Replication Strategy in MANET to Increase the File Availability

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Abstract— The peer to peer file sharing in MANETs (Mobile Ad-Hoc Networks) gives the gravid impact in the world of communication and sharing. The file sharing in network like LANs, WLANs where server takes the brilliance and all tasks or file sharing activities done with processing queries on server. That gives lag querying processing and sometime due to rushing on server time out occurs. Importance is achieved due to communicability between peer groups or between un-peearable nodes. It is favorable for short and long terms goals because of sharing without central nodes. The time efficiency factor increases with query processing and p2p file sharing. The main importance is taken by file sharing in MANETs that is securely storing of files with File Replication in MANETs. In the literature there is some existed replication protocols in MANET that includes : File replication data allocated on mobile nodes in MANET and store it, Replicas are slenderize to neighbor nodes and then reduced or merged, The cache technique works, where query processing done in frequently encountered nodes and that nodes are used for file replication, The probability based system in which file replication done in that node who's probability of adopting the replicas in the network is higher than other nodes in network. The PCS file replication protocol that works efficiently and minimizes querying processing delay in network. In our algorithm the replicas are created in fixed server where inside the server peers are available and file stored in encrypted format, so no unsafe can deal with proper file, so file is secured in MANET.

Key words: MANET, Peers, Encrypted

I. INTRODUCTION

Now a days, the mobile devices are very popular due to their mobility, robustness, friendliness and other benefits. For sharing purpose in mobile devices the MANET is created which provides flexibility in network. The MANET is network stands for Mobile Ad Hoc Network. This network doesn't have pre-existing environment like LAN or any fixed network. In case of fixed network there is no dynamicity in network, means devices can't be added by prior information. But in MANET the devices can be added quickly and can be away from network as the interest is finished. In MANET no traditional topology is used, it is completely self-organizing. No server or base station is required means all nodes are performing role in network host as well as server. That network can also provide on-demand service and no interface of administrative control. The communication between nodes that is important issue but by using the peers in server the communication done effectively.

The peers are working in the MANET network like the intermediate nodes or the path-nodes. The file replication is effective method for file availability in any network. The replication is minimizes the querying delay in network, by using that replica the user can perform the operation like the original data. However the predictive algorithm working in MANET where the semantic information about the user, data and previous access patterns are used to decide replication location. DCG (Dynamic connectivity grouping), DAFN (Dynamic access frequency neighborhood), SAF (Static access frequency) algorithms [7] are frequency based in mobile nodes. The scheme like cache based [6] algorithms works with the caching techniques which perform popular files replication in cache memory. The adaptive replica allocation algorithm which used dynamic [2] environment which is worked for fixed network, the decision for replication taken based on the request for file frequently queried by nodes. The replication in local memory [3] in that the node creates some common sharing space for other nodes in that location replica are store. The probability of data may not be losses or security is maximized by creating and storing replica, but sometime the storing replica in storage space is costly due to file size or long length file transfer. The file security is again important issue with the file because file is easily available in the network, by replication. So, that type of replication is not profitable concept because of file security reason.

In this paper, we introduce the concept of SFR algorithm, which stores the file by splitting file in number of small parts and using the encryption technique the file is secured in MANET with dedicated server. The literature tells the various previous techniques that can provide the security for replicated file in MANET by using various algorithms they focused only on availability of the file but by using our technique the security to the file is also improved.

II. LITERATURE REVIEW

J. Zheng, J. Su, K. Yang, and Y. Wang proposed the ADAPTIVE REPLICA ALLOCATION ALGORITHMS for fixed networks. In the fixed networks, the optimal replica allocation scheme of an object depends on the read-write pattern, but in the MANET environment it rest on not only on the read-write pattern but also on the nodes motion. In the ARAM (the Adaptive Replica Allocation Algorithm In MANET) algorithm, each replica node collects access requests from its neighbors and makes choices locally to inform the replica allocation scheme. Thus the ARAM algorithm adapts to the dynamic MANET environment. Furthermore, it can dynamically adjust the replica allocation scheme towards a local (rather than global) optimum.

