Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Institute of Computer Science
Chair of Communication Networks
Prof. Dr.-Ing. P. Tran-Gia

Future Internet Applications and Overlays (FIA Research Group)

www3.informatik.uni-wuerzburg.de

FIA Team

Head	Tobias Hoßfeld
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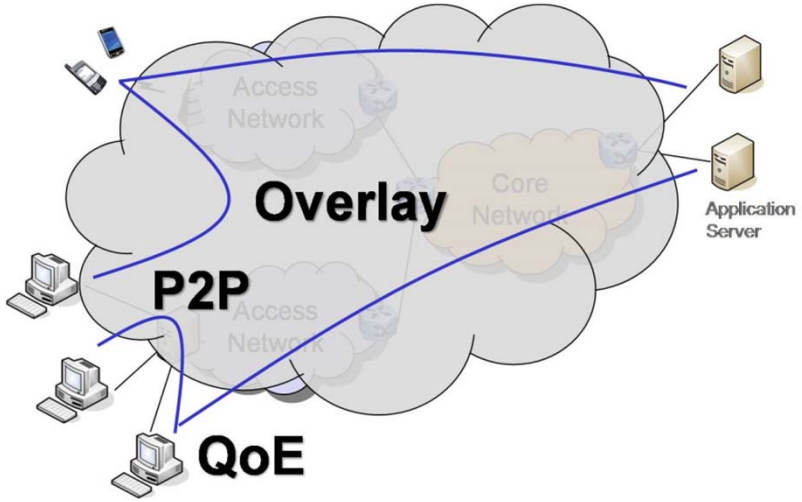
Student Helpers	…



Introduction

- Dr. Tobias Hossfeld (University of Würzburg)
  - received PhD in 2009 on „ Performance Evaluation of Future Internet Applications and Emerging User Behavior”
  - Group Leader „Future Internet Applications and Overlays“
- Research interests:
  - Social networks and Internet dynamics
  - Crowdsourcing and Web 2.0 technologies
  - Video streaming applications: IPTV, P2PTV, 3DTV
  - Virtualization and Cloud Computing
  - Traffic characterization and identification
  - Quality of Experience
- Projects:
  - Involved in several national and international projects
    - Siemens, Bosch, Bertelsmann, Datev, … ,
    - BMBF G-Lab, FP7 SmoothIT, FP7 Euro-NF, COST Qualinet, DFG projects
  - Internet Research Center (IRC) at University of Würzburg
- http://www3.informatik.uni-wuerzburg.de/research/fia

Introduction

- Frank Lehrieder (University of Wuerzburg, Chair of Communication Networks)
  - Researcher „Future Internet Applications and Overlays“

- Research interests:
  - P2P-based content distribution networks
  - Simulative and analytical performance evaluation
  - Resource management in NGN (pre-congestion notification)
- Projects
  - Simple Economic Management Approaches of Overlay Traffic in Heterogeneous Internet Topologies (SmoothIt, 6/2009 – today)
  - ISP-friendly Peer-assisted Content Distribution (ISPeer, 9/2009 – 5/2010)
  - German-Lab (G-Lab, 1/2009 – today)

Introduction

- Dr. Simon Oechsner (University of Würzburg)
  - received PhD in 2010 on „Performance Challenges and Optimization Potential of Current P2P Overlay Technologies”

- Research interests:
  - Structured search overlays
  - Locality-awareness and traffic optimization
  - Scalable video codecs
  - Video streaming applications
  - Distributed CDNs
  - Geo-location aware overlay structures

- Projects:
  - Involved in several national and international projects
  - industrial cooperation projects: NSN, Siemens AG, Datev, ATG,
  - research projects: BMBF funded G-Lab project, EU FP7 STREP project SmoothIT

- http://www3.informatik.uni-wuerzburg.de/staff/oechsner/

Introduction

- Thomas Zinner (University of Wuerzburg, Chair of Communication Networks)
  - Researcher „Future Internet Applications and Overlays“

- Research interests:
  - Performance evaluation and optimization
  - Multipath Transport Protocols
  - Quality of Experience (QoE), QoE control and QoE management

