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PII: S0140-3664(17)30143-3
DOI: 10.1016/j.comcom.2018.06.007
Reference: COMCOM 5716

To appear in: *Computer Communications*

Received date: 7 February 2017
Revised date: 8 December 2017
Accepted date: 13 June 2018

Please cite this article as: JanFizza Bukhari, Jun-Hyuk Park, Wonyong Yoon, Providing Multicast Services over SDN-evolved LTE Network: Architecture, Procedures and Performance Analysis, *Computer Communications* (2018), doi: 10.1016/j.comcom.2018.06.007

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Abstract

The recent innovation in cellular technologies like LTE/LTE-Advanced has increased the demand of high bandwidth services e.g. mobile Internet Protocol TV (IPTV), on-demand video streaming etc. However, current cellular multicast service called Evolved Multimedia Broadcast Multicast Service (eMBMS) is not enough in terms of IPTV service provisioning, flexibility, and efficiency. Software-defined networking (SDN) being an emerging networking paradigm offers its services to program such cellular networks, providing a remotely configurable forwarding plane. This paper enlightens the notion of SDN in cellular multicast data transmission within eMBMS networks. It presents an objective sketch of transforming current multicast cellular communication into OpenFlow based SDN-evolved communication. We perform the first fine-grained analysis of common multicast procedures (group join, handover etc.) involved in both the current and SDN-evolved eMBMS network along with the supporting simulation results while providing multimedia services to the users. Considering user plurality of multicast services, we model the user requests as independent events of a Zipf-like distribution and find out the correlation among multimedia content popularity, operational load on the network and delay metrics. This paper provides a comparison of both the networks, summarizes the significant differences between the two, and highlights the effectiveness of our proposed SDN-evolved multicast approach in terms of minimized network operations, reduced delays, reliable and streamlined multicast tree construction.

Keywords: LTE, eMBMS, SDN, OpenFlow, Zipf-like distribution

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