VSE/ESA

Development with
Websphere Studio Application developer

z/VM, VSE, and Linux on zSeries Tech Conference
Miami Beach - Oct 7 - 10th

Wilhelm Mild

VSE/ESA Design and Development

e-business ambassador

IBM Boeblingen Laboratory

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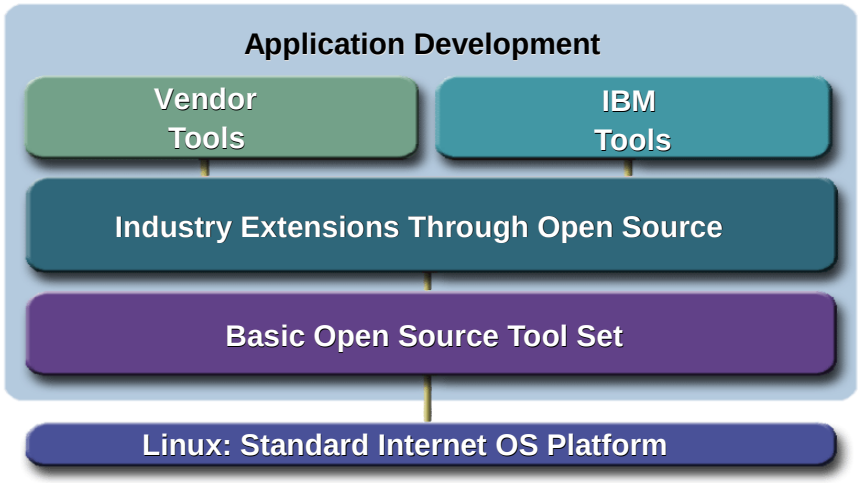
Open/Standards-based Application Deployment

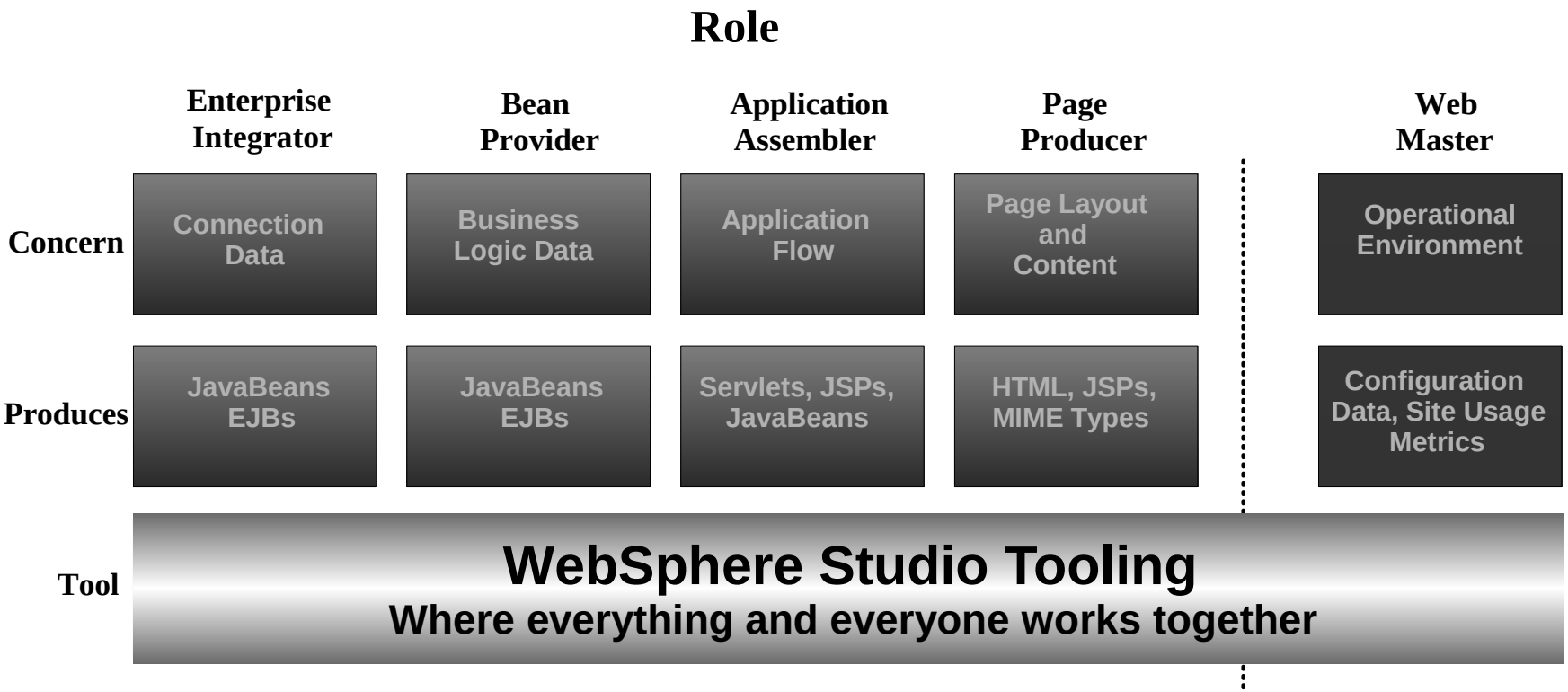


- **Common Application Development**

- **zSeries**
- **iSeries**
- **pSeries**
- **xSeries**
- **Embedded Appliances**

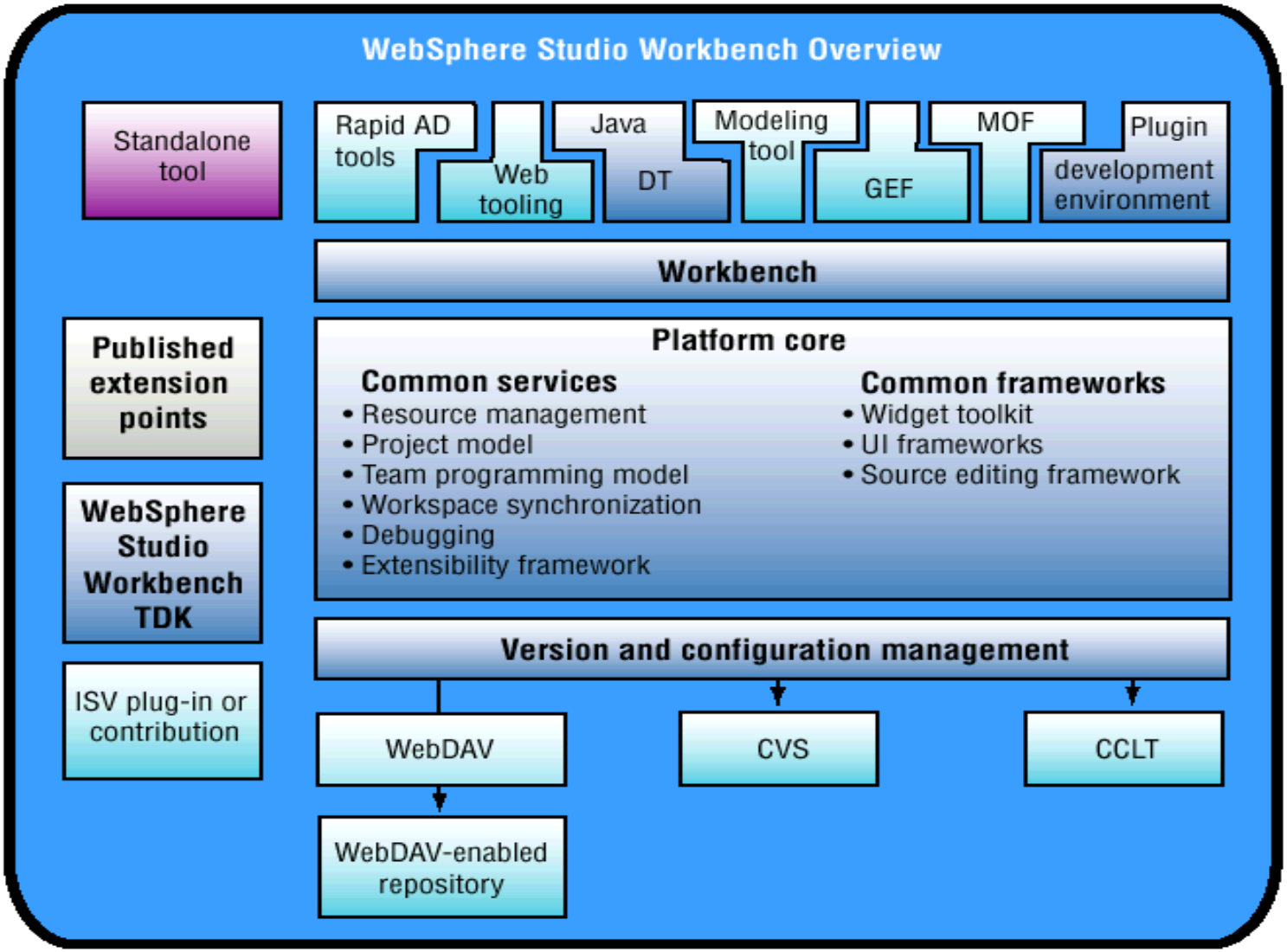
Roles-based Development

- Developing Web Applications requires more than just writing Java code



One tool, many user perspectives

Workbench - Architecture



www.eclipse.org

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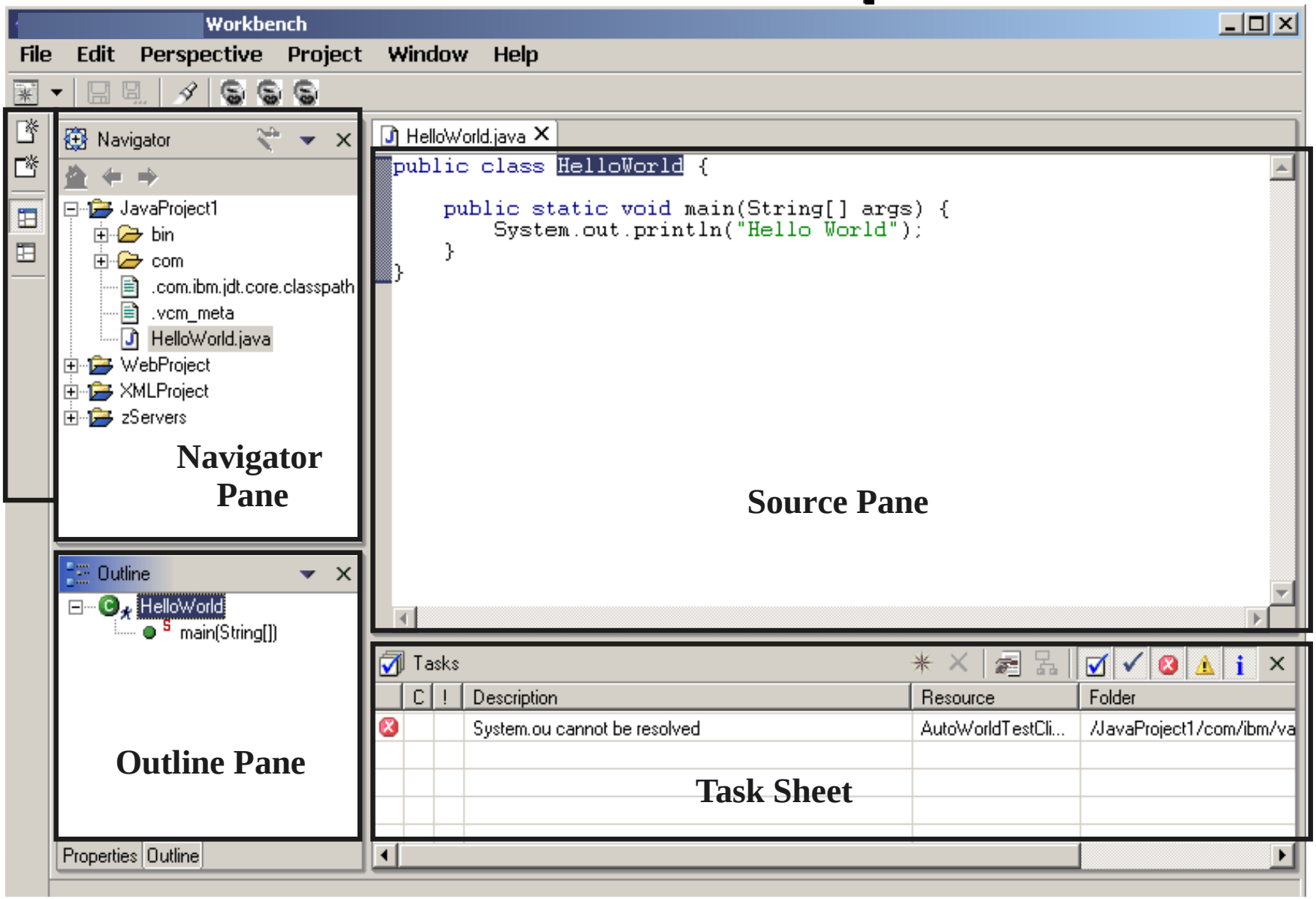
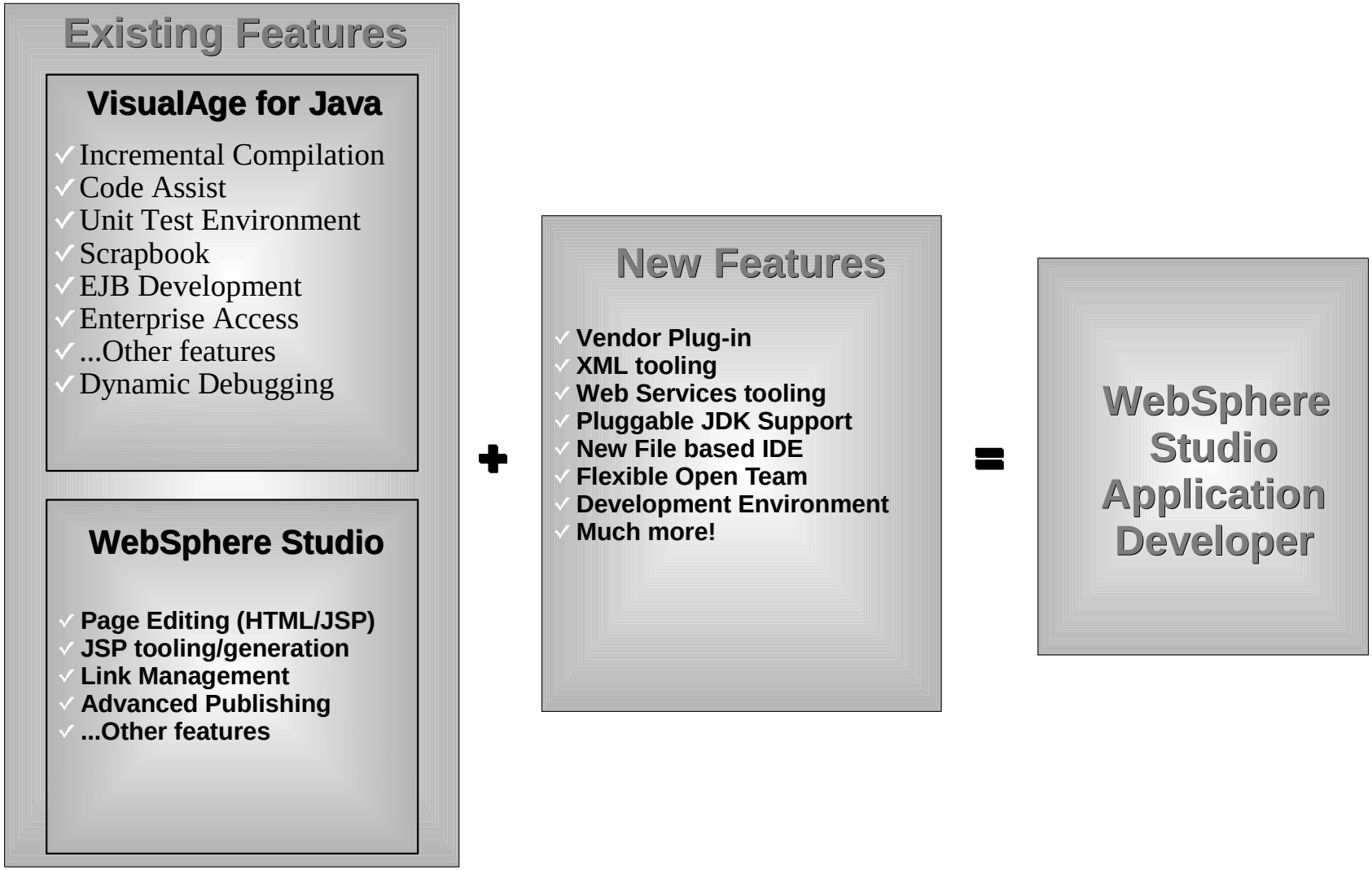
Offering/Branding

- **WebSphere Studio is the brand name for the next generation of tooling:**
- **Products:**
  - **WebSphere Studio Site Developer**
    - **Focused on development of Web Services, JSPs, Servlets, XML, WAS and Basic Team support.**
  - **WebSphere Studio Application Developer**
    - **Includes all WebSphere Studio Site Developer functionality**
    - **Focused on development of J2EE and database applications in a team environment**
    - **VisualAge for Java EE 4.0 will contain the Beta**

