

The Enterprise JavaBeans 3 specification is a deep overhaul of the EJB specification that improved the EJB architecture by reducing its complexity from the developer's point of view. It leverages annotations (introduced in Java 7) and Object-Relational Mapping (ORM) technologies to eliminate the dependence on complex EJB APIs, allow POJO (Plain Old Java Object) based development, and provide an effective technology for creating distributed, transactional components, and for mapping relational data to an object schema.

This 5 day course provides thorough coverage of the EJB3 technology - presented in a clear and effective manner. It starts with the basic concepts and APIs of EJB and then continues on with complex topics such as message driven beans and transactions. New concepts such as the use of annotations and the use of Dependency Injection to initialize references are covered in depth. The course also includes thorough coverage of managing persistence using the Java Persistence API 2 (JPA2). This course provides additional coverage of JPA as compared to our Fast Track to EJB3 course.

Course Objectives:

- Understand the EJB 3 architecture and API, and how it fits into the overall Java EE architecture.
- Understand and use the EJB 3 annotations.
- Create, deploy, and use stateful and stateless session beans.
- Use CDI (Contexts & Dependency Injection) to initialize resources.
- Understand and use Interceptors.(Lifecycle and Business Method)
- Use JNDI (Java Naming and Directory Interface)
- Write EJB clients (remote and local)
- Understand, deploy, and use message-driven beans.
- Understand distributed transactions, the Java Transaction API, and the EJB transaction model.
- Understand and use the EJB security model.
- Understand practical architectural issues associated with EJB applications
- Understand the new Java Persistence API (JPA).
- Create, deploy, and use JPA persistence entities.
- Understand and use the Entity Manager.
- Understand and use Java Persistence Query Language.
- Use optimistic locking and versioning.
- Use advanced JPA capabilities such as entity relationships, inheritance, and embeddable classes.

Audience: Java developers who want to use EJB 3.2.

Prerequisites: One year of Java programming experience (or equivalent) is preferred. Knowledge of relational databases and JDBC is strongly recommended.

Number of Days: 5 days

1	Overview What is EJB?	EJB Goals Types of Enterprise JavaBeans
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	Java Persistence API	Deployment Descriptors
	EJB and Java EE (Enterprise Editions)	The XML Deployment Descriptor
	EJB in Java EE Architecture	Obtaining Resources
	SOA and EJB	Qualifiers
	SOA with Web Services and EJB	More about Annotation Declarations
	EJB 3.0 Overview	CDI Producer
	EJB 2.X Problems	Producing Other Resources
	EJB 3.0 Goals	Resource Manager Connection Factories
	EJB 3.1 and 3.2 Goals	The @Resource Annotation
	Session Bean Usage	Using Logical Lookup Names
	Persistent Entity Usage	Simple Environment Entries
	MDB Usage	Setter Injection
2	Session Beans	Deployment Descriptor vs Annotation
	What are Session Beans	Stateless Session Bean Lifecycle &
	Stateless and Stateful Beans	Interceptors
	Defining a Session Bean	Life Cycle of SSB
	Calculator Bean Local Business	Client Call of a Stateless SB Method
	Interface	Business Method Interceptors
	Remote and Local Business Interfaces	InvocationContext Interface Details
	Calculator Bean Local Business	Interceptor Class
	Interface	Lifecycle Interceptor in the Bean Class
	Simplified Interface Declaration (EJB	and Separate Class
	3.2)	Asynchronous Methods, Singleton
	How Annotations Work	Session Beans
	Annotation Definition	Stateful Session Beans
	Using Annotations	Coding a Stateful Session Bean
	Packaging and Deployment	Stateful Session Bean Clients
	JEE Packaging	Using the SFSB in a JSP
	ejb-jar File	Stateful Session Passivation/Activation
	Deployment Descriptor	Stateful Session Bean State Diagram
	ejb-jar File Structure	The Timer Service
	Web Application Structure – JEE 6/7	Programming Timers
	Server Deployment	How the Timer Works
	JNDI Overview	Issues with Programmatic Timers
	JNDI Tree Structure	4 Message-Driven Beans
	The Context Interface	Overview of Messaging Systems
	Specifying the InitialContext Properties	Loose Coupling
	Using JNDI	Publish/Subscribe – Illustrated
	EJB Remote Client	Point-to-Point
	EJB 3.1+ - Portable JNDI Names	Overview of JMS API
3	Additional EJB Capabilities	What is Java Message Service?
	Dependency Injection	API Structure
	An EJB referencing another EJB	Administered Objects
	ItemRepository	Client Workflow
	More about @Inject	Synchronous Queue Consumer Client
	Injection Using @EJB	JMS Message Types

	Message-Driven Beans (MDB)		The Event Class
	JEE Message Producers and Consumers		The EVENTS Table
	MDB Consumption of a Message		Mapping Properties
	Activation Configuration Properties		Entity Manger and Persistence Context
	Specifying a Destination Using a DD		Obtaining an Entity Manager
	Message-Driven Bean Lifecycle		Retrieving Persistent Objects
	Interceptor Methods		More about Mappings
5	Transactions and Security	8	Updates and Queries
	Transaction Definition		Inserting and Updating
	Transactional System		Persisting and Updating New Entities
	Transactions in EJB		Querying and JPQL
	EJB Declarative Transaction Management		JPQL Basics
	Specifying Transaction Attributes		Executing a Query
	Beans Have a Say in Transactions		Where Clause
	Transactions Attributes		JPQL Operators and Expressions
	Explicit / Bean-Managed Transactions		Query Parameters
	Transaction Isolation Levels		Named Queries
	Security in EJB		Criteria API
	JEE Security		Path Expressions
	Roles		WHERE Clauses
	Authentication		The Persistence Lifecycle
	Programmatic Security		Transient & Persistent State
	Transport Level Security with SSL		Synchronization To The Database
6	Exception Handling and Best Practices	9	Versioning and Optimistic Locking
	Exception Overview		Locking Objects
	Checked and Unchecked Exceptions		Entity Relationships
	Exceptions in EJB 3		Object Relationships, Directionality
	Application and System Exceptions		Characteristics of Relationships
	Container Handling of System Exception		Mapping Relationships
	EJB 3 Best Practices		The Table Structure – Many-To-One
	When to Use EJB		The Owning Side
	Session Façade Structure		Mapping the Bidirectional Relationship
	Transaction Duration		More on the Inverse Side
	Tuning		Collection Types
	Clustering		Cascading Operations
7	Introduction to Java Persistence API (JPA2)		Mapping Inheritance
	JPA Overview		Entity Inheritance
	Object-Relational Mapping (ORM)		Single Table, Joined (Table per Subclass), Table per Concrete Class
	Issues		Embedded Objects
	JPA Benefits		Compound Primary Keys
	JPA Architecture	10	Element Collections (JPA 2)
	Mapping a Simple Class		Additional JPA Capabilities
	Entity Class Requirements		Queries - Projection, Aggregate, Bulk Update/Delete

Extended Persistence Contexts
XML Mapping Files
Java Persistence with Java SE
JPA Best Practices
Primary Key Considerations
Consider Going Outside of JP
Know Your Provider Implementation
Resources (EJB3 and JPA)