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Improved File Dynamics P2P Capability in Mobile ad-hoc Networks for Efficient File Sharing

AshwiniS. Jagtap

M.E. Student, Dept. of Computer Engineering, Dhole Patil College of Engineering, Savitribai Phule Pune University, Pune, India

ABSTRACT: Wireless communications are receiving more attention now a days. In mobile ad-hoc networks nodes are moving freely from one location to another.So in MANET disconnections occurs often. So there is a problem of file availability. For that purpose file replication can be used. With the help of access mechanisms, peer to peer (P2P) file sharing can be done over Mobile Ad-hoc Network(MANET). The capability of file querying suffer from the properties of networks which include node mobility and limited communication range and resource. For these problems file replication can be used. File replication plays important role in enhancing file availability and reduce file querying delay. By creating replicas, the probability of encountered requests can be improved. Previously proposed model were considering node storage for the replication but lacks to consider the node mobility. In our system we have considered the mobility of the node.Forthat purpose we have considered Optimal File Replication Rule is which consider the priority of the files. In the proposed system we are going to consider two factors first is the peer mobility and second one is battery energy for identifying the best neighbour for replication of the file. So in this workwearegoingtoimprovisetheefficiencyofthefilereplicationbyconsideringthesetwofactors.

KEYWORDS: Mobile Ad-hoc Network, file sharing, efficiency, node mobility,battery energy.

I. INTRODUCTION

The MANET differentiates itself from traditional wireless networks by its dynamic changing topology, no basestation support, and multi-hop communication ability [9]. In a MANET, nodes are free to move to the random locations and are able to meet node which is in the communication range also thy can exchange their information with the other nodes. Withthehelpoffilereplicationwecanimprovefileavailability and reduce file querying delay. It creates replicas for a file to improve its probability of being encountered by requests. But it is not viable and ineffective to enable every node to hold the replicas of all files in the system as there are limited node resources. Also, file querying delay is always a main concern in a file sharing system. Users often desire to receive their requested files quickly no matter whether the files are popular or unpopular. There are different protocols which are already present in which each individual node replicates files it frequently queries creating redundant replicas in the system or a group of nodes create one replica for each file they frequently query [9] creating redundant replicas which are reduced by group cooperation, neighbouring nodes may separate from each other due to node mobility, leading to large query delay. The present file replication protocols enable to allocate limited resource to different files for replica creation to achieve the minimum global average querying delay, which means that global search efficiency optimization under limited resource but they do not consider their properties like peer mobility, battery energy. The basic idea of considering these two features is it will increase the efficiency. Also by considering the battery energy nodes remaining power can be calculated and considered before doing the replication operation. Because of which the retransmission can be avoided. Using the peer mobility feature the link stability is calculated. So with the help of those two features best neighbour is identified.

II. RELATED WORK

Author TaoufikYeferny[5], has focused on methods based on query history, which use the historical information of past queries and query hits to build a local knowledge base per peer. When a peer forwards a given query, it runs a learning algorithm that evaluates the query against the local knowledge base in order to select a set of relevant peers to whom

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the query will be routed. If the current peer fails to select a sufficient number of relevant peers it floods the query through the random overlay network, which badly affects the routing efficiency and effectiveness. To address the unsuccessful relevant peers search problem, we propose to organize the P2P network into semantic clusters of peers sharingsimilarknowledge bases. The proposed approach here is (i) its retrieval effectiveness in term of recall and precision, (ii) its routing efficiency in term of messages traffic.Advantages -Improves the recall and precision metrics while it dramatically reduce network traffic.Disadvantages-Some effective benchmarks has not taken into considerations

In the paper Evaluation ofPeer-to-Peer Network ContentDiscovery Techniquesover Mobile Ad-Hoc Networks, [4] author has proposed an evaluation of the two approachesforP2PcontentdiscoveryrunningoveraMANET. The first, based on unstructured P2P networks, relies on controlled flooding, while the second, based on structured P2P networks, uses distributed indexing to optimize searches. Use simulations to evaluate the effect of network size, mobility,channel error rates, network workload, and application dynamics in the performance of P2P protocols over MANETs.Advantages-Structured protocols, conversely, consume less energy and are more appropriate for MANETs where topology ismostlystatic.