- Projects:
  - BSI project „Architecture and Operation of a secure and resilient IT – Early Warning Infrastructure“ (1.1. 2007 – 31.12 2008)
  - German-Lab (Glab, 1.1.2009 - today)
  - FP6-NoE EuroFGI (1.1. 2007 – 30.6.2008, local coordinator)
  - FP7-NoE EuroNF(1.1.2008-30.6.2011, local coordinator)
  - SJRP MultiNext(1.4.2010-30.3.20011, project leader)

Research Interests

- Internet Applications and Services
  - IPTV, P2PTV, 3DTV: live streaming and video-on-demand
  - Content distribution platforms like YouTube or BitTorrent
  - Mobile P2P and multi-homing
  - Online Social Networks and sophisticated services (iPhone)
  - Crowdsourcing: clickworkers and microjobs

- Overlays
  - Performance evaluation and optimization of overlays, P2P architectures, CDNs (e.g. ALTO)
  - Design of new CDN mechanisms and architectures
  - Network virtualization
  - Management of coexisting networks

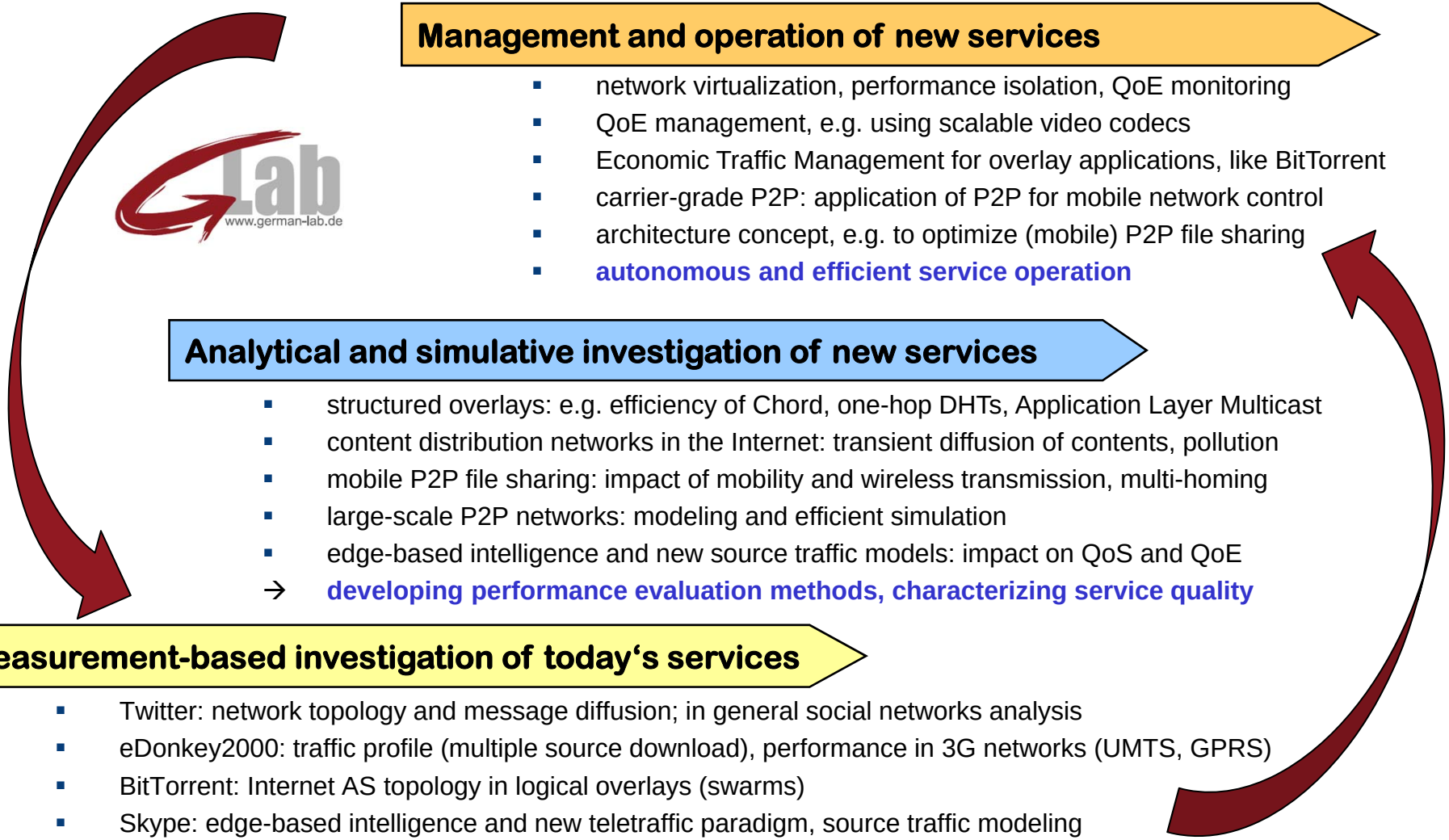
Goal

- Modeling of
  - Application behavior and network traffic profile
  - Quality of Experience and user behavior
  - Internet dynamics

- Future Internet Applications driven by
  - new scenarios: high-definition video streaming with quality management adapting to device and access heterogeneity
  - new technologies: virtualization to improve flexibility for the creation of network and application services
  - new services: 3DTV, social search, trustful services based on social networks, Internet collaboration platforms

- Interdisciplinary approach

FIA Research Methodology



Former Projects

- Mopi (funded by Siemens AG)
  - Feasibility of eDonkey file-sharing in mobile networks
  - Architecture concept to overcome restrictions of today's systems
- Mobile P2P (funded by DFG)
  - mapping of P2P mechanisms to mobile and wireless networks
  - modifications to characteristics of these environments

- Capi (funded by Siemens AG)
  - support of vertical handover: mobility in heterogeneous access technologies; edge-based, service autonomic, and multiple providers; "carrier-grade": fast (QoS), dependable
