Developing Java Enterprise Applications Using EJB3

Course Description:
This course is a comprehensive introduction to writing Enterprise JavaBeans (EJB) using the EJB 3.x specification. An overview of Java EE technology is provided, followed by hands-on experience with JNDI, JDBC, JMS, session beans, entity beans, and message-driven beans. Topics also include container-managed persistence (CMP), container-managed relationships (CMR), and the EJB Timer Service. This course can be taught using IBM WebSphere, Oracle WebLogic, or the JBoss application server.

Who Should Attend:
This course is for experienced Java programmers and software engineers preparing to write Enterprise JavaBeans for Java EE applications hosted on a Java EE-compliant application server.

Prerequisites:
Students should be comfortable with Java programming and object-oriented concepts. A minimum of six months coding experience is suggested. In addition, students should have prior experience using JDBC and SQL.

Benefits of Attendance:
Upon completion of this course, students will be able to:
- Start, stop, and configure an application server
- Use JNDI to access database and EJB resources
- Create JDBC data sources
- Write stateless and stateful session beans
- Use container-managed persistence
- Use standard annotations for EJBs
- Configure and deploy EJB applications
- Assemble Java EE-compliant enterprise applications
- Use the Session Facade pattern
- Implement container-managed relationships
- Create JMS destinations
- Write message-driven beans
- Use the EJB Timer Service

Course Outline:
Overview of Java EE
Java Platforms
Characteristics of “Enterprise” Computing
Java EE Technologies
Multi-Tier Architectures
Advantages of Multi-Tier Architectures
Container-Based Approach
Containers involved in Java EE Development
Java EE Application Models
HTTP Services Application Model
N-Tiered Application Model

Java EE Development using Eclipse
What is Eclipse?
Starting Eclipse
Creating a Java Project
Importing Existing Java Code
Creating a New Java Program
Java EE-Compliant Application Servers
Creating a Server Instance
Starting and Stopping the Server

Java Naming and Directory Interface
What is JNDI?
Benefits of JNDI
Naming Services
Directory Services
Using JNDI
Context Operations
JNDI Utility Class
JNDI Example
Naming Exceptions
Running the JNDI Example

Using JDBC Data Sources
A Simple JDBC Program
JDBC Driver Types
Using the Derby Database
JDBC Data Sources
Data Source Example
Configuring a JDBC Data Source
Running the JDBC Examples
Executing a Query
Using the Database Explorer

RMI and IIOP
Object Serialization
Remote Method Invocation
RMI Architecture

Enterprise JavaBeans
Enterprise JavaBeans Component Model
Types of Enterprise Beans
EJB Wrapper Interfaces
Deployment Descriptors
Context and Environment Objects
EJB Runtime Environment
The Remote Interface
The Remote Object
The Home Interface
The Enterprise Bean Class
The Client Test Program
The ejb.jar File
The Vendor-Specific Deployment Descriptor
Creating an Enterprise Application Project
Deploying the Enterprise Application

Introduction to EJB 3
Limitations of EJB 2
EJB 3 Feature Overview
Comparing EJB 2 and 3
The EJB 3 Business Interface
Review of Java Annotations
The Annotated EJB Class
Dependency Injection
Container Callback Methods

Session Beans
Session Bean Lifecycle
Session Bean Interface
Session Bean Lifecycles
Stateless Session Bean Example
Accessing Environment Entries
Stateful Session Bean Example
EJB Exceptions - Examples
Testing the Session Beans
Creating a New Session Bean

CMP Entity Beans
Entity Beans
Entity Bean Interface
Lifecycle of an Entity Bean
Container-Managed Persistence
Primary Key Class
Implementing CMP Entity Bean Methods
Container-Managed Persistence Example
Custom Finders
EJB Query Language
Mapping Container-Managed Fields

Session Facade Pattern
J2EE Design Patterns
Session Facade Pattern
Local Interfaces
Example - ItemOrderer Bean
Deployment Settings for ItemOrderer Bean
Testing the Session Bean

Container-Managed Relationships
Container-Managed Relationships
Local Interfaces
Local Home Interfaces
CMR Example - Entity Bean Classes
Transfer Object Pattern
CMR Example - Session Bean
Creating New CMP Entity Beans
Creating a Relationship

Message-Driven Beans
Message-Driven Beans
Message-Driven Bean Lifecycle
Configuring Message-Driven Beans
Deploying Message-Driven Beans
Creating a New Message-Driven Bean

EJB Timer Service
Overview of the Timer Service
Timer Service API
Creating Timers
Canceling and Saving Timers

Appendix A: Web Resources
Java Technology
Application Servers
Derby Database

Appendix B: Using EJBs in a Web Application
Using Web Components as EJB Clients
Servlet Code for the Survey Application
Session Bean for the Survey Application
Deploying the Survey Application

Appendix C: EJB Transactions
Transactions
Container-Managed Transactions
Transaction Attributes
System vs. Application Exceptions
Rolling Back a Container-Managed Transaction

Appendix D: EJB Security
Java EE Security
Specifying Permissions for EJBs

Appendix E: Java Message Service
Introduction
JMS and the Java EE Platform
Basic JMS Concepts
The JMS Programming Model
Point-to-Point Example
Configuring JMS
Publish/Subscribe Example
Reliable Message Delivery