

Preface

The growing interest towards wireless communication services over the recent years has increased the demand for radio spectrum. Inefficient spectrum management together with the scarcity of the radio spectrum is a limiting factor for the development of modern wireless networks. As a solution, the idea of cognitive radio networks (CRNs) is introduced to use licensed spectrum bands for the benefit of the unlicensed secondary users. However, the preemptive priority of the licensed users results in random resource availabilities at the secondary networks, which makes the quality-of-service (QoS) support challenging. With the increasing demand for elastic/interactive data services (internet based services) and wireless multimedia services, QoS support becomes essential for CRNs. This brief investigates the voice and elastic/interactive data service support over CRNs in terms of their delay requirements. The packet level delay requirements of the voice service and session level delay requirements of the elastic/interactive data services are considered. In particular, constant-rate and on-off voice traffic capacities are analyzed over CRNs with centralized and distributed network coordination. Some generic channel access schemes are considered as the coordination mechanisms, and call admission control algorithms are developed for non-fully-connected CRNs. Advantage of supporting voice traffic flows with different delay requirements in the same network is also discussed. The mean response time of the elastic data traffic over a centralized CRN is studied, considering the shortest processor time with and without preemption and shortest remaining processor time service disciplines, in comparison with the processor sharing service discipline. Effects of the traffic load at the base station and file length (service time requirement) distribution on the mean response time are discussed. Finally, the relationship between the mean response times of interactive and elastic data traffic is presented.

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