Judd Solutions
Development, Mentoring and Training

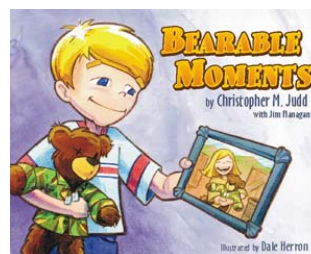## 706 – Step by Step: Making Enterprise JavaBeans with J2EE Standard Tools

Christopher M. Judd
President/Consultant
Judd Solutions, LLC

Christopher M. Judd

- President/Consultant of Judd Solutions
- Central Ohio Java User Group (COJUG) coordinator

Pro Eclipse JST
Plug-ins for J2EE Development
Christopher Judd and Hakeem Shittu

Enterprise Java Development on a Budget
Leveraging Java Open Source Technologies
Brian Sam-Bodden and Christopher M. Judd

BEARABLE MOMENTS
by Christopher M. Judd
with Jim Flanagan
Illustrated by Dale Herron

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Other Sessions of Interest

- WTP
  - T-4. Develop Better J2EE Applications with the Web Tools Platform (Wed 8:45)
  - 101. Quick Tour of the Eclipse Web Tools Platform (Thu 8:30)
  - 107. Leveraging JSF Components (Thu 8:30)
  - 201. How to Build Java Web Applications with the Web Tools Platform (Thu 10:30)
  - 301. Facing JavaServer Faces Development with JSF Tools (Thu 1:15)
  - 401. Consuming and Producing Web Services with Web Tools (Thu 3:15)
  - 501. Developing Java Web Services with the Web Tools Platform (Fri 8:45)
  - 504. Developing Rich Applications with JSF and AJAX (Fri 8:45)
  - 701. Building Applications with the Java Persistence API and Dali (Fri 1:45)
  - 706. Step by Step: Making Enterprise JavaBeans with J2EE Standard Tools (Fri 1:45)
  - 801. How to Use and Extend Eclipse's XML and Schema Tools (Fri 3:45)
- Other
  - T-7. Callisto Boot Camp: Ten Projects. One Day (Wed 8:45)
  - 107. Leveraging JSF Components (Thu 8:30)
  - 202. Web 2.0 the Eclipse Way with the Rich AJAX Platform (Thu 10:30)
  - 204. Interacting with Relational Databases (Thu 10:30)

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Agenda

- EJB Overview
- WTP Overview
- JST Overview
- Workspace Setup
- Session Bean
- Session Bean Client
- Packaging and Deployment
- Conclusion

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Enterprise JavaBean Development is HARD!!!

EJB Types

- Session – Server-side business logic
  - Stateful
  - Stateless
- Entity – Persistable business objects
  - CMP
  - BMP
- Message-Driven – Consumers of JMS messages

- Session
  - Remote Interface
  - Home Interface
  - Local Interface
  - Local Home Interface
  - Bean Class
  - EJB Deployment Descriptor
 - App Server Specific EJB Deployment Descriptor

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- Entity
  - Remote Interface
  - Home Interface
  - Local Interface
  - Local Home Interface
  - Bean Class
  - EJB Deployment Descriptor
  - App Server Specific EJB Deployment Descriptor
  - App Server Specific CMP Deployment Descriptor

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EJB Files

- Message-Driven Bean
  - Bean Class
  - EJB Deployment Descriptor
  - App Server Specific EJB Deployment Descriptor

Managing Complexity

- Code classes and interfaces by hand
- Diagrams
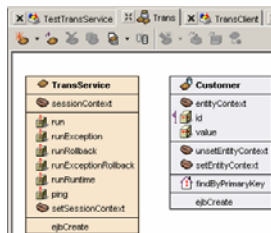
- Annotations

```
/**
 * A generated session bean
 * @ejb.bean name="TransService"
 *           description="A session bean named TransService"
 *           display-name="TransService"
 *           jndi-name="TransService"
 *           type="Stateless"
 *           transaction-type="Container"
 */
public abstract class TransServiceBean implements
    javax.ejb.SessionBean {
```

Agenda

- EJB Overview
- **WTP Overview**
- JST Overview
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Web Tools Platform Project (WTP)