In the MANET environment, algorithm is executed at each replica node periodically and independently. The time duration of the period which is parameter t is a uniform system parameter. It totally depends on the dynamicity the network topology. The period tends to be shorter for a network with more common topological modifications and read-write pattern changes. [2]

V. Gianuzzi The considered environment is an ad hoc mobile network, where each mobile node can cooperating with each other and construct the common

space, by sharing of its some memory space with the other nodes. The links uses for communication between nodes are maintained as these are found in the same of radio communication range, where the links are bidirectional. A mobiles hosts supports to create replicas and maintain them local memory. It can produce new records (original data and share them with the other users. It can also form locally a data access tracks ("PathData") which allow a quicker access for distant data. They proposed decentralized and distributed algorithm of dynamic data replication for MANETs. For that primary and dynamic replication algorithms are developed.

In primary replication system provide a shared data which present a certain interest for the mainstream of the network, it replicates and distributes uniformly the replicas whereas in dynamic replication the mobile nodes adjust the position and some communication links are cut off while others appear. This algorithm advances the reply times by approximating the data (in number of hops) to the nodes which frequently influence it. The evaluation of spaces between the replicas is carried out in term of the number of hops. This technique allows to keep any information closer to the mobiles hosts. The work also focused on data accessing routine. [3]

L. Yin and G. Cao designed and evaluated cooperative caching methods to proficiently support data access in ad hoc networks. Specifically, they recommended three systems: CachePath, HybridCache and CacheData. In CacheData, middle nodes cache the data to serve future requirements instead of fetching data from the data center. They design and evaluate cooperative caching techniques to efficiently support data access in ad hoc networks. First proposed two schemes: CacheData which caches the data, and CachePath which caches the data path. Later analyzing the performance of those two schemes, propose a hybrid approach (HybridCache) which can further increase the outcome by considering benefit of CacheData and CachePath while avoiding their flaws. Simulation outcomes indicate the recommended schemes can expressively reduce the query delay and message complexity when compared to other caching schemes.[6]

T. Hara and S.K. Madria developed the replica allocation methods, there is no central server that controls the apportionment of replicas, but mobile hosts autonomously determine the allocation in a distributed manner. Some of their proposed replica allocation methods need a mobile host as the coordinator which is chosen dynamically. They proposed three allocation schemes which divide in emphasis that is set on access frequency and network topology. The allocation schemes are named as SAF (Static Access Frequency), DAFN (Dynamic Access Frequency and Neighborhood), DCG (Dynamic Connectivity based Grouping). In the SAF technique, the aim is to allocate replica in the mobile host in descending order of access frequency. The mobile hosts do not need to exchange information with each other for replica allocation. No duplication removal takes place as they are not aware of existence of replica with their neighbor.

The efficiency of this method is the allocation of replica takes place with low overhead and low traffic. On the other side since each mobile host assigns replicas on the basis of the access frequencies to data items, mobile hosts with the same access features allocate the same replicas. Therefore, the SAF method gives low data availability when many mobile hosts have the similar or related access characteristics. Compared to SAF, data accessibility is expected to be higher in DAFN method, but does not completely get rid of replica duplication among neighboring hosts because it performs the elimination process only for once by scanning the network based on the breadth first search. The objective of this method is to eliminate duplicate of replicas that exist between the connected mobile hosts. At a relocation period, each mobile host broadcasts its node identifier and info on access frequencies to data items. On completion of broadcasts, from the received host identifiers, every host will understand as its connected mobile hosts. Each mobile host at the beginning determines the assignment of replicas on the basis of the SAF method. In each set of mobile hosts which are connected to each other, when there is duplication of a data item (original or replica) between two neighboring mobile hosts, and if any one of them is the original, the host which holds the replica of data changes it to replica of another replica. The DCG method is performed at every relocation period. In each group, an access frequency of the group for each data item is calculated as addition of access frequencies of mobile hosts in the group to the item. This calculation is done by the mobile host with the lowest identifier. Based on the order of the access frequencies of the group, replicas of data items are allocated to all mobile hosts in the group until the memory space of the host becomes full. The replicas of data items which are held as originals by mobile hosts in the group are not appointed. Each replica is allocated at a mobile host whose access frequency of the data item is the highest among hosts and has free memory space to create it. [7]

