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File Sharing System in P2P with Access Availability for Social Networks using Node Storage and Meeting Frequency

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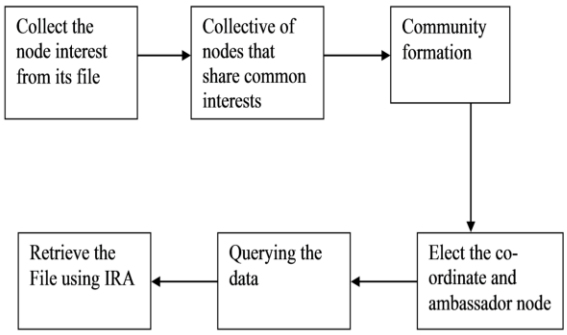
Abstract —for sharing purpose in mobile devices the MANET is created which provides flexibility in network. The MANET is network stands for Mobile Ad Hoc Network. This network doesn't have pre-existing environment like LAN or any fixed network. In case of fixed network there is no dynamicity in network, 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. File sharing is one of the aspects which include peer to peer file sharing over MANET. Main advantages of P2P file sharing are files can be shared without base stations, overload on server can be avoided and it can exploit the otherwise wasted peer communication opportunities among mobile nodes. File replication which plays important role in enhancing file availability and reduce file querying delay. By creating replicas the probability of encountered requests can be improved. Random Way Point used for the normal MANET and Community-Based Mobility Model used for Disconnected MANETs. 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.

Keywords — ***MANET, Peers, Encrypted, file sharing, file availability.***

Introduction

Normal MANETs and disconnected MANETs. First has a relatively dense node distribution in a local area while the latter has sparsely distributed nodes that opportunistically meet each other. The local P2P model provides three advantages. Firstly, it enables file sharing when no base stations are available (e.g., rural area). Secondly, with the P2P architecture, the bottleneck on overloaded servers in current client-server based file sharing systems can be avoided. Thirdly, it exploits the otherwise wasted peer to peer communication opportunities among mobile nodes. Because of which, nodes can freely and unremarkably access and share files in the distributed MANET environment, which can possibly support some interesting applications. However the distinctive properties of MANETs, including node mobility, limited communication range and resource, have rendered many difficulties in realizing such a P2P file sharing system. File replication is an effective way to enhance file availability and reduce file querying delay. It creates replicas for a file to improve its probability of being encountered by requests. Unfortunately, it is impractical and inefficient to enable every node to hold the replicas of all files in the system considering 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. In a mobile ad hoc network (MANET), mobile hosts can communicate directly with one another using direct pair wireless links. Because it requires no fixed infrastructure and most of the time no explicit administration a MANET can extremely useful to support communication in challenging situations, such as in rural, remote , or disaster-struck areas. P2P computing refers to technology that enables two or more peers to collaborate spontaneously in a network of equals (peers) by using appropriate information and communication systems without the necessity for central coordination. P2P networks are overlay networks typically operated on infrastructure (wired) networks, such as the Internet. However, the P2P overlay network is dynamic, where peers come and go (i.e., leave and join the group) for sharing files and data through direct exchange. Such peer-to-peer communication paradigm will be very important in wireless multi-hop networks as centralized servers might not be available or located in the Internet. Therefore, P2P will be an interesting alternative for decentralizing services

or making its own local resources available in the multi-hop network to serve local user communities. P2P overlay networks in the Internet and mobile ad-hoc networks share many key characteristics such as self-organization and decentralization due to the common nature of their distributed components.



Literature Survey

[1] 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.

[2] 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.

[3] 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 neighbour.

[4] 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.

Proposed System

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. File sharing in peer to peer mobile ad hoc network is made efficient and reduced delay with help increased cache size. In file sharing, it looks for two operation,

• Cache miss
• Cache penalty

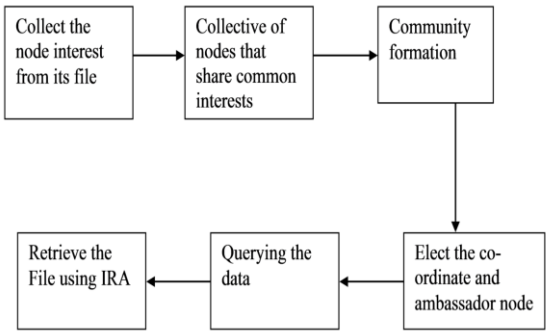
A cache miss refers to a failed attempt to read or write a piece of data in the cache, which results main memory access takes longer latency. Cache misses can be of three types: data read miss, instruction read miss and data write miss. Design and implementation of secured cooperative cache in wireless P2P networks are presented. Through real implementations, important design issues are

identified and proposed an asymmetric approach in order to reduce the overhead of copying data between the user space and the kernel space, and also to reduce the data processing delay. The proposed algorithm well considers the caching overhead and adapts the cache node selection strategy to maximize the caching benefit on different MAC layers. Results show that the asymmetric approach outperforms the symmetric approach in traditional 802.11-based ad hoc networks due to removal of most of the processing overhead.

