

Chapter 28

Providing VoIP and IPTV Services in WLANs

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ABSTRACT

Nowadays, triple-play services are offered in both wireless and wired networks. The network convergence and the new services such as VoIP (Voice over Internet Protocol) and IPTV (Internet Protocol Television) are a reality. However, the future of these networks will have a different concept, breaking the current limits beyond the computers even the current mobile devices, any device may have access to any service at anytime from anywhere. In order to understand this new dimension, the ubiquity concept must be clear: an electronic device has to be able to be always connected to the network. The solutions must be based on the structures and current environments to carry out those challenges in a correct way. In order to reach this ubiquity, the science community has to take into account that its implementation should not assume a high cost to the user and that the system must comply with the quality of service measurements to satisfy the user. In this chapter, first we will show the main VoIP (Voice IP) and IPTV (IP Television) transmission protocols and the compression formats most used as also the bandwidth needed. Our goal is provide ubiquity into multimedia scenarios in WLANs. We will carry out tests to guarantee the appropriate values in some network parameters such jitter, delay, number of lost packets and enough effective bandwidth that should be satisfied. We will show the measurements taken from several test benches. They show the parameter values that the devices should perform in order to stay connected from anywhere at any time to these services.

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INTRODUCTION

In telecommunications' world, Triple Play (Hellberg, Greene and Boyes, 2007) is a marketing concept that could be defined as the service integration and audiovisual contents (voice, high speed data and television). Triple Play includes voice services with broadband access, adding also audiovisual services like TV channels and pay per view (PPV). The Triple Play service offers all the services in the same network independent of the kind of access technology: coaxial, optical fiber, unshielded twisted pair (UTP), Power LAN Communications (PLC) or radio (for example, through microwave). All the services are provided using the IP technology. The bundling of voice and television services over IP (VoIP and IPTV) plus the broadband data services in the residential markets is now a priority in the strategy of the service providers in the entire world.

From several years ago, wireless networks have been achieving great popularity because the deployment of these networks are low cost while provide quite mobility, ubiquity and scalability (Tang, Man-Fung and Kwong, 2001). When they appeared, users only transmitted best effort information. But, now, WLANs are used for many kind of traffic such as: data traffic, multimedia traffic, telephony traffic, etc. These networks have evolved quickly to meet the needs of the users: more security and bandwidth. It is therefore evolved from IEEE 802.11b, which is used to supply a theoretical bandwidth of 11Mbps, to IEEE 802.11a and IEEE 802.11g, which provides a theoretical bandwidth of 54Mbps. Moreover, IEEE 802.11n standard provides a theoretical bandwidth of 600Mbps using MIMO (a technology which uses multiple antennas to coherently resolve more information than possible using a single antenna). This technology is always in progress. Nowadays the WLANs became key

offering advantages such as ubiquity, flexibility while providing high bandwidth.

The main objective of this chapter is to evaluate the Voice service over the Internet Protocol (VoIP) and the TV service over the Internet Protocol (IPTV) in Wireless Local Area Networks in order to guaranty ubiquity to this type of services. Moreover, we will see that the final user will have connectivity everywhere if they have this parameter values. The user will not lose the service; therefore our network will be providing a continuous grade of ubiquity. First, we will analyze the performance of VoIP services and their protocols by showing the measurements taken of their delay, jitter, bandwidth, the number lost packets, etc (Edo, Garcia, Turro, and Lloret, 2009). Any VoIP device must have guaranteed an appropriate quality of service. VoIP devices, such as the smart phones, are capable of connecting to the wireless network and make free VoIP calls between devices in the same IP network. This feature is very interesting in companies and institutions that have a big wireless local area network and employers moving inside the intranet with their mobile devices. Nowadays, PBXs based on free software provide the same functionality as a traditional PBX. In wireless network architectures, the quality of a call has to be ensured by taking network measurements and analyzing network parameters during the call. Finally, we will analyze IPTV service under ubiquity situations in dual-band environments. First, we will analyze the minimum bandwidth required in the wireless access network to provide IPTV services showing also the measurements taken of their delay, jitter, and the number lost packets. This work will show which range of measurements should follow any administrator in its wireless local area network in order to provide mobility and ubiquity to IPTV and VoIP devices while maintaining enough quality of experience to the final user.

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