H. Duong and I. Demeure proposed a algorithm to be used for data sharing in MANETs. The system uses the predictive algorithm based on semantic information about the user, the data and the previous access patterns. It also aims at creating enough replica to prevent data loss in case a peer unexpectedly disappears or partition occurs. They also provide stable group creation algorithm on long lasting connectivity. [11]

III. PROBLEM STATEMENT

The problem outline is as Follows:

1) The availability of files in MANET network with minimum time delay and provide maximum querying efficiency for nodes.
2) The file security is again important issue that can be handled and maintain consistency between files.

IV. PROPOSED SYSTEM

1) The system enhanced meaning of replication by using splitting the replica and stored them in peers on server.
2) System provides the consistency between the files while accessing them by client.
3) The algorithm can stored replica effectively on the peers in encrypted format, which cannot accessible proper file by any unsafe. The proposed work can provide security to files.

V. SYSTEM ARCHITECTURE

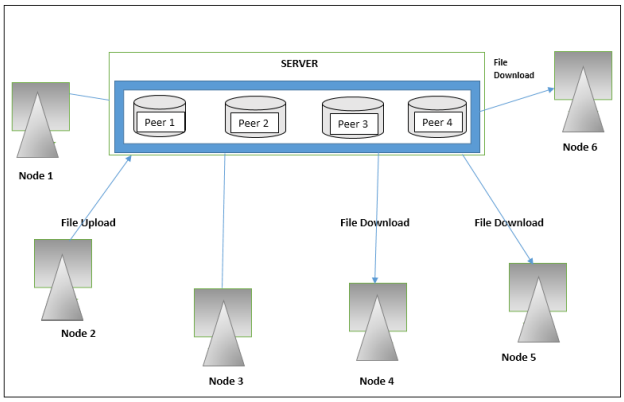

Fig. 3: System Architecture

The system architecture has MANET structure, where the server contains peers (peer1, peer2, peer3, peer4) and the nodes in MANET are present. The file which is stored by the server or file owner can splitted and stored in encrypted format. The node has the list of all files which are stored in server, that can update automatically and node which wants that file can download that file and access that file.

VI. ALGORITHM

1) Step 1. Start
2) Step 2. Input file -> F(z)
3) Step 3. Count -> 0;
4) Step 4. Create replica node -> n1(z)
5) Step 5. Count -> count+1
6) Step 6. Set order list for replica
7) Step 7. For each file -> F(z) -> node while(R(Z) ! = null) n1 -> R(Z). createReplica() function for respective node.
8) Step 8. Find F(z) node total memory
9) Step 9. F(Z) = f1,f2,f3..... is a replica store randomly particular server respective file name.
10) Step 10. F(Z).Size()is performs reduce
11) Step 11. Then download the merger file respective file name
12) Step 12. nSum -> nTotal+nRandom+fn(z)
13) Step 13. Return nSum -> F(Z)
14) Step 14. End.

VII. MATHEMATICAL MODULE

A. *Input:*

P (Z)=PEER1 ,PEER2,PEER3...PEERn
U (Z)=U1,U2,U3.....Un
F (Z)=F1,F2,F3....Fn
R (Z)=R1,R2,R3.....Rn

1) U(Z) U F(Z) =(Un,Fn)

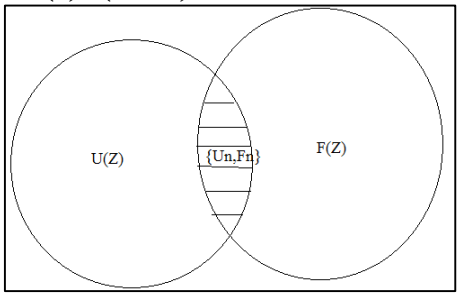

Fig. 4: U(Z) U F(Z) =(Un,Fn)

