

Cooperative Cross Layer Topology for Concurrent Transmission Scheduling Scheme in Broadband Wireless Networks

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Abstract : In this paper, we consider CCL-N (Cooperative Cross Layer Network) topology based on the cross layer (both centralized and distributed) environment to form network communities. Various performance metrics related to the IEEE 802.16 networks are discussed to design CCL-N Topology. In CCL-N topology, nodes are classified as master nodes (Master Base Station [MBS]) and serving nodes (Relay Station [RS]). Nodes communities are organized based on the networking terminologies. Based on CCL-N Topology, various simulation analyses for both transparent and non-transparent relays are tabulated and throughput efficiency is calculated. Weighted load balancing problem plays a challenging role in IEEE 802.16 network. CoTS (Concurrent Transmission Scheduling) Scheme is formulated in terms of three aspects – transmission mechanism based on identical communities, different communities and identical node communities. CoTS scheme helps in identifying the weighted load balancing problem. Based on the analytical results, modularity value is inversely proportional to that of the error value. The modularity value plays a key role in solving the CoTS problem based on hop count. The transmission mechanism for identical node community has no impact since modularity value is same for all the network groups. In this paper three aspects of communities based on the modularity value which helps in solving the problem of weighted load balancing and CoTS are discussed.

Keywords : cross layer network topology, concurrent scheduling, modularity value, network communities and weighted load balancing

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