



Distributed Systems

Summer Term 2020

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

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Distributed Systems

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0 Organisation

About Myself



- ➔ Studies in Computer Science, Techn. Univ. Munich
 - ➔ Ph.D. in 1994, state doctorate in 2001
- ➔ Since 2004 Prof. for Operating Systems and Distributed Systems
- ➔ **Research:** Monitoring, Analysis und Control of parallel and distributed Systems
- ➔ **Mentor** for Bachelor Studies in Computer Science with secondary field Mathematics

- ➔ **E-mail:** roland.wismueller@uni-siegen.de
- ➔ **Tel.:** 0271/740-4050
- ➔ **Room:** H-B 8404
- ➔ **Office Hour:** Mo., 14:15-15:15 Uhr

About the Chair "Operating Systems / Distrib. Sys."



Andreas Hoffmann

andreas.hoffmann@uni-...
0271/740-4047
H-B 8405

- ➔ E-assessment and e-labs
- ➔ IT security
- ➔ Web technologies
- ➔ Mobile applications



Damian Ludwig

damian.ludwig@uni-...
0271/740-2533
H-B 8402

- ➔ Capability systems
- ➔ Compilers
- ➔ Programming languages



Lectures/Labs

- ➔ Rechnernetze I, 5 LP (every summer term)
- ➔ Rechnernetze Praktikum, 5 LP (every winter term)
- ➔ Rechnernetze II, 5 LP (every summer term)
- ➔ Betriebssysteme I, 5 LP (every winter term)
- ➔ Parallel Processing, 5 LP (every winter term)
- ➔ Distributed Systems, 5 LP (every summer term)

Teaching ...



Project Groups

- ➔ e.g., recording and analyzing car sensor data
- ➔ e.g., outlier detection in car sensor data

Theses (Bachelor, Master)

- ➔ Topic areas: secure virtual machine, parallel computing, pattern recognition in sensor data, e-assessment, ...

Seminars

- ➔ Topic areas: IT security, programming languages, pattern recognition in sensor data, ...
- ➔ Procedure: block seminar
 - ➔ 30 min. talk, 5000 word seminar paper



Lecture

➔ Monday **12:20** - 13:50, H-F 001

Exercises

➔ Tuesday, 10:15-11:45, H-F 104/105, **Start: 05.05.**

➔ Possibility for practical exercises in the laboratory H-A 4111

➔ You will receive the login credentials in the first exercise

➔ you have to accept the user regulations!

➔ Please fill in card key application form in advance

➔ let Mrs. Syska sign it (H-B 8403, Mon. - Fri., 09:00 - 12:00),
and then deliver it to Mr. Kiel (AR-P 209)

➔ user regulations and card key application form: see website



Information, Slides and Announcements

➔ <http://www.bs.informatik.uni-siegen.de/lehre/vs>

➔ If necessary, updates/supplements shortly before the lecture

➔ look at the date!

➔ For printing: use print service of the Student Council!

