

# INET: Intelligent Networks and Management of Distributed Systems

An-Institut Deutsche Telekom Laboratories

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<http://www.net.t-labs.tu-berlin.de/>

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## INET: Research Group

- Location
  - Telefunkenhochhaus 16. Stock
- Office hours
  - After the lecture or per email
- Contact
  - Best per email☺
- Teaching contact
  - Fabian Schneider
- Web site
  - <http://www.net.t-labs.tu-berlin.de/>

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## 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 + 15 Ph.D. students so far: INET, Usability (QU)
  - Innovation development
    - Project work, e.g., IP-TV, Overarching AAA

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## Research interests

- ❑ Internet in general
- ❑ Traffic measurement and characterization
- ❑ Routing and mesh networks
- ❑ Peer to peer
- ❑ Network security, e.g., intrusion detection

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## Example of a research topic: Evaluating the benefits of re-routing

- Scenarios
  - Community networks
  - Mobility
  - P2P systems
  - Traffic engineering via traffic redistribution
  - Wide area migration of virtual machines
  - ...

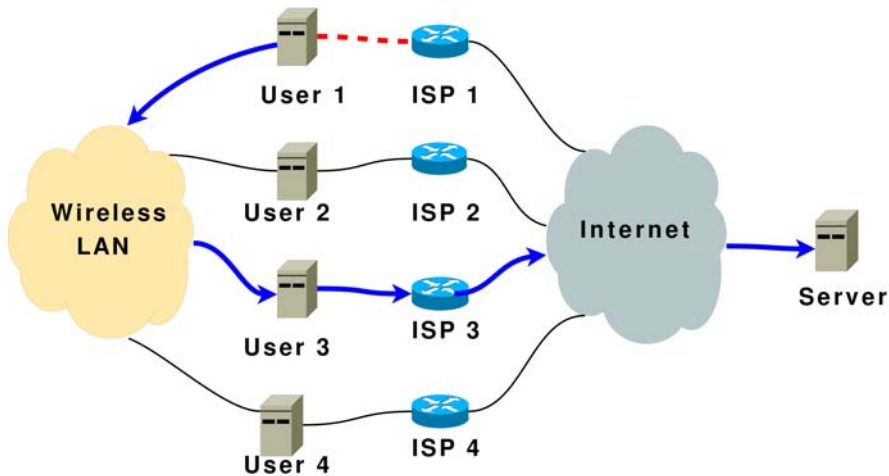
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## Scenario 1: Community Networks

- Can cooperating users benefit from sharing their access?
- Goal:
  - Improved performance for users
- Idea:
  - Allow flow re-routing
  - Significant benefit for bandwidth-limited flows

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## Scenario 1: Community Networks (2)



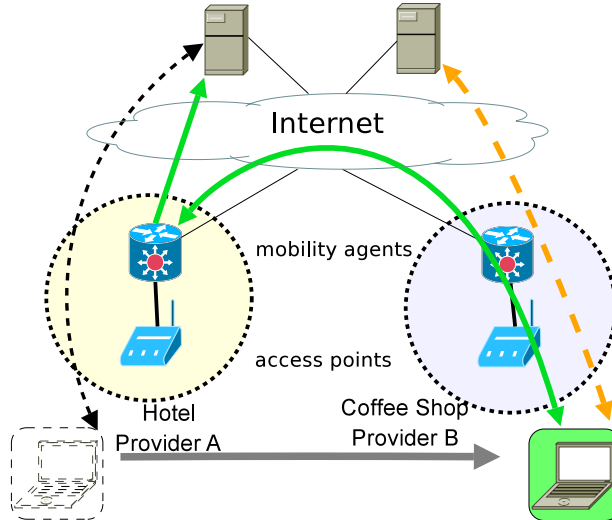
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## Scenario 2: Support for Mobility

- Can we support seamless mobility
- Goals:
  - Support users without permanent IP addresses
  - No overhead for new connections
  - Preserve sessions across network locations
  - Robust, scalable and incrementally deployable
  - Address economics of roaming
- Idea:
  - Only solve persistence problem
  - Take advantage of heavy-tail nature of traffic

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## Scenario 2: Support for Mobility (2)



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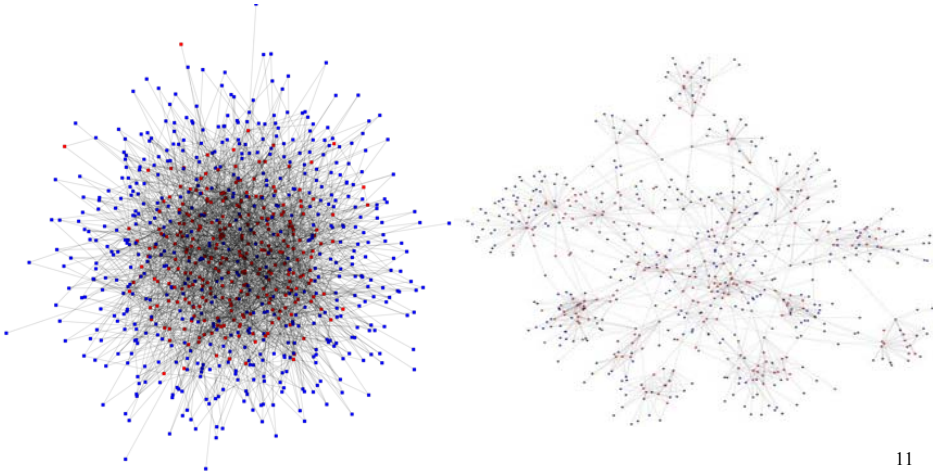
## Scenario 3: Peer-to-Peer networks

- ❑ 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**
- ❑ 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<sup>10</sup>

## Benefits of oracle for P2P topology

without oracle

with oracle



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## Teaching

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

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## Lectures

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

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## 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

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## Lab courses

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

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## 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)

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## Weekly schedule WS 07/08

### □ Tuesday

- 14 – 16: Lab Tutorial (TEL Auditorium 20th floor)

### □ Wednesday

- 10 – 12: Lecture (MA042)
- 14 – 16: Lecture tutorial (planned) (TEL Auditorium)
- 16 – 18: PGT (TEL Auditorium)

### □ Thursday

- 14 – 16: Lecture tutorial (planned) (TEL Auditorium)

### □ Friday

- 14:30 – 16: Cookie meeting (TEL 18th floor)