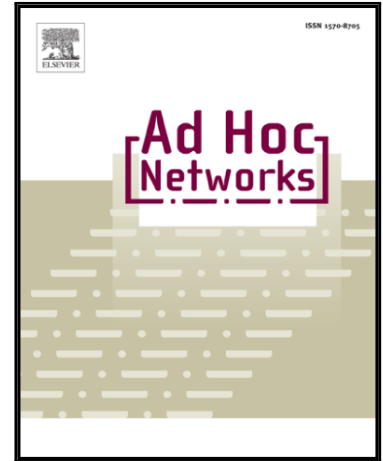


Accepted Manuscript

Fast Convergecast for Low-Duty-Cycled Multi-Channel Wireless Sensor Networks

Meng-Shiuan Pan, Yi-Hsun Lee

PII: S1570-8705(15)30005-6
DOI: [10.1016/j.adhoc.2015.12.006](https://doi.org/10.1016/j.adhoc.2015.12.006)
Reference: ADHOC 1332



To appear in: *Ad Hoc Networks*

Received date: 2 April 2015
Revised date: 14 October 2015
Accepted date: 21 December 2015

Please cite this article as: Meng-Shiuan Pan, Yi-Hsun Lee, Fast Convergecast for Low-Duty-Cycled Multi-Channel Wireless Sensor Networks, *Ad Hoc Networks* (2015), doi: [10.1016/j.adhoc.2015.12.006](https://doi.org/10.1016/j.adhoc.2015.12.006)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Fast Convergecast for Low-Duty-Cycled Multi-Channel Wireless Sensor Networks

Meng-Shiuan Pan and Yi-Hsun Lee

Department of Computer Science and Information Engineering

Tamkang University, New Taipei City, Taiwan

(e-mail: mspan@mail.tku.edu.tw and 601410037@s01.tku.edu.tw)

Abstract

Convergecast is a fundamental operation in many wireless sensor network (WSN) applications. To conserve energy, many previous WSN protocols discuss to periodically schedule active timings (or say *slots*) of transmission links in the network. When collecting data, the slots should be carefully assigned to conserve latency. Recently, the multichannel concept is utilized to facilitate slot assignment. When the network has multiple channels, the convergecast latency can be further reduced since the interferences between transmission links can be eliminated. In this work, we model the above scenario as a *minimal delay scheduling (MDS)* problem, and prove it as an NP-complete problem. We propose a heuristic algorithm, which contains three phases. In our design, the first phase connects nodes by a shortest path tree with constrained degrees. Then, the second phase assigns slots to links to achieve optimal report latency (regardless of interferences). Finally, the third phase assigns frequency channels to nodes to eliminate interferences between links, and carefully adjust some slots if necessary. Simulation and implementation results indicate that the proposed scheme can effectively reduce the convergecast latency in WSNs with multiple channels.

Keywords: convergecast, graph theory, multichannel, scheduling, wireless sensor network.

Download English Version:

<https://daneshyari.com/en/article/6878738>

Download Persian Version:

<https://daneshyari.com/article/6878738>

[Daneshyari.com](https://daneshyari.com)