

Middleware for Heterogeneous and Distributed Information Systems

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Course Outline (1)

- Chapter 1: Motivation
 - Developing distributed information systems
 - 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: Web-based Information Systems
 - Web-based DB access architecture
 - Client-side vs. server-side access
 - Session state management
 - SQL/HTML integration



Course Outline (2)

- Chapter 5: Remote Procedure Calls and Distributed Transactions
 - RPC concepts
 - Remote Method Invocation
 - Transactional RPCs
 - X/Open DTP
- Chapter 6: Application Server Middleware
 - RPC middleware infrastructure
 - TP Monitors
 - Object Brokers and Object/Component Transaction Monitors
- Chapter 7: Object Persistence, Relationships and Queries
 - Concepts and approaches (explicit, implicit, orthogonal persistence)
 - Support in application server middleware (CORBA persistence, EJB CMP, Java Data Objects)
- Chapter 8: Security and Connectors
 - Security features and basic concepts
 - Security support in application server middleware
 - Connectors: Accessing Enterprise IS from application servers



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Course Outline (3)

- Chapter 9: Virtual Integration, Wrappers and External Data
 - Virtual Integration Architectures
 - Wrapper-based data federation (Garlic, SQL/MED)
 - Data-links for managing external data
- Chapter 10: Data Replication and Materialized Integration
 - Replication middleware uses and architecture
 - Change propagation and ownership strategies
 - Data Warehousing and ETL
- Chapter 11: Information Integration
 - Forms of heterogeneity
 - Architectures
 - Schema matching and mapping
 - Schema integration
 - Dynamic Information Integration



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Course Outline (4)

- Chapter 12: Message-Oriented Middleware
 - Asynchronous transaction processing
 - Message Queuing
 - Message Brokering
 - Databases and Message Queuing Systems
- Chapter 13: XML
 - Fundamentals
 - XML data processing (XPath, XQuery, SQL/XML)
- Chapter 14: Introduction to Web Services
 - Service Oriented Architecture
 - Invocation (SOAP), Description (WSDL), Discovery (UDDI)
 - Web Services Support in Middleware Platforms



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Course Outline (5)

- Chapter 15: Web Services Coordination and Transactions
 - Conversation Routing and Protocol Handlers
 - Coordination and Transactions
- Chapter 16: Business Process Modeling and Workflow Management
 - Business Engineering
 - Workflow Management Systems
 - WF and Transactions
- Chapter 17: Web Service Composition
 - Web Services Composition and Choreography
 - BPEL4WS
 - e-Business Coordination, Collaboration and Integration



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Books

- **Alonso, G.; Casati, F.; Kuno, H.; Machiraju, V.: Web Services, Springer Verlag, Heidelberg, 2003**
- Allamaraju, S. et. al.: Professional Java Server Programming - J2EE 1.3 Edition, Wrox Press, Birmingham, UK, 2001
- Blakeley, B., Harris, H., Lewis, R.: Messaging & Queuing Using the MQI, McGraw-Hill, New York, 1995
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- Gray, J., Reuter, A.: Transaction Processing: Concepts und Techniques, Morgan Kaufmann, San Mateo, Kalifornien, 1993
- Harold, E.R.: The XML 1.1 Bible, Wiley Publishers, 2004
- Leser, U., Naumann, F.: Informationsintegration, dpunkt.verlag, 2007
- Leymann, F., Roller, D.: Production Workflow, Prentice Hall, 2000
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- Siegel, J.: CORBA 3 Fundamentals and Programming (2nd ed.), Wiley Computer Publishing Group (John Wiley & Sons, Inc.), New York, 2000
- The J2EE™ Tutorial, <http://java.sun.com/j2ee/tutorial/index.html>



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