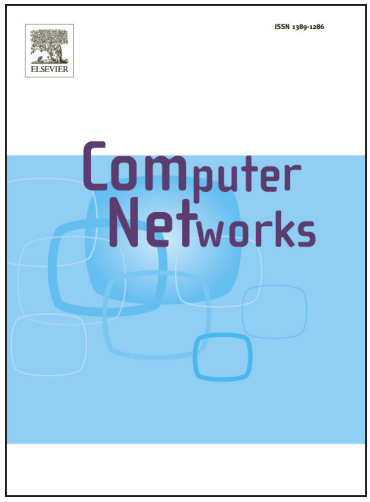

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PII: S1389-1286(13)00243-0
DOI: http://dx.doi.org/10.1016/j.comnet.2013.07.017
Reference: COMPNW 5054

To appear in: *Computer Networks*

Received Date: 4 May 2012
Revised Date: 27 March 2013
Accepted Date: 27 July 2013

Please cite this article as: X. Chen, J. Xu, W. Yuan, W. Liu, W. Cheng, Channel Assignment in Heterogeneous Multi-radio Multi-channel Wireless Networks: A Game Theoretic Approach, *Computer Networks* (2013), doi: http://dx.doi.org/10.1016/j.comnet.2013.07.017

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Abstract

Channel assignment is a challenging issue for multi-radio multi-channel wireless networks, especially in a competing environment. This paper investigates channel assignment for *selfish* nodes in a heterogeneous scenario, in which nodes may have different QoS requirements and thus compete for different channels with unequal bandwidth. The interaction among nodes is formulated as a non-cooperative Multi-radio Channel Assignment Game (MCAG), where Nash Equilibrium (NE) corresponds to a stable channel assignment outcome from which no individual node has the incentive to deviate. The NEs in MCAG are characterized in this paper. Since multiple NEs may exist in this game, it is natural to choose the NE that maximizes the network utility, i.e., the sum of node utilities. It is shown that the optimal NE outcome can be derived by solving an integer non-linear programming problem. Based on some observations on the radio number distribution of NE, we propose a two-stage optimization algorithm to achieve an optimal channel assignment. Finally, computer simulations validate the effectiveness of the proposed algorithm.

Keywords: channel assignment, multi-radio multi-channel, game theory

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