When mobile users move and contact each other opportunistically, they form a Delay Tolerant Network (DTN), which can be exploited to share data among them. Data replication is one of the common techniques for such data sharing.XuejunZhuo,Qinghua Li[7] have recognizethedeficiencyofexistingdatareplicationschemeswhich treat the complete data item as the replication unit, and propose to replicate data at the packet level. We analytically formulate the contact duration aware data replication problem and give a centralizedsolutiontobetterutilizethelimitedstoragebuffersand the contact opportunities. Further they proposed a practical contact Duration Aware Replication Algorithm (DARA) which operates in a fully distributed manner and reduces the computational complexity. Extensive simulations on both synthetic and realistic traces show that our distributed scheme achieves close-to-optimal performance, and outperforms other existing replication schemes.

In this paper, Zheng Jing, Wang Yijie [8] have considered a dynamic adaptive replica allocation algorithm that can adapt to the nodes motion is proposed to minimize the communication cost of object access. When changes occur in the access requests of the object or the network topology, each replica node collects access requests from its neighbours and makes decisions locally to expand replica to neighbours or to relinquish the replica. The algorithm dynamically adapts the replica allocation scheme to a local optimal one. Simulation results show that our algorithms efficiently reduce the communication cost of object access in MANET environment.

In Delay Tolerant Networks (DTNs), mobile nodes connect to each other using opportunistic contacts.The paper i) address the problem of where to cache, it exploit social relations among nodes, and propose a novel centrality metric to evaluate the caching capability of each node within the social community. ii) Identify the effects of contact duration on caching. To address the problem of how much data to cache, derives an adaptive caching bound at each node based on its specific contact patterns with others. iii) Developedadistributedcachingprotocol,anddemonstrate that it can significantly improve the performance of data access though trace-driven simulations[6].

By Takahiro Hara[9], different consistency conditions of data operations on replicas in MANETs. First,classified consistency levels according to application requirements. After that the protocols are proposed to achieve them and, then, discuss the impact of replica allocation for the system performance when the memory space of mobile hosts is limited. The main contributions of this paper are 1) the classification of consistency levels according to the system and application requirements, 2) the choices of the existing techniques and their extensions for design of the protocols of these consistency levels in MANETs, and 3) performance studies of these protocols.

In ad hoc networks, mobile hosts move freely, disconnections occur frequently, and this causes frequent network division. Consequently, data accessibility in ad hoc networks is lower than that in the conventional fixed networks. In this paper, three replica allocation methods are proposed to improvedata accessibility by replicating data items on mobile hosts. With these three methods, taken into account the access frequency from mobile hosts to each data item and the status of the network connection [10].

WeiGao [2]proposedschemesforNCLselection,createdonaprobabilisticselectionmetric, and coordinate multiple caching nodes for optimizing trade-off between data accessibilityand caching overhead.

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AccordingtoYu-Chee-Tseng [11]thepropertiesofMANETScanbedynamicchangingtopology,nobase-stationsupport,andmultihopcommunicationcapability. Forcommunicationtheyuse the hopping concept. When two nodes are within the radio range, they communicate witheach other using single hop function. The problem discussed here is about the flooding of broadcasting .The problem with broadcasting is storm problem. For this rebroadcasting can bedone which is done on timely basis.

III. Proposed Approach And Design

A. Problem Definition

Therearedifferentfilereplicationprotocols available, themainproblemwithavailableprotocols is that they lack a rule to allocate limited resource to different files for replica creationin order to achieve the minimum global average querying delay that is global search efficiencyoptimization under limited resource. Available protocols simply consider storage as the resource for replicas, but neglect that a node's frequency to meet other nodes also controls the Availabilityofitsfiles. Thereisaproblemofhowtoallocatethelimitedresourceinthenetworkto different files for replication so that the overall average file querying delay is minimized andalso selecting a best neighbour node for replication of file is the main problem.

B. Proposed Architecture and Design

The proposed system shown in Figure. 1 consist of different file of dynamic size. When the request for the file comes the popularity of the file is identified. After that those files are prioritized by the peer based on the popularity of the file. Each node has the list of files. The files are arranged in the descending order of the files popularity. When more requests for same files are generated, the replication is done in that case. While doing the replication most popular files are replicated on the neighbour. The number of files that are replicated is based on the size or space available on the node. The case when replication is needed and particular neighbor does not have a space then another neighbor is selected in that case.