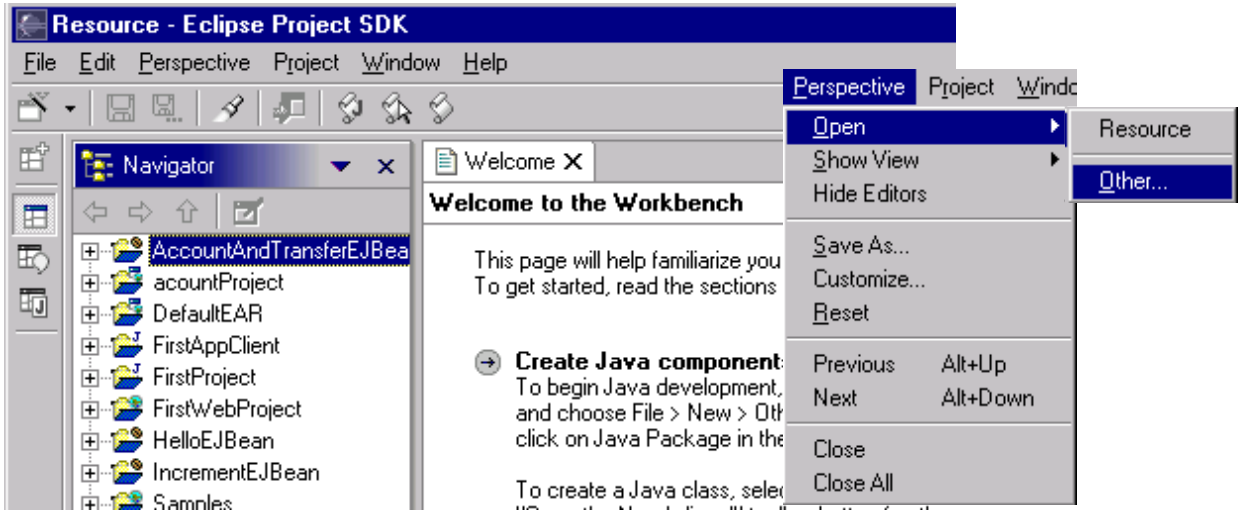
Workbench – Organization
Default Resource Perspective

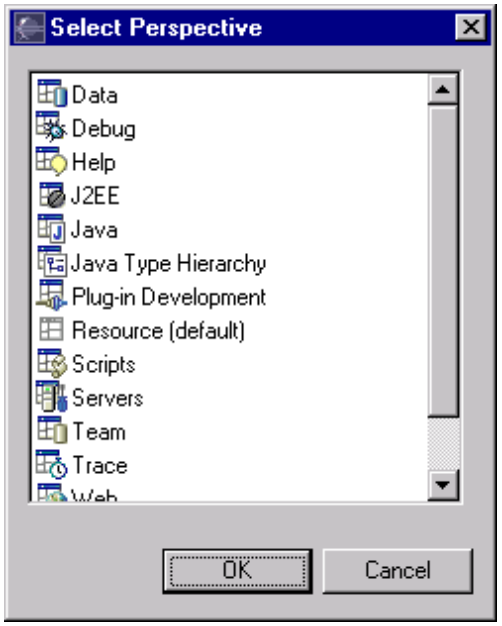


WebSphere Studio Application Developer



Perspective





- A group of related views and editors is called a perspective
- You can open different perspective by
  - Perspective -> Open -> Other
- WebSphere Application Developer contains several Perspective
  - Resource perspective: default perspective when you open the workbench
  - Java perspective: number of views that provide the information that you need to work on a Java project
  - Managing perspective: which allows you to work with a team
  - Debug perspective: which allows you to run and debug your project.

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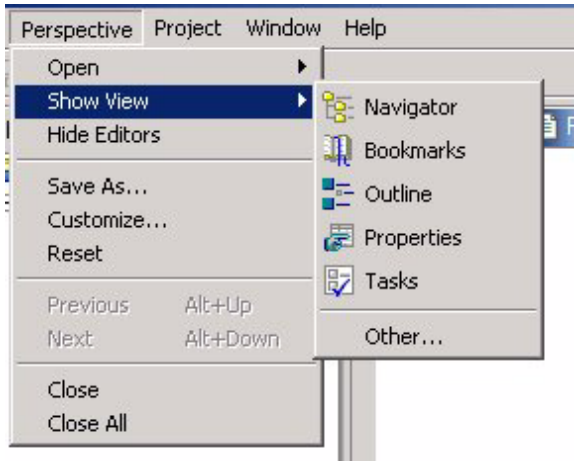
Perspectives

- Perspectives allow team members to focus on the task they just work on
  - Provides "Views" into the e-business application
- Perspectives can be opened from same Workbench or anchored to a different Workbench
  - Allows developers to maximize "real-estate" usage
- Desktop Perspectives can be customized
  - The design intentions allow to configure the workbench in a manner, that developers can have similar look and feel to other Java tools they are familiar with
- This allows customers to consolidate all Java tools to one development platform
  - Unique Perspectives should satisfy everyone
    - VAJ developer, JBuilder developer, Visual Cafe developer can all have their own perspectives

Views



- Display a view by selecting **Perspective** > **Show View**
- Views support:
  - Editors
  - Provide alternative presentations or navigation of the information
- A view might appear by itself, or stacked with other views in a tabbed notebook
- Views can be floated by Selecting the blue bar at the top of the Tasks view and drag it on to the desktop.

Standards Support

- Advanced-function HTML and JSP editor
- Built-in WebSphere Application Server and Tomcat Jakarta test environment with JSP Debugger
- Database support to define databases and create applications using wizards
- Advanced rich media image editing and animation tools
- An integrated version control system including adapters for Rational ClearCase LT OEM and Concurrent Versions system (CVS)
- Integrated Java development environment
- Comprehensive Visual XML development environment
- Complete Web services development environment

Standards Support

- 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
- XML Namespaces
- XML Schema
- HTML 4.01
- CSS2 (PageDesigner displays a subset)

WebSphere Studio Application Developer – Key Features

- Java IDE
- Web Services development environment
- XML Tooling
- RDB Tooling
- Web Tooling
- Java Performance Analysis/Trace Framework
- J2EE Tooling

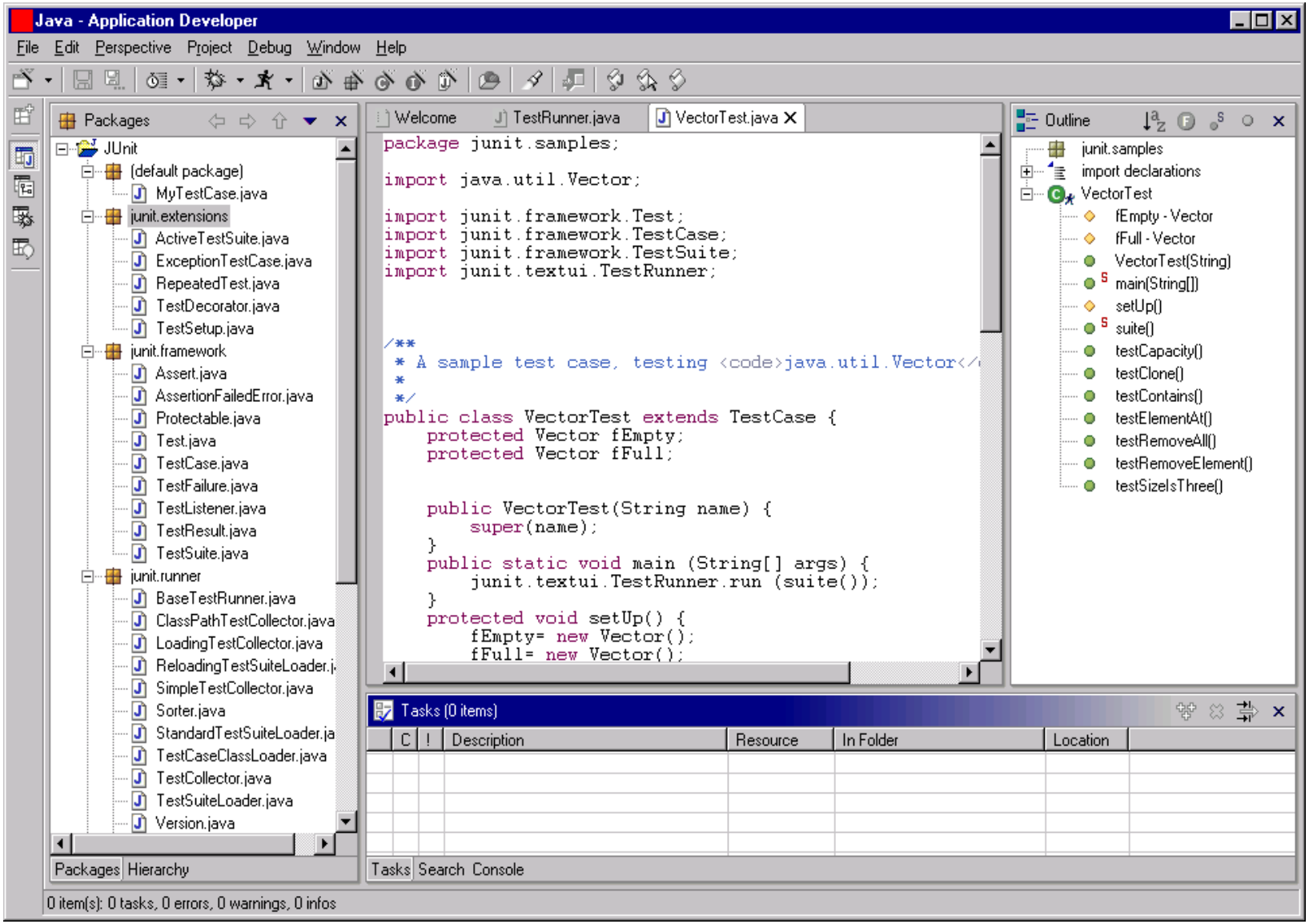
Java IDE - Key Features

- Is shipped with JDK 1.3
- Pluggable JDK support
  - Defined at project level
- Hot Method Replace
- Java Snippet support (Scrapbook)
- Task Sheet (All Problems Page)
- Code Assist
- Class Outliner
- One debugger for local/remote debugging
- Run code with errors
- Refactoring Support
  - Rename/move support for method/class/packages
  - Fixes all dependencies for renamed element

Java IDE - Incremental Compilation/Hot Method Replace

- Incremental compilation/hot method replace will be supported with these caveats:
  - The JVM must support hot method replace
    - J9 JVM supports this today
    - IBM JVM plans to support this with JDK 1.4
    - SUN JVM may support this with JDK 1.4
- IBM has worked with JavaSoft to add hot method replace into JVM technology
  - This was the best way to support pluggable JDKs and hot method replace in our Java IDE
  - Must wait for JVMs to be released which support this technology

Java Perspective



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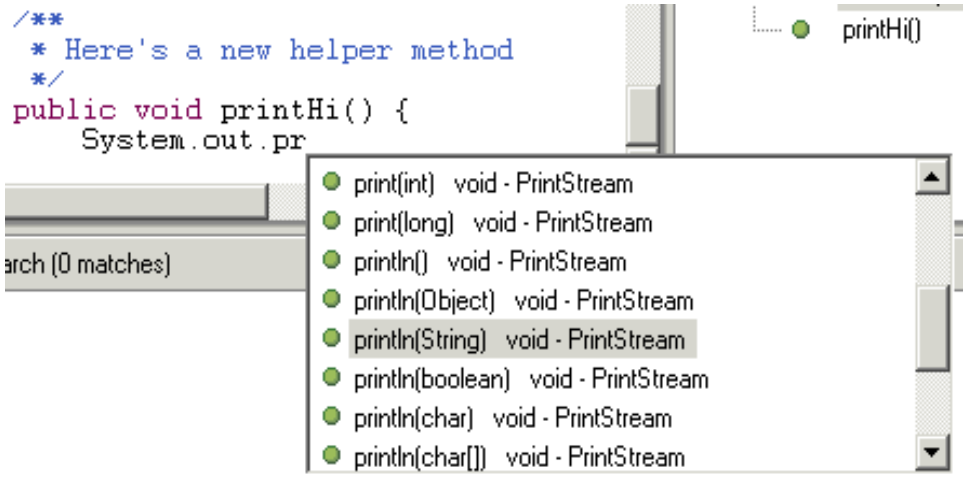
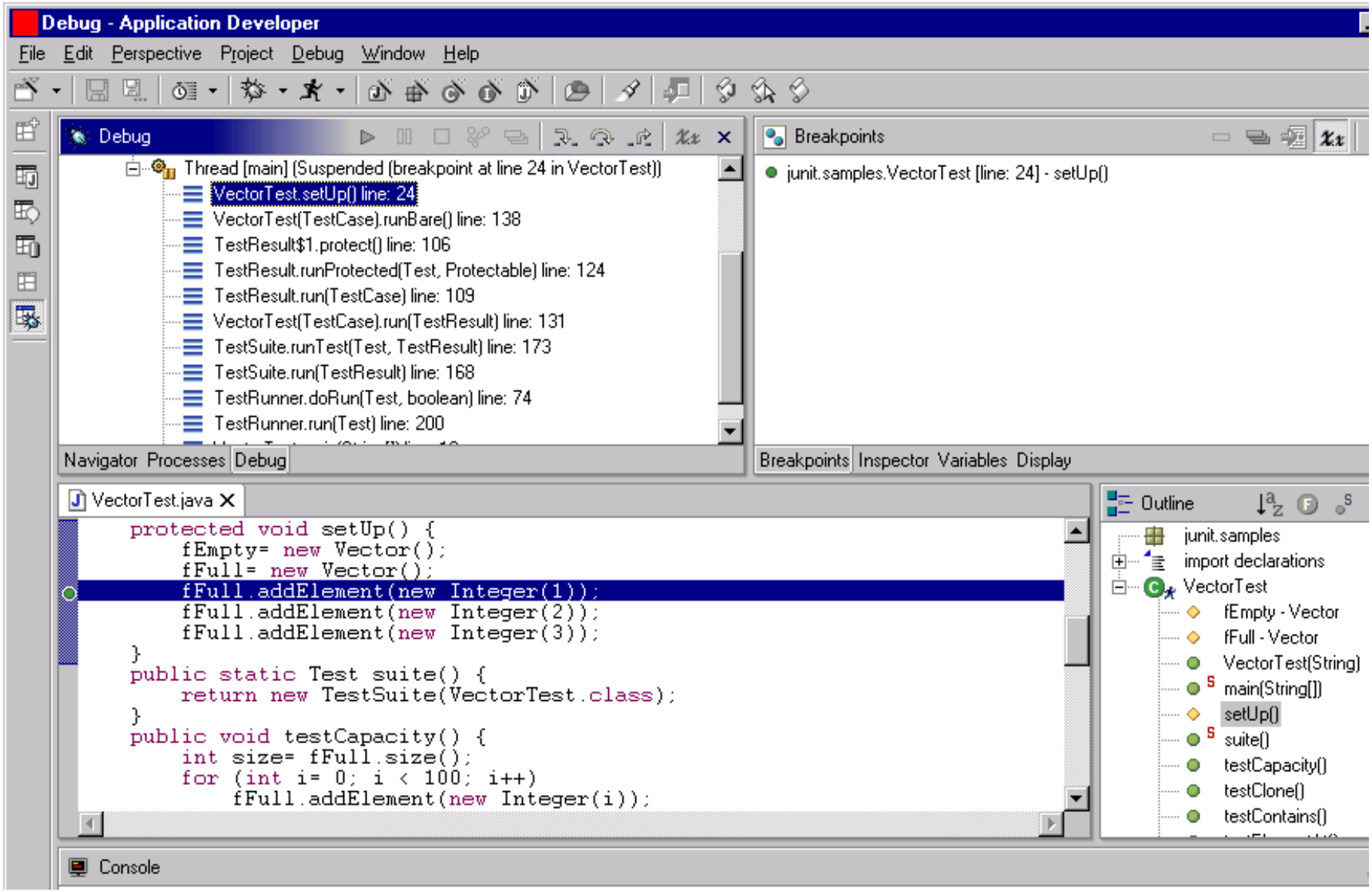
Java Editor

- Coding Assistance
  - Enter assist mode with CTRL-space
  - Select from scrolling list of possible completion's



