Enterprise JavaBeans

Layer:01

Overview
Agenda

- Course introduction & overview.
- Hardware & software configuration.
- Evolution of enterprise technology.
- J2EE framework & components.
- EJB framework & components.
Course Overview
Introduction

• During this course we'll explore Sun Microsystems' *Enterprise JavaBeans* component object model.
• Because of its complexity, this course can't provide complete coverage over all aspects of the EJB framework.
• This course will serve as a foundation upon which later knowledge can be based.
Prerequisites

Because this course involves enterprise Java, I assume the following knowledge:

– Servlet, JSP, and JDBC development
– Ability to perform installation, configuration, administration, and troubleshooting tasks.

If you haven't met the official prerequisites for this course, I strongly suggest you drop.
Required Texts

- *Enterprise JavaBeans 1.1 specification.*
Grading

- Your final grade will be calculated using the following weights:
  
  - Homework 30%
  - Midterm 30%
  - Final 30%
  - Participation 10%
Hardware & Software
Operating System

- For this course I strongly recommend the following operating systems:
  - Windows NT 4.0
  - Windows 2000
  - Linux
- If you're running Windows 95/98/ME, I won't guarantee or support the behavior of the EJB server.
Required Software

• The following is the required software for this course:
  – Jakarta-Tomcat 3.2 or later
  – JBoss 2.2.2
  – Cloudscape 3.6.4
  – Ant 1.3
  – JUnit 3.7

• This list is non-negotiable. I'll accept no substitutions or alterations.
Enterprise Evolution
Goals

Modern companies have specific goals for the enterprise information systems:

- Time-to-market
- Portability
- Interoperability
- Lower cost
Architectures

• Architectures have undergone three (3) key evolutions:
  – 1-tier: This is the traditional mainframe architecture.
  – 2-tier: This is the client-server model.
  – N-tier: This is the current model whereby we distribute our software over a set of machines all of which comprise a part of the application.
Each architecture has specific issues in the areas of:

- Maintainability
- Manageability
- Performance
- Availability
J2EE Framework
What is J2EE?

1 of 3

- The Java 2 Enterprise Edition (J2EE) is a Java-based service-oriented framework.
- The goal is to allow developers to focus on solving business problems, rather than on developing system services.
- This provides for separation of business logic from system services.
The J2EE technology components can be arranged by the service it provides:

<table>
<thead>
<tr>
<th>Service</th>
<th>J2EE Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web</td>
<td>Servlets, JSP</td>
</tr>
<tr>
<td>Database</td>
<td>JDBC</td>
</tr>
<tr>
<td>Naming &amp; Directory</td>
<td>JNDI</td>
</tr>
<tr>
<td>Messaging</td>
<td>JMS</td>
</tr>
<tr>
<td>Email</td>
<td>JavaMail, JAF</td>
</tr>
<tr>
<td>Distributed Objects</td>
<td>JavaIDL, RMI, RMI-IIOP</td>
</tr>
<tr>
<td>Transactions</td>
<td>JTA</td>
</tr>
</tbody>
</table>
What is J2EE?

J2EE consists of four (4) main elements:

- Specification
- Reference implementation
- Compatibility test suite
- Blueprints
The J2EE specification outlines what services *must* be provided by a vendor that wishes to be J2EE compliant.

Specifications typically outline *minimum* requirements.

The specification often defines the API to be provided to a developer.
Reference Implementation

- The J2EE reference implementation is a fully functional J2EE server that provides web and EJB containers.
- It's used to demonstrate that a product can be built that implements the specification as written.
- *It isn't meant to be production-grade software.*
Compatibility Test Suite

- The J2EE compatibility test suite is used to evaluate a vendor product to ensure that it meets the requirements of J2EE as defined by the specification.
- Any vendor that wishes to market its product as "J2EE compliant" must submit that product for testing.
The J2EE blueprints are an effort by the Sun Java Development Center to document the best practices involving the use of J2EE components.

In many ways the blueprints are similar to the design patterns you studied in SE455.
EJB Framework
EJB technology is a complex subject.

While these aren't the only topics of interest within the EJB framework, they're the most critical.
What are Enterprise JavaBeans?

- *Enterprise JavaBeans* (EJB) is an architecture for component-based distributed computing.
- Typically EJBs are elements of business processing that could be shared across applications as well as across a network.
There are four (4) main components to EJB technology:

- EJB server
- EJB container
- EJB
- Deployment descriptor
EJB Server

- The EJB server provides common services available to all EJBs.
- The server's job is to hide the complexity of these services from the applications that require them.
The EJB specification outlines six (6) services that must be provided by each server:

- Naming
- Transaction
- Security
- Persistence
- Concurrency
- Lifecycle
EJB Container

- The EJB container integrates with the EJB server and acts as an intermediary between the server and EJBs.
- It provides services such as:
  - EJB instance lifecycle management
  - EJB instance identification
EJB Roles

- The EJB specification outlines six (6) key roles required for EJB development:
  - Bean provider
  - Application assembler
  - Deployer
  - Server provider
  - Container provider
  - System administrator
**Bean Provider**

- The *bean provider* is a developer.
- They're responsible for translating business requirements into physical code within an EJB.
- The final product of the bean provider is an EJB-JAR file containing the appropriate classes as well as the structural content of the deployment descriptor.
Application Assembler

- The *application assembler* is often a team lead or senior developer.
- They're responsible for packaging all of the EJB-JAR files generated by the bean providers into a complete application.
- Their final product is an EAR file containing the appropriate EJB-JAR files.
Deployer

• The *deployer* is usually a senior developer or architect.
• They're responsible for installing the application into the target runtime environment.
• They've got to be familiar with all aspects of the environment including security and transaction support.
Server Provider

- The *server provider* is usually an external vendor.
- Most clients don't have the time, money, or interest to develop their own EJB servers.
- The job of the server provider is to produce an EJB server that's compliant with the EJB specifications.
Container Provider

- The *container provider* is usually an external vendor and is often the same as the server vendor.
- Most clients don't have the time, money, or interest to develop their own EJB containers.
- The container provider produces an EJB container that's compliant with the EJB specifications.
System Administrator

- The *system administrator* is generally a member of the organization into which an application is being installed.
- Their task is to ensure that the runtime environment is configured in such a way that the application can function correctly and integrate with all of the required external components.
Summary

- Course introduction & overview.
- Hardware & software configuration.
- Evolution of enterprise technology.
- J2EE framework & components.
- EJB framework & components.
Next Steps

- Make sure that you install, configure, and test the software required for this class.
- Read chapters 1-2 in your text.