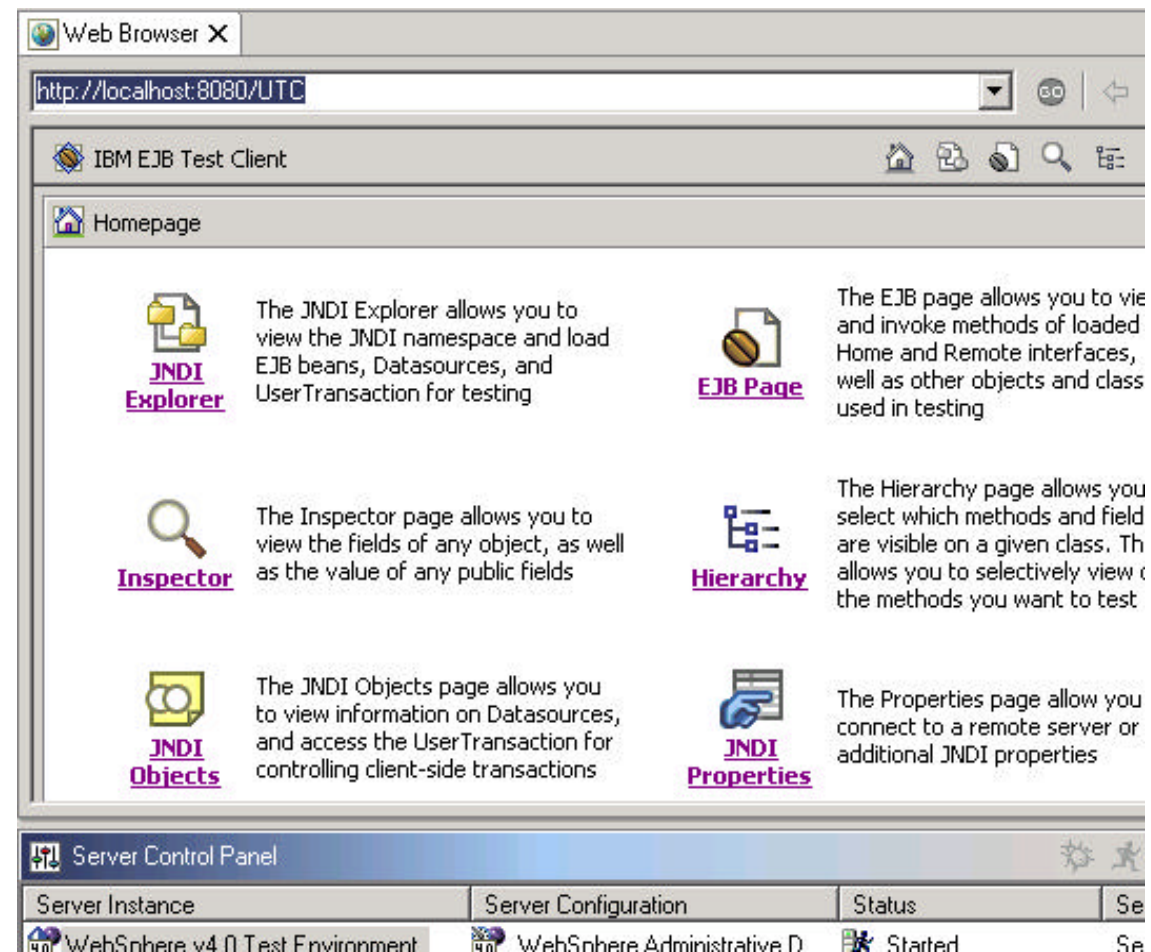
■ EJB Access Beans

- ▶ **Simplify client-side EJB programming**
 - Wrapper EJB client-side interfaces as JavaBean
- ▶ **Improve performance by caching properties locally**
 - Methods are generated to synchronize client cache with EJB



EJB Unit Testing

- **Built-in EJB Test client provides quick and complete EJB testing**
 - ▶ No coding necessary to test any EJB!
 - ▶ JNDI Browser
 - ▶ J2EE based application
 - Runs in a Web Browser



