Distributed Applications
Verteilte Anwendungen
Module IN 2102

Applied Informatics / Cooperative Systems
Prof. Schlichter, TUM
Overview

Introduction

Architecture of distributed systems

Remote Invocation (RMI)

Basic mechanisms for distributed applications

Web Services

Design of distributed applications

Distributed file service

introduction of basic concepts for the design and implementation of distributed applications.

Architecture of distributed applications

Distributed object-based systems

Remote invocation (RMI)

Distributed shared memory

Design and Concepts of distributed applications

Distributed file service

Web Services

Lecture Content

Bibliography

Abbreviations
Discussion of various aspects, concepts and mechanisms of distributed applications.

Basic principles for the design of distributed applications.

Terminology, communication mechanisms, client-server model, aspects of remote invocation (RPC, RMI).

model for distributed applications.

happened-before relation, clocks for synchronization

Introduction to distributed transactions and group communication.

2 phase commit, aspects of consistent message delivery ("atomic multicast", virtual synchronization) in groups, group management.

Information replication and distributed file systems.

consistency of replicated information, concurrency control.

Designing distributed applications.

Web services

MDA (Model-Driven Architecture)

SOA modeling

Object-oriented distributed systems.

Impact of the object-oriented paradigm on design of distributed applications, especially Corba.

Secure communication in distributed systems.

The following literature was used to prepare this lecture.

Course Text Books


see also Web Site for references and additional information

George F. Coulouris, Jean Dollimore, Tim Kindberg, “Verteilte Systeme: Konzepte und Design”, Pearson Studium, 2005 (German)


Andrew S. Tanenbaum, Maarten van Steen, “Verteilte Systeme - Prinzipien und Paradigmen”, Pearson Studium, 2007 (German)

Further Reading


K. Birman, “Reliable Distributed Systems”, Springer, 2005

M. Liu, “Distributed Computing - Principles and Applications”, Pearson Addison-Wesley, 2004


Further Reading

M. Bell, "Service-Oriented Modeling", John Wiley&Sons, 2008
K. Birman, "Reliable Distributed Systems", Springer, 2005
M. Liu, "Distributed Computing - Principles and Applications", Pearson Addison-Wesley, 2004
Eric Newcomer, "Understanding Web Services", Addison-Wesley, 2002

abbreviations

API Application Programming Interface
BPEL4WS Business Process Execution Language for Web Services
B2B Business-to-Business
B2C Business-to-Consumer
CLSID class identifier (in the context of DCOM)
CORBA Common Object Request Broker Architecture
CSCW Computer Supported Cooperative Work
DCE Distributed Computing Environment (OSF)
DCOM Distributed Component Object Model
DIT Directory Information Tree (LDAP)
DME Distributed Management Environment (OSF)
DNS Domain Naming Service
DSM Distributed Shared Memory
EAR Enterprise Archive
EJB Enterprise Java Beans
GIOP General Inter-ORB Protocol
IDL Interface Definition Language
IETF Internet Engineering Task Force

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Remote Invocation (RPC/RMI)
Basic mechanisms for distributed applications
Web Services
Design of distributed applications
Distributed file service
Distributed Shared Memory
Object-Based Distributed Systems
Summary
Issues

Issues of the following section
- Motivation for distributed systems and distributed applications.
- Basic terminology for distributed systems, e.g., terms like distributed applications, and interface.
- Introduction to some influential historic distributed systems, such as NFS File system, Mach and Java 2 Platform Enterprise Edition.

Background

Key Characteristics of distributed Systems
Distributed application
Influential distributed systems

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