Analysis on Leveraging social networks for p2p content-based file sharing in disconnected manets

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ABSTRACT:

Current peer-to-peer (P2P) file sharing methods in mobile ad hoc networks (MANETs) can be classified into three groups: flooding-based, advertisement-based, and social contact-based. The first two groups of methods can easily have high overhead and low scalability. They are mainly developed for connected MANETs, in which end-to-end connectivity among nodes is ensured. The third group of methods adapts to the opportunistic nature of disconnected MANETs but fails to consider the social interests (i.e., contents) of mobile nodes, which can be exploited to improve the file searching efficiency. In this paper, we propose a P2P content-based file sharing system, namely SPOON, for disconnected MANETs. The system uses an interest extraction algorithm to derive a node's interests from its files for content-based file searching.

For efficient file searching, SPOON groups common-interest nodes that frequently meet with each other as communities. It takes advantage of node mobility by designating stable nodes, which have the most frequent contact with community members, as community coordinators for intracommunity searching, and highly mobile nodes that visit other communities frequently as community ambassadors for intercommunity searching. An interest-oriented file searching scheme is proposed for high file searching efficiency. Additional strategies for file prefetching, querying-completion, and loop-prevention, and node churn consideration are discussed to further enhance the file searching efficiency. We first tested our system on the GENI Orbit testbed with a real trace and then conducted event-driven experiment with two real traces and NS2 simulation with simulated disconnected and connected MANET scenarios. The test results show that our system significantly lowers transmission cost and improves file searching success rate compared to current methods.

1   INTRODUCTION:

File sharing in wireless ad-hoc networks in a peer to- peer manner imposes many challenges that make conventional peer-to-peer systems operating on wire-line networks inapplicable for this case. Information and workload distribution as well as routing are major problems for members of a wireless ad-hoc network, which are only aware of their neighborhood. In this paper we propose a

system that solves peer-to-peer file sharing problem for wireless ad-hoc networks. Our system works according to peer-to-peer principles, without requiring a central server, and distributes information regarding the location of shared files among members of the network. By means of a "hashline" and forming a tree-structure based on the topology of the network, the system is able to answer location queries, and also discover and maintain routing information that is used to ansfer files from a source-peer to another peer. The efficiency of current replication decisions, though, depends on both the arrival of new demand, as well as users's *impatience* (*i.e.,* as time passes without fulfillment, the demanding peer loses interest with increasing probability). Consequently, we measure the efficiency of a replication scheme based on how well its replication decisions enable the timely fulfillment of demand. this optimal allocation can be known in closed form. Furthermore, we develop a reactive distributed algorithm, *Query Counting Replication (QCR)* that produces the optimal allocation for any impatience function, based on local information and no knowledge of users's demands. We are the first work to consider the impact of impatience on optimal content dissemination schemes.

 We propose a general model to capture this impact and show that under very general assumptions on the impatience function (namely, that is is monotone) one can define an optimal cache allocation. Furthermore, we demonstrate that this optimal is unique and can be computed efficiently in a centralized manner. We prove that is may vary, depending on the users's impatience function, between a uniform and a highly skewed allocation. a new mobility model founded on social network theory.

The model allows collections of hosts to be grouped together in a way that is based on social relationships among the individuals. This clustering is then mapped to a topographical space, with movements influenced by the strength of social ties that may also change in time. We have validated our model with real traces by showing that the synthetic mobility traces are a very good approximation of human movement patterns. Devices are using a high bandwidth link when they are within info-station coverage. Outside these regions, their requests are passed to the server via a conventional cellular base-station.The mobile hosts have no wide area network access via any base-station. Second, they investigate the effectiveness of info-stations as compared to a traditional wide-area wireless network. For that, they vary the info-station density and its coverage. In our case, we consider a fixed info-station (i.e., FIS) in the region of 1km x 1 km (that corresponds to low info-station density). As we explained in the Section 1, the focus of this paper is to investigate a different data access method, namely, peer-to-peer data sharing among mobile users.

2 RELATED WORK:

he flooding-based methods, 7DS is one of the first approaches to port P2P technology to mobile environments. It exploits the mobility of nodes within a geographic area to disseminate web content among neighbors. Passive distributed indexing (PDI) is a general-purpose distributed file searching algorithm. It uses local broadcasting for content searching and sets up content indexes on nodes along the reply path to guide subsequent searching.GCLP is an advertisement-Based Methods for efficient content discovery in location-aware ad hoc networks. It disseminates contents and requests in crossed directions to ensure their encountering. P2PSI combines both advertisement (push) and

discovery (pull) processes. It adopts the idea of swarm intelligence by regarding shared files as food sources and routing tables as pheromone.

