

## Abstract

The availability of both mobile networks composed of wireless gadgets (e.g. smartphones and PDAs) and wireless sensor networks currently increases significantly. A basic requirement for the operation of such mobile ad hoc networks is a service which enables the network nodes to share common data. The “file allocation problem” introduced by Bartal assumes that a data management system is able to create and remove arbitrary many copies of a data file on the nodes of the network as and when required. Since the nodes of a mobile ad hoc network usually have only a limited amount of energy, our goal is to find algorithms which minimize the energy consumption of the nodes while serving a sequence of read- and write-requests issued by the nodes. To achieve this, an algorithm has to create and remove copies in such a way that on the one hand read-requests can be fulfilled by nearby nodes and on the other hand updating all the copies on a write-request is not too expensive. We generalize Bartal’s file allocation problem to dynamic networks, i.e. the weights of the edges are changing over time. A major challenge thereby is that an algorithm knows neither which nodes issue what kind of requests beforehand nor how the network changes in the future. We analyze the quality of different online algorithms for the file allocation problem in dynamic networks using theoretical and simulation based methods.