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Nota di contenuto	Middleware for Communications; Contents; Preface; List of Contributors; Introduction; 1 Message-Oriented Middleware; 1.1 Introduction; 1.1.1 Interaction Models; 1.1.2 Synchronous Communication; 1.1.3 Asynchronous Communication; 1.1.4 Introduction to the Remote Procedure Call (RPC); 1.1.5 Introduction to Message-Oriented Middleware (MOM); 1.1.6 When to use MOM or RPC; 1.2 Message Queues; 1.3 Messaging Models; 1.3.1 Point-to-Point; 1.3.2 Publish/Subscribe; 1.3.3 Comparison of Messaging Models; 1.4 Common MOM Services; 1.4.1 Message Filtering; 1.4.2 Transactions 1.4.3 Guaranteed Message Delivery1.4.4 Message Formats; 1.4.5 Load Balancing; 1.4.6 Clustering; 1.5 Java Message Service; 1.5.1 Programming using the JMS API; 1.6 Service-Oriented Architectures; 1.6.1 XML; 1.6.2 Web Services; 1.6.3 MOM; 1.6.4 Developing Service-

Oriented Architectures; 1.7 Summary; Bibliography; 2 Adaptive and Reflective Middleware; 2.1 Introduction; 2.1.1 Adaptive Middleware; 2.1.2 Reflective Middleware; 2.1.3 Are Adaptive and Reflective Techniques the Same?; 2.1.4 Triggers of Adaptive and Reflective Behavior; 2.2 Implementation Techniques; 2.2.1 Meta-Level Programming; 2.2.2 Software Components and Frameworks; 2.2.3 Generative Programming; 2.3 Overview of Current Research; 2.3.1 Reflective and Adaptive Middleware Workshops; 2.3.2 Nonfunctional Properties; 2.3.3 Distribution Mechanism; 2.4 Future Research Directions; 2.4.1 Advances in Programming Techniques; 2.4.2 Open Research Issues; 2.4.3 Autonomic Computing; 2.5 Summary; Bibliography; 3 Transaction Middleware; 3.1 Introduction; 3.2 Transaction Processing Fundamentals; 3.2.1 ACID Transactions; 3.2.2 Distributed Transactions; 3.2.3 Common Extensions; 3.2.4 Programming Models for Transactions; 3.3 Distributed Object Transactions; 3.3.1 Transaction Model; 3.3.2 Transaction APIs; 3.3.3 Container-Managed Transactions; 3.4 Messaging Transactions; 3.4.1 Messaging Models; 3.4.2 Programming Models; 3.4.3 Queued Transaction Processing; 3.5 Web Transactions; 3.5.1 Web Services Coordination and Transactions; 3.5.2 Programming model; 3.5.3 Web Services Messaging; 3.6 Advanced Transactions; 3.6.1 Long Running Unit of Work (LRUOW); 3.6.2 Conditional Messaging and D-Spheres; 3.6.3 Transactional Attitudes (TxA); 3.7 Conclusion; Bibliography; 4 Peer-to-Peer Middleware; 4.1 Introduction; 4.1.1 Peer-to-Peer and Grids; 4.1.2 Lack of Peer-to-Peer Middleware; 4.1.3 Group Communication; 4.1.4 Challenges; 4.1.5 Chapter Outline; 4.2 JXTA; 4.2.1 Overview; 4.2.2 Resources and Advertisements; 4.2.3 Peer Groups; 4.2.4 Services and Modules; 4.2.5 Protocols; 4.2.6 Messages and Pipes; 4.2.7 Security; 4.2.8 Relay and Rendezvous Peers; 4.2.9 Group Communication; 4.2.10 Applications using JXTA; 4.2.11 Challenges; 4.2.12 Summary; 4.3 P2P Messaging System; 4.3.1 Self-Organizing Overlay Networks; 4.3.2 Failure Tolerance; 4.3.3 Implicit Dynamic Routing; 4.3.4 Quality-of-Service; 4.3.5 System Model; 4.3.6 Network Abstraction Layer

## Sommario/riassunto

A state-of-the-art guide to middleware technologies, and their pivotal role in communications networks. Middleware is about integration and interoperability of applications and services running on heterogeneous computing and communications devices. The services it provides - including identification, authentication, authorization, soft-switching, certification and security - are used in a vast range of global appliances and systems, from smart cards and wireless devices to mobile services and e-Commerce. Qusay H. Mahmoud has created an invaluable reference tool that explores the ori