ABSTRACT

The research in MIMO (Multi Input Multi Output) systems has shown that enormous improvements in data transmission capacity are achievable under specific propagation conditions. MIMO research has key applications in the future high speed wireless networks. Progress in MIMO research poses exciting challenges in the area of modeling (Of mobile MIMO wireless channels) Information Theory( Coding, channel capacity and other bounds on information algorithms), and system level modeling of wireless networks in order to understand better the impact of MIMO links, next generation wireless algorithms to achieve higher throughput and better quality of service.

All future wireless communication beyond 3GHz will be powered by the combination of Orthogonal Frequency Division Multiplexing (OFDM) and MIMO. These two technologies will provide greater spectrum efficiencies and help to improve network performance by providing better coverage, capacity and data throughput. OFDM is the Base Radio Technology used in many wireless technologies, including Wi-Fi (IEEE 802.11), WiMax (IEEE 802.16).

To meet the requirements of multimedia application, the channel rate allocation in WiMAX network is an important parameter. The IEEE 802.16 is a standard for broadband wireless communication in Metropolitan Area Networks. The rate allocation is needed to provide QoS (Quality of Service) guarantees as well as fairness among the users. Channel error is one of the factors which disrupt the fair allocation of any traffic. This research work aims to determine the channel condition as good or bad using signal to interference plus noise ratio (SINR) during admission control, and we allocate a
prioritized admission control technique to both the channels. In case of a buffer overflow, we determine our approach of earliest deadline technique, to deviate the traffic through lower priority channels. Next, we develop a predictive rate control technique, using queue length and bandwidth requirement information. Thus, the value of predictive rate control helps the base station to predict the future traffic load and adjust the rate based on it. By simulation results, we show that our proposed scheme attains better throughput and fairness with reduced delay.

WiMAX (Worldwide Interoperability for Microwave Access) is a telecommunications protocol that provides fixed and fully mobile internet access. The WiMAX Forum certification allows vendors to sell their equipment as WiMAX (Fixed or Mobile) certified, thus ensuring a level of interoperability with other certified products, as long as they fit the same profile.

WiMAX is regarded as a disruptive wireless technology and has many potential applications. It is expected to support business applications, for which QoS support will be a necessity. Depending on the applications and network investment, WiMAX network can be configured to work in different modes, point-to-multipoint (PMP) or Mesh mode.

Companies are deploying WiMAX to provide mobile broadband or at-home broadband connectivity across whole cities or countries. Additionally, given the relatively low cost to deploy a WiMAX network (in comparison to GSM, DSL or Fiber-Optic); it is now possible to provide broadband in places where it may not have been economically viable. WiMAX is a possible replacement candidate for cellular phone technologies such as GSM and CDMA, or can be used as an overlay to increase capacity.