- Top Level Eclipse Project
- www.eclipse.com/webtools/
- Included in Callisto release
- Development tools for web and JEE development
  - No runtime dependencies
  - Vendor extensible
- Subprojects
  - Web Standard Tools (WST)
  - J2EE Standard Tools (JST)
  - JavaServer Faces Tools (JSF)
- Current version 1.5
- Dependencies
  - Eclipse 3. 2
  - Eclipse Modeling Framework (EMF) 2.2.0
  - Graphic Editor Framework (GEF) 3.2
  - Java EMF Model (JEM) 1.2

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WTP Subprojects

- Web Standard Tools (WST)
  - Web artifacts
  - Defined by open standards bodies
- J2EE Standard Tools (JST)
  - J2EE components
  - Java Community Process (JCP)
  - Depends on WST
- JavaServer Faces Tools (JSF)

WTP Scope
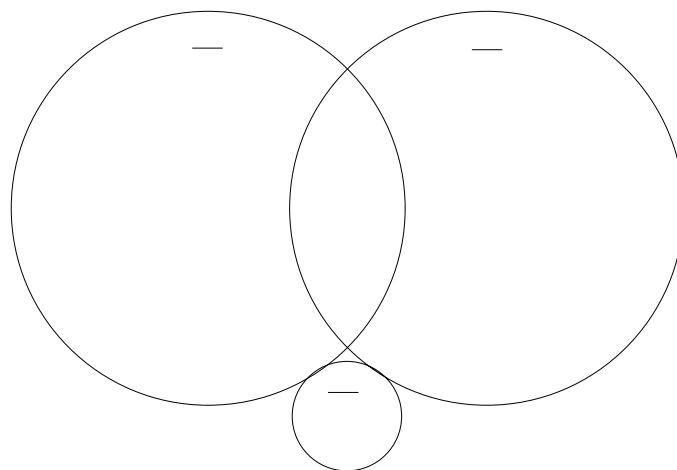
WTP Installation Options

- Callisto
- All-in-one
  - Eclipse 3.2
  - Eclipse Modeling Framework (EMF) 2.2.0
  - Graphic Editor Framework (GEF) 3.2
  - Java EMF Model (JEM) 1.2
- Update Manager
  - Eclipse.org update site
- Piecemeal

* JSF is a separate install

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JST Scope

WTP 1.5 focuses on J2EE 1.4 support

- EJB 2.1
- Servlet 2.4
- JSP 2.0
- JMS 1.1
- JTA 1.0
- JavaMail 1.3
- JAF 1.0
- JAXP 1.2
- Connector 1.5

- Web Services 1.1
- JAX-RPC 1.1
- SAAJ 1.2
- JAXR 1.0
- J2EE Management 1.0
- JMX 1.2
- J2EE Deployment 1.1
- JACC 1.0

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JST Future Scope (2.0)

- EJB 3.0 (Dali)
- JavaServer Faces (JSF)

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JST Annotations

- Plug-able annotations platform
- XDoclet
  - Open Source
  - Attribute Oriented Programming (AOP) framework
  - xdoclet.sourceforge.net
- Generates
  - Bean Interfaces
  - Bean Util classes
  - EJB Deployment Descriptors
  - Web Deployment Descriptors

JST Projects

- Projects Types
  - Enterprise Application Project (ear)
  - EJB Project (ejb-jar)
  - Dynamic Web Project (war)
  - Application Client Project (jar)
  - Connector Project (rar)

