

# FG INET: Intelligent Networks

An-Institut Deutsche Telekom Laboratories

**Prof. Anja Feldmann, Ph.D.**

[anja@net.t-labs.tu-berlin.de](mailto:anja@net.t-labs.tu-berlin.de)  
<http://www.net.t-labs.tu-berlin.de/>

1

## 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/>

2

## 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

3

## 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

4

## 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

5

## 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

7

## Security aspects of Internet communication

- Internet security architectures
- Secure traffic engineering
- Network neutrality
- Deployability of security architectures / protocols

8

## 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
  - ...

9

## Example: Peer-to-Peer networks

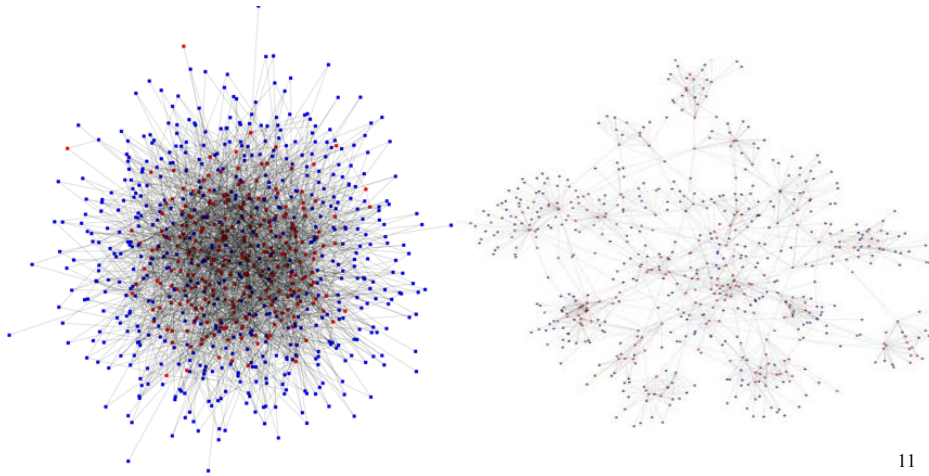
- Can ISPs and P2P users cooperate?
- Goal:
  - Improved performance for users
  - Enable traffic control for ISP
- Idea:
  - ISPs: offer oracle that provides network distance info
  - P2P: use oracle to build P2P neighborhoods
- P2P oracle concept:
  - Service of AS / ISP
  - Input: list of possible 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

10

## Benefits of P2P oracle for topology

without oracle

with oracle



11

## Teaching

- Lectures (Vorlesungen)
- Seminars (Seminare)
- Lab course (Praktika)
- Projects (Projekte)
- Theses (Diplom/Master/Bachelor)
  
- PGT: Project Group Meeting

12

## 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)

13

## 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

14

## Lab courses

- Hands on exercises
  
- **Protocol Design**
  - Implementing network protocols (not applications)
- Router Lab
  - Configuring and managing networks
  - Internet experiments in a Lab

15

## 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)

16