VoIP TRAFFIC SCHEDULING

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Introduction

- Popularity of Voice over IP (VoIP) applications such as Skype, Google Talk, and MSN Messenger along with emerging deployment of WiMAX networks is making VoIP over WiMAX an attractive market and a driving force for both carriers and equipment suppliers in capturing and spurring the next wave of telecommunications innovation.
- While conventional scheduling methods have not considered the traffic characteristics of VoIP, in this paper, a traffic aware scheduling algorithm for VoIP applications in WiMAX Networks is introduced.
- The trade off between delay and bandwidth efficiency is discussed and it is shown that using our scheduling method enhances the efficiency of VoIP over WiMAX.
The excessive demand for providing mobile users with broadband wireless access has attracted tremendous investment from the telecommunications industry in the development and deployment of WiMAX networks.

Voice over IP (VoIP) over WiMAX will be one of the killer applications for rapid deployment of WiMAX networks.

The legitimate desire for bundling voice and data will increase the portion of voice traffic in the WiMAX network.
VoIP, as the current technology for making voice calls through packet switch networks, will be a key application in WiMAX networks.

- scarcity of available bandwidth in wireless networks
- WiMAX, comprises of different scheduling services and QoS mechanisms
HOW WiMAX WORKS

INTERNET BACKBONE

ISP NETWORK

WiMAX 802.16 TRANSMITTER

LINE OF SIGHT BACKHAUL

HOME LOCAL AREA NETWORK

NON LINE OF SIGHT TRANSMISSION

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• Our aim is to propose a new algorithm for scheduling the uplink VoIP packets generated at the end user of a WiMAX subscriber station.

• We have to understand the features of the increasing traffic and its service requirements in the Internet.

• Many Models were introduced as result for scheduling the Traffic in network
  Multi Tap Model
  On-Off Model

• Multi Tap Model
  The *multitap* traffic model includes two important features of the traffic.
  
  These features include packet size and inter-packet time. The SS captures the traffic char. Such as packet size
WiMAX: How it works

Powerful wireless networks known as WiMAX are poised to be the next wave in digital communication - and could one day overtake copper wire, coaxial and even cellular infrastructure.
• **ON-OFF Model**
  
  In this model, it is assumed that the source generates equal-size packets separated equally in time during the ON period and either does not generate any packet or generate smaller packets during the OFF period.

• VoIP traffic is real-time and delay sensitive, and it is required to allocate network resources to this traffic within a limited period of time.

• One of the important scheduling points is the scheduling of the Up Link(UL) subframe by the base station (BS). To schedule the UL subframe, the BS receives the requests from subscriber stations (SSs), and after processing them, it
After receiving the UL MAP message, each SS will know the time and amount of bandwidth reserved for its very next UL subframe. This process requires bandwidth negotiations between the BS and each SS. Based on the type of traffic and policy of the network, there are different approaches to perform the bandwidth request and grant procedures.

There are three types of scheduling services that are capable of supporting real-time traffic such as VoIP. They are:

4. unsolicited grant service (UGS),
5. real-time polling service (rtPS),
6. extended real-time polling service (ertPS)
• **UGS**: In this service, the BS periodically allocates a fixed amount of bandwidth resources to the subscriber station and the SS does not need to send bandwidth request.

• **rtPS**: In this service, the BS periodically polls the SS about its uplink bandwidth request and allocates bandwidth to it in the next uplink subframe.

• **ertPS**: It basically works similarly to UGS but the SS has the opportunity to request the BS to allocate different amount of bandwidth whenever the SS needs to change the transmission
Request Algorithm

• SS informs the BS when the next packet will be ready for transmission.
• The SS may transmit any information to the BS only if the BS has allocated to the SS part of the UL subframe.
• Therefore, the SS predicts and piggybacks the index in the packet.
• When the SS is transmitting a packet to the BS, it calculates the time difference between the last packet generation time and the current time.
• The SS has to piggyback a separate BW request in the packet if it has traffic already queued up in its buffer. Owing to the time sensitivity, the BS allocates enough resources for this request as soon as possible.
Grant Algorithm

- The BS reserves appropriate time slots based on the received *index parameter and the* network constraints.
- Grant algorithm reserves enough BW for the SS to transmit its traffic to the BS.
- By using the values of the parameters received from SS, *the BS calculates the next transmission time of the SS.*
Conclusion

User preference for bundled services over the same network has resulted in a high demand for ubiquitous network access. This demand will prompt WiMAX system providers, as the promising technology providers for broadband wireless access, to specially provisioning their customers with reliable and qualified voice connections via VoIP applications.