FG INET: Intelligent Networks

An-Institut Deutsche Telekom Laboratories

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INET: Research Group

- **Location**
  - Telefunkenhochhaus, 16. Stock

- **Office hours**
  - Tuesday 12:30 – 13:00
  - After the lecture or per e-mail

- **Contact**
  - Best per e-mail 😊

- **Teaching contact**
  - Fabian Schneider

- **Web site**
  - [http://www.net.t-labs.tu-berlin.de/](http://www.net.t-labs.tu-berlin.de/)
T-Labs

- Institute at TU Berlin funded by Deutsche Telekom AG
- Co-locates researchers from TU Berlin and project managers of Deutsche Telekom
- Two parts
  - Strategic research
    - 4 Research Groups + 30 Researchers + 40 Ph.D. students so far: INET, Quality and Usability (QU Lab)
  - Innovation development
    - Project work, e.g., IP-TV, Overarching AAA
Research interests

- Internet in general
- Clean slate network architectures
- Traffic measurement and characterization
- Wireless mesh networks
- Peer to peer and social networks
- Network security, e.g., intrusion detection
Sonja Buchegger, Ph.D.

- **Biography:**
  - Computer Science @ Uni Klagenfurt, Austria
    Uni Alicante, Spain / ETH Zurich, Switzerland (exchange student)
  - Networking @ IBM Research Zurich Lab (Researcher)
  - Communication Systems @ EPFL, Swiss Federal Institute of Technology in Lausanne (Dr.)
  - Information Systems @ UC Berkeley (Postdoc)
  - Networking @ Deutsche Telekom Laboratories (Senior Research Scientist)

- **Research Interests:**
  - Self-organized networks
    (peer-to-peer, mobile, sensor, vehicular, ..)
  - Economics and security
Peer-to-Peer social networks

- Facebook, StudiVZ, MySpace, etc. collect data about everyone, can even sell data to others. What if you don't want that?

- How can we have the cool features of online social networks, but with privacy?
  - Decentralization: peer-to-peer infrastructure
  - Protection: encryption and access control
Yannis Avramopoulos, Ph.D.

- Biography:
  - ECE @ Technical University of Athens, Greece
  - Electrical engineering @ Princeton University (Ph.D. advisor Prof Hisashi Kobayashi)
  - Computer Science @ Princeton University (Postdoc in Jennifer Rexford’s group)
  - Networking @ Deutsche Telekom Laboratories (Senior Research Scientist)

- Research Interests:
  - Secure routing
  - Secure measurements
  - Optimization of virtual networks
Security aspects of Internet communication

- Internet security architectures
- Secure traffic engineering
- Network neutrality
- Deployability of security architectures / protocols
Example of a research topic: Evaluating the benefits of re-routing

- Scenarios
  - P2P systems
  - Community networks
  - Traffic engineering via traffic redistribution
  - Wide area migration of virtual machines
  - ...
Example: Peer-to-Peer networks

- Can ISPs and P2P users cooperate?
- Goal:
  - Improved performance for users
  - Enable traffic control for ISP
- Idea:
  - ISPs: offer oracle that provides network distance info
  - P2P: use oracle to build P2P neighborhoods
- P2P oracle concept:
  - Service of AS / ISP
  - Input: list of possible dst IP addr. and src IP addr
  - Output: ranked list of dst IP addr.
    e.g. according to distances between src IP and dst IPs
Benefits of P2P oracle for topology

- without oracle
- with oracle
Teaching

- Lectures (Vorlesungen)
- Seminars (Seminare)
- Lab course (Praktika)
- Projects (Projekte)
- Theses (Diplom/Master/Bachelor)

- PGT: Project Group Meeting
Lectures

- Network protocols and architectures (VL+UE)
  - How does the Internet work ....
  - Base for all other INET classes

- Internet Routing (VL)
- Internet Security (VL)
- Internet Measurement (VL)
Seminars

- Network architectures
  - Emphasising:
    - Internet routing
    - Internet security
    - Internet measurement
  - Topic: current research paper
  - Task:
    - Summary paper + presentation
    - Participation in discussion during the seminar
  - Typically en block after the end of term
Lab courses

- Hands on exercises

- Protocol Design
  - Implementing network protocols (not applications)

- Router Lab
  - Configuring and managing networks
  - Internet experiments in a Lab
Projects and Theses

Topic:
- See Web pages
- Talk to members of INET
- Suggest your own topic

Work flow:
- Literature/background search
- Presentation of idea at project group meeting (PGT) (20 minutes 😊)
- Execution of idea / preparation of thesis document
- Presentation of results at PGT (20 minutes)