2) U(Z) U F(Z) U R(Z) :(Un,Fn,Rn)

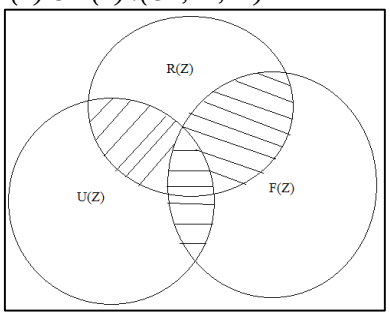

Fig. 5: U(Z) U F(Z) U R(Z) :(Un,Fn,Rn)

3) U(Z) -> F(Z) -> R(Z) U S(Z)

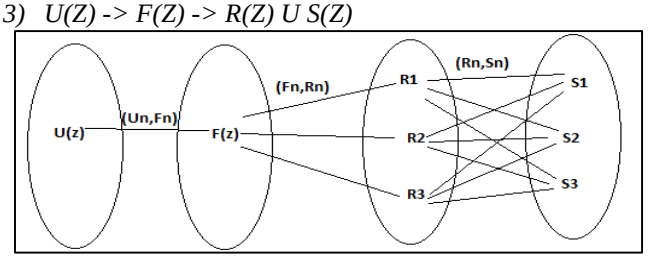

Fig. 6: U(Z) -> F(Z) -> R(Z) U S(Z)

VIII. EXPERIMENTAL SETUP AND RESULT ANALYSIS

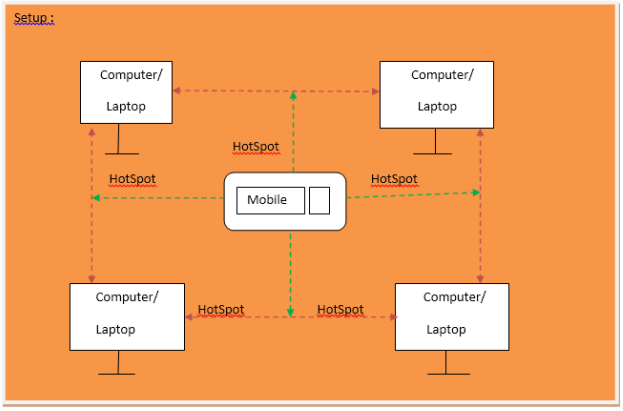

Fig. 7: Experimental setup

In the setup we require to create MANET network with connected nodes. The server which are created are fixed with the peers. The file can be uploaded by nodes in server and server can automatically divide that file and store the respective portions in peers. When the file is require for any node in MANET can be accessible by list display in client side.

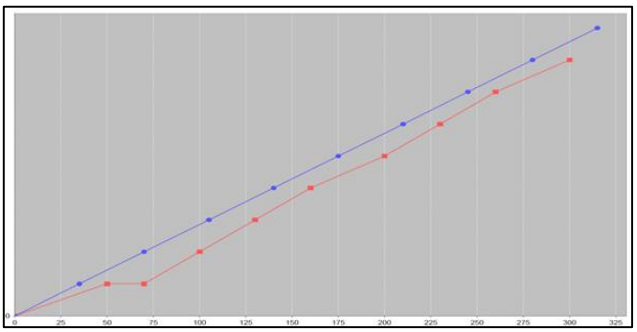

Fig 7. Result Analysis shows result maximized by our proposed algorithm.

In that the results the file availability in MANET by using proposed algorithm is perform better functionality than previous algorithm and can stored file securely in MANET network.

IX. CONCLUSION AND FUTURE WORK

The condition when flashy crowd for file accessibility in MANET then our algorithm gives maximum availability to file due to files stored in peers. The consistency is preserve by the waiting state in network. The threat of hot files in MANET can be minimized because of files are stored in encrypted format and can access only at client side when algorithm properly runs.

Our proposed algorithm can work only with PDF, document file and text file. In future we trying that on music, video files. The file which are in data grids where the replication in clusters that created by using our algorithm.

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