Unit Testing/Debugging

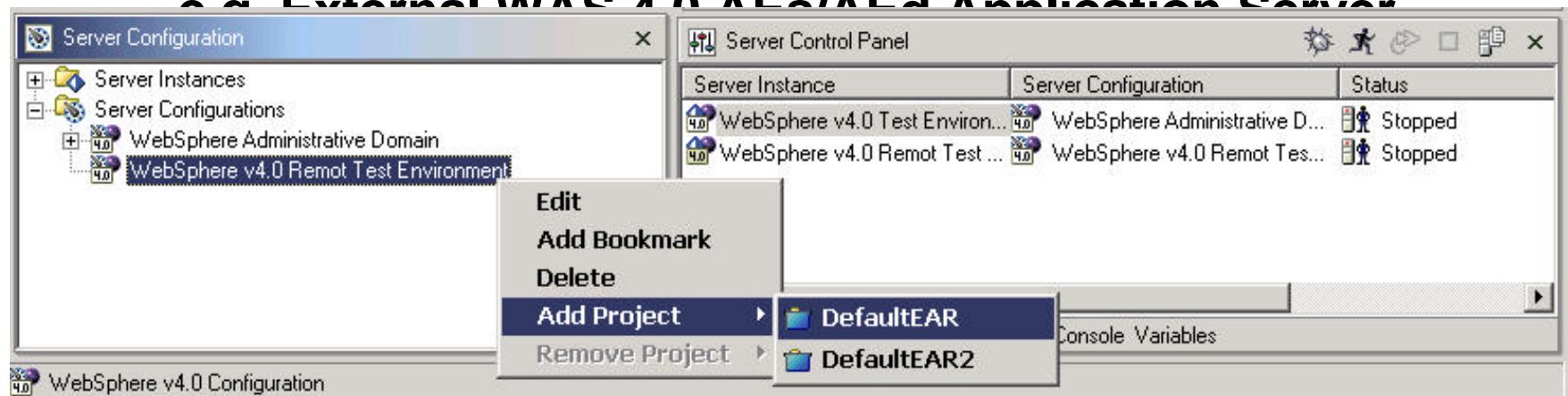
- **Built-in Unit Test Environment allows for the configuration of multiple unit test servers**

- ▶ **Local servers**

- Built-in WAS 4.0 AEs/AEd Application Server
- Apache TomCat
- TCPIP Monitoring Server

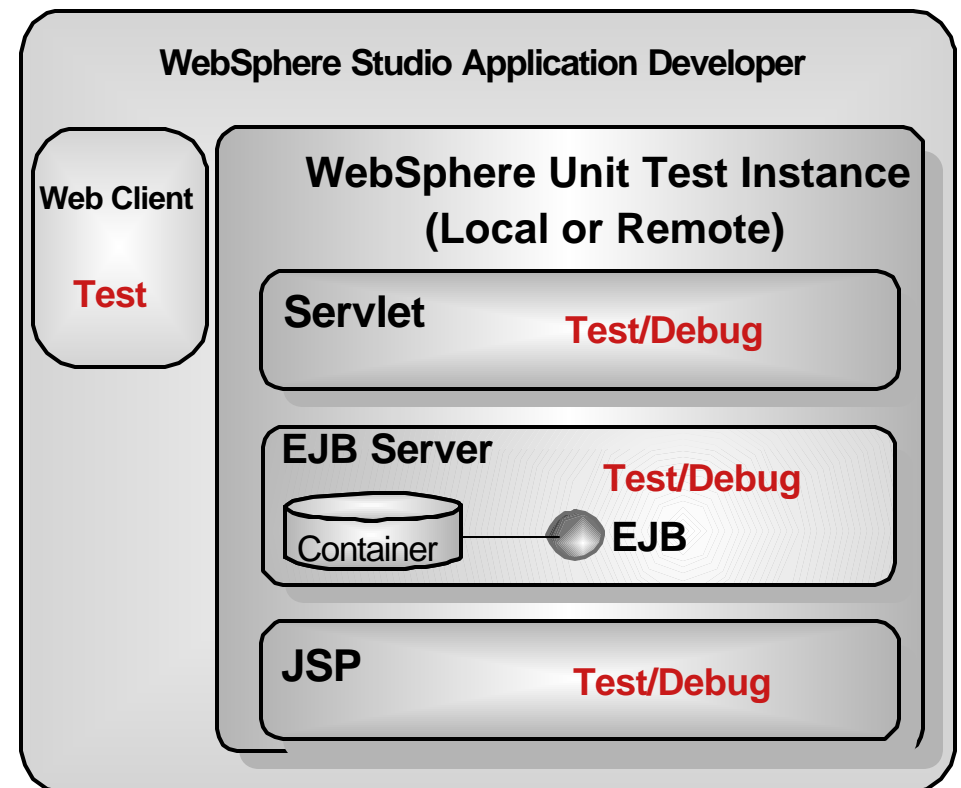
- ▶ **Remote servers**

o.g. External WAS 4.0 AEs/AEd Application Server



Unit Testing a J2EE Application

- **Unit Test Server can be run in debug mode**
 - ▶ Test/Debug Servlets
 - ▶ Test/Debug EJBs
 - ▶ Test/Debug JSPs
- **Web Browser runs in source view in workbench**
 - ▶ Internet Explorer