JST Projects

- Project Layouts
  - Project per module
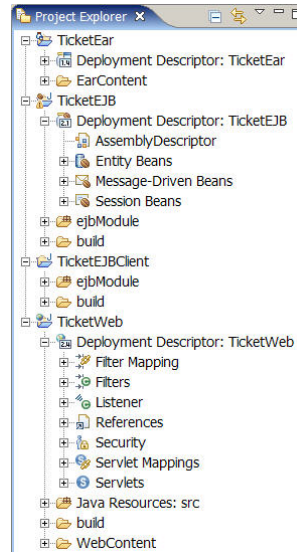
J2EE Perspective
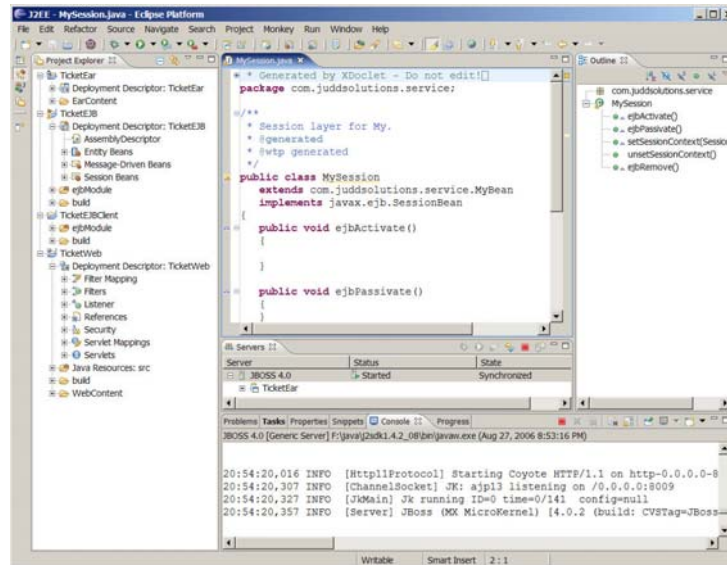
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- EJB Overview
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- **Workspace Setup**
- Session Bean
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Workspace Setup

- **Configure application server runtime**
- Configure J2EE Annotations

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Supported Servers

- Apache Tomcat
  - 3.2
  - 4.0
  - 4.1
  - 5.0
  - 5.5
- Apache Geronimo 1.0
- BEA WebLogic 8.1 & 9.0
- IBM WebSphere 6.0.x
- JBoss 3.2.x & 4.0.x
- JOnAS 4.x
- Oracle OC4J Standalone 10.1.3

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Defining Server

1. Configure server appropriate JDK
2. Configure server runtime
3. Test server

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Configure JDK

- Window > Preferences > Java > Installed JREs

Configure Server Runtime

- Window > Preferences > Server > Installed Runtimes
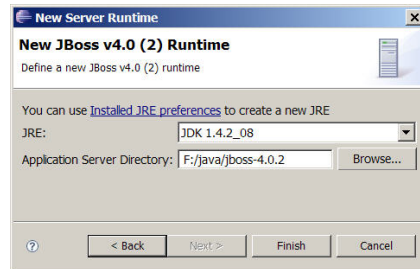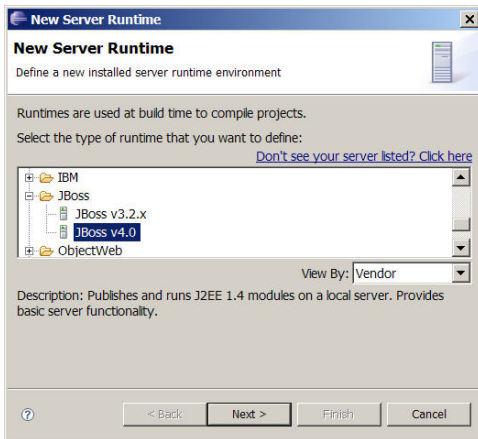
- Use Server View in J2EE Perspective
1. Add server (New > Server)
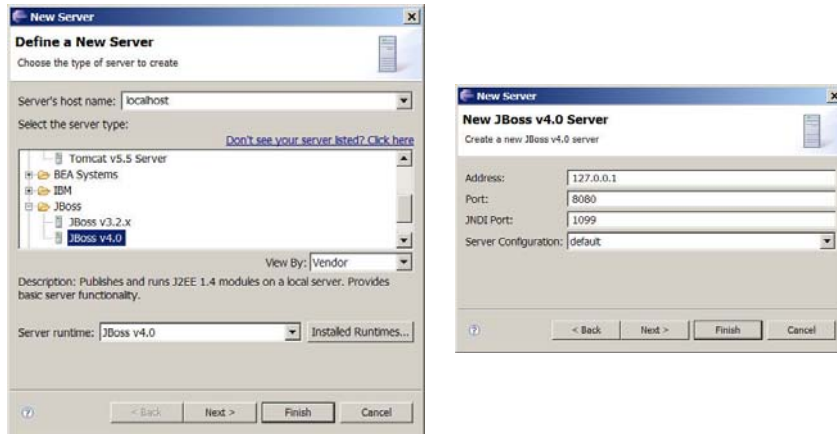
2. Start server
3. Verify server is up
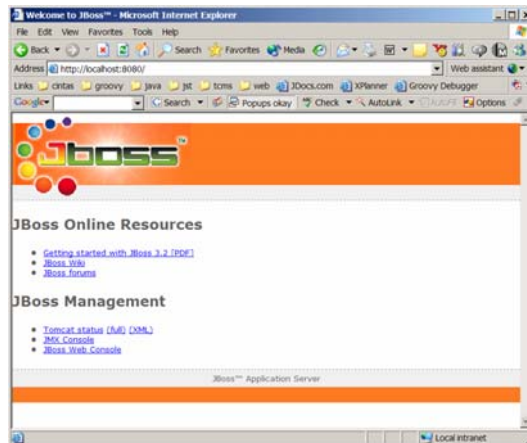
Server View Usability Tip

