Developing with EJB3 in Java EE

Description

The new EJB3 architecture is designed to greatly simplify the development of Enterprise JavaBeans, which today represents the most advanced solution in distributed architecture. It enables the development of business components that can be addressed both by a web service and by an organization’s traditional IT systems. This approach facilitates the creation of robust, scalable applications aligned with the strategic needs of modern enterprises.

Understanding the importance of EJB 3 in business

Through a logical progression, this EJB 3 training covers all the essential aspects of development in Java EE. You will learn how to leverage different types of beans, manage client-server communication, and secure your applications. The course content is built around concrete examples and real-world use cases, ensuring immediate understanding and effective hands-on practice.

Course Content
Module 1: Fundamental Architectural Concepts

- What is architecture?
- Architecture vs. design
- Quality of Service (QoS)
- Common mechanisms
- Architectural description
- What architecture is not
- The need for architecture
- The architect
- Roles of the architect
- Skills of the architect

Module 2: Guidelines for Designing a System Architecture

- Security risks
- Performance and scalability risks
- Availability and complexity risks
- Compatibility and control risks
- Network considerations
- Latency and bandwidth
- Reduce the number of network calls
- Reduce the size of network calls
- Firewall traversal
- Secure communication
- Distributed object technologies
- What is a transaction?
- Bank example
- Multiple users sharing data
- ACID properties of transactions

- Architecture
- Reference architecture
- Patterns
- Development methodologies
- Open standards
- Frameworks

Module 3: Quality of Service Requirements

- What are quality of service requirements?
- Quality of service and design
- Quality of service inventory
- Performance
- Scalability
- Reliability
- Availability
- Extensibility
- Maintainability
- Usability (operability)
- Security
- Cultural adaptability
- Portability
- Testability
- Usability
- Recoverability
- Prioritize QoS requirements
- Review QoS requirements for trade-off opportunities
- Quality of service reviews

Module 4: Software Architecture Layers

- System architecture
- Good architecture
- From cave drawings to the modern day
- Evolution of information systems today
- Client-server computing
- Client-server advantages / disadvantages
- Multi-tier architectures
- Single-tier architecture
- Single-tier pros / cons
- Two-tier architecture
- Two-tier advantages / disadvantages
- Three-tier architecture
- Three-tier advantages / disadvantages
- N-tier architecture
- N-tier advantages / disadvantages

Module 5: Managing Client-Side Considerations

- Understand client concerns
- Types of clients
- JEE client responsibilities

- User interface presentation
- User input validation
- Communicating with the server
- Understand client-side security
- Compare / contrast user interface devices
- Apply reuse at the client level
- Strategies for deploying Java desktop applications

Module 6: Java EE Technology Servers

- Types of servers in Java EE
- Java EE servers
- Java EE containers
- Enterprise information systems
- ERP systems
- Mainframe transaction processing systems
- Relational and legacy databases
- Legacy integration
- Selecting a Java EE server
- Packaging and deployment definitions
- Roles and responsibilities
- EJB modules
- Packaging the EJB module
- EJB module recommendations
- Web modules
- Web module recommendations
- Deployment descriptors

Module 7: Java EE Technologies

- Servlets
- The web container
- Servlet API
- Session management
- Servlet threading issues
- JSP (JavaServer Pages)
- How JSP works
- JSP elements
- Using JavaBeans in JSP
- Custom tags
- Filters
- Filters and the processing pipeline
- Filtering API
- Uses for filters
- Event listeners
- What are EJBs?
- Main characteristics of EJBs
- EJB architectural components
- EJB container
- EJB container – persistence
- EJB container – transactions
- Enterprise JavaBeans

- Session beans
- Entity beans
- Message-driven beans
- EJB classes and interfaces
- EJB container – relationships
- How remote EJBs work
- Remote or local EJBs
- Web services
- Implementing web services in Java EE
- Deploying web services in J2EE
- JCA (Java EE Connector Architecture)
- Application-level contract
- System-level contracts

Module 8: Java EE Technology Choices

- Client session state
- Client-managed state
- Web-tier-managed state
- EJB-tier-managed state
- Business objects
- When to use EJB
- When to use entity beans
- CMP vs. BMP
- Types of clients
- Web browser clients
- Java clients
- Model-View-Controller
- MVC in the web tier
- Web application frameworks
- Web presentation overview
- Java presentation overview
- Message-oriented middleware and JMS
- Messaging domains
- MOM characteristics
- Advantages of asynchronous communication
- Advantages of synchronous communication

Module 9: Java Connector Architecture (JCA)

- JCA overview
- Resource adapter
- System contracts
- Outbound contracts
- Inbound contracts
- Lifecycle contracts
- Common Client Interface (CCI)
- Benefits of JCA
- Resource adapter adapter
- Connection management
- Transaction management
- Transaction scenario