Debug Perspective



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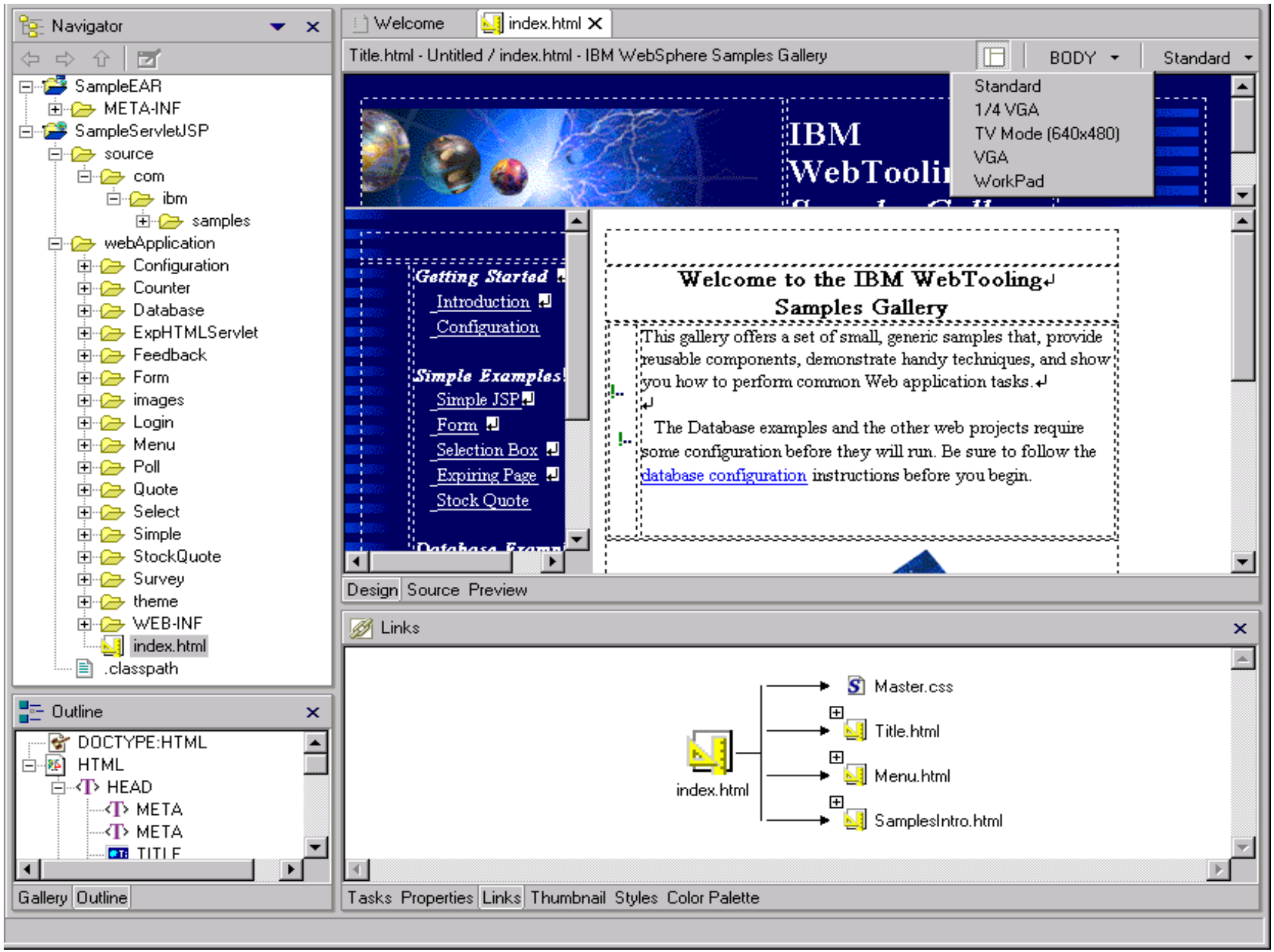
Web Tooling

- HTML/JSP Editing
  - WYSIWYG page design, source editing, page preview
- HTTP/FTP Import
- 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 Servlet, Database, JavaBean Wizards
  - Quick generation of HTML/Servlet/JSP
- Built-in JSP Debugging
- Site-Style and Template Support
- Built-in Web Perspective provides the useful views for HTML/JSP developer

Web Perspective



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J2EE Tooling Features

- Full EJB 1.1 Support
- WAR/EAR deployment support
- All metadata exposed as XMI
  - No hidden metadata
- Enhanced Unit Test Environment for J2EE
  - IBM WebSphere Application Server or Apache TomCat
  - Create multiple projects with different Unit Test configurations/instances
    - Allows for versioning of unit test environment
    - Share Unit Test Environment Configuration across developers
- O/R Mapping for EJBs
  - Top-Down/Bottom-up/Meet-in-the-middle

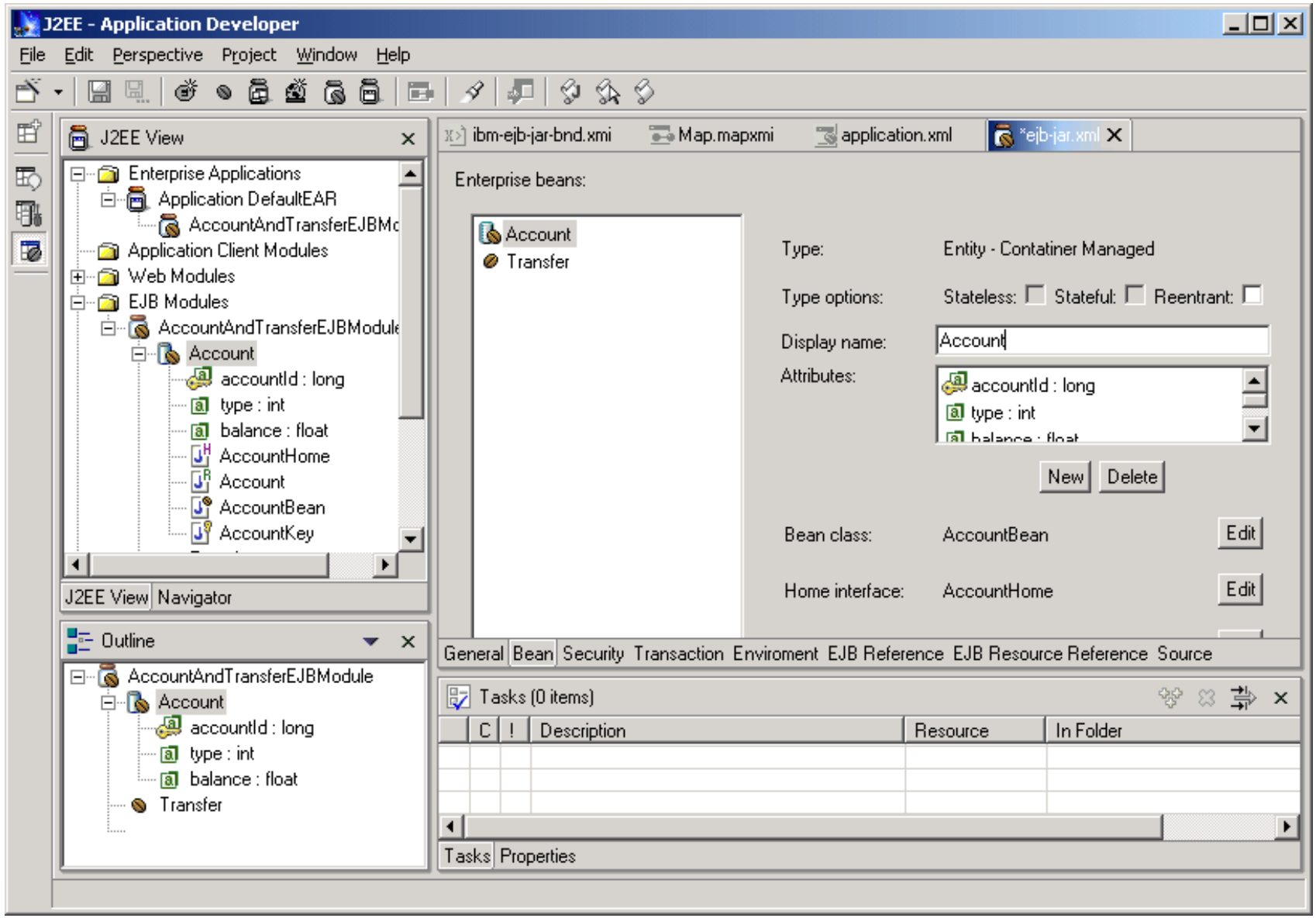
J2EE Tooling Features (continued)

- Updated EJB Test Client
  - HTML Based
  - J2EE Programming model
  - Built-in JNDI Registry Browser
- Enterprise Connectors (separate plug-in offering)
  - JCA Connector based
- Built-in J2EE Perspective provides the useful views for the EJB/J2EE developer

J2EE Perspective

- J2EE Projects
  - Enterprise application, EJB, Web, application client modules
  - Provided in the J2EE View
- EJB Editor
  - deployment descriptor (ejb-jar.xml)
- EJB Extension Editor
  - extensions (ibm-ejb-jar-ext.xmi)
  - bindings (ibm-ejb-bnd-ext.xmi)
- Enterprise Application Editor
  - EAR deployment descriptor (application.xml)
- EJB RDB Mapping Editor

The J2EE View



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Data Tooling

- Relational Schema Center
  - Provides views geared for DBAs to
    - Create Databases
    - Create Tables/Views/Indexes/Keys
    - Generate DDL
  - Online and off-line 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
- Built-in Data Perspective provides the useful views for the DBA

Data Perspective

- Data Perspective contains
  - DB Explorer
    - View existing database entities on database server
    - Read only view
  - Data view
    - writable local view of database entities
    - Copy of description of existing entities
    - Description of new entities

Data Perspective

- Data Perspective contains
  - DB Explorer
    - View existing database entities on database server
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    - Copy of description of existing entities
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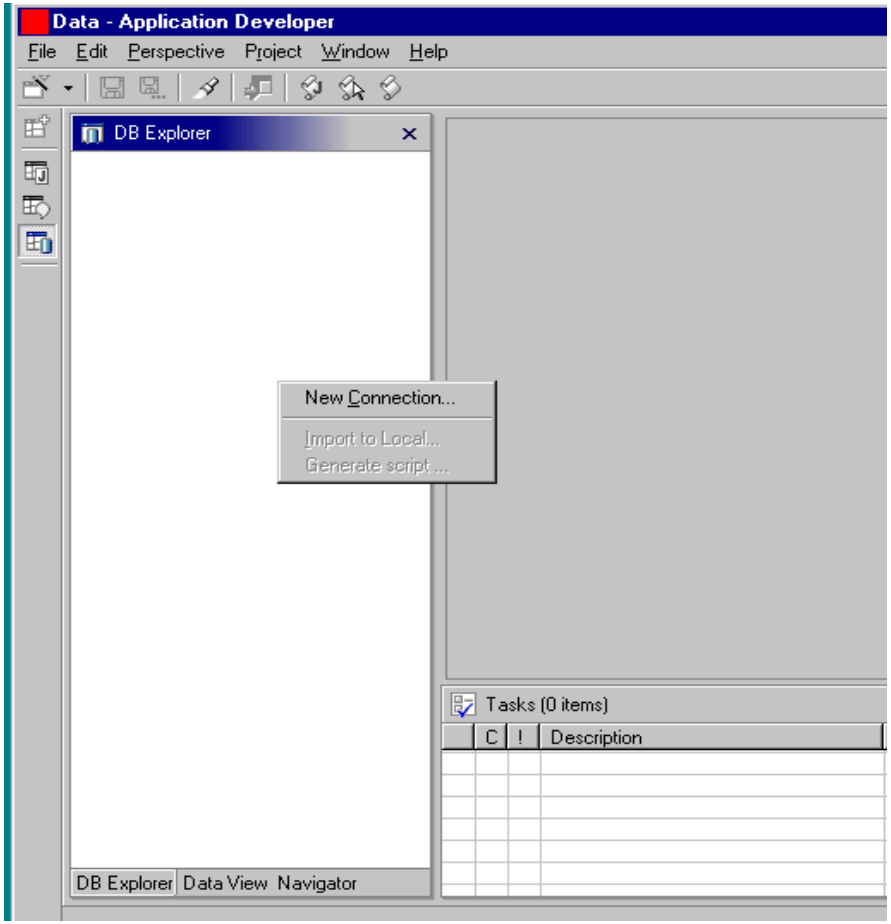
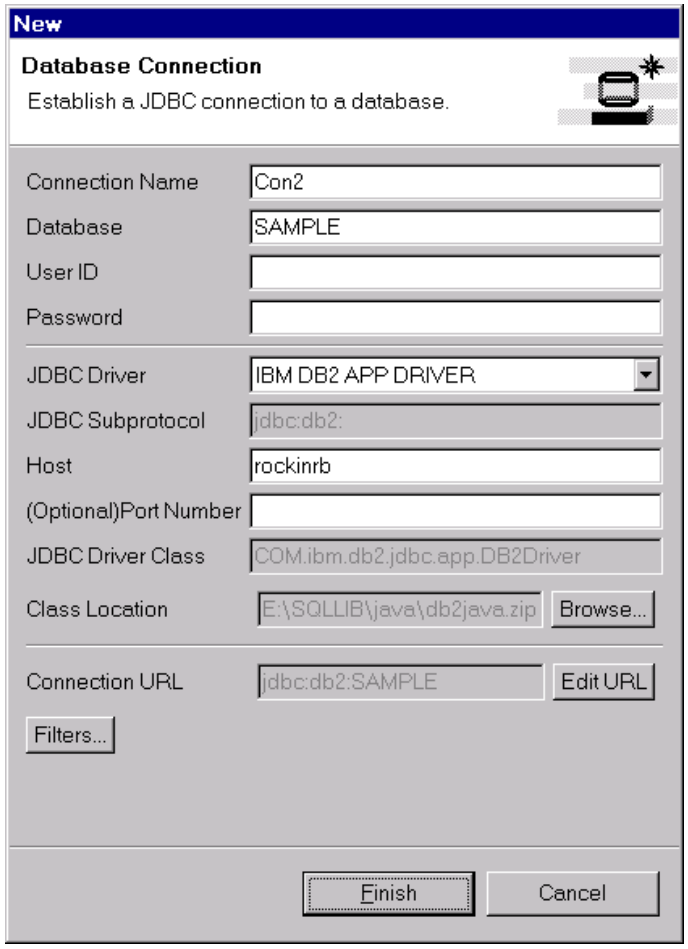
New Database Connection





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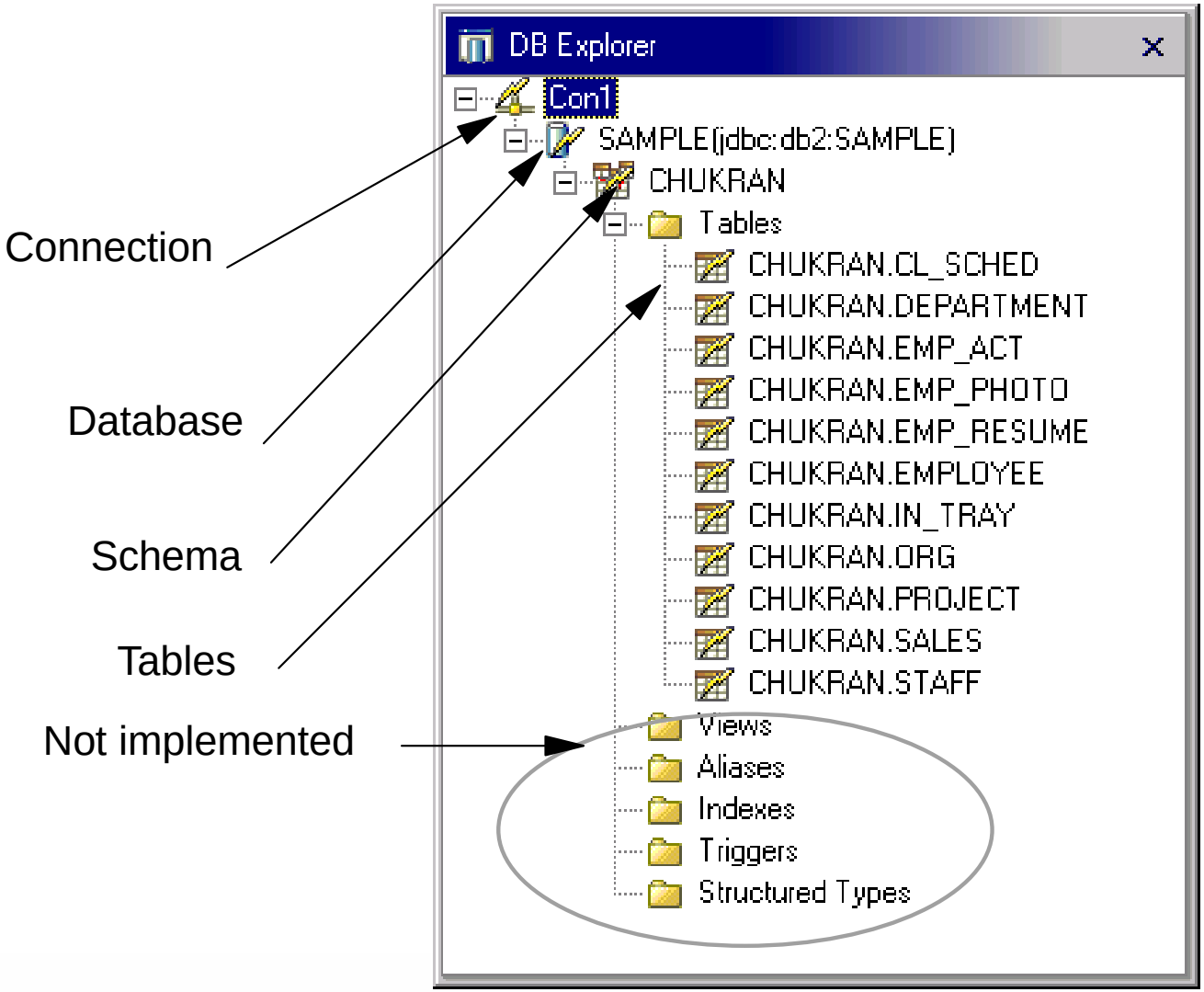
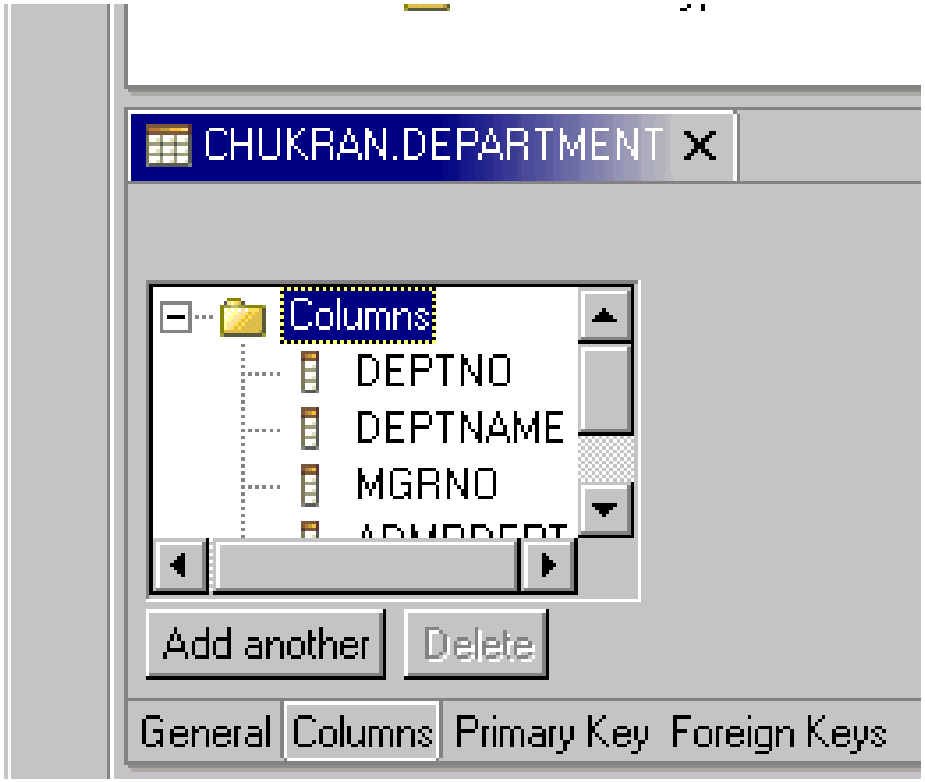
DB Explorer