  - self-configuration of access points: reduction of OPEX; "carrier-grade": self/re-organization speed, robustness

- MAX and PriMa (funded by Siemens AG)
  - P2P-based architecture of a high-performance lookup system
  - strict service requirements, but flexibility needed
  - prototypical implementation and measurement studies

Current Projects

- SmoothIT (FP7 STREP IST Project)
  - Structure overlays by means of incentive mechanisms → optimal for both, user communities and ISPs
  - Advance traffic management beyond traditional limits → economic traffic management, e.g. locality promotion
- ISPeer (funded by Euro-NF, FP7 NoE)
  - decrease operator's costs emerging from P2P traffic, e.g. due to inter-domain traffic, by implementing caching entities

- COMCON (funded by BMBF within G-Lab)
  - Provider and operator-grade management and control of coexisting networks (by network virtualization)
  - Intelligent isolation of slices, efficient and effective QoE and QoS monitoring for virtualized networks
- MULTI-NEXT (funded by Euro-NF, FP7 NoE)
  - Concurrent Multipath Transmissions in an Experimental Facility
- VNREAL (funded by Euro-NF, FP7 NoE)
  - Virtual Network Resource Embedding ALgorithms

Current Projects

- G-Lab (Phase 1, funded by BMBF)
  - QoE Management with Scalable Video Codecs for Future Video Streaming Systems
  - QoE Models for video streaming
  - P2P Architecture and mechanisms to realize QoE Management
- COST Qualinet (funded by EU)
  - European Network on Quality of Experience in Multimedia Systems and Services (Jan 2011 – Nov 2014)

Ongoing and Future Work

- Quality of Experience
  - Active user tests based on crowdsourcing
  - Modeling QoE for web traffic wrt. temporal dynamics
  - QoE Model for YouTube taking into account stalling
- Application-Layer Traffic Optimization
  - Implementation as Vuze Plugin
  - Mechanisms to achieve win-win-situation for P2P and CDNs
- Online social networks
  - Measurement methodology to crawl OSNs
  - Modeling information diffusion in OSNs