



Using bee algorithm for peer-to-peer file searching in mobile ad hoc networks[☆]

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ABSTRACT

In this work, we present a P2PBA algorithm that refers to a peer-to-peer file searching method, which uses the bees algorithm. The proposed algorithm has been designed with an aim towards providing an efficient peer-to-peer (P2P) file search in mobile ad hoc networks (MANETs). With reference to Li et al. (2004) and Gerla and Lindemann (2005) it has been observed that the implementation of P2P file sharing system on MANETs is quite tricky to implement as compared to that on a wired network. With the advent of swarm intelligence, the P2P file sharing methodology not only found an optimized search process involving a more selective node tracing, but it also proved to improve the time efficiency and robustness of the sharing mechanism. The P2P file searching system implementation, particularly in a network of mobile nodes, poses: (a) the percentage network area scanned and (b) the selective file retrieval from a set of file bearing nodes as the biggest challenges. Managing nodes scattered over a large terrain is not easy. Node connectivity and file information become more volatile as the network area increases. Probability of retrieving a file from a profitable source is also a yardstick to determine how good the file retrieval algorithm is. This algorithm referred to as P2PBA implements the P2P file searching process using the bee algorithm (Pham et al., 2006b; Wedde and Farooq, 2005) and aims at solving these two challenges. This scheme of swarm-based intelligence, which is based on the foraging behavior of honey bees, optimizes the search process selectively hunting for more promising honey sources and scans a sizeable area in a more comprehensive manner. Following a description of the proposed algorithm, this paper finally presents the simulation results for the network against various specified parameters. The simulation results show that our algorithm proposes to make file searching much more efficient and improves the statistics against the posed challenges.

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1. Introduction

P2P file sharing systems (Li et al., 2004; Gerla and Lindemann, 2005) have observed an enormous splurge in the recent years following the growth of networking peers in the recent years. In contrast to earlier network practices comprising of clients and servers, which work in managed environments, controlled by a central body, a P2P file sharing system involves free transactions between various computers over a network. With the growing

number of wireless networks, a similar file sharing system would require even a better methodology to be followed that is able to achieve the same performance measure as the wired P2P networks are able to achieve for MANETs.

The organization of P2P systems on MANETs becomes a challenge as the connectivity of each mobile node in the network is managed through multiple hop paths. This creates not only an overhead for the search process but also for the file retrieval as the number of control messages and network messages flood the traffic. These systems, which have been from eon, been in a domain broadly used for sharing media files and other entertainment database across global distances, are now entering a phase where sharing the information between wireless devices in a given geographical area will be burgeoning. Hence there is a need to work on the performance issues pertaining to such systems on MANETs.

The P2P system on MANETs (Sözer et al., 2004; Oliveira et al., 2005) mainly suffers from two major problem areas as discussed before: network scan area and filtering of file sources in the order of

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