Distributed Systems

Summer Term 2020

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Distributed Systems

Summer Term 2020

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

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H-B 8405

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

Damian Ludwig

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H-B 8402

- Capability systems
- Compilers
- Programming languages

Teaching

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

About the Lecture

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

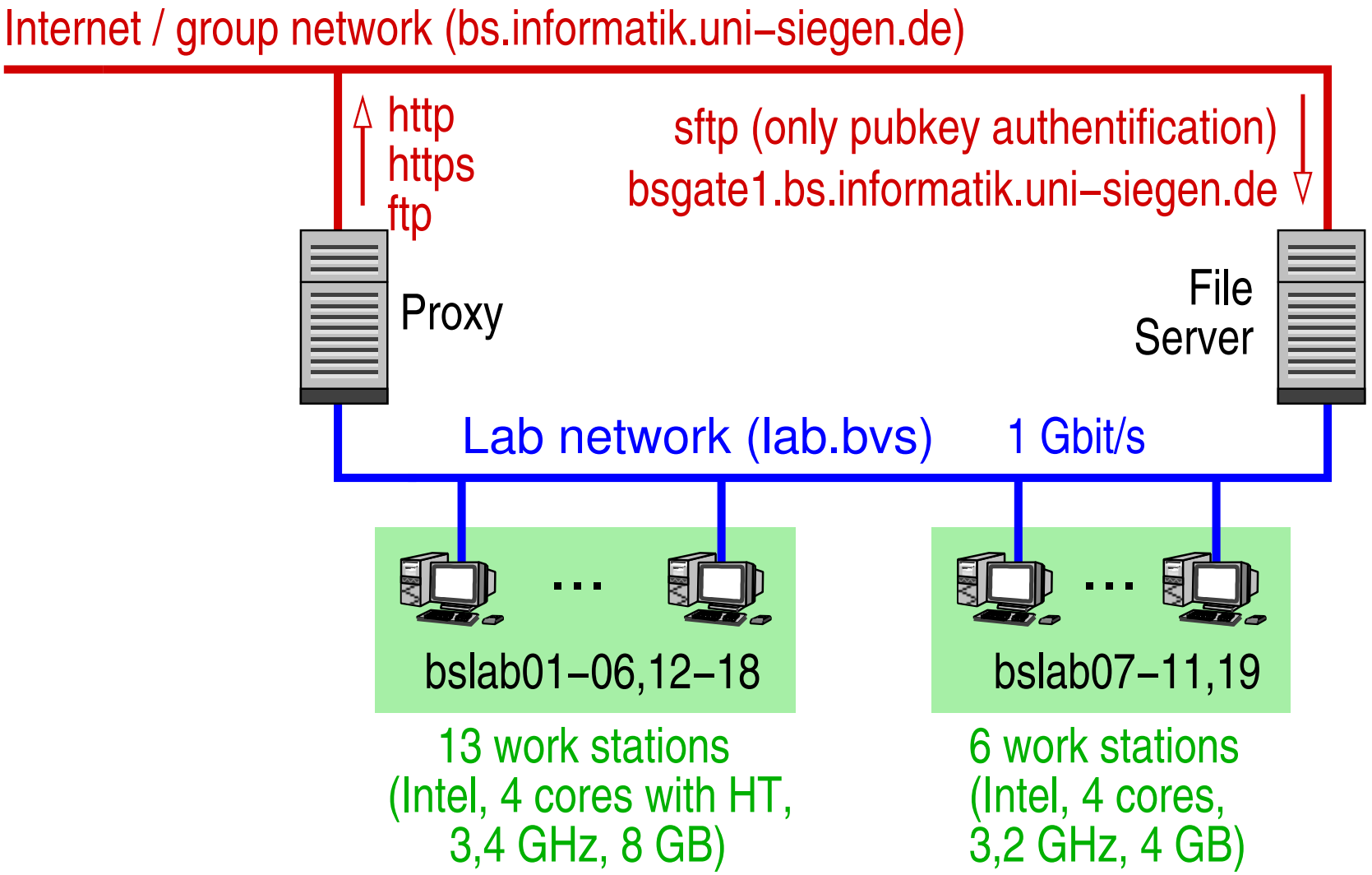
About the Lecture ...

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!

Computer Environment in the Lab Room H-A 4111

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



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!

Contents of the Lecture

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

Learning targets

- 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

Literature

- 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.

Literature ...

- 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.