

Multi-Level Clustering Based Congestion Control Protocol for Cyber Physical Systems

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Abstract : The Internet of Things (IoT), a cyber-physical paradigm, allows a large number of devices to connect and send the sensory data in the network simultaneously. This tremendous amount of data generated leads to very high network load consequently resulting in network congestion. It further amounts to frequent loss of useful information and depletion of significant amount of nodes' energy. Therefore, there is a need to control congestion in IoT so as to prolong network lifetime and improve the quality of service (QoS). Hence, we propose a two-level clustering based routing algorithm considering congestion score and packet priority metrics that focus on minimizing the network congestion. In the proposed Priority based Congestion Control (PBCC) protocol the sensor nodes in IoT network form clusters that reduces the amount of traffic and the nodes are prioritized to emphasize important data. Simultaneously, a congestion score determines the occurrence of congestion at a particular node. The proposed protocol outperforms the existing Packet Discard Network Clustering (PDNC) protocol in terms of buffer size, packet transmission range, network region and number of nodes, under various simulation scenarios.

Keywords : internet of things, cyber-physical systems, congestion control, priority, transmission rate

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