- DB Explorer after opening new connection



Schema Editor

- Double-click in navigator edits table
  - Add columns
  - Specify keys



XML Tooling

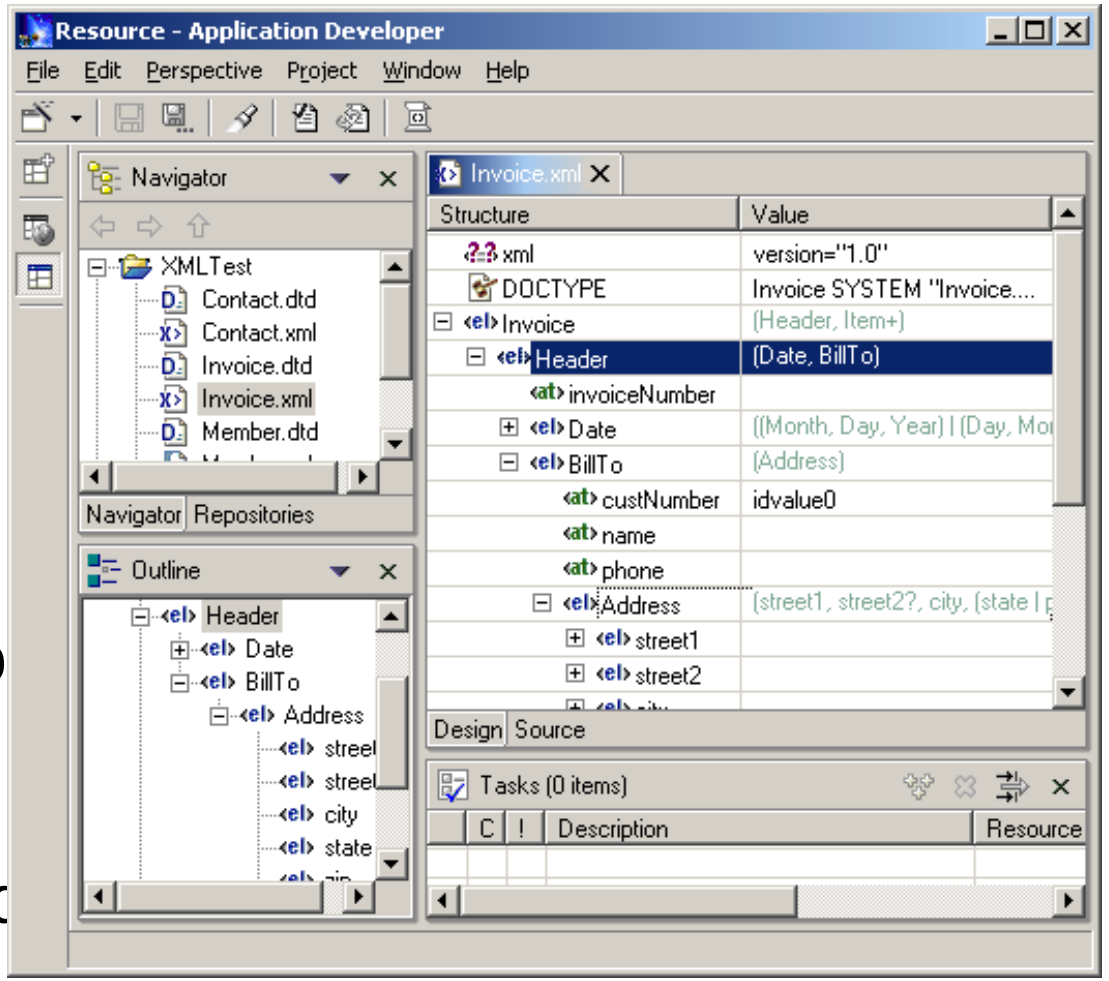
- XML Tooling provides integrated tools/perspectives to create XML based components:
  - DTD Editor
    - Visual tooling (Design/Source) for working with DTDs
    - Create DTDs from existing documents
    - Generate an XML Schema from a DTD
    - Generate JavaBean(s) for creating/manipulating XML documents
    - 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 *(continued)*

- 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 to/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

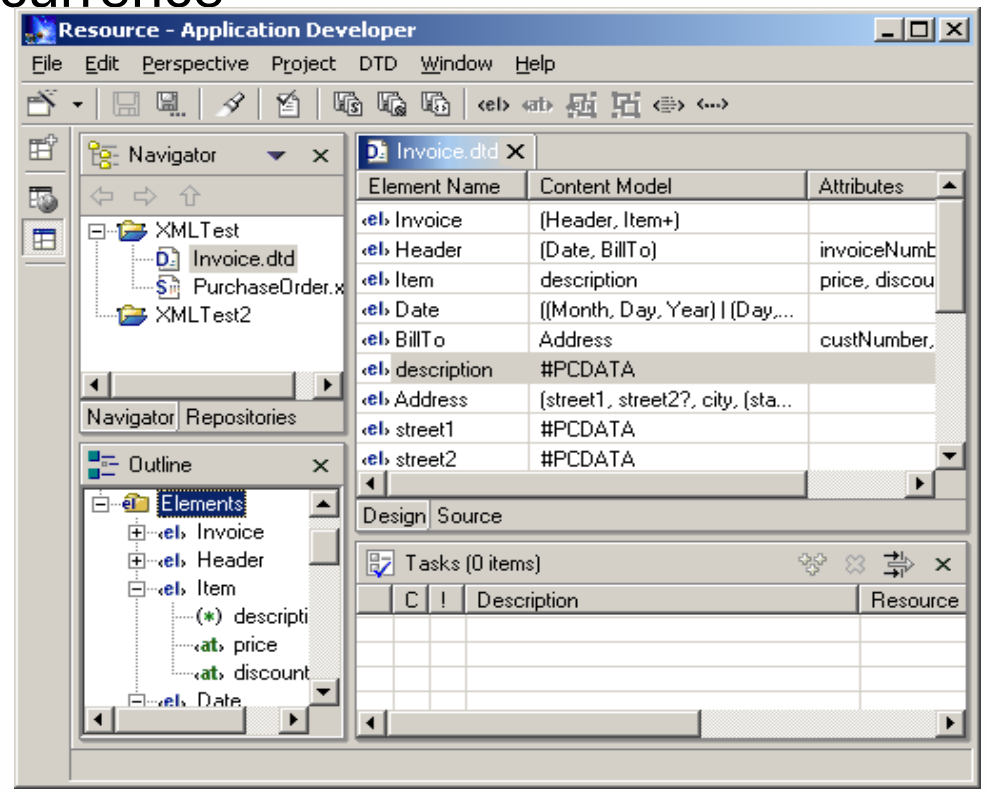
XML Editor

- Create XML
  - New file
  - From DTD file
  - From XSD file
- Validation Option
- Smart double-click
- Content Assist
  - Combo-box choices fo enumerator attribute type
  - Element content based on sequence/choice relationships



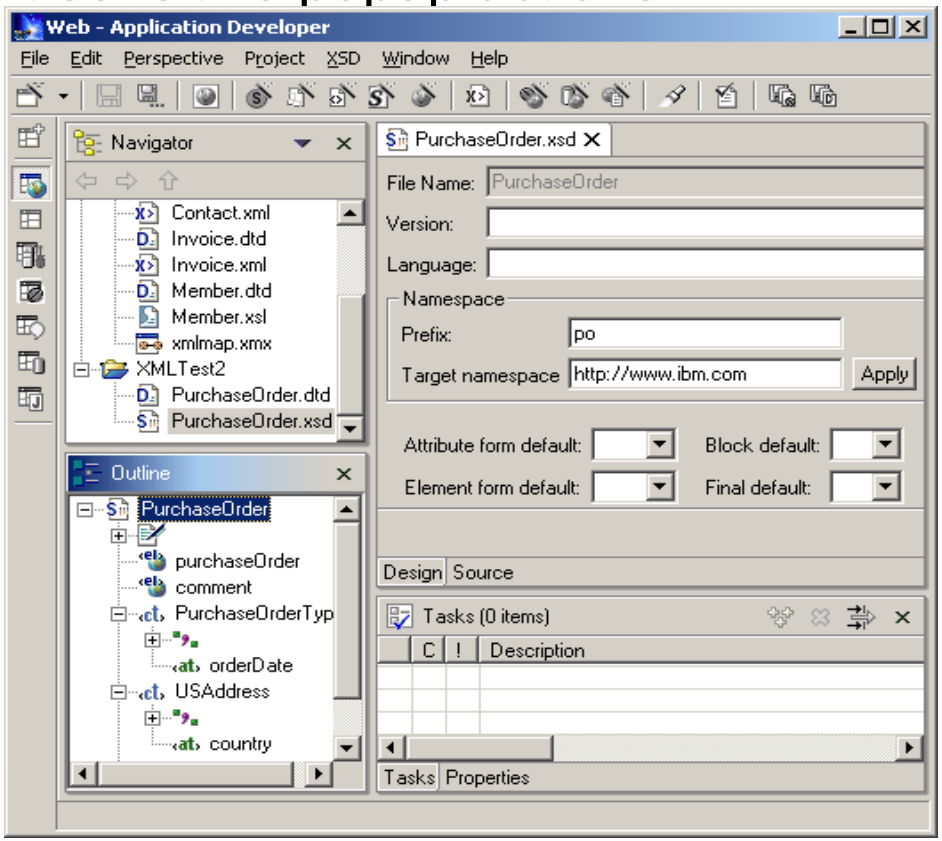
DTD Editor

- Create DTD
  - Create New DTD
  - Create from Multiple XML files
- Validation
- Define elements, attributes, entities, notations
- Define content model, occurrence
- Reusable Entities
  - External files
  - Internal model
  - Within another entity



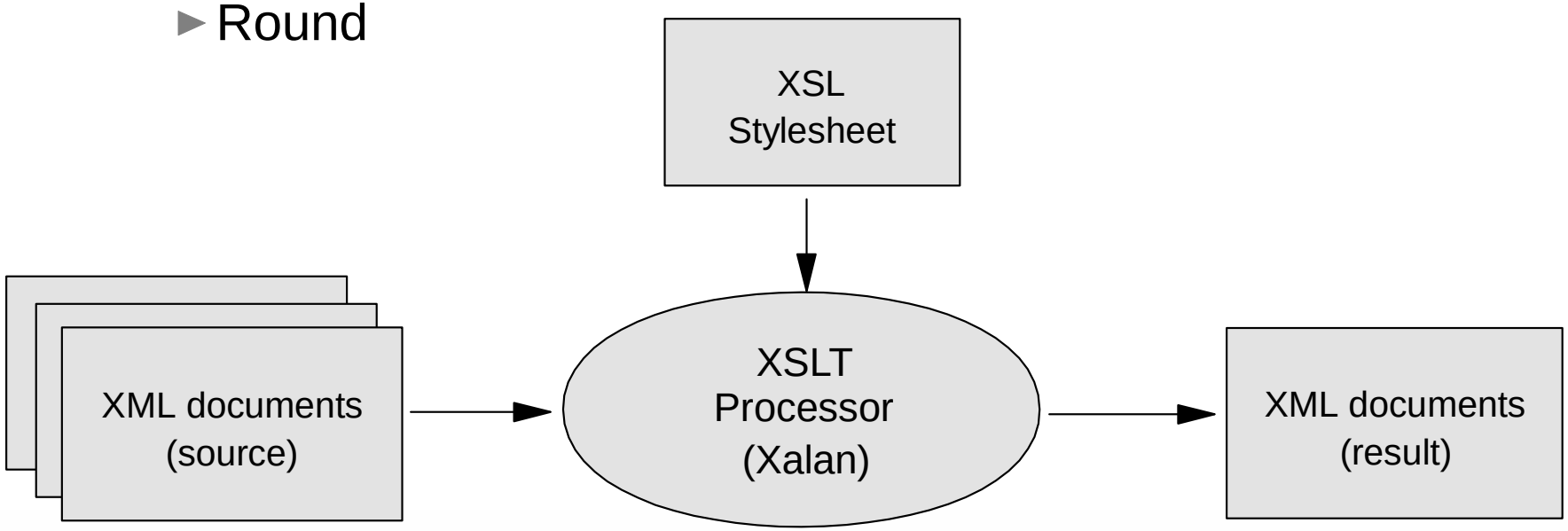
XSD Editor

- Create, Import XSD
- Validation
- Generate DTD, DDL file from XSD
- Define complex type, simple type, element, attribute, attribute group, group etc.
- Context sensitive popup actions



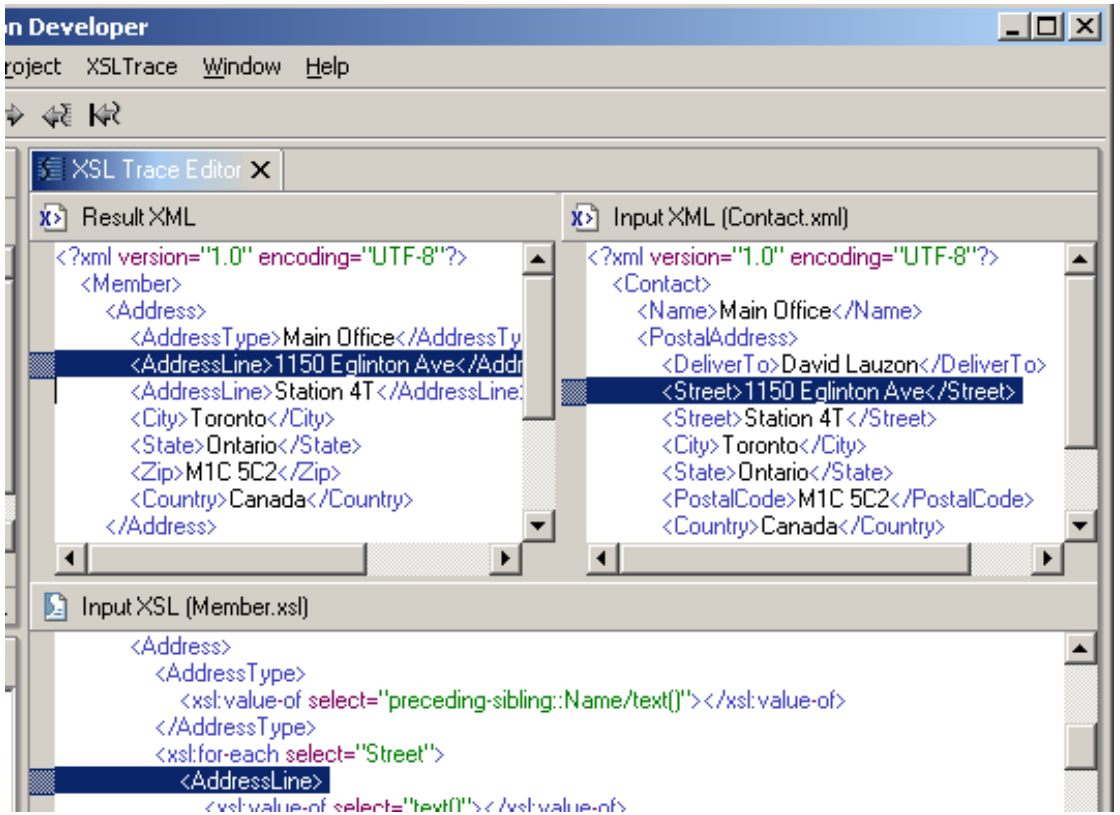
XML to XML Mapping Editor

- Convert XML data from one definition type to another
- Visually defines the mapping between source and target
- Generates XSL that represents the transformation
- Hides the complexity of creating XSL
- Allows user to define functions for converting between source and target
  - Substring
  - String-length
  - Round



XSL Trace

- Apply XSL to XML document
  - Step Forward
  - Step Back
  - Watch flow of XSL
- Type of Output
  - XML document result
  - HTML output result



Team Development

- Workbench integration occurs through a pluggable adapter based configuration:
  - Open framework allows any SCM provider to add adapter to integrate their SCM into the Workbench
  - CVS Plugin
  - WebDAV enabled adapter planned over time
- Built-in Team Perspective

