4-Class UMTS Traffic Emulation

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Published in:
Proceedings of the 12th International Union of Radio Science (URSI) Forum, Brussels (Belgium), 10 December 2004

Publication date:
2004

Document Version
Peer reviewed version

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1. INTRODUCTION

Traffic emulation is an essential research phase towards the deployment of the UMTS. We present here an extension to the traffic generator *TG* which enables to generate the four UMTS traffic classes proposed by the 3GPP.

2. TRAFFIC MODEL

In [1] the 3rd Generation Partnership Project (3GPP) has defined four classes of services that need to be provided in UMTS. To characterise a single-user traffic, we fit each of these classes in a three-level model [2]. Here is a quick run-down of their signification: the session-level lasts as long as the application is running, its statistics are mainly influenced by user behaviour. The connection-level describes the connection behaviour of a single session, the pattern chosen for our sources is based on an On-Off (High-Low) model in which it is possible to generate traffic on both states. Finally, for each state of the connection-level, the packet-level describes the packet inter-arrival and size distribution. Based on this level division, we have modeled the four traffic classes in terms of statistical distributions, in line with literature [2,3] or 3GPP standards [4,5] when applicable.

To generate these different traffics, we used an enhanced version of Traffic Generator (*TG*[1]) implementing the Pareto distribution as well[2]. We simulated five User Equipments (UE) connected to the same NodeB, each of them generating and receiving all kinds of traffic during 50,000 seconds (about 14 hours). The simulation took place on our UMTS testbed[3]. In order to simultaneously emulate several autonomous UEs, we coded a control panel based on multi-thread programming and virtual network interface management. The role of this control panel is to facilitate the UE management by delegating them a single thread and an IP address.

3. REFERENCES

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[3] A. Reyes, E. Gonzalez-Parada, E. Casilari, J.C. Casasola, and A. Díaz-Estrella. *A page-oriented www traffic model for wireless system simulations*. ITC16, pages 1271-1280, 1999.
[4] Technical Specification Group Radio Access Network. *TR 25.896 V6.0.0, Feasibility Study for Enhanced Uplink for UTRA FDD*. 3GPP, April 2004.
[5] Technical Specification Group Radio Access Network. *TR 25.933 V5.4.0, IP transport in UTRAN (Release 5)*. 3GPP, January 2004.

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1 http://www.postel.org/tg/tg.htm
2 A validation of this distribution implementation and the new version of *TG* are available on: http://www.info.fundp.ac.be/rech/doc/tg/
3 A description of our testbed is to be found in the following document: http://www.info.fundp.ac.be/~hvp/rech/doc/proposition.pdf