The advertisement-based methods generate high overhead for advertising and cannot guarantee the success of file searching due to node mobility. The flooding-based methods produce high overhead due to broadcasting. We propose a social network-based P2P content file sharing system in disconnected mobile ad hoc Networks. The system uses an interest extraction algorithm to derive a node's interests from its files for content-based file searching. We focus on the P2P file sharing in a disconnected MANETcommunity consisting of mobile users with social network properties. The disconnected MANETs are featured by sparse node density and intermittent node connection, which makes the flooding based methods and advertisement based methods infeasible in such networks. The proposed system considers both node interest and contact frequency for efficient file sharing. For efficient file searching, the proposed system groups common-interest nodes that frequently meet with each other as communities. The proposed system considers both node interest and contact frequency for efficient file sharing. The proposed system takes advantage of node mobility by designating stable nodes Strategies for file pre-fetching, querying-completion, and loop-prevention, and node churn consideratioused further enhance the file searching efficiency
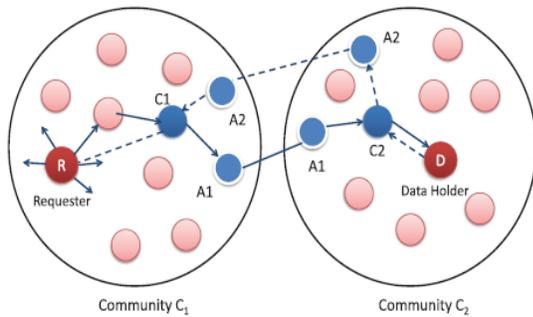

Fig 1: System Architecture

3 PROBLEM DEFINITION:

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4 PROPOSED SOLUTION:

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We focus on the P2P file sharing in a disconnected MANET community consisting of mobile users with social network properties. The disconnected MANETs are featured by sparse node density and intermittent node connection, which makes the flooding based methods and advertisement based methods infeasible in such networks. The proposed system considers both node interest and contact frequency for efficient file sharing. For efficient file searching, the proposed system groups common-interest nodes that frequently meet with each other as communities.

5 SYSTEM PRELIMINARIES:
A. INFORMATION EXCHANGE AMONG NODES

In the community construction phase, two encountered nodes exchange their interest vectors and community vectors, if any, for community construction. In the role assignment phase, nodes broadcast their degree centrality within their communities for coordinator selection. When the coordinator is selected, the coordinator ID is also broadcasted to all nodes in the community. Then, each node reports its contact frequencies with foreign communities to the coordinator for ambassador -selection. Besides, when a node meets a coordinator of its community, the node also sends its updated node vector to the coordinator to update the community vector and retrieves the updated community vector from the coordinator.

B. INTELLIGENT FILE PREFETCHING

Ambassadors in SPOON can meet nodes holding different files since they usually travel between different communities frequently. Taking advantage of this feature, an ambassador can intelligently prefetch popular files outside of its home community. Recall that a query in a local community for a file residing in a remote community are forwarded through the coordinator of the local community. Thus, each coordinator keeps track of the frequency of local queries for remote files and provides the information of popular remote files to each ambassador in its community upon encountering it. When a community ambassador finds that its foreign community neighbors have popular remote files that are frequently requested by its home community members, it stores the files on its memory.

C. QUERYING-COMPLETION AND LOOP-PREVENTION

Given a file query, there may exist a number of matching files in the system. A node can associate a parameter *Smax* with its query to specify the number of files that it wishes to find. A challenge we need to handle is to ensure that the querying process stops when *Smax* matching files are discovered

when multi-copy forwarding is used. To solve this problem, we let a query carry *Smax* when it is generated. When a query finds a file that matches the query and is not discovered before, it decreases its *S* by 1. Also, if this query is replicated to another node, *S* is evenly split to the two nodes. A query stops searching files when its *S* equals 0.a social network-based P2P content file sharing system in disconnected mobile ad hoc Networks. The system uses an interest extraction algorithm to derive a node's interests from its files for content-based file searching.

6. CONCLUSION:

We focus on the P2P file sharing in a disconnected MANET community consisting of mobile users with social network properties. The disconnected MANETs are featured by sparse node density and intermittent node connection, which makes the flooding based methods and advertisement based methods infeasible in such networks. The proposed system considers both node interest and contact frequency for efficient file sharing. For efficient file searching, the proposed system groups common-interest nodes that frequently meet with each other as communities.

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