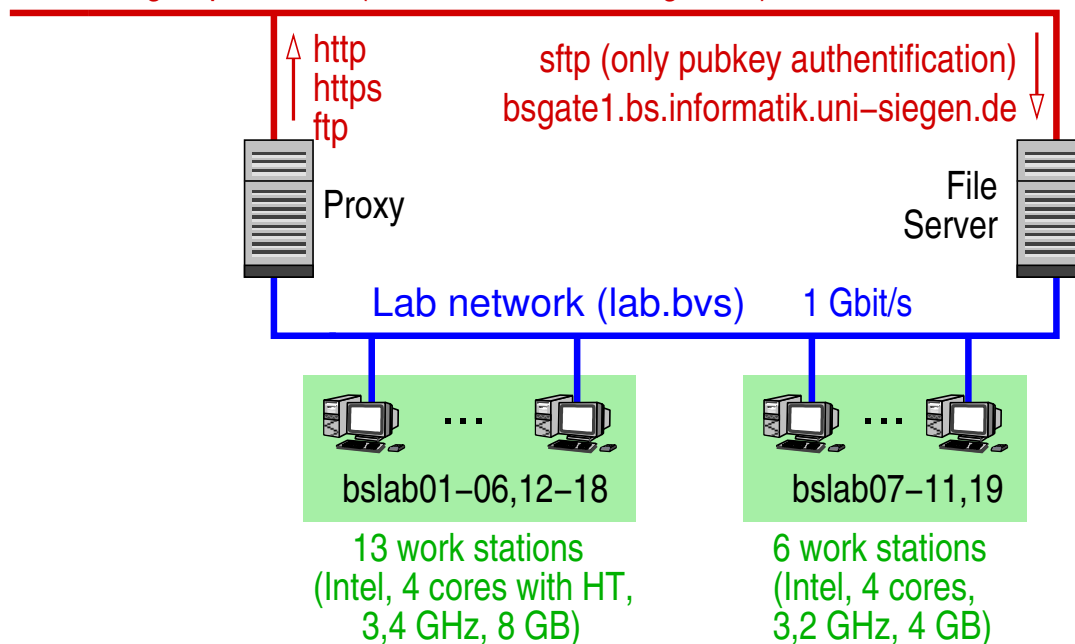
➔ Exercise sheets will be put online as PDF

➔ please print and process them yourself!



- ➔ Linux-PCs, private IP network, but `sftp` access to file server

Internet / group network (`bs.informatik.uni-siegen.de`)



Examination



- ➔ Oral examination
 - ➔ duration about 30 minutes
- ➔ Registration:
 - ➔ first register at the campus management system (`unisono`)
 - ➔ at least 1 week before the exam date
 - ➔ then fix a date with my secretary
 - ➔ at least 1 week before the exam date
 - ➔ Mrs. Syska, Room H-B 8403, 08:30 - 12:00
 - ➔ cancellation is possible up to 7 days before the exam
 - ➔ via `unisono`
 - ➔ please inform me, too!



- ➔ Introduction
- ➔ Middleware
- ➔ Distributed programming with Java RMI
- ➔ Name services
- ➔ Process management
- ➔ Time and global state
- ➔ Coordination
- ➔ Replication and consistency
- ➔ Distributed file systems
- ➔ Fault tolerance



- ➔ Understand the properties of distributed systems
 - ➔ absence of a global state
 - ➔ problems with synchronization and with consistency of replicated data
- ➔ Understand the approaches to solve the problems and be able to apply them to given challenges
- ➔ Distinguish architecture models for distributed systems as well as different types and tasks of middleware and be able to assess their usability for given problems
- ➔ Be able to develop simple distributed programs with Java RMI



- ➔ Andrew S. Tanenbaum, Marten van Steen. *Verteilte Systeme, Grundlagen und Paradigmen*. Pearson Studium, 2003.
(English: *Distributed Systems: Principles and Paradigms, 2nd Edition*. Pearson Education, 2016. Available [online](#).)
- ➔ Ulrike Hammerschall. *Verteilte Systeme und Anwendungen*. Pearson Studium, 2005.
- ➔ George Coulouris, Jean Dollimore, Tim Kindberg. *Verteilte Systeme, Konzepte und Design, 3. Auflage*. Pearson Studium, 2002.
(English: *Distributed Systems: Concepts and Design, 5th Edition*. Pearson Education, 2012.)
- ➔ Andrew S. Tanenbaum. *Moderne Betriebssysteme, 2. Auflage*. Pearson Studium, 2003.
- ➔ William Stallings. *Betriebssysteme – Prinzipien und Umsetzung, 4. Auflage*. Pearson Studium, 2003.



- ➔ Jim Farley, William Crawford, David Flanagan. *Java Enterprise in a Nutshell*. O'Reilly 2002.
- ➔ Cay S. Horstmann, Gary Cornell. *Core Java 2, Band 2 – Expertenwissen*. Sun Microsystems Press / Addison Wesley, 2008.
- ➔ Robert Orfali, Dan Harkey. *Client/Server-Programming with Java and Corba*. John Wiley & Sons, 1998.
- ➔ Torsten Langner. *Verteilte Anwendungen mit Java*. Markt + Technik, 2002.