Testing of LTE Configurations and Applications*

Francisco Javier Rivas[1], Almudena Diaz Zayas[2], and Pedro Merino Gomez[2]

[1] AT4 Wireless, Systems Division, Malaga, Spain
fjrivas@at4wireless.com
[2] Dpto. de Lenguajes y Ciencias de la Computación, University of Malaga, Spain
{almudiaz,pedro}@lcc.uma.es

Abstract. This paper introduces an experimental testbed developed at the University of Malaga to analyze the behavior of mobile applications and services over LTE (Long Term Evolution) networks. The novelty of the testbed is the ability to correlate the impact of radio propagation issues on LTE configurations and applications protocols and cross tuning LTE parameters and IP protocols from the point of view of the quality perceived by end users. In this work we focus on the evaluation of VoIP services over LTE networks.

Keywords: Testbed, LTE, mobile application and services, performance.

1 Introduction

LTE have proven to be the primary choice for network operators to provide high rate data services with an evolving path to 4G, which will be provided by LTE Advanced. As LTE is an All-IP data centered technology, there is no support for circuit switched voice services. However, LTE is expected to provide voice services over IP and IMS (IP Multimedia Subsystem), as intended by the VoLTE (Voice over LTE) initiative.
According to network operators, their customers are used to a high voice quality, and any migration path to LTE should not compromise the provided quality of service. Voice is still the core business for many operators, and obtaining accurate knowledge on the trade-offs involved in resource management and QoS over LTE will be critical for their success. With the aim of generating reference results, we suggest a novel approach that will hopefully help key market players in making decisions. Further details can be found in [1].

2 Testbed Architecture

In order to meet the target requirements, we suggest a test architecture based on high-end network emulation, open VoIP applications and standard voice quality estimation methods.

* This work has been funded by Spanish projects TIN 2008-05932 and WITLE2 IDI-20090382, by the Andalusian project P07-TIC3131 and ERDF from the European Commission.

T. Korakis, M. Zink, and M. Ott (Eds.): TridentCom 2012, LNICST 44, pp. 417–418, 2012.

A custom tool chain illustrated in Fig.1 has been integrated to allow automatic processing of received traffic parameters and voice quality. Voice calls are originated between a softphone SIP client, and a VoIP server. For clients deployed in a laptop, the internet connection is established by a commercial LTE USB device and Wireshark may be used to monitor the traffic at the client side. Alternatively, a VoIP client can be run at smartphones and the TestelDroid [2], a tool developed in our department to allow the acquisition of communication related measurements at different levels in Android devices, is used to monitor the traffic.

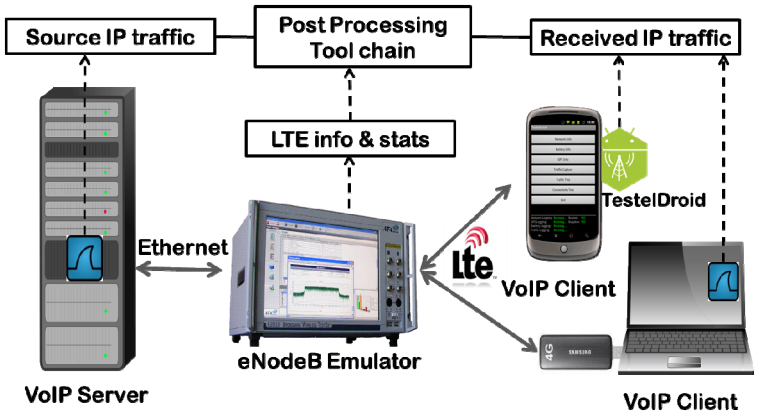

Fig. 1. Testbed setup deployment

An LTE network is created using an E2010 eNodeB emulator from AT4 wireless that allows fine configuration of radio network parameters using the S3110B LTE Mobile Test Application. Most of the features are exposed by the S3110B not only through a graphic interface but also via remote control commands. Using those commands, we plan to automate network configuration and measurement campaigns.

For that purpose, a data gateway application has been developed to communicate the external server with the E2010 external data interface. This gateway will also allow us to control the data flows in future works, e.g. restricting the available bandwidth or introducing packet losses, to emulate the effect of the core network transport.

References

1. Díaz, A., Merino, P., Rivas, F.J.: Test Environment for QoS Testing of VoIP over LTE. In: Proceedings of the 13th IEEE/IFIP Network Operations and Management Symposium (NOMS 2012), Maui, NV, USA (April 2012)
2. Álvarez, A., Díaz, A., Merino, P., Rivas, F.J.: Field measurements of mobile services with Android smartphones. In: Proceedings of the IEEE Consumer Communications and Networking Conference (CCNC), Las Vegas, NV, USA (2012)