

# Certificate

**Alexander Rudolf**

has taken part in the following GFU-training course from 2018-02-19 to 2018-02-22:

## "JPA with Hibernate Complete"

Trainer: Thomas Much

### Topics:

- **Getting started with JPA**
  - Fundamentals of object-relational persistence
  - Mapping of POJOs with annotations
  - Configuration with the JPA interfaces
  - Generation of the database schema
  - Life cycle of objects
- **Map database schemas to object models**
  - identity of objects
  - Technical, natural and compound keys
  - mapping of associations (relations)
  - Cascading and Lazy Loading
  - Composition and inheritance
- **Queries with queries**
  - The JPA Query Language (JPQL)
  - The Criteria API
  - Native SQL queries
  - Use of NamedQueries
  - Use of entity graphs
- **JPA in enterprise use**
  - Typical enterprise patterns
  - Integration in EJB 3.x.
  - Integration in Spring
  - Server examples (Tomcat, JBoss / WildFly, GlassFish)
- **Other topics**
  - transactions
  - Locks
  - Performance optimization and caching
  - Differences between JPA 1.0 and 2.x.
  - A quick tour of Hibernate-specific API
  - Overview of other JPA implementations (EclipseLink, OpenJPA)
  - Testing object models
  - Overview of the bean validation standard (JSR-303)
  - Bean validation annotations in JPA entities
  - Outlook for the use of NoSQL databases with JPA and Hibernate OGM (MongoDB as an example)
- **Practical exercise**
  - With programming exercises the individual topics are deepened, whereby each participant has its own computer