- Move Server View above Console view
  - Easier application server startup
  - Easier deployment

Workspace Setup

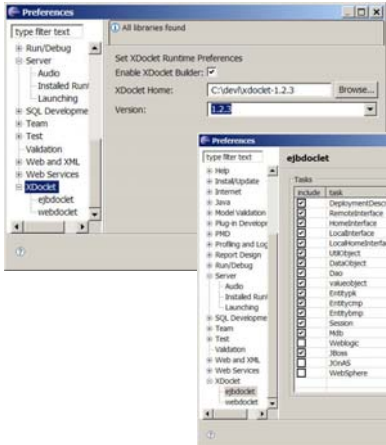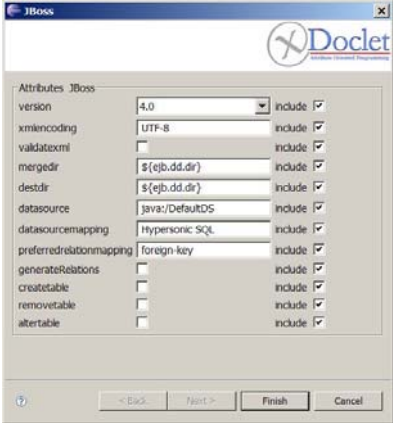- Configure application server
- Configure J2EE Annotations

XDoclet Configurations

- Location
- App server & version

Agenda

- EJB Overview
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- **Session Bean**
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Create Session Bean

1. Create EJB, EJB Client & EAR Projects
2. Run XDoclet Enterprise JavaBean Wizard
3. Add XDoclet ejb annotations
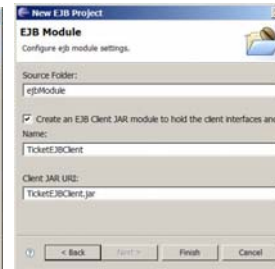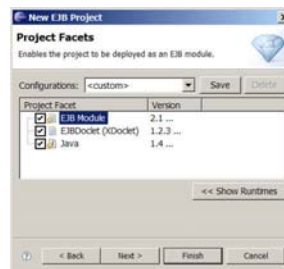4. Add XDoclet app server specific annotations
5. Deploy

Create Projects
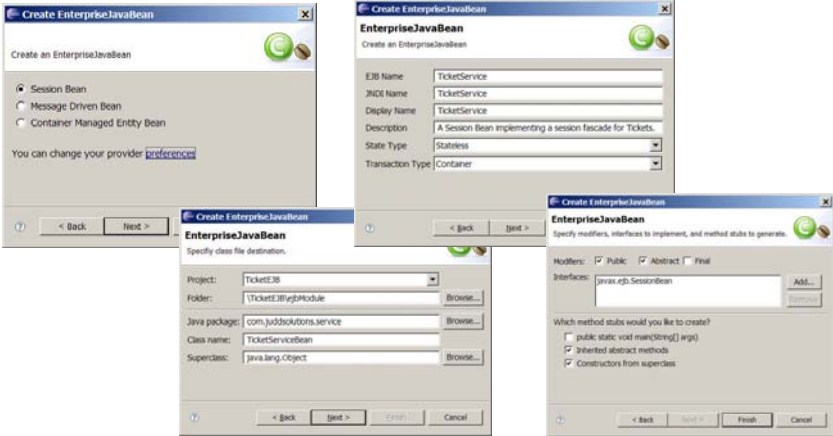
- New > Project > EJB > EJB Project
  - Create EJB, EJB Client and EAR Projects
  - Select Application Server

