

Training: Capstone Courseware
163 Enterprise JavaBeans

TRAINING GOALS:

This course gives the experienced Java developer a thorough grounding in **Enterprise JavaBeans** -- the Java EE standard for scalable, secure, and transactional business components. EJB 3.0 has reinvigorated this area of Java enterprise development, with dramatic improvements in ease of use and smooth integration with servlet-based or JSF web applications. This course treats the 3.0 specification, with a few notes on 2.1 compatibility but an emphasis on doing things the 3.0 way.

Students get an overview of the EJB rationale and architecture, and then dive right into creating session beans and entities. The new dependency-injection features of EJB3 cause perhaps the most confusion, so we work through a chapter devoted explicitly to DI and JNDI, and basically how components find each other to make an application. We study entities and the Java Persistence API in depth, and get a look at message-driven beans as well. The latter phase of the course covers advanced topics including transactions, security, and interceptors.

This version of the course is designed to work with the Java EE 5 SDK, Update 7, which includes the GlassFish application server, version 2.1, and TopLink as the JPA provider. Variants of the course are also available with specific support for recent versions of **JBoss** and **WebLogic**.

CONSPECT:

- Chapter 1. Overview
 - Enterprise Applications
 - Containers and Objects
 - Three Containers
 - Remote Connectivity
 - Scalability and Availability
 - Security
 - Transaction Control
- Chapter 2. Architecture
 - What is an EJB?
 - Types of Beans
 - Inversion of Control
 - The Bean-Type Annotations
 - Dependency Injection

- The @EJB Annotation
- The GlassFish Application Server
- The Administration Console
- Deploying EJB Applications
- Configuring Data Sources
- Development Cycle and Roles
- Chapter 3. Session Beans
 - Interface/Implementation Split
 - Stateful vs. Stateless
 - The @Stateless Annotation
 - Lifecycle and State Transitions
 - Session Context
 - The @Stateful Annotation
 - State Transitions
 - Singletons and Pools
- Chapter 4. Entities
 - The Java Persistence API
 - Persistence Annotations
 - Configuration by Exception
 - ORM Annotations
 - The EntityManager
 - Acquiring and Using the EntityManager
 - persistence.xml
 - @Enumerated and @Temporal Types
- Chapter 5. Associations
 - Associations, Cardinality, and Ownership
 - Annotations
 - Unidirectional vs. Bidirectional
 - The @Embedded Annotation
- Chapter 6. Java Persistence Query Language
 - OO Query Languages
 - The FROM Clause and Directionality
 - The WHERE Clause
 - The SELECT Clause
 - Joins
 - Aggregates and Grouping

- Ordering
- Chapter 7. Dependency Injection
 - Interdependent Systems
 - The Factory Pattern
 - The Service Locator Pattern
 - Dependency Injection
 - Injection by Magic?
 - Injection by Type
 - Injection by Name
 - The Component Environment
 - Deployment Descriptors
 - Impact on Stateful Session Beans
 - JNDI
 - Connecting to a Remote Bean
 - Using mappedName
 - Who Can Declare Dependencies
- Chapter 8. Message-Driven Beans
 - Asynchronous Messaging
 - The Java Message Service
 - Message-Driven Beans
 - Message Types
 - Injecting JMS Queues
 - JMS Configuration in GlassFish
- Chapter 9. Transactions
 - ACID Transactions
 - The EntityTransaction Interface
 - EJB Transaction Attributes
 - Persistence Contexts
 - Extended Persistence Contexts
 - Isolation Levels
 - Application-Managed Persistence
 - The SessionSynchronization Interface
 - Impact on JMS and MDBs
- Chapter 10. Exception Handling
 - Java Exceptions
 - Remote Exceptions

- EJB Exception Handling
- System Exceptions
- Application Exceptions
- Transaction Control
- Chapter 11. Security
 - Authentication and Authorization
 - Declarative Authorization
 - Abstract Roles
 - Concrete Realms
 - Configuring User Realms in GlassFish
 - Programmatic Authorization
 - Run-As Identity
- Chapter 12. Interceptors
 - EJB and AOP
 - The Intercepting Filter Pattern
 - EJB Interceptors
 - Annotating Interceptor Classes
 - The InvocationContext Interface
 - Binding Interceptors to Targets
 - Shared Lifecycle and Context
 - Interceptors and MDBs
- Chapter 13. Timers
 - The EJB Timer Service
 - The TimerService Interface
 - The Timer Interface
 - Timeout Methods
 - Timer Handles
 - Transactions and Timers

Appendix A. Learning Resources

Appendix B. Quick Reference: Java EE Annotations

REQUIREMENTS:

- Solid [Java programming](#) skills and understanding of OO Java and Java-5 language features is essential. Course 103 is excellent preparation for this course.
- Experience with developing Java web applications is very helpful for this course, but not strictly

required.

- Some knowledge of [XML](#) will be useful for writing the occasional deployment descriptor, but is not required. Course 501 is recommended for those who would like to get more familiar with XML before pursuing this course.

Difficulty level



CERTIFICATE:

The participants will obtain certificates signed by Capstone Courseware.

TRAINER:

Authorized Capstone Courseware Trainer.