Performance/Trace Tooling

- **Built-in tooling helps developer isolate and fix performance problems with their web application:**
 - ▶ **Attach to local/remote agents for capturing performance data**
 - ▶ **JVMPI Monitoring**
 - Heap
 - Stack
 - Class/Method details
 - Object References
 - ▶ **Resource Monitors**
 - Execution patterns
 - CPU usage
 - Disk usage
 - More...
- **Built-in Trace Perspective allows for analysis of the performance data for the Java developer**

Application Developer, Integration Edition

Application Developer, Integration Edition (1Q/2002)

Application Developer

- Web Services Tooling
- XML Tooling
- ClearCase LT OEM

- HTML/JSP Tooling
- Servlet Tooling

- + • EJB Tooling
- + • Performance and Trace Tooling

- + • Enterprise Modernization w/ Services
- J2C Connectors
- CCF Connectors
 - Runtime Only
- Microflow Builder
- Enterprise Access Builders
- BP Beans

WebSphere Studio Workbench

- IBM's commercially supported version of Eclipse Workbench

- Basis for IBM Tooling in the future

Eclipse Workbench

- Universal Tool Platform Initially Developed by IBM
- Basis of Open Source Project (www.eclipse.org)

- Provides frameworks for tool builders to focus on tool building
 - e.g. Core Java IDE
 - e.g. core VCM API/ CVS Plug-in

WebSphere Studio Enterprise Developer

Enterprise Developer (2Q/2002)

Application Developer, Integration Edition (1Q/2002)

Application Developer

Advanced Site Developer

- Web Services Tooling
- XML Tooling
- ClearCase LT OEM

Site Developer

- HTML/JSP Tooling
- Servlet Tooling

- + • EJB Tooling
- + • Performance and Trace Tooling

- + • Enterprise Modernization w/ Services
- + • J2C Connectors
- + • CCF Connectors
 - Runtime Only
- + • Microflow Builder
- + • Enterprise Access Builders
- + • BP Beans

- + • Remote E/C/D for COBOL/PL1
- + • Visual Modeling/RAD
- + • Apache Struts Builder

Not Finalized

WebSphere Studio Workbench

- IBM's commercially supported version of Eclipse Workbench

- Basis for IBM Tooling in the future

Eclipse Workbench

- Universal Tool Platform Initially Developed by IBM
- Basis of Open Source Project (www.eclipse.org)

- Provides frameworks for tool builders to focus on tool building
 - e.g. Core Java IDE
 - e.g. core VCM API/CVS Plug-in

Other IBM Workbench Plug-ins in Development

- **Versata (IBM Partner) - Business Rules Tooling for WebSphere**
- **IBM Portal Server Tooling**
- **IBM Personalization Server Tooling**
- **Business Integrator Tooling**
- **VoiceXML Server Tooling**
- **Commerce Server Tooling**
- **Many more to come...**

The WebSphere Studio Workbench is the IBM Tooling Platform of choice for our Tools!

Summary

★ Eclipse and WebSphere Studio Workbench

- ✓ IBM and other industry leaders are unlocking the full power of open e-business software infrastructure through an equally powerful open application development (AD) platform

★ WebSphere Studio Application Developer

- ✓ IBM's first offering on the Workbench platform heralds a new era promising productivity gains:
- ✓ Higher-quality Java, J2EE, Web, XML, and Web services applications in a fraction of the time
 - Single development environment provides integrated support
 - Productive, highly-integrated WebSphere Server test environment and deployment automation tools

★ Future offerings (plug-ins) from IBM and partners will provide an ever-increasing suite of AD solutions that leverage the powerful WebSphere Studio Workbench common platform

- ✓ Plug-in components allow quick adoption of technologies to leverage new opportunities

For More Information . . .



★ **WebSphere Studio Information and Web Demo**

- ▶ www.ibm.com/software/ad/adstudio

★ **WebSphere Studio Developer Domain (WSDD)**

- ▶ www.ibm.com/websphere/developer/zones/studio/transition.html
 - "Transitioning to the New WebSphere Studio Development Products"

★ **Redbooks/Redpieces**

- ▶ **Web Services Wizardry with WebSphere Studio Application Developer**

★ **WebSphere Studio Partner Program**

- ★ www.ibm.com/partnerworld

★ **Education**

- ★ <http://www-4.ibm.com/software/ad/studioappdev/education>

★ **Eclipse**

- ▶ www.eclipse.org