Create Enterprise JavaBean

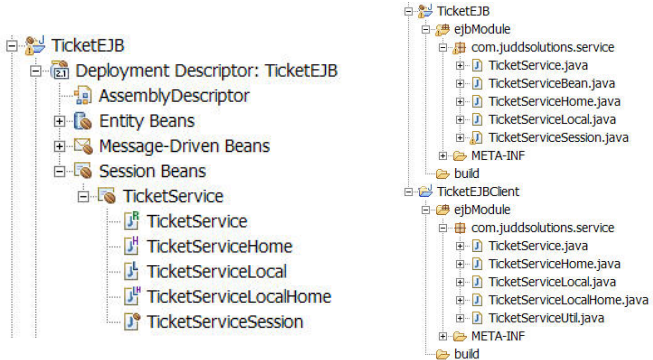- New > Other > EJB > XDoclet Enterprise JavaBean

Enterprise JavaBean Wizard Output

- *Bean is the only wizard generated class

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Enterprise JavaBean Source

```
package com.juddsolutions.service;

/**
 * <!-- begin-user-doc -->
 * A generated session bean
 * <!-- end-user-doc -->
 * *
 * <!-- begin-xdoclet-definition -->
 * @ejb.bean name="TicketService"
 *         description="A Session Bean implementing a session fascasde for Tickets."
 *         display-name="TicketService"
 *         jndi-name="TicketService"
 *         type="Stateless"
 *         transaction-type="Container"
 * <!-- end-xdoclet-definition -->
 * @generated
 */

public abstract class TicketServiceBean implements javax.ejb.SessionBean {

    /**
     * <!-- begin-xdoclet-definition -->
     * @ejb.interface-method view-type="remote"
     * <!-- end-xdoclet-definition -->
     * @generated
     */
    public String foo(String param) { return null; }
}
```

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XDoclet Output

- Generates Home, Remote, EJB Deployment Descriptors, App Server DD and Util
  - Don't need to version control the generated classes
  - Don't modify the generated classes
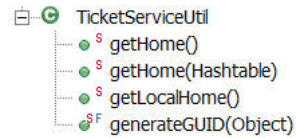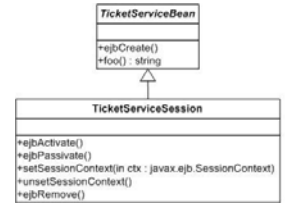- Changes to *Bean causes XDoclet to regenerate

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XDoclet Convention

- Bean class
  - Contains business methods
  - Session descendant implements EJB lifecycle methods

- Util class
  - Locator methods
  - GUID generation

- Local Home and Remote Home
  - Component Name
  - JNDI Name

XDoclet annotations

- Code Assist (ctrl + space)

```
/**
 * <!-- begin-xdoclet-definition -->
 * @ejb.interface-method view-type="both"
 * <!-- end-xdoclet-definition -->
 * @generated
 */
public String foo(String param) {
  return param + " " + new Date();
}
```
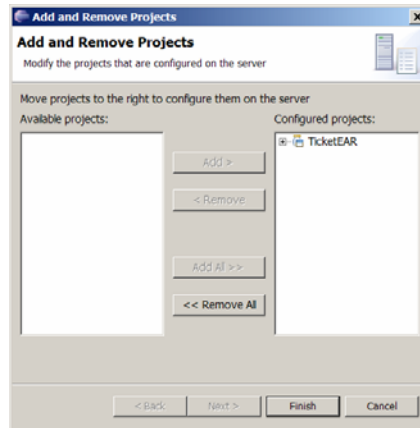
Deploy

- Right click on server and Add and Remove Projects

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Create Session Bean Client

1. Create Java project
2. Create client class
3. Add app server client jars
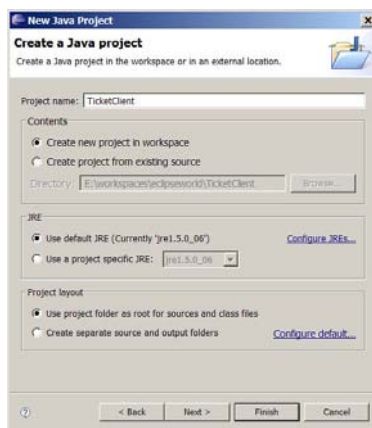4. Create jndi.properties file
5. Run

