

Video traffic on the Internet is constantly growing; networked multimedia applications consume a predominant share of the available Internet bandwidth. A major technical breakthrough and enabler in multimedia systems research and of industrial networked multimedia services certainly was the HTTP Adaptive Streaming (HAS) technique. This resulted in the standardization of MPEG Dynamic Adaptive Streaming over HTTP (MPEG-DASH) which, together with HTTP Live Streaming (HLS), is widely used for multimedia delivery in today's networks. Existing challenges in multimedia systems research deal with the trade-off between (i) the ever-increasing content complexity, (ii) various requirements with respect to time (most importantly, latency), and (iii) quality of experience (QoE). Optimizing towards one aspect usually negatively impacts at least one of the other two aspects if not both.

This situation sets the stage for our research work in the ATHENA Christian Doppler (CD) Laboratory (Adaptive Streaming over HTTP and Emerging Networked Multimedia Services; <https://athena.itec.aau.at/>), jointly funded by public sources and industry.

In this talk, we will present selected novel approaches and research results of the first year of the ATHENA CD Lab's operation. We will highlight HAS-related research on: (i) multimedia content provisioning (machine learning for video encoding); (ii) multimedia content delivery (support of edge processing and virtualized network functions for video networking); (iii) multimedia content consumption and end-to-end aspects (player-triggered segment retransmissions to improve video playout quality); and (iv) novel QoE investigations (adaptive point cloud streaming). We will also put the work into the context of the international multimedia systems research.