Voice Priority Queue Scheduling System Models for VoIP over WLANs

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ABSTRACT

The Voice over Internet Protocol (VoIP) is a delay sensitive traffic due to real-time applications on networks. The assessment of voice flow quality in the VoIP is an essential requirement for technical and commercial motivation. The packets of VoIP streaming may experience drops because of the competition among the different kinds of traffic flow over the network. A VoIP application is also sensitive to delay and requires the voice packets to arrive on time from the sender to the receiver side without any delay over WLAN. The scheduling system model for VoIP traffic is an unresolved problem. In this research paper, the author proposes a new Voice Priority Queue (VPQ) scheduling system models and algorithms for the VoIP over WLANs to solve scheduling issues over IP-based networks. They present new contributions, through the three stages of the VPQ. The VPQ scheduling algorithm is provided as an essential technique in the VoIP communication networks to guarantee the QoS requirements. The design of the VPQ is managed by the limited bandwidth utilization and has been proven to have an efficient performance over WLANs.

Keywords: Bandwidth Utilization, Scheduling Algorithm, Voice Priority Queue (VPQ), Voiceover Internet Protocol (VoIP), Wireless Local Area Networks (WLANs)

1. INTRODUCTION

We will explain all stages of the new Voice Priority Queue (VPQ) scheduling system model and algorithms over WLANs using IEEE802.11 standards. The VoIP is a delay sensitive traffic due to real-time applications on networks. The assessment of voice flow quality in the VoIP is an essential requirement for technical and commercial motivation. In this research paper, we proposed new Voice Priority Queue (VPQ) scheduling system models and algorithms for the VoIP over WLANs to solve scheduling issues over IP-based networks. We presented new contributions, through the three stages of the VPQ. The VPQ scheduling algorithm is provided as an essential technique in the VoIP communication networks to guarantee the QoS requirements. The design of the VPQ is managed by the limited bandwidth utilization and has been proven to have an efficient performance over WLANs. It will discuss the

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following features and principles that should be implemented in the simulation. The efficient bandwidth implementation is the most important in the VPQ design. It applied the VF and NVF techniques to channelize the traffic proficiently over the network.

The VPQ algorithm will assign available resources fairly across the VF and NVF connections over the network. In this manner, they are giving preference to the VF due to the higher priority due to delay sensitive traffic over WLANs. In this section, it will present the simulation analysis for VF flows. They have focused on two things, delay roundedness and maximum achievable throughput. The simulations have performed for both types of traffic i.e. the VF and NVF.

In paper three, the 3rd stage of the VPQ scheduling model has discussed in detail. The switch mechanism provides the move to the VF when the NVF is in the empty condition. This switch mechanism provides more fairness in VF traffic over WLANs using IEEE 802.11 standards. This switch manages the bursty traffic flow at peak times. It provides a key technique introduced by VPQ scheduling model. The key technique shows the high priority and low priority queue management system over IP-based networks. The scheduling system model is an important technique to achieve efficient throughput and fairness over WLANs based on IEEE 802.11 standards (Lee, Claypool, & Kinicki, 2010), (Wang, & Zhuang, 2008) Scheduling techniques manage voice traffic over WLANs.

It will be able to offer bandwidth link-sharing to tolerate the status of changing traffic queues and to be scalable over IP-based networks. A number of related schedulers have been proposed to support traffic flow over IP-based networks. Most of the existing schedulers support limited services and do not meet the requirements of real-time applications especially for the VoIP over WLANs (Ansel, Ni, & Turletti, 2006; Mirkovic, Orfano, Reumerman, & Denteneer, 2007; Wang & Wei, 2009; Xiong & Mao, 2007). The IEEE 802.11 WLAN networks support both contention-based DCF and contention-free PCF functions. DCF uses Carrier Sensing Multiple Access/Collision Avoidance (CSMA/CA) as the access method (Cao, Li, Tianji & Leith, 2009; Dini, Font-Bach, & Mangues-Bafalluy, 2008; Li, Ni, Turletti & Xiao, 2006; Ni, Li, Turletti, & Xiao, 2005; Garg & Kappes, 2003). IEEE 802.11 standards 802.11a support 5GHz frequency band and 54Mbps data rate, 802.11b support 2.4GHz frequency and 11Mbps data rate, 802.11g support 2.4GHz frequency band and data rate 54Mbps, (Wu, Peng, Long, Cheng, & Ma, 2002; Li, Ni, Turletti & Xiao, 2006). The proposed VPQ algorithm automatically shares the link between the VF and NVF traffic over IP-based networks. For the VF flow, the Real-time Transport Protocol (RTP) for the VoIP traffic. For the NVF flow, it has a variety of traffic such as Transmission Control Protocol (TCP), User Datagram Protocol (UDP) and Constant Bit Rate (CBR) for the NVF traffic over WLAN networks. The main advantage of the VPQ traffic scheduler is that it provides extra bandwidth to the VF flow through link sharing without affecting the NVF flow over WLANs in stages. Furthermore, this priority will not affect the fairness when the VF and NVF flows are in active conditions. The newly proposed VPQ mechanism provides the guaranteed link sharing between the VF and NVF flows.

We discuss the achieved objectives, those obtained from the VPQ scheduling system model and algorithms over networks. We did a comparison with related schedulers and algorithms to evaluate the VPQ to enhance the performance of the VoIP over WLANs using IEEE 802.11 standards. Furthermore, we examined, simulated and did test-bed techniques to verify the VPQ scheduler. We achieved these objectives to classify the VoIP Flow (VF) and Non-VoIP Flow (NVF) traffic over WLANs. In this research, the achieved objectives are as follows:

The VPQ is based on three stages of scheduling system model over WLANs. The novelty of the VPQ is providing classification of the VoIP Flow (VF) and Non-VoIP Flow (NVF) traffic and they proposed three stages of the VPQ for a VoIP application.
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