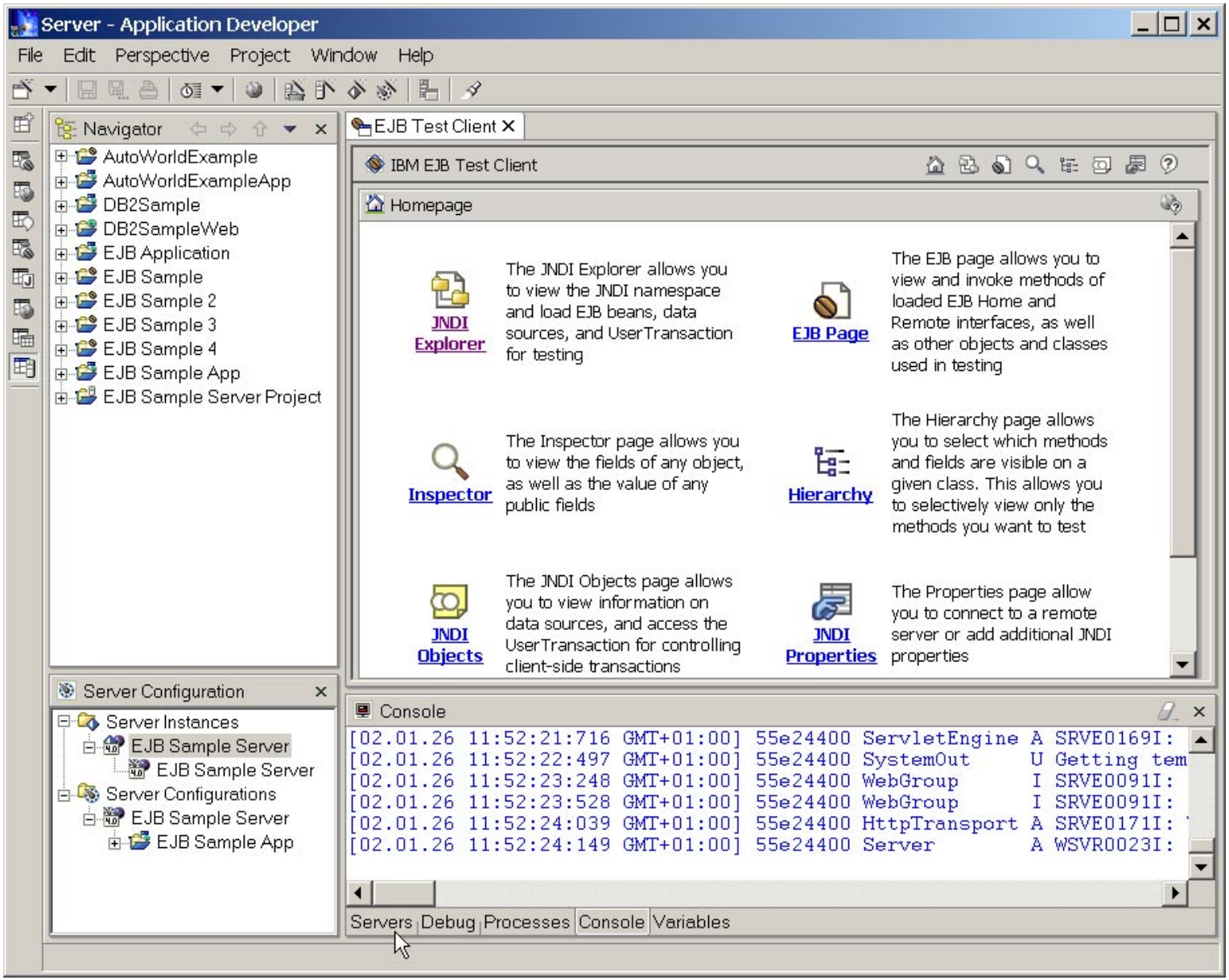
Web Services Tooling

- Easily 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
    - Web Service to WebSphere or TomCat for testing
  - Test
    - Built-in test client allows for immediate testing of local/remote Web Services
  - Publish
    - Web Services to UDDI registry

Testing: Server Perspective

- Repackaged WAS AE Single Server included (Runs EJBs, JSPs, Servlets, and HTML files)
- Supports Web projects, EJB projects, EAR project
- Can be Unit Test, Local Unit Test, Remote Unit Test
- If Remote Unit Test, must install:
  - WebSphere Application Server
  - IBM Remote Agent Controller
- Is the default server type for all projects
- When Unit Test, changes made to files are saved to disk, detected, and reread by WAS (except EJB Interface changes)

Server Perspective



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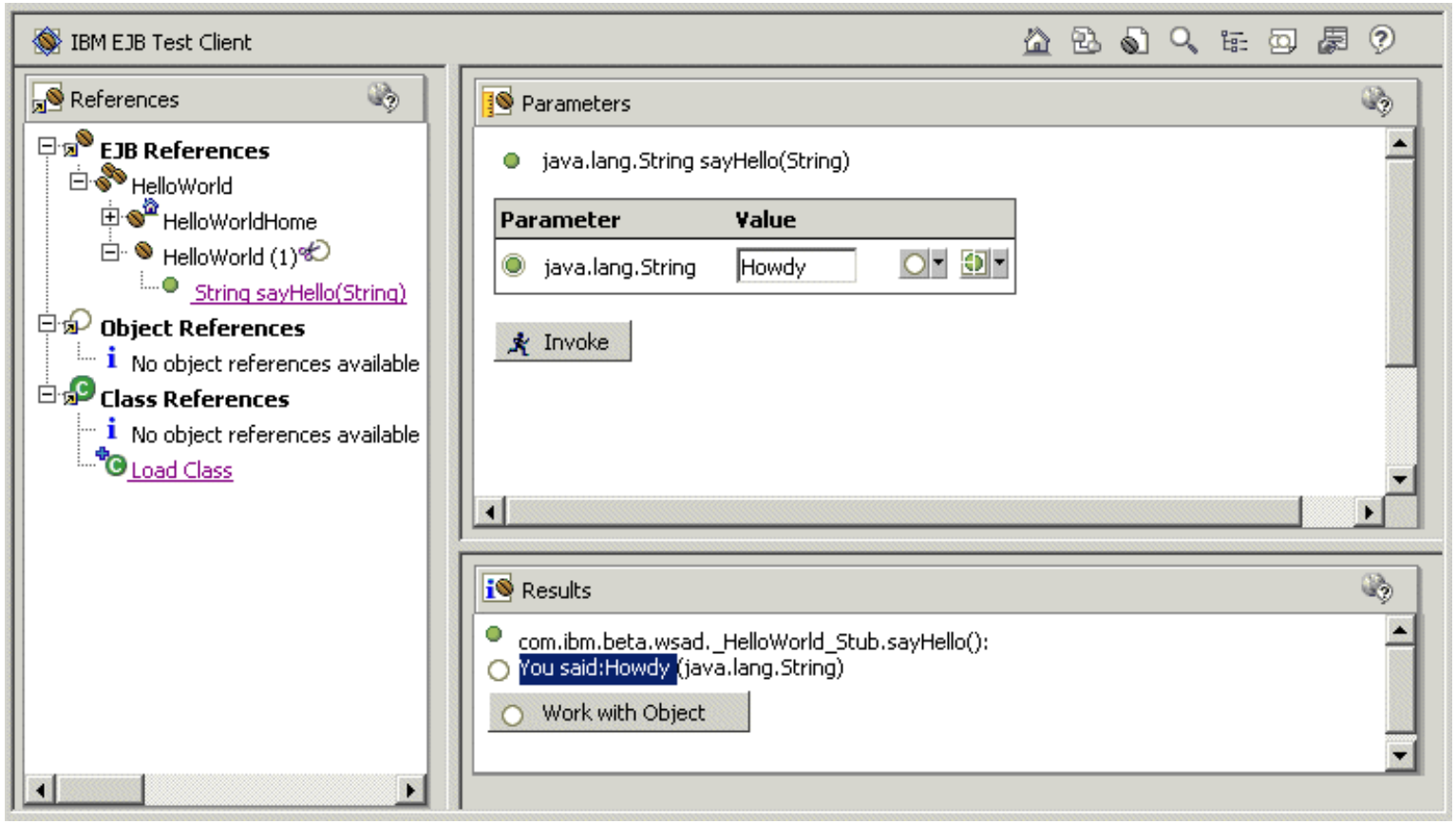
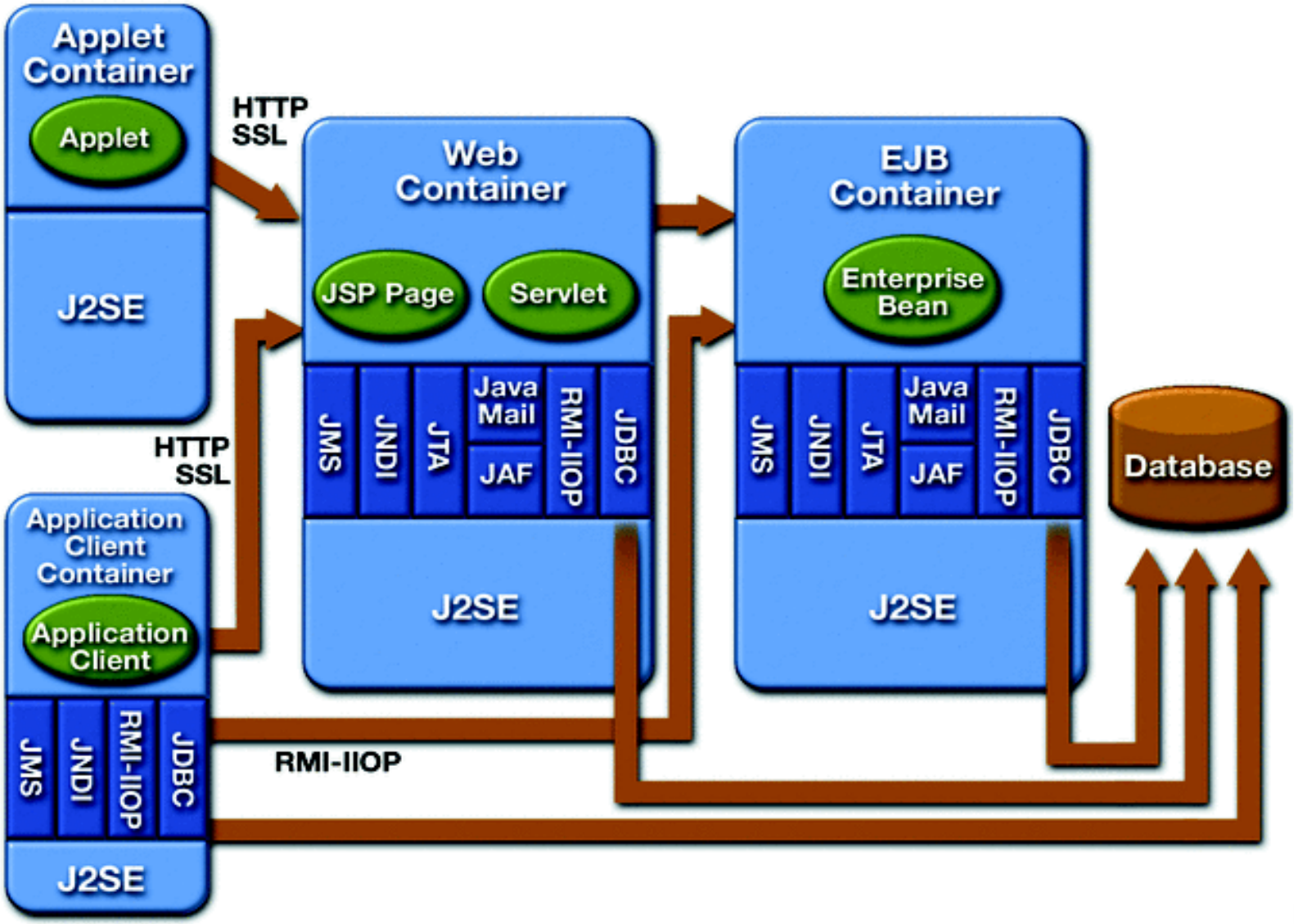
EJB Test Client



VA Java Project Migration

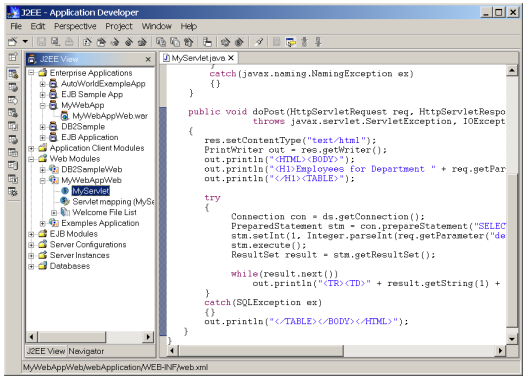
- Import Wizard will be added to the New Tooling
  - Wizard will import the VAJ Project(s) into the new tooling
- Work is being done for additional migration support
- Coexistence support for current/new tooling
  - Usage scenario documents

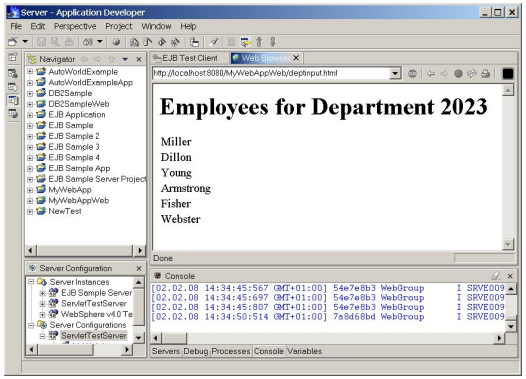
Development - J2EE Containers



Servlet Development Process

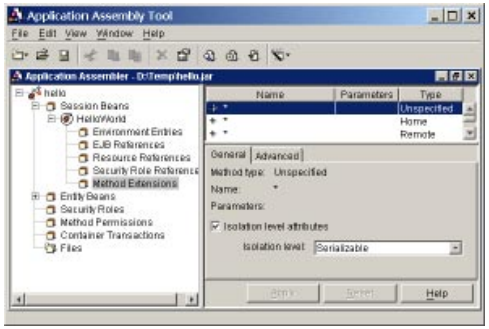
1. Create Web Application in WSAD





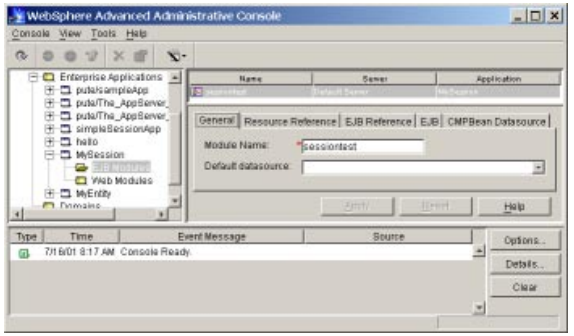
2. Test Web Application in WSAD Test Server

