Chapter 3

Best Approach for Video Codec Selection Over VoIP Conversation Using Wireless Local Area Network

Mohd Nazri Ismail
University of Kuala Lumpur, Malaysia

ABSTRACT

This study evaluates video codec performance over VoIP using a campus wireless network. Today, the deployment of VoIP occurs in various platforms, including VoIP over LAN, VoIP over WAN and VoIP over VPN. Therefore, this study defines which video codec provides good video quality over VoIP transmission. The soft phone is used as a medium for communication between two parties. A network management system is used to evaluate and capture the video quality performance over VoIP. The quality of video codec is based on MOS, jitter, delay and packet loss. The experimental scope is limited to G.722 with MP4V-ES, G.726 (16) with H.261 and G.726 (24) with H.264. The results show that audio codec G.722 with MP4V-ES generates good video quality over VoIP using wireless local area network. Whereas audio codec G.726 (16) with H.261 generates low rate video and voice quality performance. Therefore, using the appropriate video and audio, the codec selection increases video quality over VoIP transmission.

INTRODUCTION

The objective of this study is to: i) define the best approach for video codec selection over VoIP communication using campus wireless network environment. The experiment of this study is limited to the three types of video and audio codec such as G.722 with MP4V-ES, G.726 (16) with H.261 and G.726 (24) with H.264. This experiment will study the performance of video quality over VoIP communication. Codec is an algorithm used to encode and decode the voice conversation. This paper presents the evaluation of audio and video codec performances over wireless local area networks (WLAN). This study will identify the problematic areas of audio and video codecs over a WLAN environment. The objectives of this research are:
1. To study the characteristics of V2oIP performance in WLAN environment
2. To study which audio and video codecs that are able to provide better performance in wireless environment

The contributions and signification values of this study are:

1. To produce a significant knowledgeable on V2oIP (video and audio) performance in campus wireless environment to social network especially to researchers and academic institutions
2. The results of the V2oIP performance in wireless environment are useful and can be used as a guidelines for next generation network

REVIEW OF LITERATURE

Today’s communication networks are greatly affected by a number of technological changes resulting in the development of new and innovative end-user services. One of the elements for these new applications is video services that impact on the appearance of new multimedia services. Voice services are complemented with video and text (instant messaging and videoconference). Examples are multimedia conferences and collaborative applications that are now enhanced to support nomadic (traveling employees with handheld terminals) and IP access (workers with an SIP client on their PC and WLAN access) (Alfonso et al., 2008; Alcatel, 2005; Pérez & Fernández, 2006).

Since the early 1990s, when the technology was in its infancy, international video coding standards—chronologically, H.261 (ITU-T, 1993), MPEG-1 (ISO/IEC, 1993), MPEG-2/H.262 (ITU-T and ISO/IEC, 1994), H.263 (ITU-T, 2000), and MPEG-4 (Part 2) (ISO/IEC, 1999) – have been the engines behind the commercial success of digital video compression. H.264/MPEG-4 AVC is the latest international video coding standard. It was jointly developed by the Video Coding Experts Group (VCEG) of the ITU-T and the Moving Picture Experts Group (MPEG) of ISO/IEC (Gary et al., 2004), MP4V-ES is the video mpeg4 bitstream.

Today, many researchers concentrate on wireless technology implementations on VoIP service. In the digital era, the increase of network bandwidth and the ubiquitous wireless access facilitate the creation of more and more innovative network services. Among these services, Voice over Internet Protocol (VoIP) is surely one of the most popular and successful real-time multimedia services on the Internet (Wang & Wu, 2008).

Many organizations are using WLANs as a medium for communication, so it is important to investigate how VoIP over WLAN performs based on previous study (Stuedi & Alonso, 2007). Wireless VoIP applications make the very inefficient use of WLAN resources. Due to the large overhead involved in transmitting small packets in an 802.11 WLAN, the bandwidth available for VoIP traffic is far less than its maximal 11Mbps data rate it currently supports (Narbutt & Davis, 2006).

METHODOLOGY

In the experiment, campus wireless network environment is used as a communication medium between two parties using audio and video transmission. This study posits several research questions: i) what is the video quality performance using different types of video and audio codec and ii) what is the acceptance level for video and audio codec selection. VQ manager is used to capture the video quality performance over VoIP. Figure 1 shows the interface of VQ manager application.

Soft phone is used to transmit audio and video application between two parties in campus environment. Soft phone is a software program