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Thème

Elaboration and Implementation of an efficient strategy for the
transport of multicast stream through multipath networks

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Abstract

Modern networks and applications required to handle and communicate an increasing amount of data, so they take advantage of multiservice, i.e. they can provide several services concurrently on the basis of one transport platform. In addition, to transmit traffic packets of IPTV service, distance learning, database replication, multicast which is the most efficient and viable mechanism, it is therefore widely used for transporting them over IP networks.

However, the transport of multicast streams in networks offering multiple paths remains an open problem, because nowadays transmission control protocol (TCP) is the most popular protocol to transmit and deliver information reliably, that makes use of a single path connection, without benefiting from multihoming and multiple paths which are increasingly available to end point devices.

Multipath multicast has been developed to address the multipath unicast limits which can improve the user experience, reduce overall network congestion in the perspective of multicast streaming, minimize the bandwidth consumption and avoid delivering multicast traffic to network zones not interested in receiving it. The MPTCP multihoming protocol aims to make use of path diversity, in order to offer a better overall network connectivity, increasing failures resilience, performing load balance between available paths, when more than one is available, and to allow multihoming support without the need to modify the already existing devices currently scattered over the network, and to achieve larger throughput gains in multimedia streaming.

This work proposed an effective strategy based on advanced traffic analysis techniques, and UDP / TCP statistics addressed the conception, the implementation and the evaluation of this novel solution which is intended to be efficient for load-sharing transport of multicast flows in multipath networks by deploying MPTCP as transport layer protocol for multicast streaming.

Keywords: Multihoming, Multicast, Multipath, MPTCP, Streaming, Throughput, IPTV.