3. Export WAR File

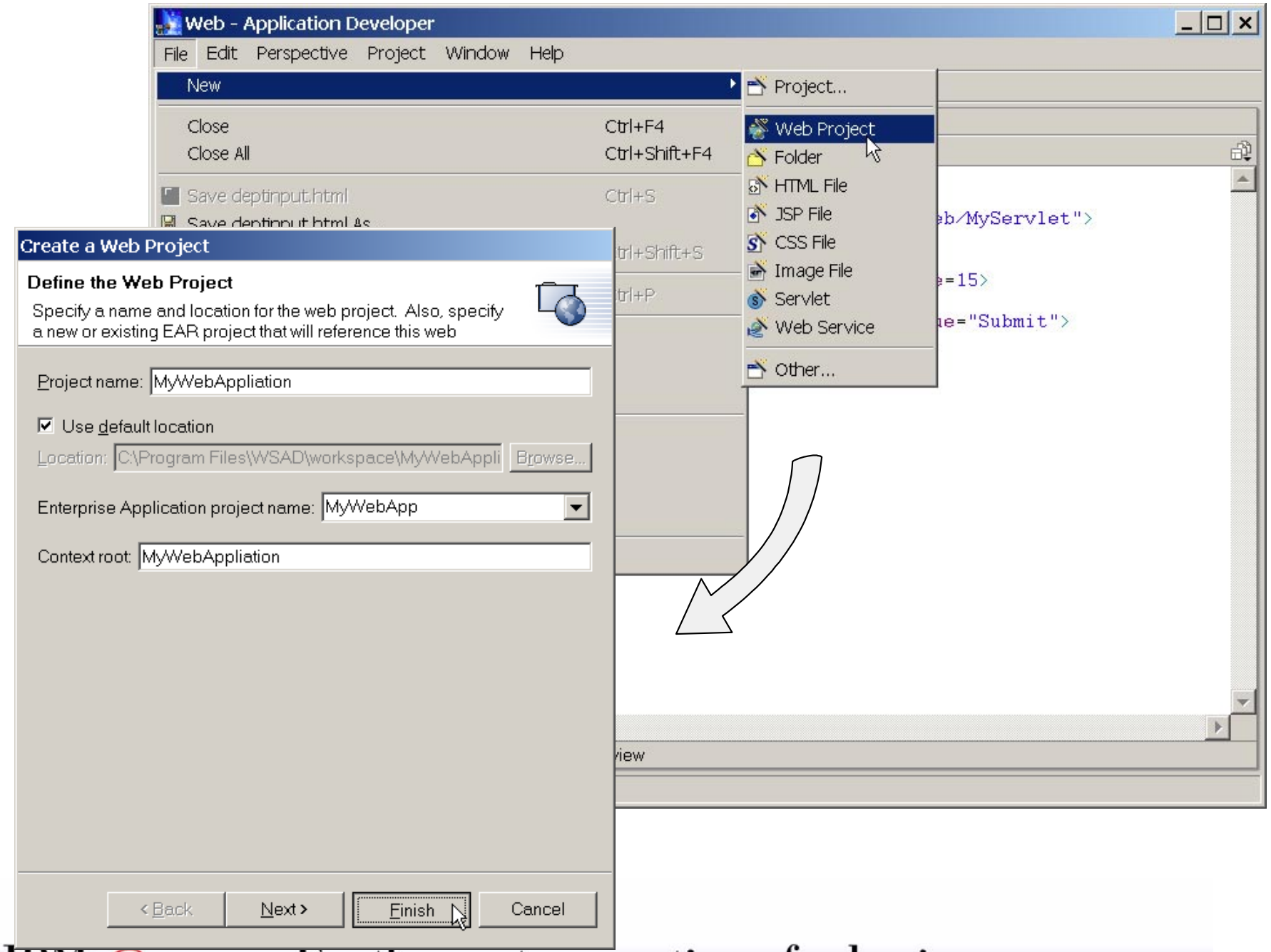


4. Deploy using Application Assembly Tool

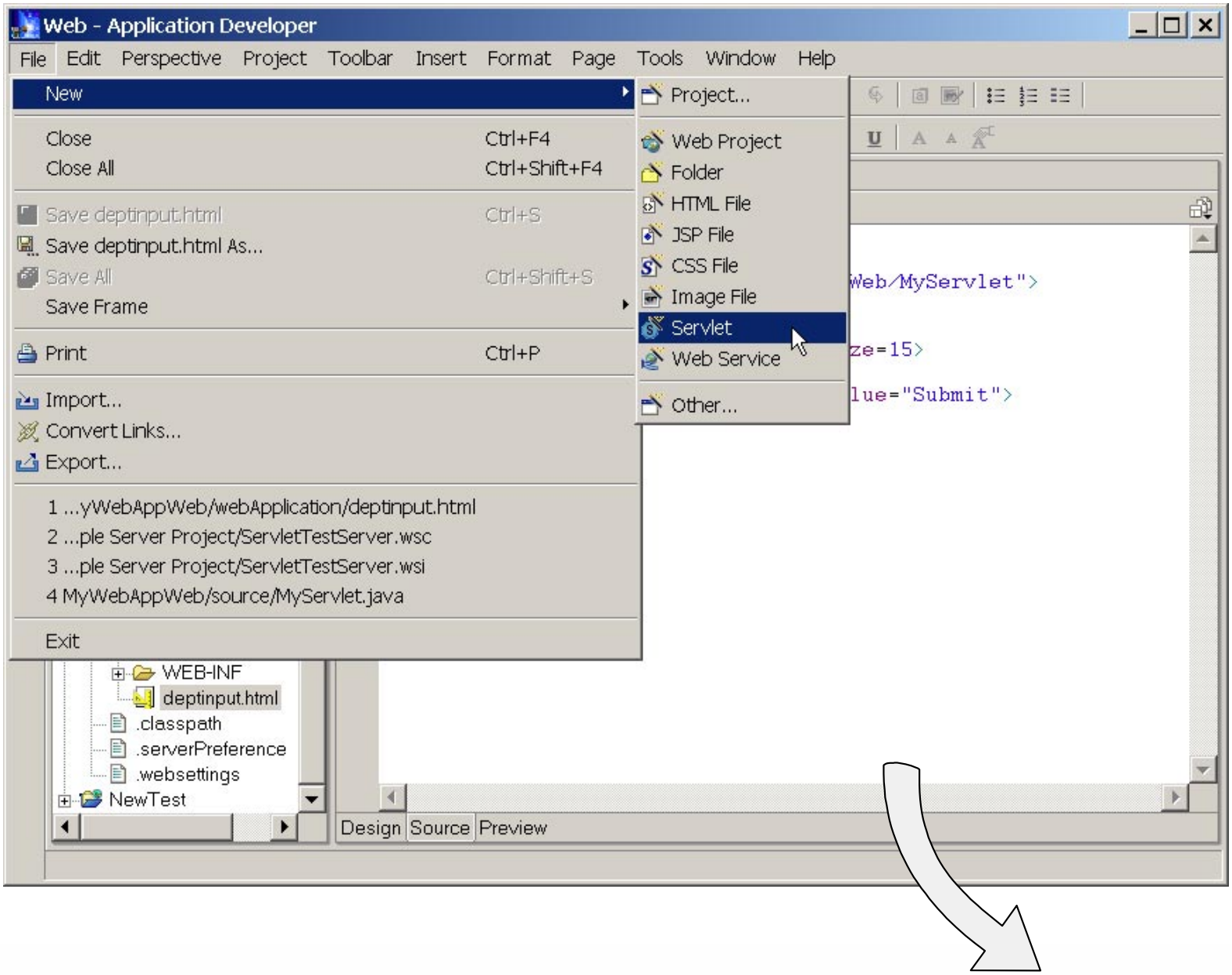
5. Install using WebSphere Admin Console



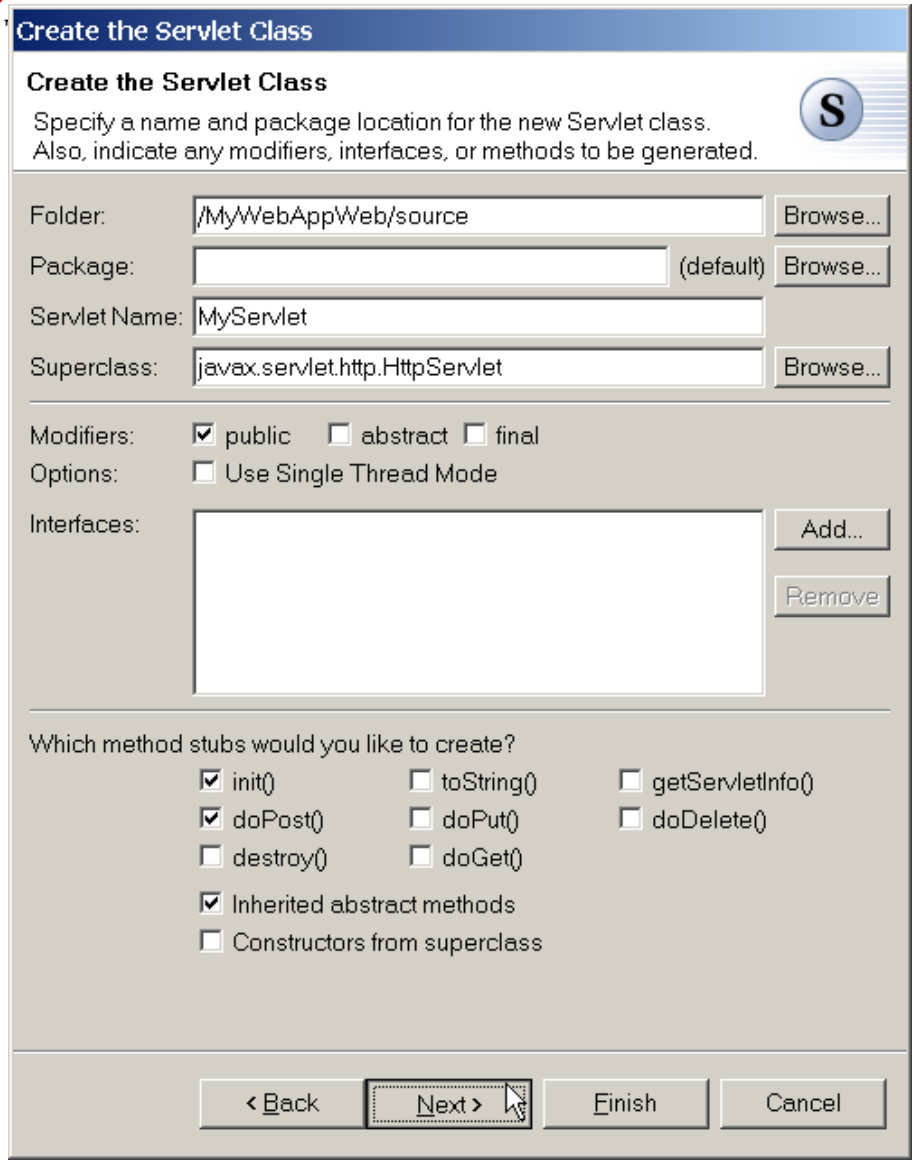
In Web Perspective: Create Web Project

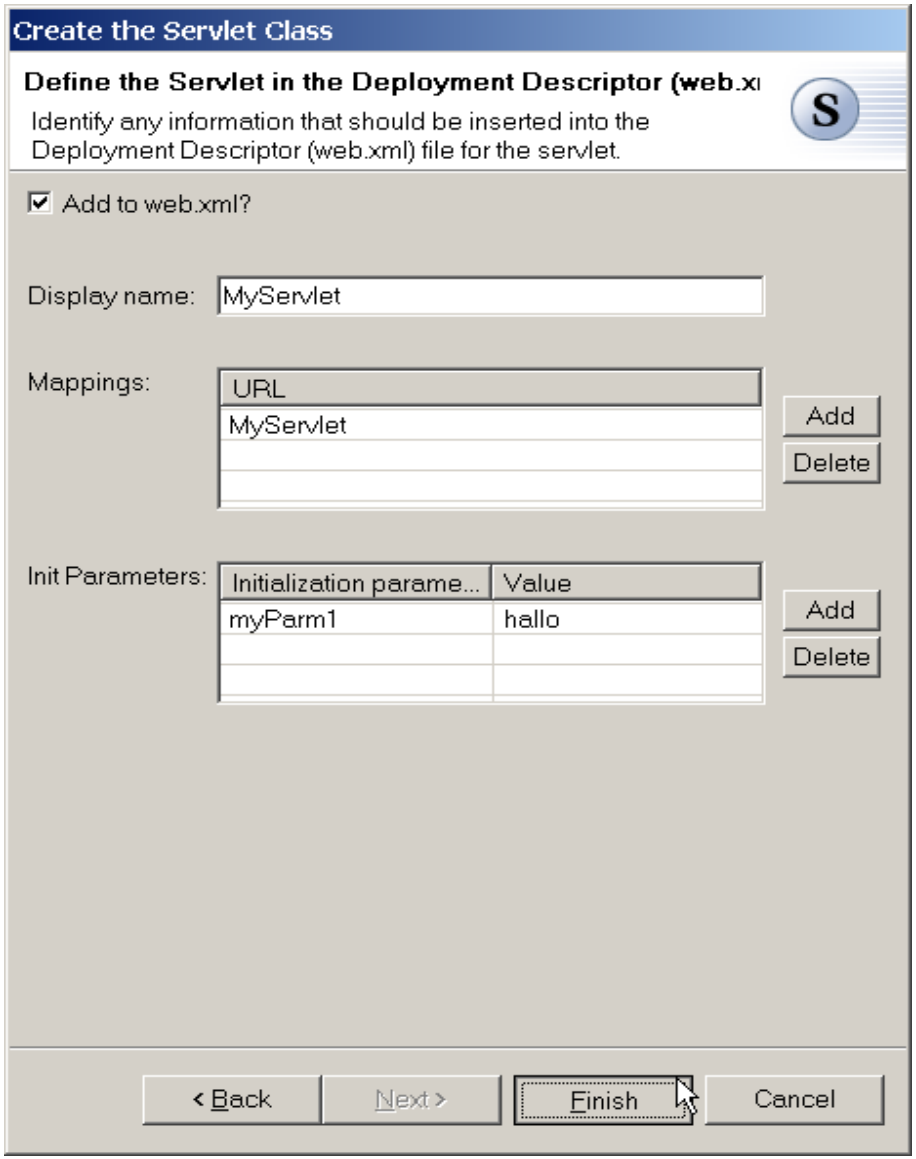


Create Servlet 1/2



Create Servlet 2/2





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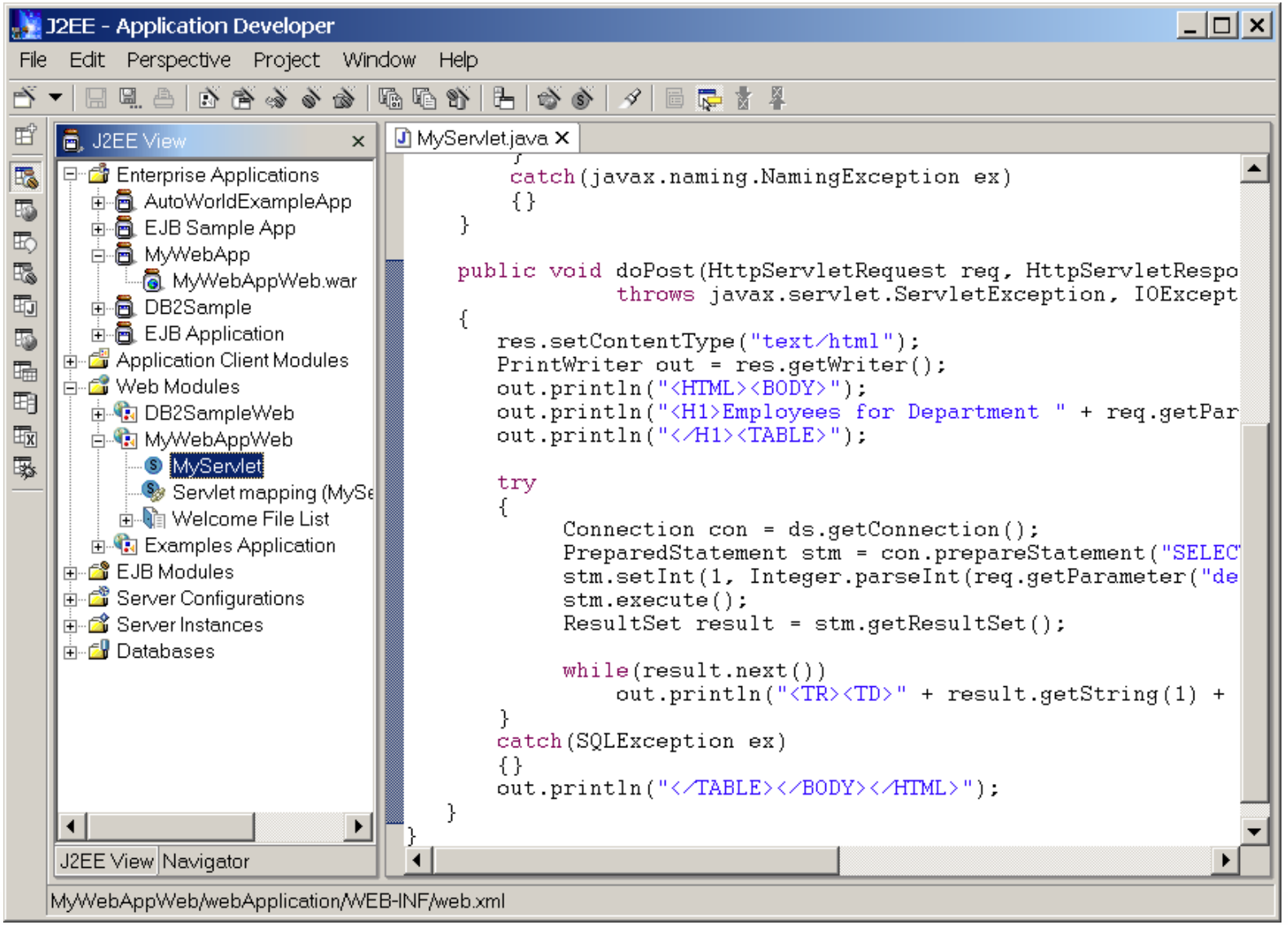
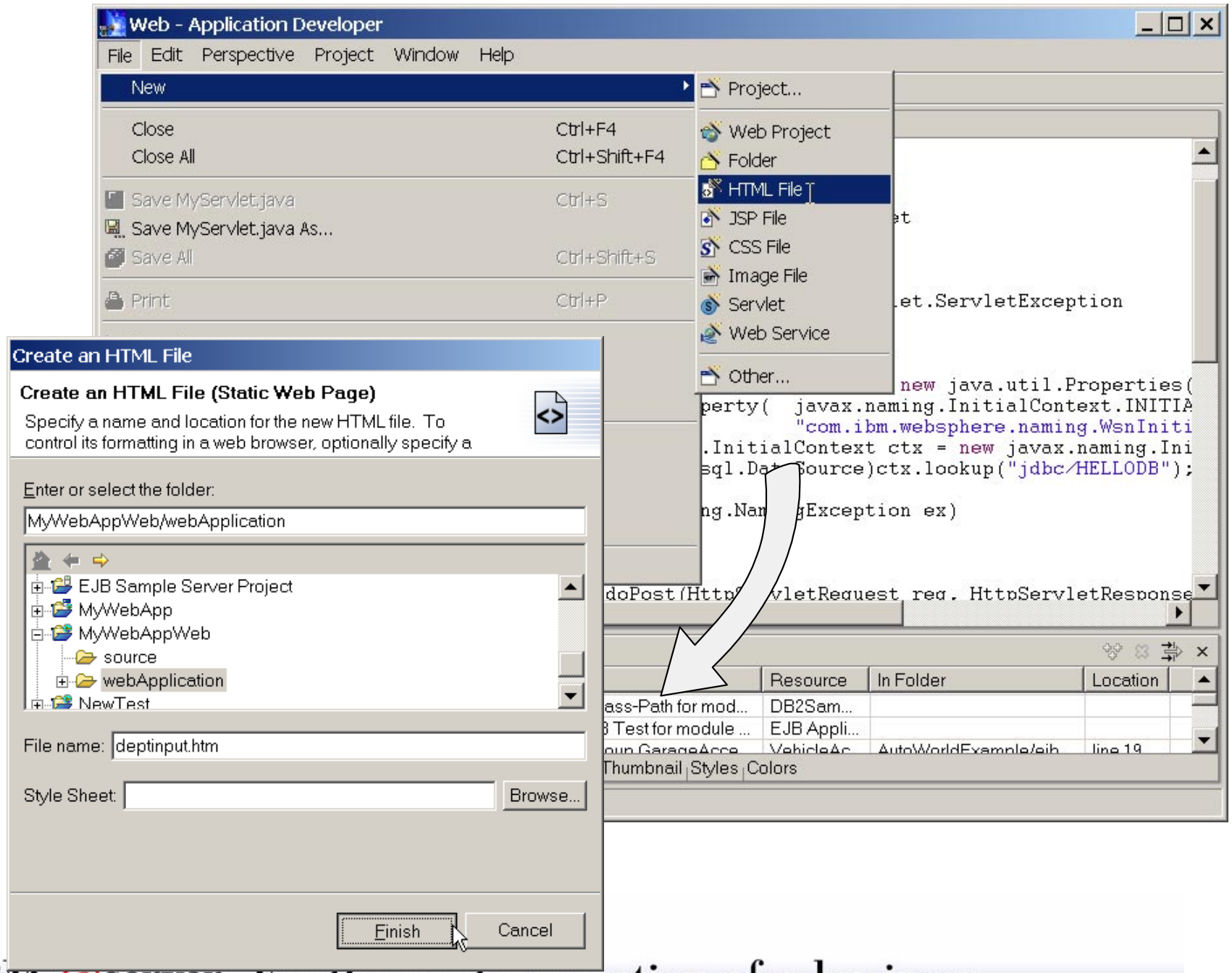
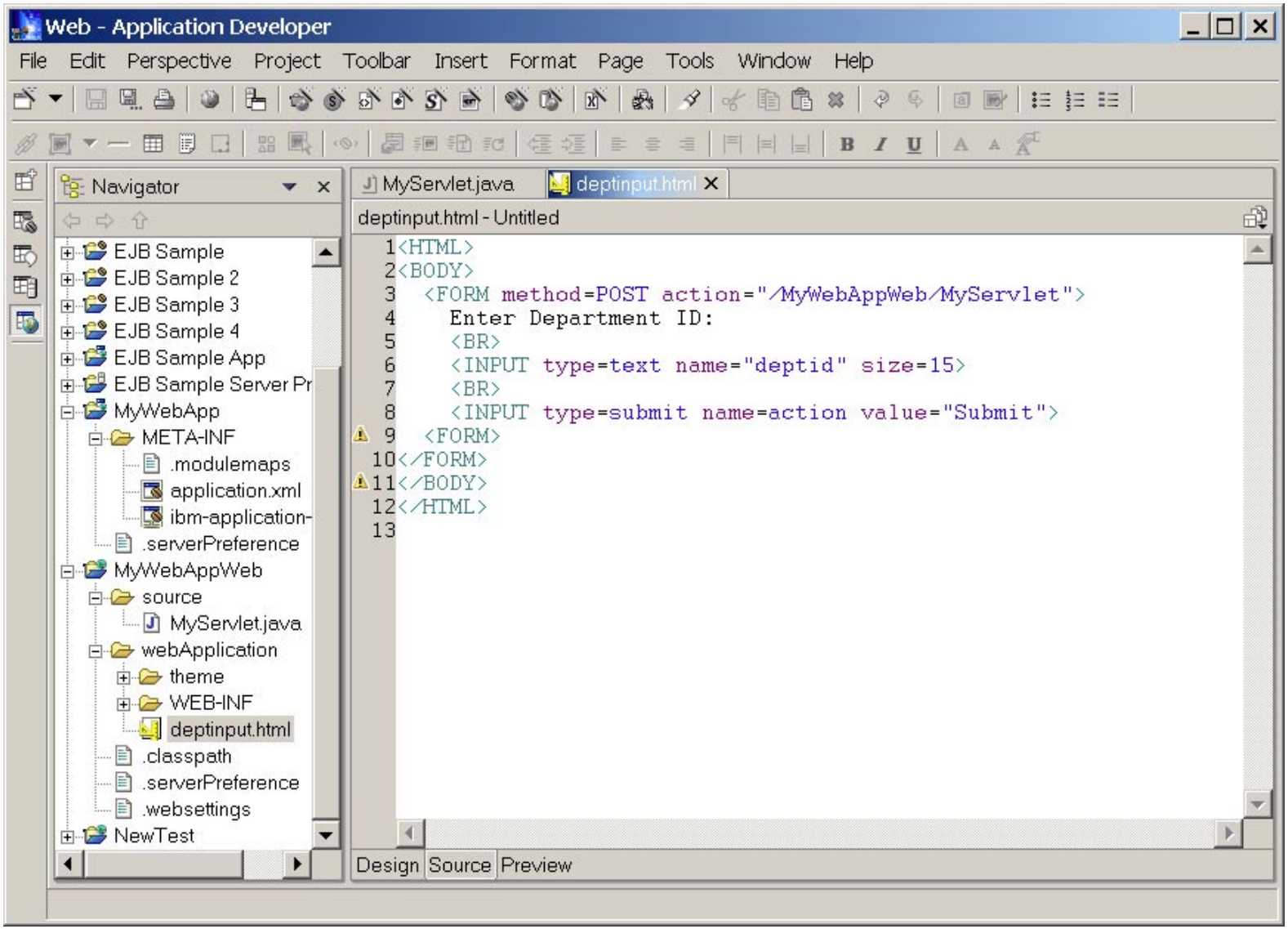
Implement Servlet Code



