Netzwerksicherheit [NetSec]

Dr.-Ing. Falko Dressler

Computer Networks and Communication Systems
http://www7.informatik.uni-erlangen.de/~dressler/
dressler@informatik.uni-erlangen.de

Systemsicherheit [SysSec]

Dr.-Ing. Jürgen Kleinöder

Distributed Systems and Operating Systems
http://www4.informatik.uni-erlangen.de/~jklein/
klein@informatik.uni-erlangen.de

Course Overview - NetSec

- **Cryptography**
  Basics, symmetric cryptography, asymmetric cryptography
- **Cryptographic Techniques**
  Modification check values, random number generation
- **Security Protocols**
  Cryptographic protocols, integrating security services into communication architectures
- **Security in Communication Protocols**
  Medium access (PPP, 802.1x, WLAN), network layer (IPSec), transport/session layer (SSL, TLS)
- **Security in Mobile Networks**
  Location privacy, pseudonyms, mix networks
- **Attack Detection**
  Attack detection and prevention, IP traceback

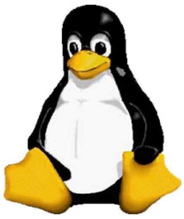
Course Overview - SysSec

Security in the context of operating systems

- **Authentication**
- **Authorization**
  Access Control Lists, Capabilities
- **Attack concepts and system weaknesses**
  Trojan horses, worms, privileged applications (s-bit problem)
- **Security concepts**
  Sandboxing, mandatory access control (AppArmor, SELinux),
  protection domains (Pentium architecture),
  secure booting, TPA, Palladium, SmartCards
  secure administration, tools for enhancing security

Exercises

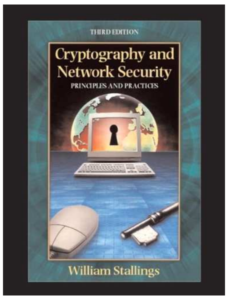
- Organization
  - Consolidation of course topics, extended studies
  - Working groups of 2-3 students
  - Mix of theoretic and practical exercises
- Overview
  - Lab training
  - Cryptographic algorithms
  - Certificates, PKI
  - Security analysis
  - Network monitoring and analysis
  - VPN, Firewalls (Linux, Cisco)
  - WLAN security (how to access secured WLANs)
  - Attack detection



Course Overview

- Material - NetSec
  - Günter Schäfer, "*Netzsicherheit - Algorithmische Grundlagen und ProtokolleMobile Communications*," dpunkt Verlag, 2003. (an English version is available)
  - William Stallings, "*Cryptography and Network Security: Principles and Practice*," Prentice Hall, 3rd ed, 2005.
- Material – SysSec
  follows

- News, updates, handouts, …
  http://www7.informatik.uni-erlangen.de/~dressler/lectures/netzwerksicherheit-ws0708/
  http://www4.informatik.uni-erlangen.de/Lehre/WS07/V_SYSSEC/



- Persons
  - Dr.-Ing. Falko Dressler (NetSec: lecture and exercises)
  - Tobias Limmer (NetSec: exercises)
  - Dr.-Ing. Jürgen Kleinöder (SysSec: lecture)
  - Michael Gernoth, Reinhard Tartler (SysSec: exercises)

Course Organization

- Lecture
  - NetSec: Monday, 14:15-15:45, H5
  - SysSec: Thursday, 10:15-11:45, H4
  - Common lectures for NetSec and SysSec on Monday **and** Thursday up to November 5th
- Exercises (in groups à 2-3 students) starting in November!
  - NetSec
    - Tuesday, 14:15-15:45, 01.153 CIP-Pool
    - Tuesday, 16:15-17:45, 01.153 CIP-Pool
    - Thursday, 16:15-17:45, 01.153 CIP-Pool
  - SysSec
    - Tuesday, 10:15 – 11:45, 0.156
    - Wednesday, 12:00 – 14:00, 01.153 CIP-Pool
- … see web page for more up-to-date information

Course Organization

- Examination
  - Computer science
    - NetSec in combination with [KS] (main subject: communication systems)
    - NetSec in combination with SysSec (main subject: operating systems)
    - SysSec in combination with Operating Systems or with Distributed Systems (main subject: operating systems)
  - CE / IuK: oral examination
  - Exercises are relevant!
- “Schein”
  - Oral examination at the end of the semester
  - “benoteter Schein”: successful processing of ALL exercises, the grade results form the oral examination
  - “unbenoteter Schein”: successful processing of ALL exercises, at least 50% must be achieved in the oral examination

NetSec - General Course Bibliography

[Amo94] E. G. Amorosi. *Fundamentals of Computer Security Technology.* Prentice Hall. 1994.

[Cha95] Brent Chapman and Elizabeth Zwicky. *Building Internet Firewalls.* O'Reilly, 1995.

[For94b] Warwick Ford. *Computer Communications Security - Principles, Standard Protocols and Techniques.* Prentice Hall. 1994.

[Gar96] Simson Garfinkel and Gene Spafford. *Practical Internet & Unix Security.* O'Reilly, 1996.

[KPS95] C. Kaufman, R. Perlman und M. Speciner. *Network Security – Private Communication in a Public World.* Prentice Hall. 1995.

[Men97a] A. J. Menezes, P. C. Van Oorschot, S. A. Vanstone. *Handbook of Applied Cryptography.* CRC Press Series on Discrete Mathematics and Its Applications. CRC Press, 1997.

[Sch96] B. Schneier. *Applied Cryptography - Second Edition: Protocols, Algorithms and Source Code in C.* John Wiley & Sons, 1996.

[Sta98a] W. Stallings. *Cryptography and Network Security: Principles and Practice.* Prentice Hall, 2nd ed, 1998.

[Sti95a] D. R. Stinson. *Cryptography: Theory and Practice (Discrete Mathematics and Its Applications)*. CRC Press, 1995.

[Sch03] G. Schäfer. *Netzsicherheit – Algorithmische Grundlagen und Protokolle*. dpunkt.verlag, 2003.