Create Java Project

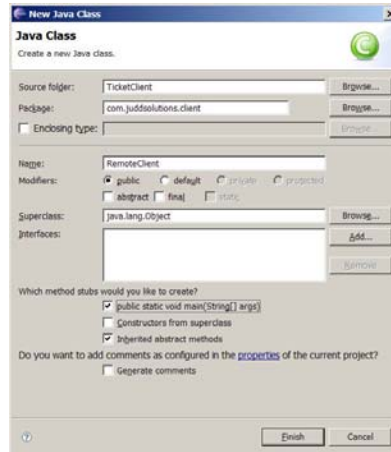- New > Project > Java > Java Project
- Add required *EJBClient project

Create Client Class

- New > Class
- Add main method

Client Source

- Mostly boiler plate EJB client code

```java
public class RemoteClient {

    /**
     * Main entry point to client
     * @param args command line args
     * @throws Exception any possible exception
     */
    public static void main(String[] args) throws Exception {
        TicketServiceHome home = TicketServiceUtil.getHome();
        TicketService service = home.create();
        String result = service.foo("cool");
        System.out.println(result);
        System.out.println("\ndone");
    }

}
```
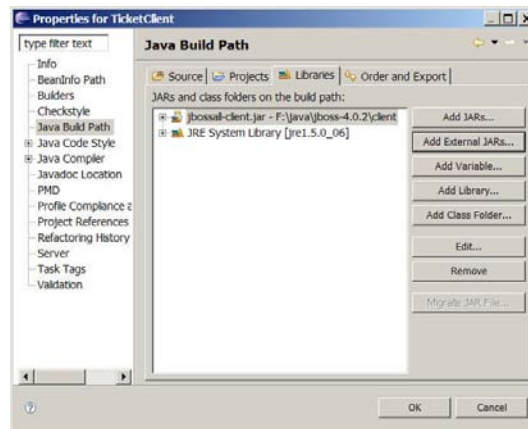
- Project > Properties > Java Build Path > Libraries

- New > File

```
# JBoss specific JNDI properties

java.naming.factory.initial=org.jnp.interfaces.NamingContextFactory
java.naming.provider.url=jnp://localhost:1099
java.naming.factory.url.pkgs=org.jboss.naming:org.jnp.interfaces
```

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Packaging

- Export > J2EE > EAR file

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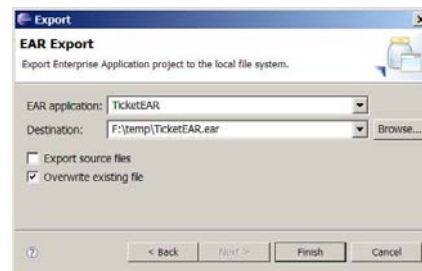- Session Bean Client
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Conclusion

JST includes all the tools necessary for developing, deploying and testing Enterprise JavaBeans using XDoclet annotations as the mechanism for generating and keeping all the required EJB file up to date.

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WTP Resources

- www.eclipse.org/webtools/
- www.projst.com
- Tutorials
  - http://www.eclipse.org/webtools/community/communityresources.html#tutorials
- Articles
  - http://www.eclipse.org/webtools/community/communityresources.html#articles
- New Group
  - news://news.eclipse.org/eclipse.webtools
- Dali
  - http://www.eclipse.org/dali/
- XDoclet
  - http://xdoclet.sourceforge.net

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J2EE Resources

- www.javasoft.com
- www.theserverside.com
- J2EE 1.4 Specification
  - java.sun.com/j2ee/j2ee-1_4-fr-spec.pdf
  - java.sun.com/j2ee/1.4/docs/api/
- EJB 2.1 Specification
  - java.sun.com/products/ejb/docs.html

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- Blog
  - http://blogs.apress.com/authors.php?author=Christopher%20Judd
- Pro Eclipse JST
  - http://www.projst.com
  - http://www.apress.com/book/bookDisplay.html?bID=447
- Enterprise Java Development on a Budget
  - http://www.apress.com/book/bookDisplay.html?bID=197

Questions ?

Please fill out your evaluations.

Slides can be found at

http://www.juddsolutions.com/ew2006/