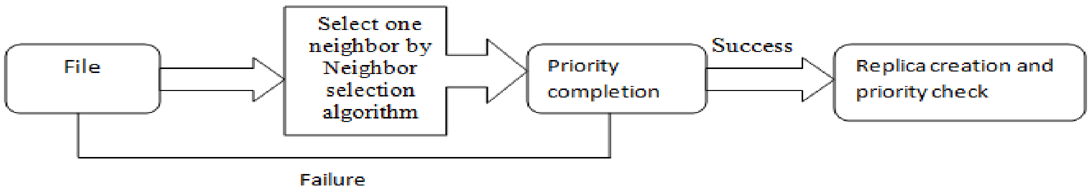

Figure 1: Proposed System Architecture

Now while selecting the neighbor if we take any neighbor the problem may arrive because in MANET nodes are moving so selected neighbor can move to the next place within some time.The other factor for consideration is that node may has less remaining battery energy.If we select this node for replication then that node goes off within some time.So while selecting the neighbor those factors need to be taken care.Neighbour selection algorithm is used for that purpose which selects the best neighbor for replication and then files are replicated on that neighbor we call it as a success .In case on not getting the neighbor the failure may occur.And then the same process is carried out again.While selecting best neighbor for replication of files we are going to consider both the factors together.

1. *Peer mobility*: In MANET environment peers are free to move from their location at any-time. We consider this important factor, thus we predict the lifetime of a link between the forwarding peer and its neighbors. To predictthe lifetime of a link i-j between the peer pi and its neighbor nj∈N we are based on the Route-lifetime Assessment Based Routing protocol (RABR) protocol functions.
2. *Battery Energy*:The calculation of energy level is important to determine the battery level of every peer during active data transmission. Here we assume that the battery level of a wireless peer decreased when the peer initiated data transmission or when the peer forwards packets. A peer gets disconnected if the battery power finishes. For predicting the remaining battery power we assume that the transmit power is fixed. Energy required for each operation like receive, transmit, broadcast, discard on a packet is given by:

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$$E(packet) = b*(packet\ size) + c$$

3. *Proposed Algorithm:* Neighbors selection algorithm

$$Pref\ (n_j) = \alpha * Link\ stability\ (i\text{-}j) + \alpha * Peer\ Load\ (n_j)$$

For selecting K best neighbors of node
BEGIN:
Step 1: The forwarding peer p_i ranks its neighbours according to a Preference function
Step 2: Then it selects the first k neighbour, which have the greatest score.
Step 3: The Preference function computes the score of each neighbour $n_j$for a given query q, as a weighted arithmetic sum of Link stability, Peer Load.
END

IV. RESULTS

The figures displayed bellows the results of the proposed system. In the proposed system sender can send the files of any size and of any kind (pfd, xls,doc etc).Figure 2 shown below shows the senders window for selecting the file for replication. In Figure-3 is after selecting the search for node it detects the done which are in the range. Figure 4 displays the window while scanning for the IP addresses. List of IP addresses is shown in the Figure-5.Figure 6-7 shows the results of file download and file replication respectively. Figure 8 shows the performance graphs of the system by considering the factors like Hit Rate, Replication Cost, and Average delay.

