Video streaming over WiMAX Networks

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Summary

WiMAX IEEE802.16 is a technology standard for long range wireless networks, it depends on two concepts, the base station, which is installed by the service provider, and the receivers, that are installed at the client's premises [1]. This is paper focuses on studying video streaming over WiMAX. The multicast/broadcast service (MBS) is a feature provided by WiMAX technology and works under MAC layer, which provides connection oriented and quality of service support [2]. Streaming video over an MBS is more efficient in terms of resource management by focusing on a certain area and ensuring high bit rate that results in a higher quality service [3].

Key words:
*MAC (Media Access Control)*

1. Introduction

WiMAX (Worldwide interoperability of microwaves access) is a wireless metropolitan access network (MAN) technology based on the IEEE standard, defined as IEEE802.16 family. WiMAX has a high speed service up to 350 Mbps; covers up to 30 miles (50 KM), and uses multiple channels for a single transmission [4]. The mobile application supports up to 30 Mbps per subscriber in 10 MHz of spectrum but typical data rate is about 3.5 Mbps [5].Video streaming over WiMAX depends on three items: WiMAX base station, the receivers at the subscriber side, and contents' sources [6].
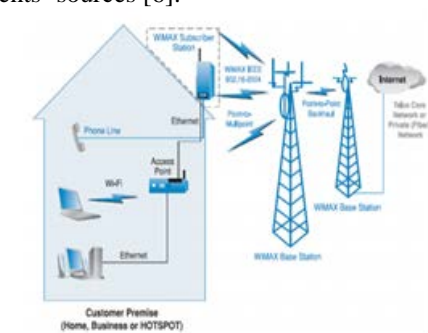

WiMAX client station connection [11]

Video content streaming:

Video content is the video information available from video service providers. Video services have two important metrics: receiver starvation ability and received video quality. They have limited play back time and do not allow for change in quality while in broadcast. The video provision service starts with the encoding of source video , which includes color conversion from RGB to YUV - also known as Y , Cr , Cb , one luma and two Chroma component- and the encoding of the source video to H.246 format (Video stream file), that is done by the video codec (a device that is used for video signals encoding and decoding) [9].
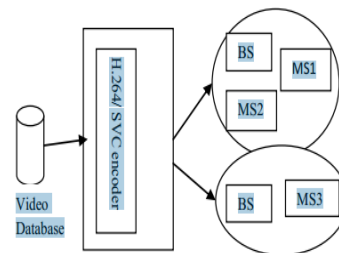

Video streaming Architecture [10]
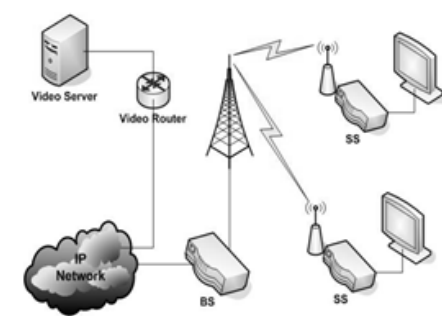
System model for IPTV Application[7]

## 2. Related work:

PUMA in WiMAX:

Protocol for unified multicasting through announcement, is a protocol that is used to stream video through WiMAX. It supports the transportation of information from sender to multiple receivers in a sub network. In PUMA any source can send multicast data to any group of recipients without having to know the constituent members of that group. Multicast announcements are used to: elect cores dynamically, determine the routes for sources outside a multicast group to subsequently unicast/multicast data packets towards that group, join and leave the mesh of a group and maintain the mesh of the group [10].
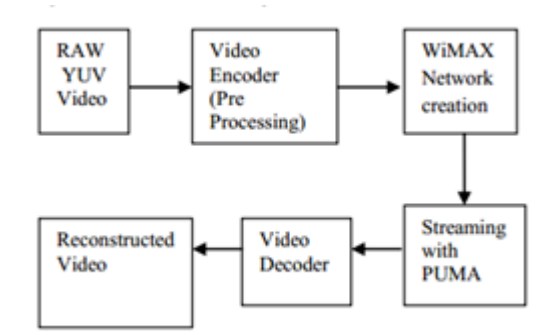
Streaming with PUMA [10]

Multicast and Broadcast service (MBS):

Video streaming is available at WiMAX base station, each stream is to be broadcasted using (MBS) to a group of mobile subscribers; this service is defined in the MAC layer. At the base station the MBS module allocates a fixed size data area in the download section of each TDD (Time Division Domain) [13]. The MBS module allocates video data from multiple streams to the MBS data area in each frame such that the real-time nature of all video streams is maintained. The allocation algorithm must consider that the receiver devices have limited buffer capacity which may cause data loss due to buffer overflow. After receiving a burst of data for a short time, receivers go into a sleep mode for a pre-computed period of time [14].
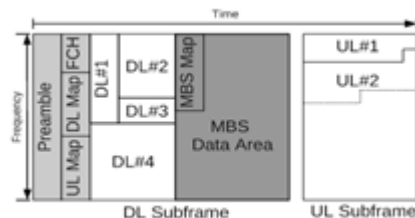
Frame structure using MBS

3. Conclusion

This paper has studied video streaming over WiMAX. It has presented video streaming architecture. It has also presented PUMA in WiMAX and multicast/broadcast service (MBS).

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