



---

# Distributed Systems

SoSe 2019

Roland Wismüller  
Universität Siegen  
roland.wismueller@uni-siegen.de  
Tel.: 0271/740-4050, Büro: H-B 8404

Stand: March 12, 2020



---

# Distributed Systems

SoSe 2019

## 12 Summary, Important Topics



### 1. Introduction

- ➔ Definition of a distributed system
- ➔ **Features / challenges of distributed systems**
- ➔ Architecture models: client/server, n-tier

### 2. Middleware

- ➔ Tasks of the middleware
- ➔ Communication-oriented and application-oriented middleware
- ➔ **Implementation of remote calls (proxy pattern)**

### 3. Distributed Programming with Java RMI

- ➔ Approach to create an RMI application
- ➔ Programming of server and client



### 4. Name Services

### 5. Process Management

- ➔ Graph partitioning, list scheduling, code migration

### 6. Time and Global State

- ➔ Synchronization of physical clocks
- ➔ Lamport's happened-before relation (causality relation)
- ➔ Lamport and vector clocks
- ➔ Consistent cuts, Chandy/Lamport algorithm



### 7. Coordination

- ➔ Election algorithms
- ➔ **Mutual exclusion (centralized, Ricart/Agrawala, ring)**
- ➔ **Multicast (reliability, order)**
- ➔ Transactions

### 8. Replication and Consistency

- ➔ Concept of consistency
- ➔ **Sequential consistency, release consistency**
- ➔ **Consistency protocols (primary-based, quorum-based)**



### 9. Distributed File Systems

### 10. Distributed Shared Memory

### 11. Fault Tolerance

- ➔ Failure models
- ➔ Physical redundancy, agreement
- ➔ Recovery