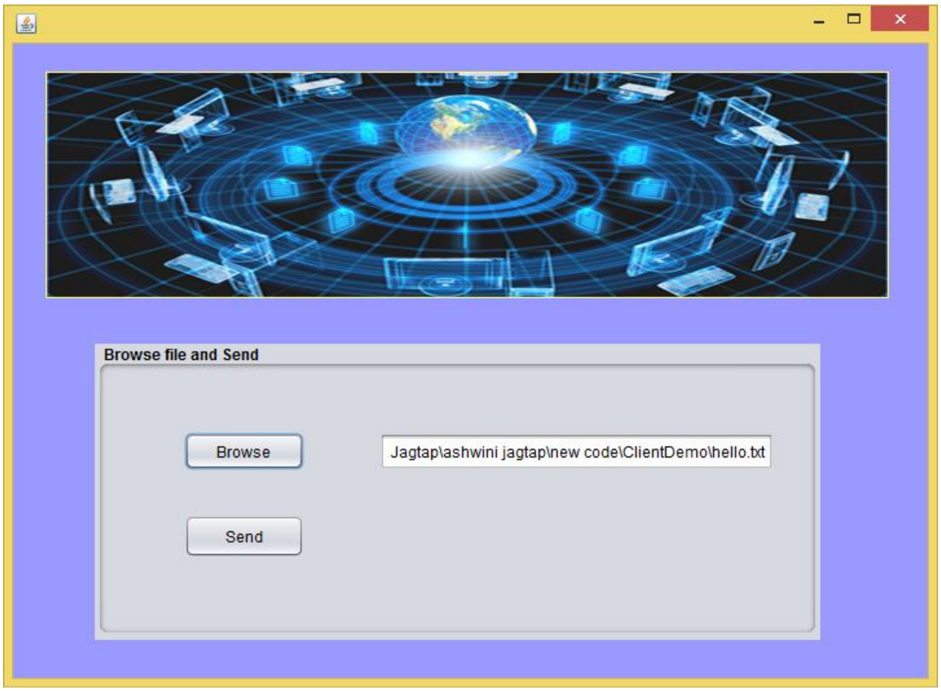

Figure2: Senders window

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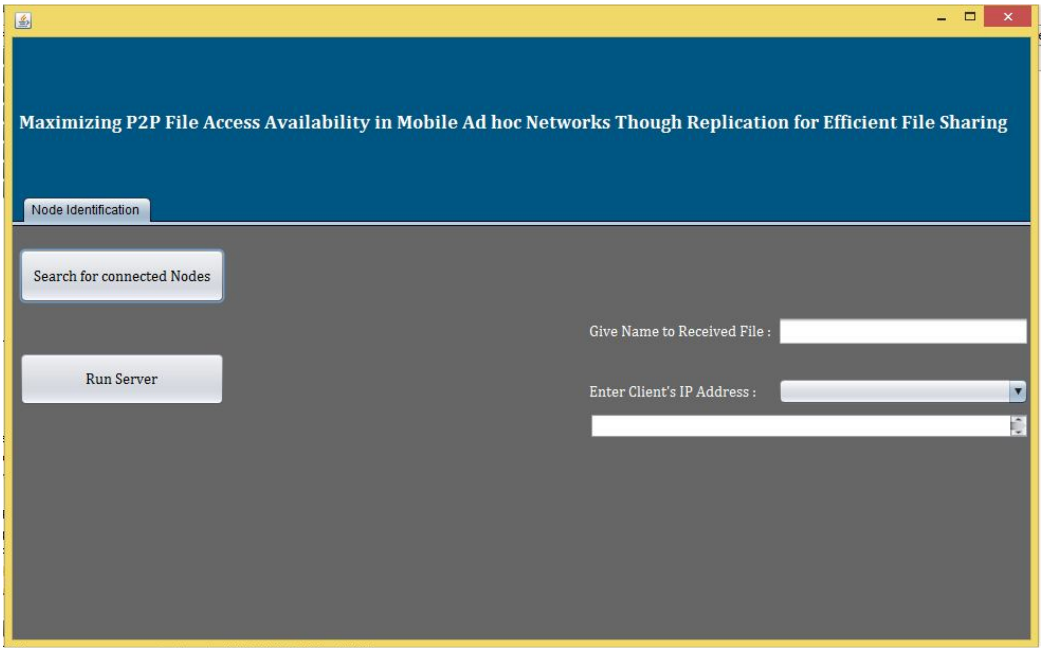