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.



Related work

To improve the response time of data retrieval in mobile environments, Data caching plays an important role. This section provides an overview of data caching schemes for mobile environments. **A. Cooperative caching :** In a mobile environment, the mobile client can access data items from the cache of its neighbouring client. This concept is known as "cooperative caching". Notably, cooperative caching can also be used in conjunction with the P2P paradigm. [15] proposes a cooperative caching scheme, designated as COCA, for mobile systems. COCA categorizes the mobile clients into two categories: Low Activity Mobile clients (LAM) and High Activity Mobile Clients (HAM). Notably, mobile clients from both of these categories share their respective caches. COCA reduces the server workload because the server replicates data items on the LAMs, while the HAMs take advantage of these replicas. Thus, COCA improves the overall system performance, reduces the number of requests as well as the access miss ratio when the mobile hosts are outside of the service region. Wireless Sensor Networks support several applications such as environment control, intelligent buildings, and target tracking in battlefields. Over the past few years, Wireless Sensor networks have been growing in importance. To serve data in short latency and with minimal energy consumption, these applications require optimization in communication among the sensors. Hence, cooperative data caching protocols has been proposed. The selection of sensor nodes is at the heart of these protocols, and it plays an important role in making the caching and request forwarding decisions. The [16] introduces two new metrics to aid in the selection of such nodes. On the basis of these metrics, the work proposed two new cooperative caching protocols.

B. Techniques for maintaining cache consistency :In mobile database systems, if data is cached on a mobile host, it will reduce the query response time and also conserve the generally limited bandwidth. However, there is a need for cache consistency. A basic cache consistency scheme works as follows. The server broadcasts the invalidation report, which identifies the updated data objects so that the mobile hosts may remove the old data from their cache. Due to this reporting, the reconnecting process of a given mobile host may be slow as the mobile host requests the server for validating a cache as it receives an invalidation report. [17] proposes a set of new cache validation schemes, which are capable of conserving the bandwidth for cache validation as well as for query processing. Caching is also useful for reducing the server load as it facilitates data access at clients, thereby improving the overall performance of the system. In mobile computing environments, there are chances of frequent disconnections. In such situations, coherence between servers and clients becomes a necessity. [18] proposes a category of cache invalidation strategy and mathematical model, and develops a high-performance caching technique. Moreover, the work evaluates the performance for practical wireless mobile computing scenarios. Furthermore, the cache invalidation methods are record ID based; hence they are not adequate to manage the cache consistency of the mobile clients efficiently. [19] proposes a cache invalidation scheme for continuous partial query in mobile computing environment, which is predicate-based. Here, the cache state of the mobile client is the predicate. The server broadcasts the cache invalidation report (CIR) and the predicate to the client for cache management. This method is useful for reducing the requirement of data for cache management. There are a number of methods to generate the CIR in the server and to identify the invalid data in the client. Additionally, in dynamic environments, users may not always be able to stay in permanent contact with the network, but message delivery should be guaranteed for all active users of the network. [20]

introduces two caching policies: basic caching and leaf caching for providing guaranteed message delivery.

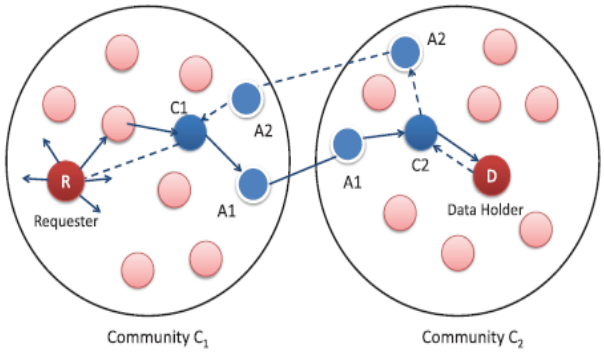
C. Cache replacement strategies: While caching frequently accessed data items on the mobile clients improve the system performance, the cache size is generally limited. Hence, effective cache replacement techniques become a necessity to determine the set of data items that should be evicted from the cache. [21] proposes a cache replacement policy called the Weighted Predicted Region-based Cache Replacement Policy (WPRRP) for location-dependent data. WPRRP works on the basis of client's movement by selecting the predicted region to calculate the weighted distance of a given item. In a mobile computing environment, the mobile user uses cache to access the data easily, thereby enhancing the data availability as well as improving the data access time. Information is transferred from the server to the query-issuer depending on its current location. This is known as Location Dependent Information Services (LDISs). [22] proposes a cache replacement policy named Prioritized Predicted Region based Cache Replacement Policy (PPRRP), which uses a cost function for the data eviction based on the client's movement pattern. [23] proposes a proactive caching model, which caches the result objects along with the index that supports these objects as the results. This is helpful for object reusability for all common types of queries. To optimize the query response time, [23] also proposes an adaptive scheme to cache an index. In mobile environments, proactive caching achieves significant performance gains as compared to page caching and semantic caching.

