Performance evaluation of SIP-based multimedia services in UMTS

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Abstract

With an ever increasing penetration of IP technologies and the tremendous growth in wireless data traffic, the wireless industry is evolving the mobile core networks towards IP technology. The third Generation Partnership Project (3GPP) has specified an IP multimedia sub-system (IMS) in UMTS Release 5/6, which is adjunct to the UMTS packet-switched (PS) GPRS core network. This IP-based network provides full packet call control capabilities by using the text-based Session Initiation Protocol (SIP). Initial indications, as to the signalling delay associated with SIP messages, have concerned mobile operators about the viability of SIP services over the UMTS air interface. This article provides an insight into the UMTS system performance, focusing on selected UMTS SIP-based services. Typical services with real-time requirements such as voice as well as delay-sensitive and non-sensitive applications, such as real-time chat and instant messaging services are investigated. Furthermore, the paper discusses and analyses the requirements and possible solutions for improving efficiency of SIP usage in a wireless environment through signalling protocol message compression. Results of a performance evaluation of SIP signalling scenarios are presented in terms of time delay and message overload in the system. Results show that message compression can considerably reduce SIP message transmission time on the radio access network while core network delay contributions are found to be still high.

Keywords: UMTS; SIP services; Multimedia services; Performance evaluation

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