Figure 3 : Node Identification

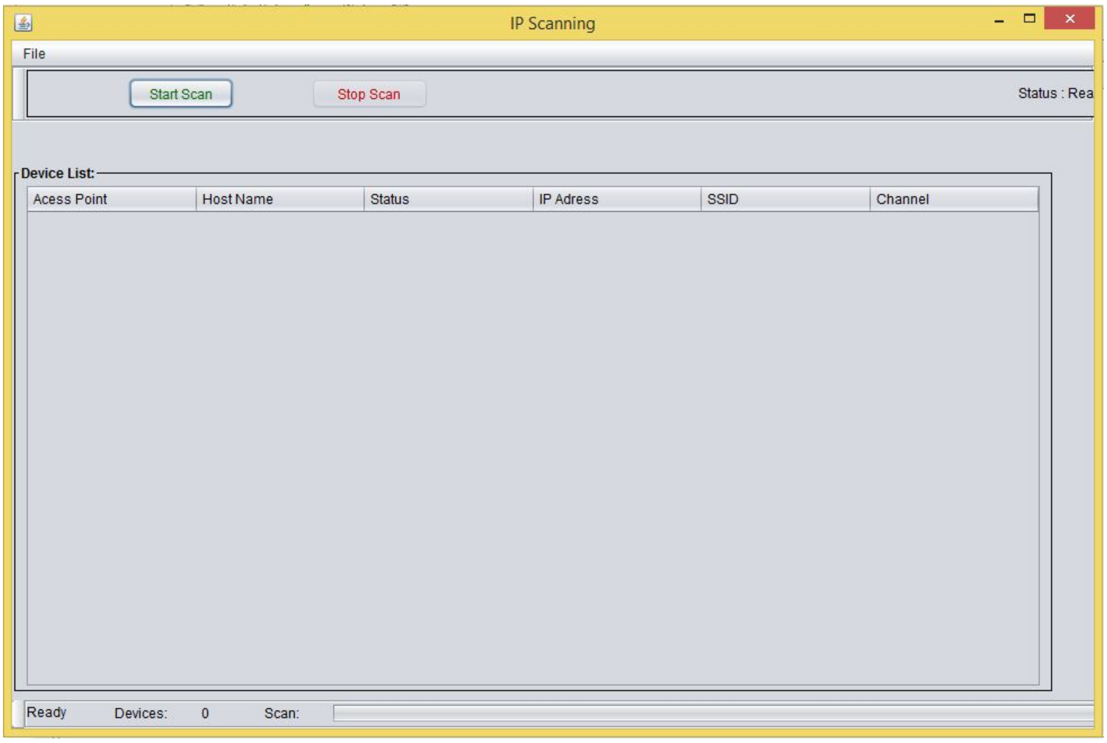

Figure 4: IP addreess Scanning

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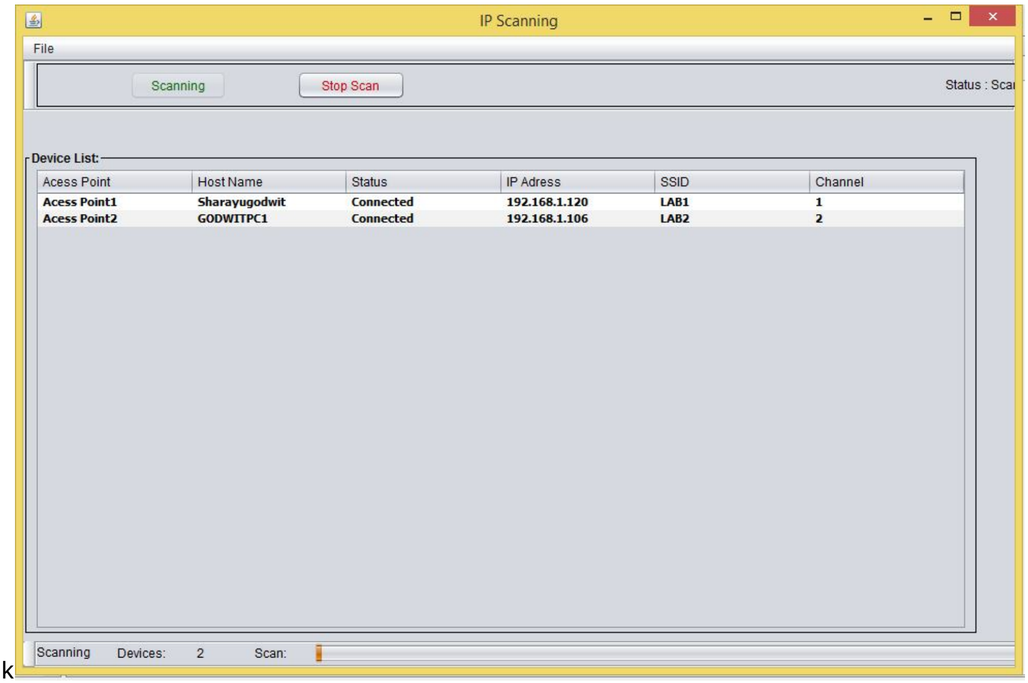

