

Colloquium



Date, time & venue: Monday, April 30, 2018, 12:00-1:15 in BB209

Title: **Network Assisted Content Distribution for Adaptive Bitrate Video Streaming**

Speaker: **Prof. Michael Zink, University of Massachusetts Amherst**

Abstract: State-of-the-art Software Defined Wide Area Networks (SD-WANs) provide the foundation for flexible and highly resilient networking. In our work we design, implement and evaluate a novel architecture (denoted SABR) that leverages the benefits of SDN to provide network assisted Adaptive Bitrate Streaming. With clients retaining full control of their streaming algorithms we clearly show that by this network assistance, both the clients and the content providers benefit significantly in terms of QoE and content origin offloading. SABR utilizes information on available bandwidths per link and network cache contents to guide video streaming clients with the goal of improving the viewer's QoE. In addition, SABR uses SDN capabilities to dynamically program flows to optimize the utilization of CDN caches.

Backed by our study of SDN assisted streaming I will discuss the change in the requirements for network-to-player APIs that enables flexible video streaming. I will illustrate the difficulty of the problem and the impact of SDN-assisted streaming on QoE metrics using various well-established player algorithms. In addition, I will present results from an evaluation of SABR together with state-of-the-art DASH quality adaptation algorithms through a series of experiments performed on a real-world, SDN-enabled testbed network with minimal modifications to an existing DASH client. In addition, a comparison of the performance of different caching strategies in combination with SABR is presented. Our trace-based measurements show the substantial improvement in cache hit-rates and QoE metrics in conjunction with SABR indicating a rich design space for jointly optimized SDN-assisted caching architectures for adaptive bitrate video streaming applications.

In conclusion, a short overview on my additional research in the area of available bitrate streaming will be given. This will include an overview on a systematic approach to reproducible DASH player comparisons and fast segment retransmissions over QUIC.

Speaker's brief bio: Michael Zink is currently an Associate Professor in the Electrical and Computer Engineering Department at the University of Massachusetts Amherst. His research interests are in cyber-physical systems, multimedia distribution, and Future Internet Architectures. In the area of multimedia streaming his work has focused on Available Bitrate Streaming and Quality of Experience. He is Co-Director of the NSF Engineering Research Center for Collaborative Adaptive Sensing of the Atmosphere, where his research focuses on closed-loop sensing system for severe weather detection and warning. As PI for several GENI projects he contributed to the creation of an "at-scale" Future Internet Testbed. Prof. Zink is a Senior Member of the IEEE, a recipient of an NSF CAREER Award, and received the DASH-IF Excellence in DASH Award for his work on quality adaptation for DASH. He received his M.S. and Ph.D. in Electrical Engineering from Darmstadt University of Technology.