

Spectrum Allocation Using Cognitive Radio in Wireless Mesh Networks

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Abstract : Wireless mesh networks (WMNs) have emerged recently to improve internet access and other networking services. WMNs provide network access to the clients and other networking functions such as routing, and packet forwarding. Spectrum scarcity is the main challenge that limits the performance of WMNs. Cognitive radio is proposed to solve spectrum scarcity problem. In this paper, we consider a cognitive wireless mesh network where unlicensed users (secondary users, SUs) can access free spectrum that is allocated to spectrum owners (primary users, PUs). Although considerable research has been conducted on spectrum allocation, spectrum assignment is still considered an important challenging problem. This problem can be solved using cognitive radio technology that allows SUs to intelligently locate free bands and access them without interfering with PUs. Our scheme considers several heuristics for spectrum allocation. These heuristics include: channel error rate, PUs activities, channel capacity and channel switching time. Performance evaluation of the proposed scheme shows that the scheme is able to allocate the unused spectrum for SUs efficiently.

Keywords : cognitive radio, dynamic spectrum access, spectrum management, spectrum sharing, wireless mesh networks

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