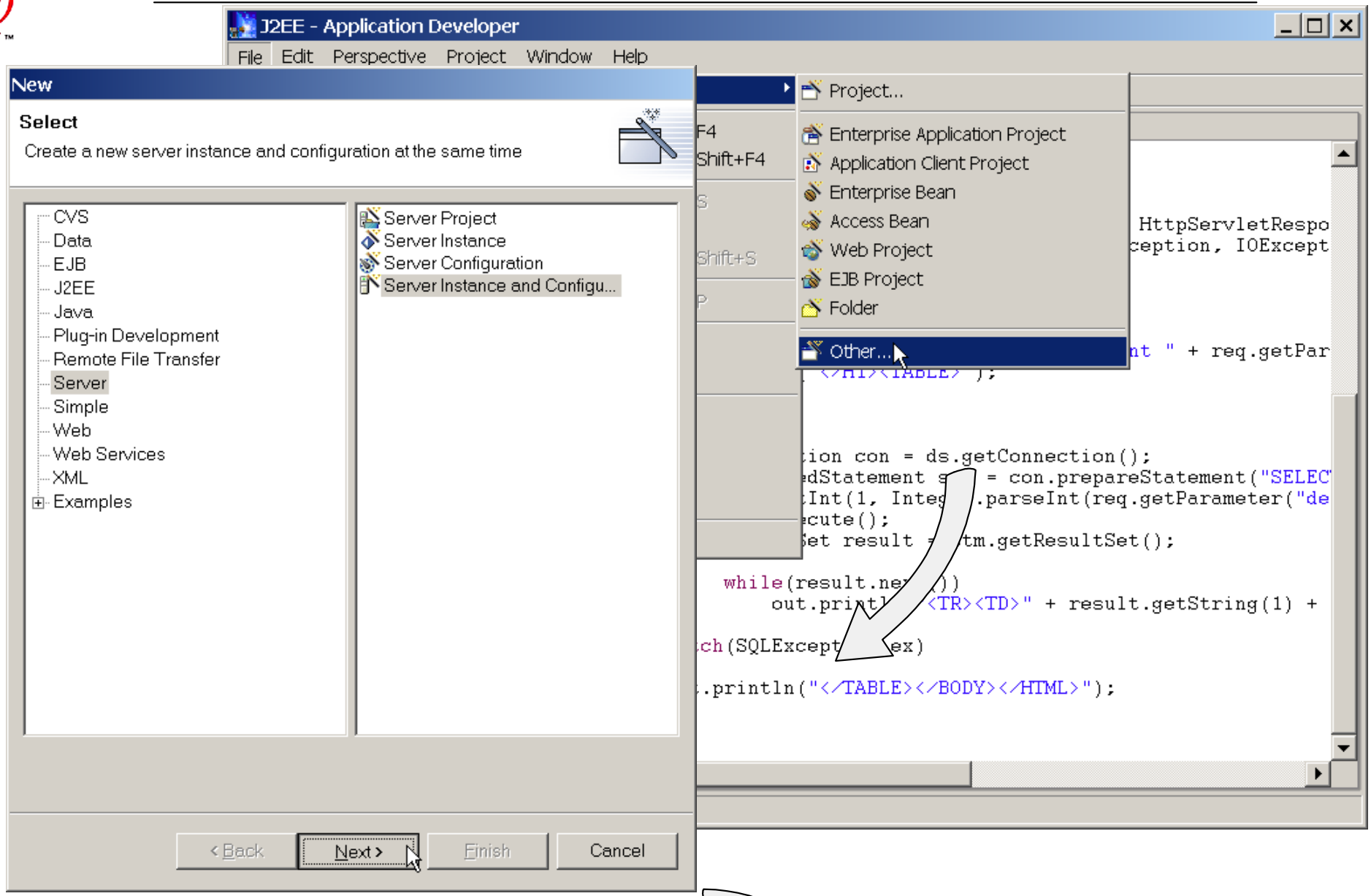
Create HTML File



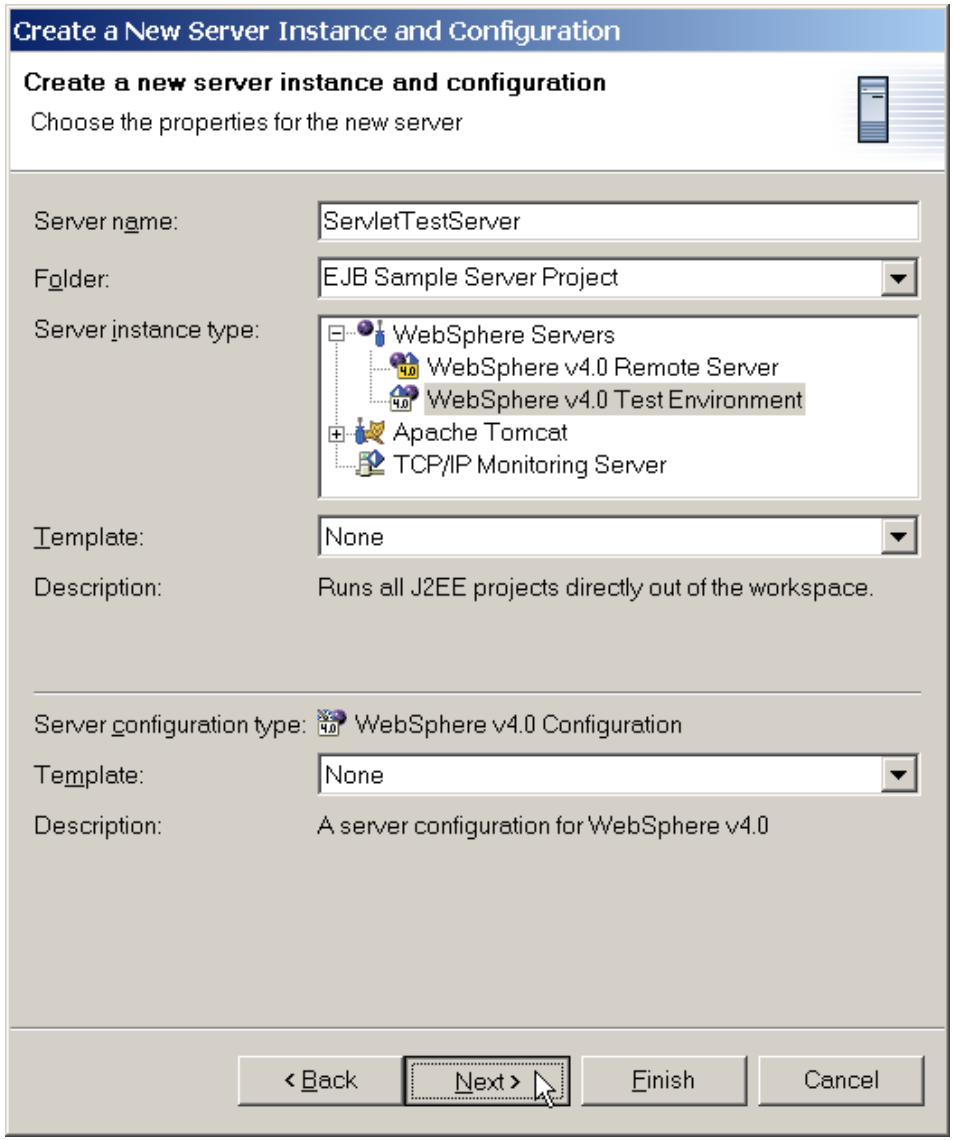
Implement HTML File

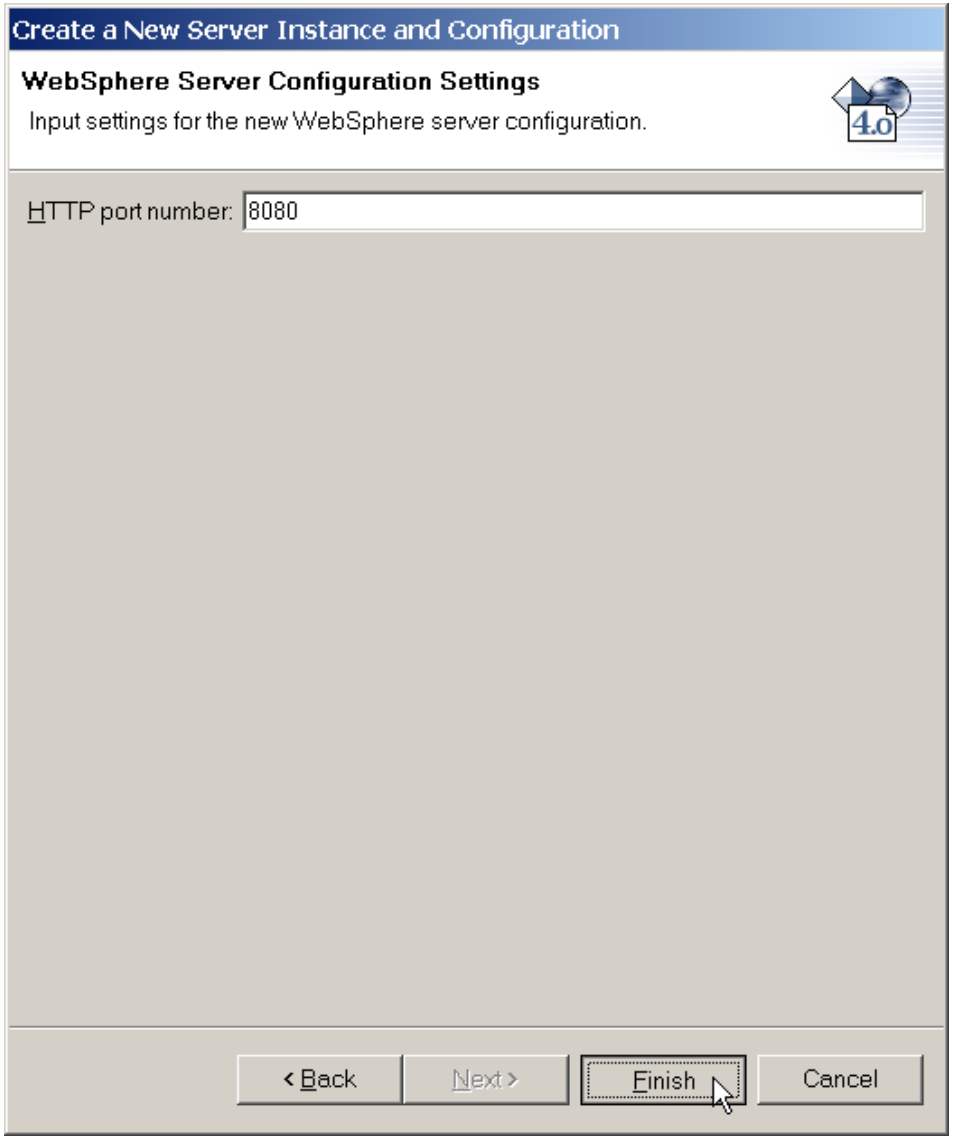


Create Test Server 1/2



Create Test Server 2/2





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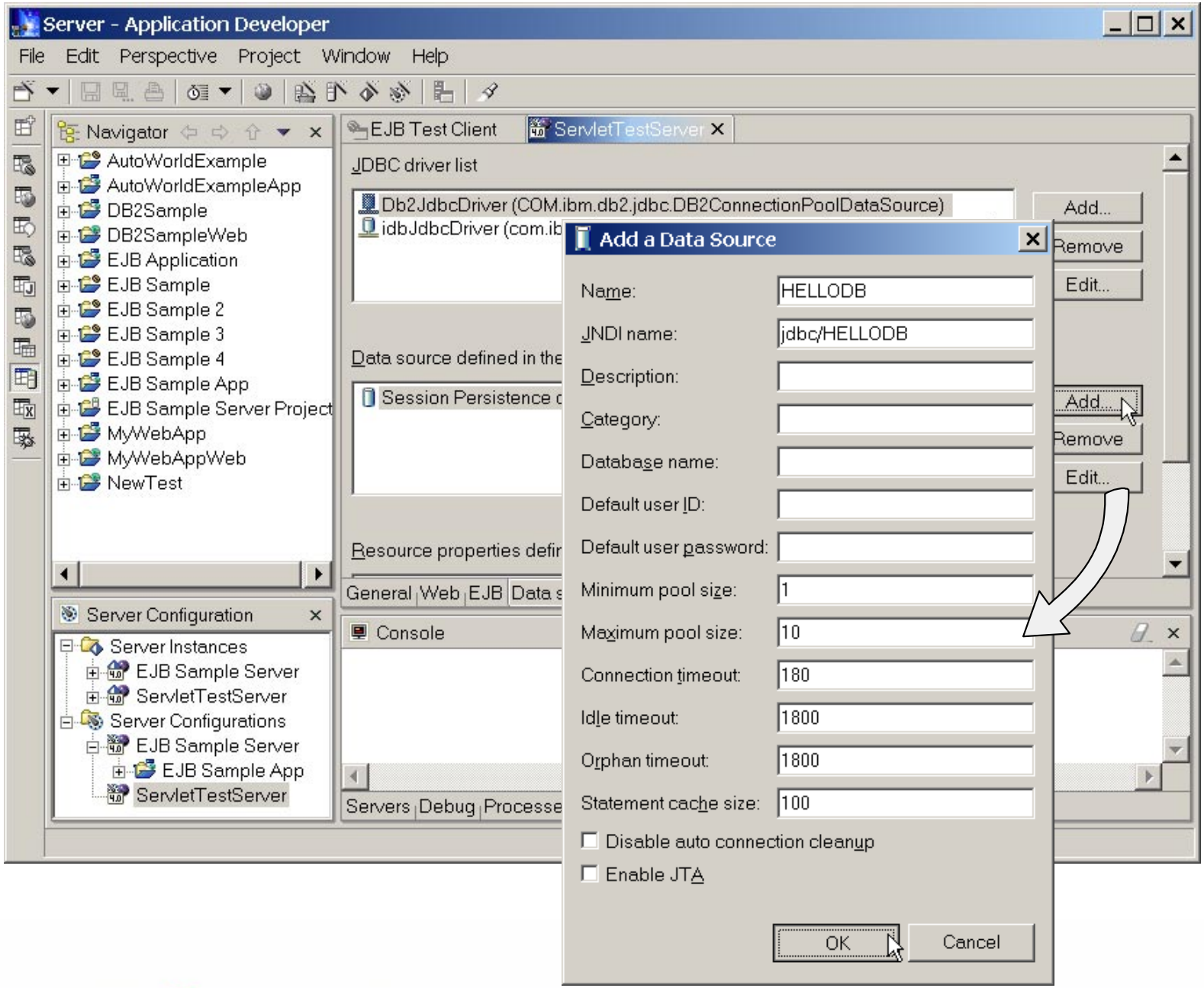
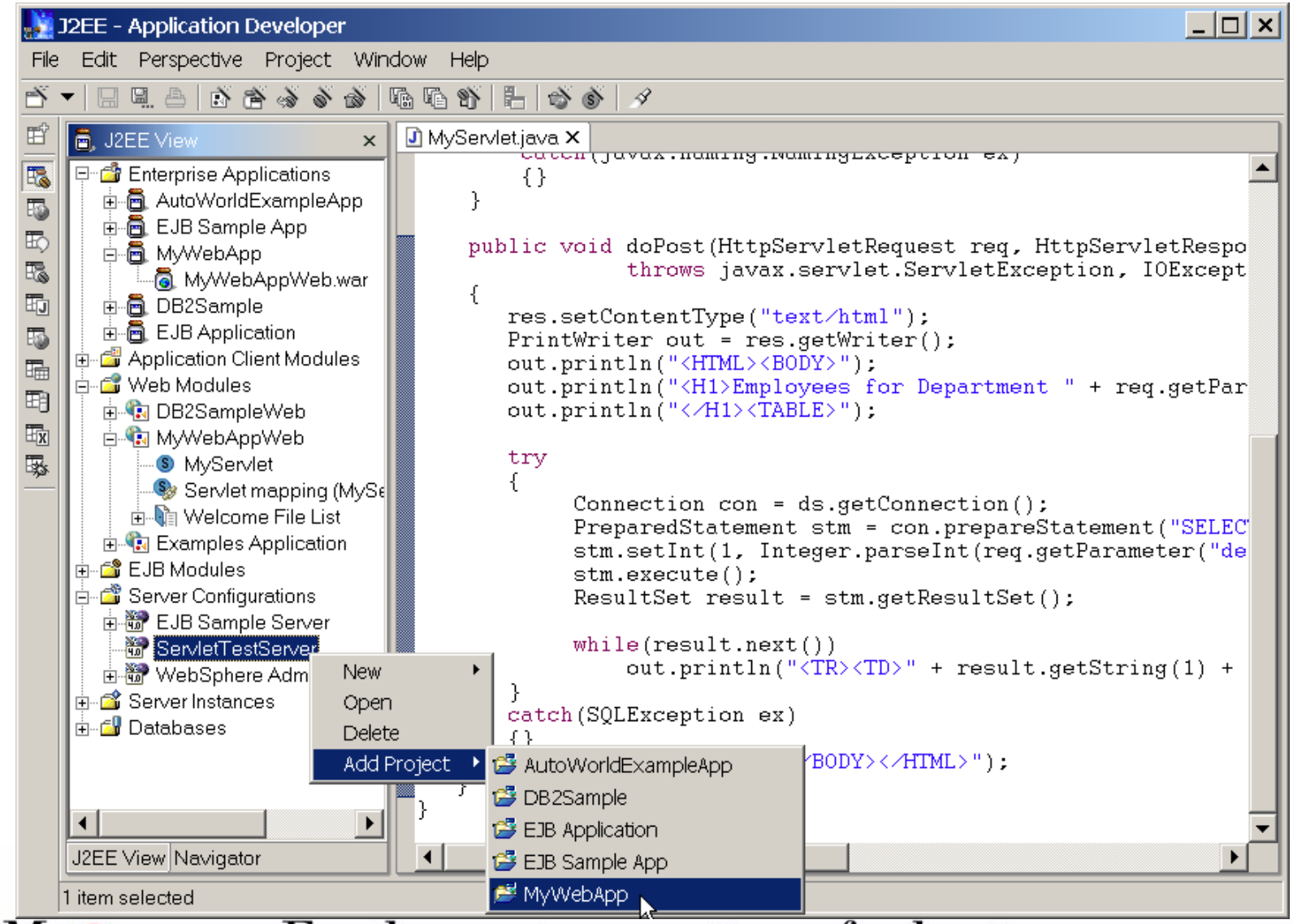
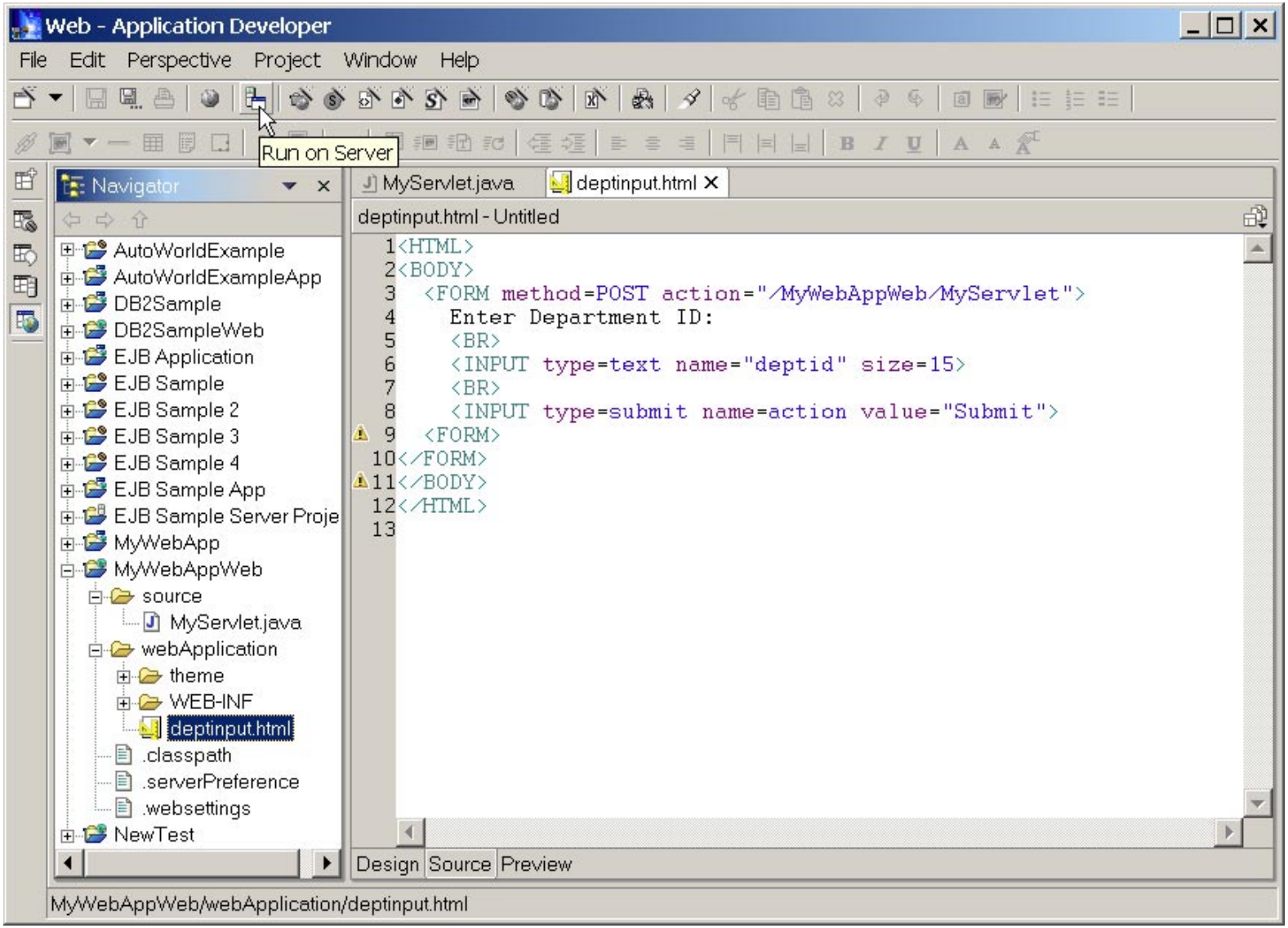
In Server Perspective: Create DataSource



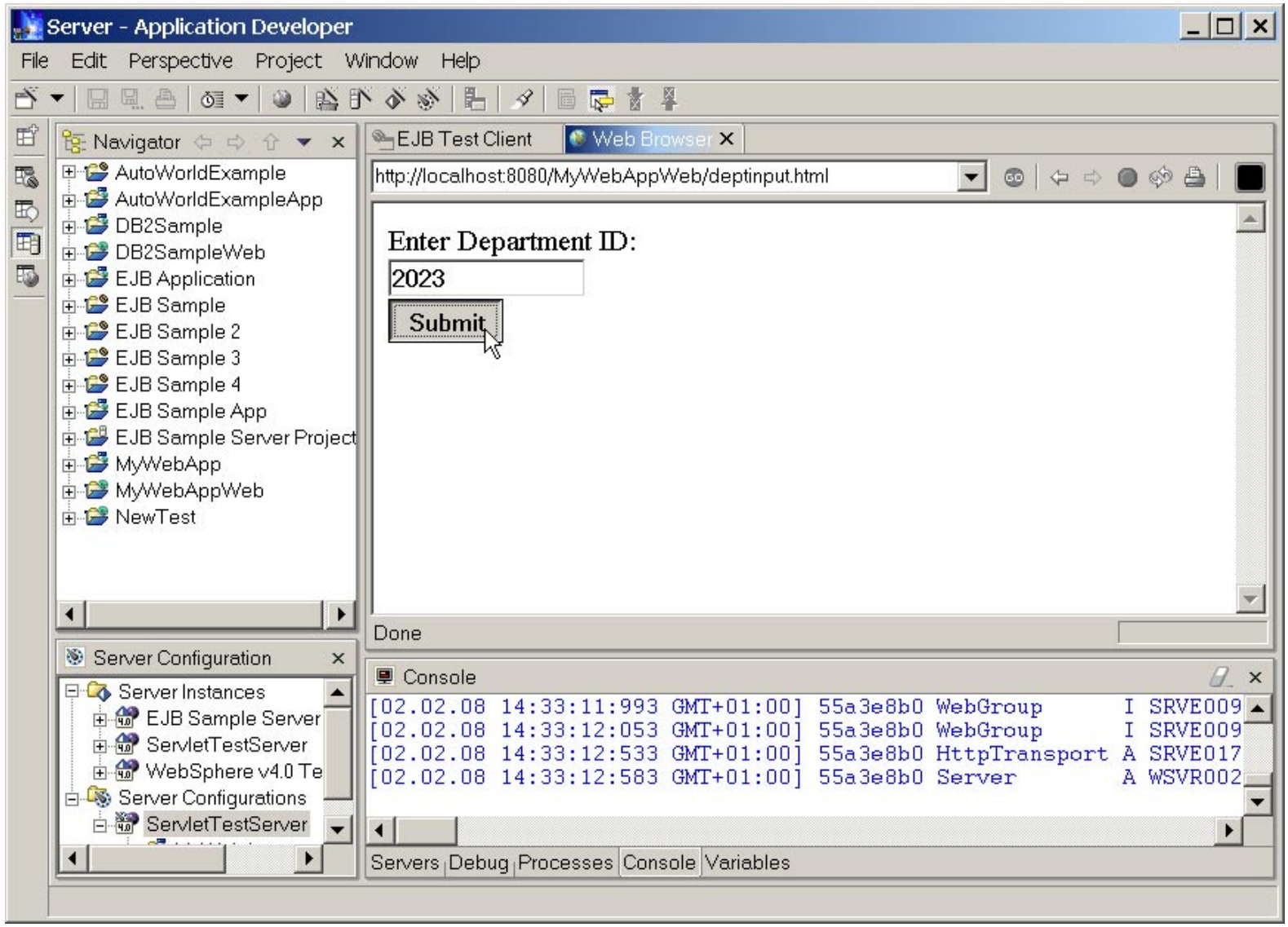
In J2EE Perspective: Add Project to Server Configuration