- Client interaction

Module 10: SOA Concepts

- Service-oriented architecture
- Componentization and reuse
- Benefits of service orientation
- Defining SOA
- Aligning the business
- What is a service?
- Service actors
- Service layering
- Service-orienting the enterprise
- Service-oriented thinking

Module 11: Introduction to JAX-WS

- JAX overview
- Origins of JAX-WS
- JAX-WS architecture and tools
- Providing a service
- Service source (option 1)
- Service Java
- Service source (option 2)
- Calling a service
- Client source (option 1)
- Client source (option 2)
- Advanced features

Module 12: Java EE Security

- JEE authentication mechanisms
- Basic authentication
- Form-based authentication
- Client certificate authentication
- JEE authorization
- Declarative security on web resources
- Programmatic security on web resources
- Security role reference
- Defining security roles with annotations
- Delegation
- Declarative security on EJB resources
- Protecting beans using annotations
- Protecting beans using the deployment descriptor
- Programmatic security on EJB applications
- Delegation

Module 13: Web Services Security (WS-Security)

- The challenges
- Public Key Infrastructure (PKI)
- Digital signature

- Certificates
- Web services security overview
- SOAP message security
- Message integrity
- Message confidentiality
- Example of symmetric encryption
- Authentication using an identity token
- Authentication
- Transport-level security
- Audit trail
- Identity assertion using SAML
- SAML SOAP example

Module 14: Prototypes

- What is a prototype?
- Conceptual prototypes
- Architectural prototypes
- Benefits of prototyping
- Deciding whether to build a prototype
- Prototypes and the software development lifecycle
- Prototype roles and responsibilities
- Throw-away vs. evolutionary prototypes
- Spikes
- Testing a prototype

Module 15: Describing and Evaluating Software Architecture

- Architecture description
- Architectural views
- Sub-systems
- Layers
- Components
- Decomposing the system into components
- Software partitioning strategies
- Dependency management
- Component diagrams
- Deployment diagrams
- Multi-tier architectures
- Managing complexity
- Evaluating the architecture

Appendix A: Data Transfer in Distributed Computing

- Data transfer in Java local computing
- Data transfer in Java distributed computing
- Comparison of local vs. distributed data transfer

Appendix B: Transactions

- Need for transactions
- Transactions

- ACID properties
- Transaction components
- Distributed transactions
- Distributed transaction components – two-phase commit
- Java Transaction API (JTA)
- Object transaction
- EJB transaction basics
- Transaction propagation
- Transaction outcome
- Container-managed transaction
- Container-managed transaction settings
- Interacting with container-managed transactions
- Support for transaction attributes
- Bean-managed transaction
- Client-managed transaction
- Transaction isolation
- Isolation level

Appendix C: Business Tier and Integration Patterns

- Business delegate pattern
- Data transfer object pattern
- DTO example (output)
- DTO example (input)
- DTO's role in MVC
- Access beans
- Types of access beans
- Data Access Bean
- Data class programming model
- Access Bean constructor
- Generating access beans
- Generating a data class
- Generating an EJB factory
- Using EJB factory and data class
- Removing the access bean
- Value object pattern
- Multi-valued objects
- Best practices: deriving EJB from the value object
- Composite entity pattern
- Class diagram
- How the client interacts
- Value object assembler
- Value list handler
- Design considerations
- Service locator
- Data Access Object (DAO)
- DAO implementation guidelines
- Service activator
- MDB – integrating JMS and EJB
- Message-driven beans differ from other EJBs
- Message beans are stateless
- Message-driven bean interfaces

- Message counter
- Class message counter
- Message processing
- Deployment descriptor entry

Lab / Exercises

- During the course participants are encouraged to actively participate in the learning experience by running example files during lectures and performing coding challenges during labs.
- Each lab session allows you to compare your solution to the instructor's

Documentation

- Digital courseware included

Exam

- This course prepares you to the 1Z0-895 : Java Platform, Enterprise Edition 6 Enterprise JavaBeans Developer Certified Expert. If you wish to take this exam, please contact our secretariat who will let you know the cost of the exam and will take care of all the necessary administrative procedures for you

Participant profiles

- Application developers
- IT managers
- Architects
- Project managers
- Engineers

Prerequisites

- Knowledge of Java language
- knowledge of servlets and JSP is a plus
- Knowledge of EJB 2.x is a plus

Objectives

- Manage the development of EJB 3 and its integration into an enterprise application

Description
EJB 3 Development Training in Java EE
Niveau
Intermédiaire
Classroom Registration Price (CHF)
3100
Virtual Classroom Registration Price (CHF)
2900
Duration (in Days)
4
Reference
EJB