Overview of Research Activites at Uni-Zg: QoE-Centric Management in Software-Defined Networks

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Outline

- Introduction to the Networked Media (NetMedia) research group
- Research activities on QoE-centric management
  - QoE-driven resource allocation
  - QoE-centric flow routing
- An overview of the project ICTGEN

The NetMedia group: who we are

- Affiliated with the University of Zagreb, Faculty of EE and Computing, Department of Telecommunications

  http://www.fer.unizg.hr/tel/en/research/research_groups/netmedia

- Members:
  - professor Maja Matijasevic
  - assistant professors Lea Skorin-Kapov and Ognjen Dobrijevic
  - postdoctoral researchers Sanja Grubesa, Tomislav Grgic, Mirko Suznjevic and Krunoslav Ivesic
  - doctoral student Ivan Slivar

The NetMedia group: research goals

- Specification of QoS/QoE requirements for advanced and interactive multimedia services; model relationships between network-level and application-level metrics
- Case studies: multi-player online and cloud-based networked games, video conferencing, adaptive video streaming
- Focus on:
  - user behavior-based traffic modeling
  - QoE-driven resource allocation
  - context-aware online charging
  - cooperative QoE-centric management
  - software-defined networking as technical realization

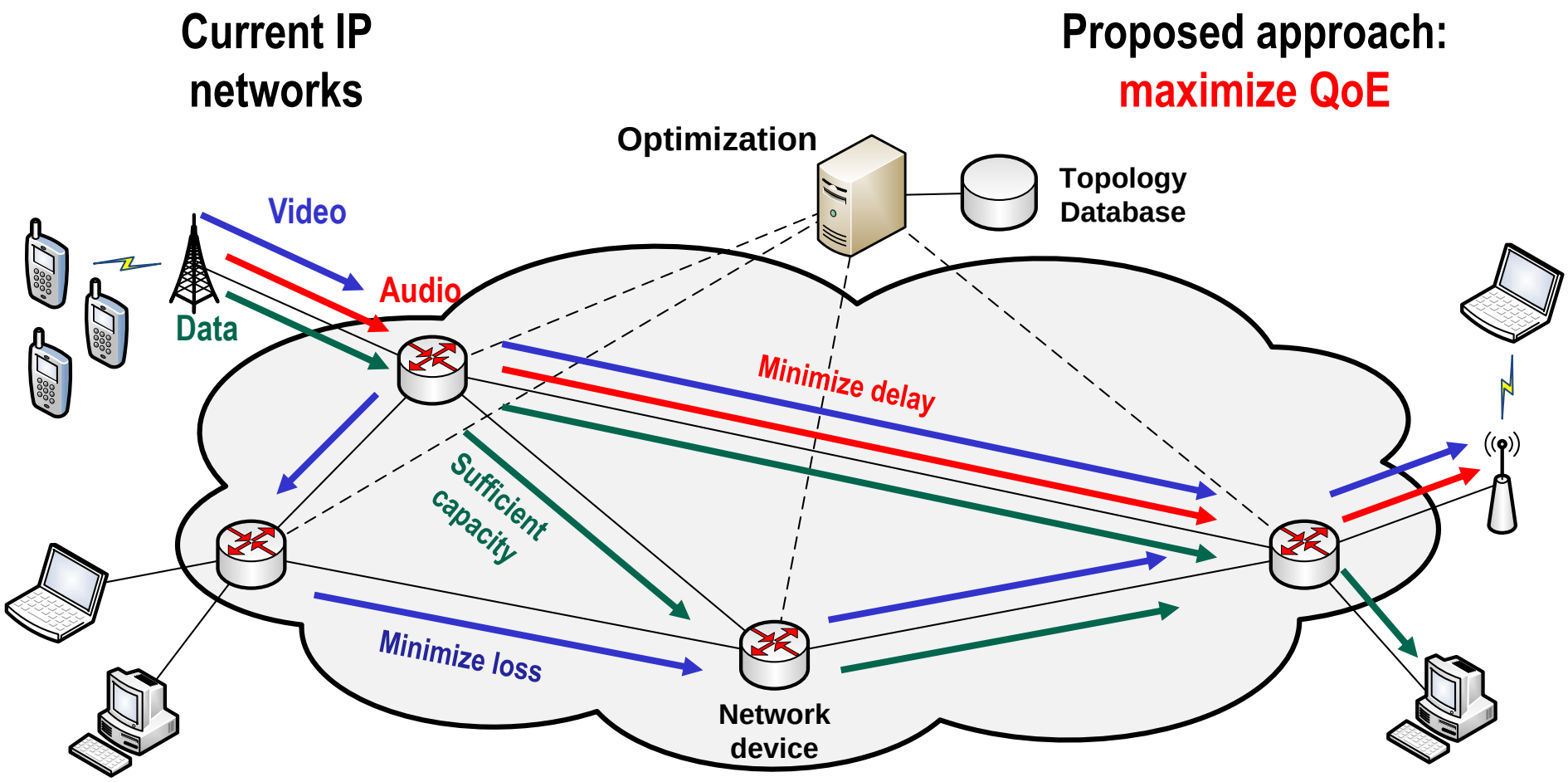
QoE-centric management

- QoS-/QoE-based application-level service negotiation and adaptation
  - SIP signaling in the scope of 3GPP mobile networks
- QoE-driven resource management
  - Knowledge-based resource (re)allocation in the scope of LTE
- QoE-centric flow routing
  - Flow routing for software-defined networks that considers different QoE impact factors
- Cooperative QoE management schemes
  - Coordination and information exchange among actors involved in service delivery chain to achieve more efficient QoE management

QoE-centric flow routing: motivation

- Current IP networks: (media) flows typically use the same path
  - Might not be the “optimal” one with respect to multimedia service demands on resources and resource limitations
- Considering multimedia service/media flow type and end-users’ expectations on QoE:
  - calculate the “best available” network path for each media flow in order to (fairly) maximize end-user QoE
- Exploit QoE models to estimate a measure of QoE
  - Going beyond network-related parameters (QoS) to provide more accurate insight to impacts on QoE → *QoE-centric flow routing*

QoE-centric flow routing: illustration



QoE-centric flow routing: optimization model*

- Goal: to maximize aggregated QoE value across all end-users and multimedia sessions in a network domain
- Perform centralized, multi-user path optimization
  - Consider different multimedia services and media types
  - Flexibility to use different QoE models
- The problem is formulated as a mixed integer linear program
  - Based on the *generalized network flow* model with multi-commodity flows
  - Specified and solved by using IBM ILOG CPLEX Optimization Studio

** O. Dobrijevic, A. Kassler, L. Skorin-Kapov, M. Matijasevic, "Q-POINT: QoE-Driven Path Optimization Model for Multimedia Services," Proc. of the 12th Int'l Conference on Wired & Wireless Internet Communications (WWIC 2014), in Lecture Notes in Computer Science, vol. 8458, pp. 134-147, 2014.*

An overview of project ICTGEN

Project ICTGEN

Instead of a conclusion

- Feel free to contact us so as to discuss possible collaboration topics or just to...
- visit Zagreb...
- and have a co