Replication is the process of sharing information so as to ensure consistency between redundant resources, such as software or hardware components, to improve reliability, fault tolerance, or accessibility. It could be data replication if the same data is stored on multiple storage devices or computation replication if the same computing task is executed many times. A data replication is typically performed in (distributed) space. A computational task is typically replicated in space, i.e. executed on separate devices, or it could be replicated in time, if it is executed repeatedly on a single device. This section discusses the existing data replication approaches to improve data availability in mobile environment.

A. Data Replication in MANETs :A network, where content exchange or delivery is done by autonomous peers, it becomes challenging to construct efficient distributed algorithms for content replication. This is due to the autonomy of the peers and their freedom to decide which objects they want to replicate. Additionally, churn (i.e., peers leaving the network autonomously) poses significant challenges to data availability. The proposals in [30], [31] discuss replication in MANETs. E-DCG+ [30] creates groups of mobile peers (MPs) that are bi connected components in a MANET, and shares replicas in larger groups of MPs to provide high stability. An RWR (read write ratio) value in the group of each data item is calculated as a summation of RWR of those data items at each MP in that group. In the order of the RWR values of the group, replicas of items are allocated until memory space of all MPs in the group becomes full. Each replica is allocated at an MP, whose RWR value to the item is the highest among MPs that have free memory space to create it. The work in [31] aims at classifying different replica consistency levels in a MANET based on application requirements, and proposes protocols to realize them. In this work, each replica is valid till its original owner updates it. Hence, applying strict consistency updates may potentially degrade the system performance, given the inherently dynamic nature of the environment. Thus, the work assumes that all applications do not necessarily require such strict consistency, and it defines consistency based on group-level information consistency. For example, in case of a disaster management group, the information must be consistent within the group, but not strictly consistent w.r.t. to the other groups. Here, the local consistency maintenance within a given group is performed via quorums and it is based on local conditions such as location and time. Notably, the proposals in [30], [31] do not consider an M-P2P architecture and data rarity issues. Incidentally, P2P replication suitable for mobile environments has been incorporated in systems such as ROAM [32], Clique [33] and Rumor [34]. ROAM, which is a system designed based on the Ward model [35], satisfies a replication solution redesigned specifically for mobile environments. ROAM further considers replication factors such as local replication, appliance compatibility for replication and consistent updates throughout the network.

B. Data Replication in M-P2P Networks: The work in [41] presented the economic model for efficient replica management in M-P2P networks, in which mobile peer has been incentivized to host replica. Here, mobile peers choose which data should be replicated based on its importance. In this manner, mobile peers earn revenues from their hosted queried data items. Hence, it encourages peer participation to improve data availability and discourages free riding. Progressively, [43] proposed ConQuer: a groupbased replication method with incentivation in M-P2P networks. This work assume the

super-peer architecture for M-P2P network, in which a broker i.e., super-peer has been incentivized for serving constrained query processing by query-issuing peer. Moreover, collaborative peer groups further improves data availability and revenues by mutually allocating and de-allocating data items based on royalty-based model. In a similar vein, a collaborative replication approach for M-P2P networks is also proposed by [40]. The proposal in [44] discussed an economic model LEASE, in which data-providers lease data items to the free-riders in lieu of a lease payment. Hence, it provides free-riders the opportunity to earn revenue by hosting data, thereby incentivizing them towards data hosting. [45] also discussed incentive-based services for a dynamic data management in M-P2P networks.



Conclusion and Future Work

In this paper, we investigated the problem of how to allocate limited resources for file replication for the purpose of global optimal file searching efficiency in MANETs. Unlike previous protocols that only consider storage as resources, we also consider file holder's ability to meet nodes as available resources since it also affects the availability of files on the node. We first theoretically analyzed the influence of replica distribution on the average querying delay under constrained available resources with two mobility models, and then derived an optimal replication rule that can allocate resources to file replicas with minimal average querying delay. Finally, we designed the priority competition and split replication protocol (PCS) that realizes the optimal replication rule in a fully distributed manner. Extensive experiments on both GENI testbed, NS-2, and event-driven simulator with real traces and synthesized mobility confirm both the correctness of our theoretical analysis and the effectiveness of PCS in MANETs. In this study, we focus on a static set of files in the network. In our future work, we will theoretically analyze a more complex environment including file dynamics (file addition and deletion, file timeout) and dynamic node querying pattern.

Our future work will concentrate on efficient and secured file sharing in peer to peer mobile ad hoc network by implementing the proposed technique improved Euclidean algorithm.

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