

Middleware for Heterogeneous and Distributed Information Systems

<http://www.lgis.informatik.uni-kl.de/cms/courses/middleware/>



Course Information

- Presence hours: 4 course, 2 recitations/exercises
 - course hours: Monday, 11:45 – 13:15, 46-260 & Thursday, 15:30 – 17:00, 46-260
 - recitations: Tuesday, 13:45 – 15:15, 13-222, starting November 2nd(!)
exception: Wednesday, 02.11.2016, 13:45 in room 11-241
- Credit points: 8 ECTS
- Exams: oral
- Prerequisites
 - Fundamentals of Information Systems and Database Management Systems: Data Models and Database Design, Query Languages (SQL), Transactions (ACID), Host/Programming Language Coupling, Database Architecture, Query Processing Steps, Commit Protocols (2PC)
 - see courses
 - introductory bachelor course on Information Systems
 - specific parts of “Data Base Systems” are desirable, but the course can be attended in the same semester
- Copies of presentation charts as pdf, downloadable from course website
- Literature/references provided on the website



Course Outline (Draft)

- Chapter 1: Motivation
 - Developing distributed information systems
 - Outlook on Information Systems Integration
 - Enterprise Application Integration
 - B2B-Integration
- Chapter 2: Distributed Information Systems
 - Layers, architecture, interaction types
 - Distributed Transactions
- Chapter 3: DB-Gateways
 - ODBC, JDBC, SQLJ
- Chapter 4: Remote Procedure Calls and Distributed Transactions
 - RPC concepts
 - Remote Method Invocation
 - Transactional RPCs
 - X/Open DTP



Course Outline (2)

- Chapter 5: Application Server Middleware
 - RPC middleware infrastructure
 - TP Monitors
 - Object Brokers and Object/Component Transaction Monitors
- Chapter 6: Object Persistence, Relationships and Queries
 - Concepts and approaches (explicit, implicit, orthogonal persistence)
 - Support in application server middleware
- Chapter 7: Message-Oriented Middleware
 - Asynchronous transaction processing
 - Message Queuing
 - Message Brokering
 - Databases and Message Queuing Systems
- Chapter 8: Introduction to Web Services
 - Service Oriented Architecture
 - Invocation (SOAP), Description (WSDL), Discovery (UDDI)
 - Web Services Support in Middleware Platforms



Course Outline (3)

- Chapter 9: Web Services Coordination and Transactions
 - Conversation Routing and Protocol Handlers
 - Coordination and Transactions
- Chapter 10: Business Process Modeling and Workflow Management
 - Business Engineering
 - Workflow Management Systems
 - WF and Transactions
 - Web Services Composition and Choreography
- Chapter 11: Web-based Information Systems
 - Web-based DB access architecture
 - Client-side vs. server-side access
 - Session state management



Course Outline (4)

- Chapter 12: Information System Integration
 - Data Integration
 - Enterprise Application Integration and B2B Integration
- Chapter 13: Virtual Integration, Wrappers and External Data
 - Virtual Integration Architectures
 - Wrapper-based data federation (Garlic, SQL/MED)
 - Data-links for managing external data
- Chapter 14: Data Replication and Materialized Integration
 - Replication middleware uses and architecture
 - Change propagation and ownership strategies
 - Data Warehousing and ETL
- Chapter 15: Information Integration
 - Forms of heterogeneity
 - Architectures
 - Schema matching, mapping, and integration
 - Dynamic Information Integration

