Cross layer design in 802.16d

ABSTRACT

WiMAX based wireless mesh network aims to provide broadband wireless for the last-mile access. It has high-speed data rate for large spanning area and is the key topology for the next generation wireless networking. The WIMAX mesh network (WMN) is developed with the use of base station (BS) as the main controller. However, the effects of the interferences from the transmission of the neighboring nodes within the mesh networks are inevitable and critical because all the nodes are using the same medium to communicate. This paper presents a cross-layer design that rely on the routing information in network (NET) layer and the scheduling slots in the medium access control (MAC) layer. The construction of the routing path with multi-channel single transceiver system and single channel single transceiver is proposed together with centralized scheduling (CS) algorithms that reduce the existing interferences in WMN. The analysis results show that the proposed algorithms have significantly improved the system performance in term of length of scheduling, channel utilization ratio (CUR), and throughput of the system.

Keyword: WiMAX; Cross-layer; Routing; Scheduling; Multi-channel; Single channel