k

Figure 5: Scanned IP addresses

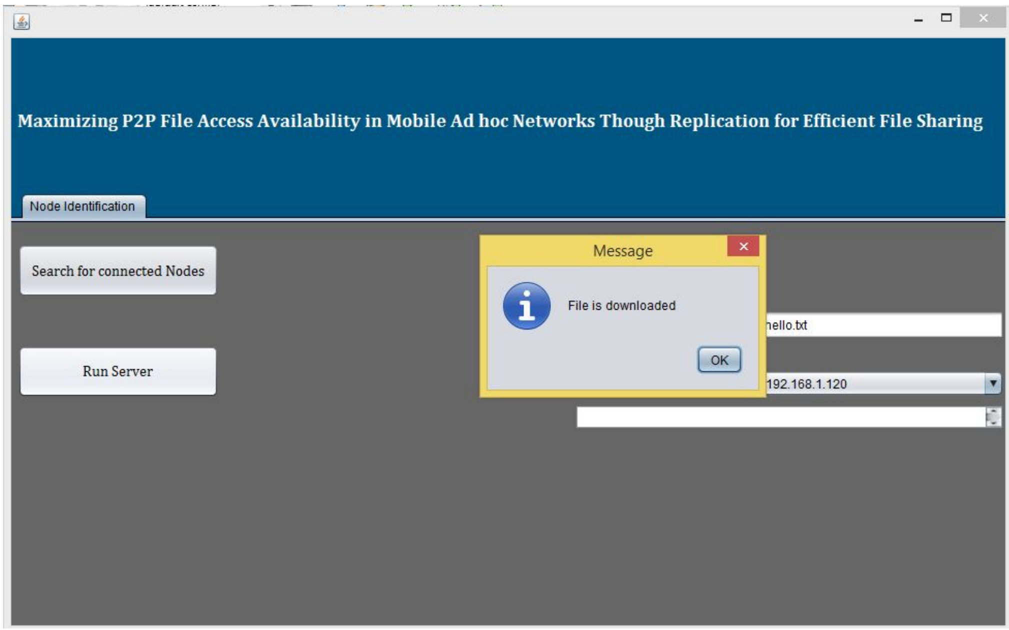

Figure 6: File Download

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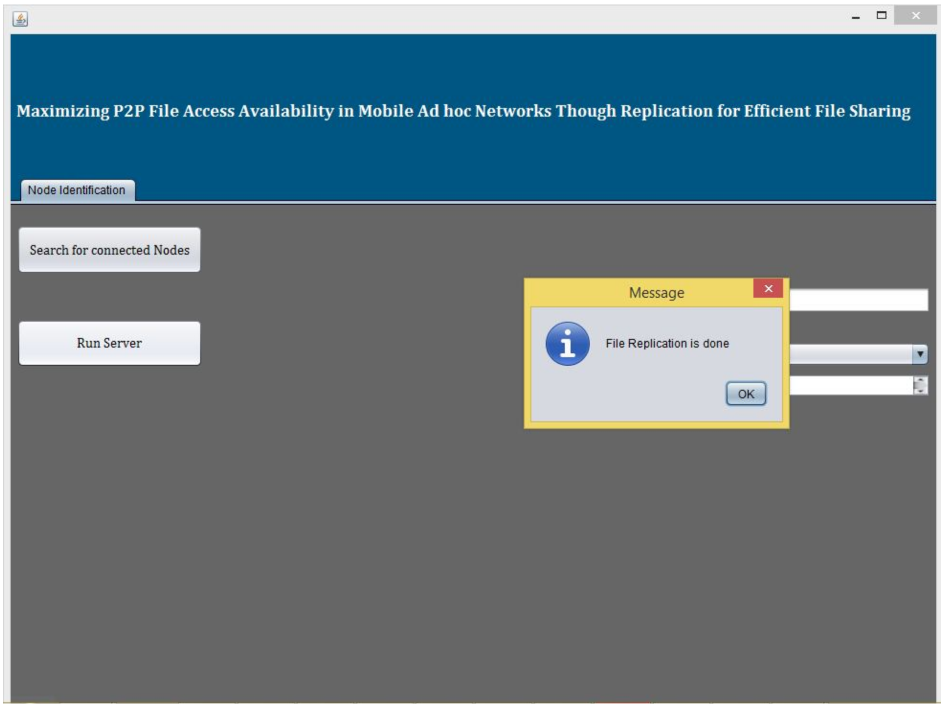

