# DASH over CCN: A CCN Use-Case for a Social Media based Collaborative Project

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Social networks have become an integral part of modern life, driving more and faster communication than ever before. For politics, business, and pleasure these new connections are shaping our world. SocialSensor is a European funded project (FP7) that is developing a new framework for enabling real-time multimedia indexing, search, and access across multiple social media sources[1]. For this reason, efficient content distribution and maintaining Quality of Service (QoS) under difficult network conditions is essential.

Content Centric Networking (CCN) [1] has been designed for efficient content delivery and is also well suited for multimedia applications. To ensure QoS in difficult network conditions, i.e., large round trip times and tremendous bandwidth fluctuations, it is necessary to adapt the content dynamically according to these conditions. Dynamic Adaptive Streaming over HTTP (DASH) is an emerging standard for adaptive streaming over HTTP, recently ratified by ISO/IEC MPEG [2, 3]. In this paper, we report on our findings of applying DASH over CCN in the context of a larger collaborative project.

The Alpen-Adria-Universität (AAU) Klagenfurt has contributed significantly to the standardtization of MPEG-DASH and provides a borad range of tools [2] such as the DASH VLC Plugin, DASHEncoder, libdash, MPD Validator, and DASH-JS (JavaScript client for instant Web integration) [4]. Like JCP-Consult, the AAU is a partner in the SocialSensor project. DASH supports different media formats, e.g., segmented ISO Base Media File Format (ISOBMFF) [5], which divide the media file into segments of different bit rates, resolutions, etc. These segments are represented by their URL in a so-called Media Presentation Description (MPD) file. At runtime the DASH client automatically downloads the most appropriate segment based on the users' context, i.e., bandwidth conditions, preferences, etc.

Although DASH is primarily designed for HTTP, its modular design allows HTTP to be substituted by CCN (or any other delivery protocol). In contrast to the native DASH approach, segments can be cached more efficiently in the network which reduces latency and congestion. Figure 1 presents the architecture of DASH over CCN (components that are adapted with respect to the traditional DASH architecture are highlighted in purple). We identified two ways to use DASH over CCN. First, a HTTP proxy service that transforms a HTTP request to a corresponding Interest Message and is responsible to ensure a reliable response. Second, a native CCN interface within the DASH client which uses a CCN naming scheme (CCN URIs) to denote segments in the MPD file. When the DASH client requires a particular segment, a CCN Interest Message is generated by the CCN access component. Finally, the Interest Messages are satisfied by video segments that are stored in the network (video segments on CCN nodes).

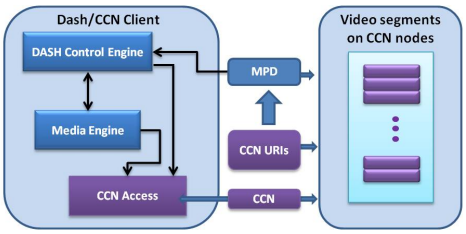


Fig. 1. DASH over CCN architecture.

The adaptation of DASH to work over CCN proved to be relatively straightforward. We are currently in the process of testing the effect on QoS of DASH over IP and DASH over CCN in our test-bed. We also plan to install CCNx on PlanetLab to make a further test in a real network environment. Additionally, media segments can be aggregated automatically by the CCN network nodes, e.g., due to the bandwidth conditions of the corresponding interface. This may reduce the overhead cost necessary to express an Interest Message for subsequent segments and is planned as future work.

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[2]see DASH at ITEC/Alpen-Adria-Universität Klagenfurt, http://dash.itec.aau.at

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