Organizational (1)

- **Course Volume**
  - 3 SWS lecture + 1 SWS exercise
  - 5 ECTS

- **Lectures**
  - Mondays (09:15 – 10:00, MI HS 2) and Tuesdays (14:30 – 16:00, Interim 2)
  - Lecture language: English
  - Recording using TeleTeaching Tool (TTT), recordings available via video server

- **Lecture material**
  - Available on our Web Site: [http://www11.in.tum.de/lehre](http://www11.in.tum.de/lehre)
  - PDF script for print and online use
  - Few modifications compared to material of SS 2013

Organizational (2)

- **Written exam – Klausur**
  - Will be scheduled soon
  - Registration via TUMOnline

- **Consultation – Sprechstunde**
  - After the lecture
  - Office Hours: Mondays 12 - 13
  - Or via Email: schlichter@in.tum.de

- **Exercises**
  - Goals: supplementary issues and aspects from practical experience
  - **Every Thursday, 09:00 – 10:00, 00.13.009A (Medien)** content of the exercise is part of the exam
  - Grade bonus: if 70% of homework score is achieved
  - Tutor: Dr. Frank Schütz. Email: Frank.Schuetz@interface-ag.de
  - Further contact: Dr. W. Wörndl. Tel: 18686. Email: woenndl@in.tum.de
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Overview

Introduction

Architecture of distributed systems

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

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.
  - hop-and-send-before-reception, 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.
Introduction

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

Development of computer technology

1950
specialized applications
(reserved computing time)
isolated data

1960
numerical applications
(batch)

1970
commercial applications
(Time Sharing)
data modeling

1980
presentation-oriented applications (personal workstation)
isolated data, desktop publishing

1990
distributed application
distributed information management
Multimedia

2000
internet computing
Web Services
service oriented architecture (SOA)
Variety of domains for distributed applications
  collaborative information spaces, workflow management, telecooperation, autonomous agents

Development of computer technology
Internet computing
Enterprise Computing