Figure 7 : File Replication

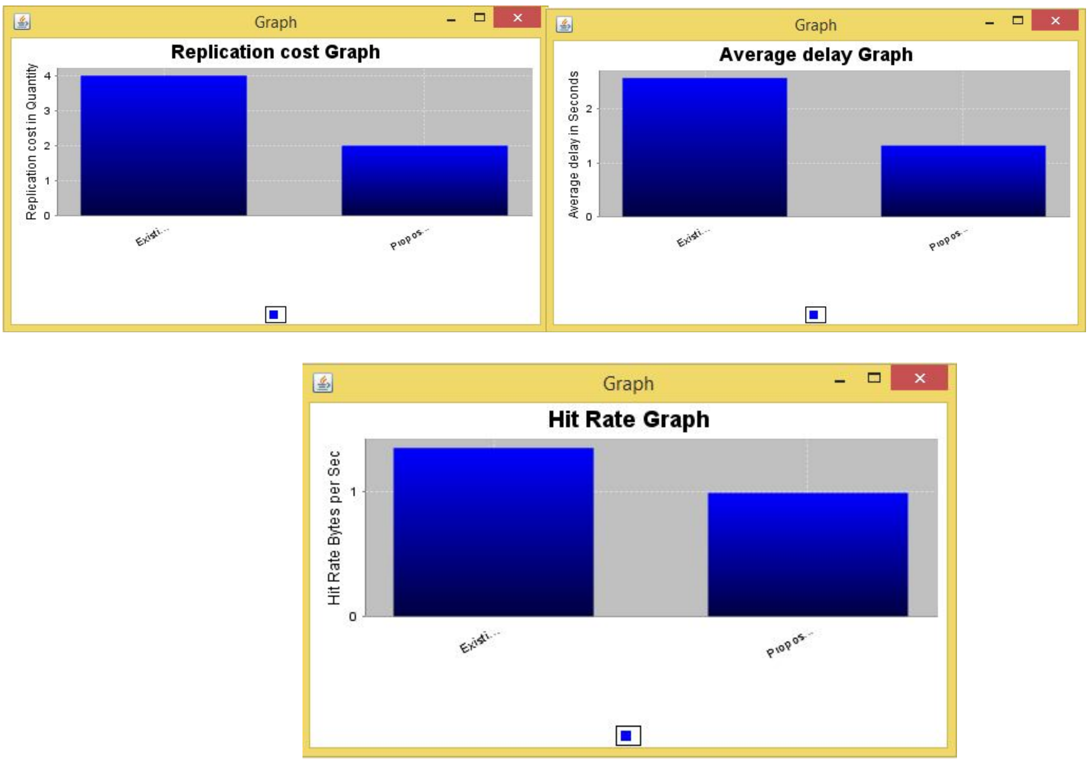

Figure 8: Comparison Graphs

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V. CONCLUSION AND FUTURE SCOPE

For maximizing file availability in the mobile ad-hoc network the replication can be used. If small number of replicas are used, file sharing can't be efficient.The idea is that a data item should best be placed on a node with very good connectivity with other nodes that are interested in the data item's topic. Set of nodes that are interested in a topics form a Community of interest.There is different file replication protocols used but they suffer from the problems like allocating limited resources to different files and consider storage as a resource for replicas. The solution provided for this is globally optimal file replication. The approaches discussed in the paper are for allocating the limited resources. Using the priority based rule the replication is done on neighbors. But as the nodes are moving from their places it is not efficient to replicate files of any size on any neighbor. For that purpose we are have proposed a model that considers peer mobility and battery energy for identifying the best neighbor. In this way replication can be done on selected neighbor, which will increase the efficiency. In future we can consider more features along with the mentioned features for finding the neighbour.We can also plan to analyze a more complex environment including file addition and deletion, file time-out and dynamic node querying pattern.

VI. ACKNOWLEDGEMENT

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BIOGRAPHY

Ashwini S. Jagtapis a student in the ComputerEngineering Department, Dhole Patil College of Engineering, SavitribaiPhuleUniversity,Pune. She received Bachelor degree of Computer Science and Engineering in 2010 from Shivaji University, Kolhapur,Maharashtra, India. Her research interestis Mobile ad-hoc networks.