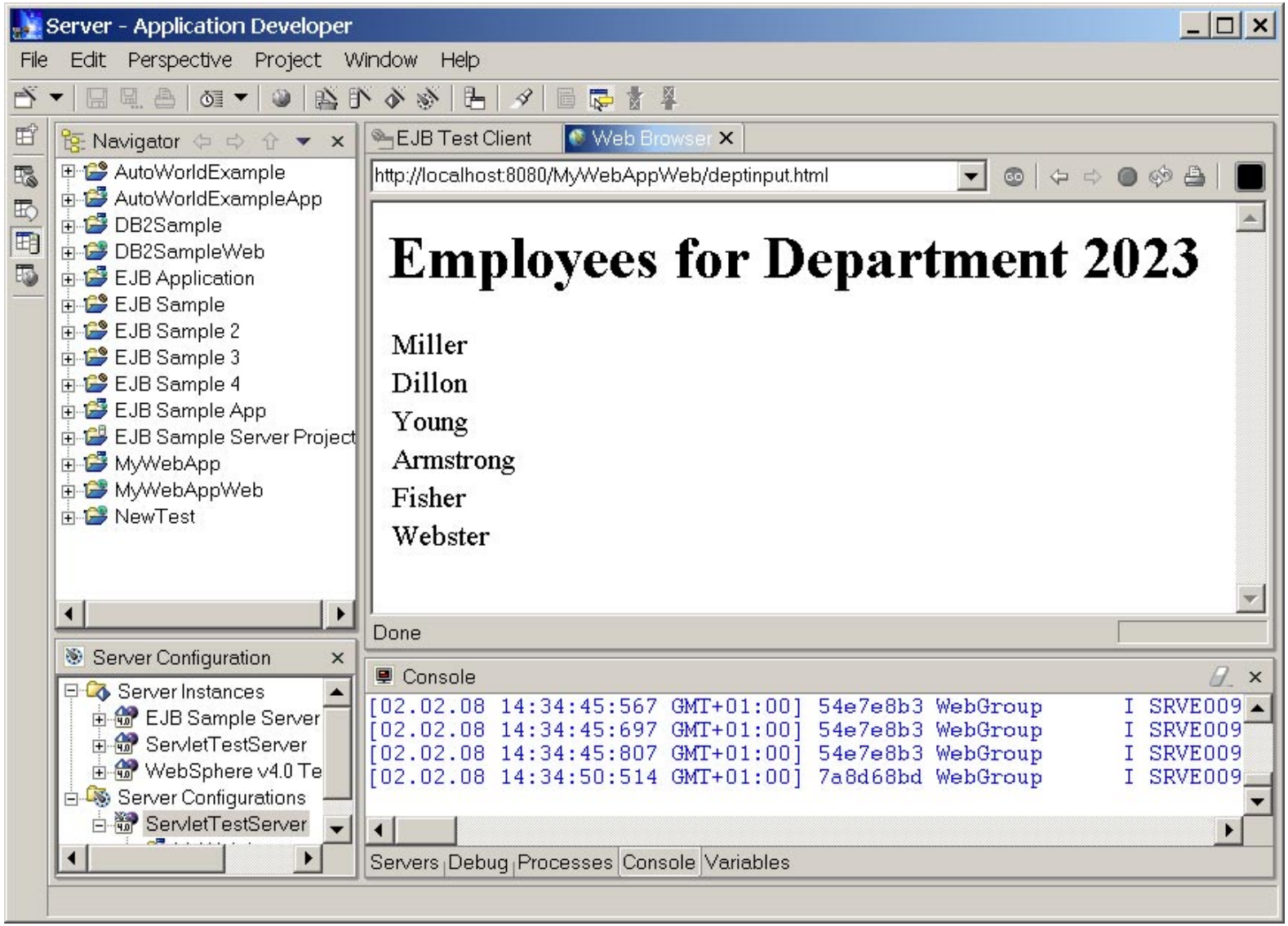
Start HTML Page in Test Server



Invoke Servlet via POST



Servlet Output



Additional Information

- VSE/ESA Home Page
  http://www.ibm.com/servers/eserver/zseries/os/vse/

- e-business for VSE/ESA customers
  http://www.ibm.com/servers/eserver/zseries/os/vse/ebus/home.html

- e-business Connectors User's Guide SC33-6719

Redbooks:

- e-business Connectivity for VSE/ESA SG24-5950

- e-business Solutions for VSE/ESA SG24-5662

- Servlet and JSP Programming SG24-5755

We appreciate your comments at :
VSEESA@de.ibm.com