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# Efficient File Sharing Scheme in Mobile Adhoc Network

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***Abstract:*** **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. Here, we introduce a new concept of resource for file replication, which considers both node storage and node meeting ability. We theoretically study the influence of resource allocation on the average querying delay and derive an optimal file replication rule (OFRR) that allocates resources to each file based on its popularity and size. We then propose a file replication protocol based on the rule, which approximates the minimum global querying delay in a fully distributed manner.**

***Keywords:*** **File Sharing Scheme, optimal file replication rule (OFRR).**

## 1. INTRODUCTION

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 not. Thus, a critical issue is raised for further investigation: how to allocate the limited resource in the network to different files for replication so that the overall average file querying delay is minimized? Recently, a number of file replication protocols have been proposed for MANETs. In these protocols, each individual node replicates files it frequently queries, or a group of nodes create one replica for each file they frequently query.

In the former, redundant replicas are easily created in the system, thereby wasting resources. In the latter, though redundant replicas are reduced by group based cooperation, neighboring nodes may separate from each other due to node mobility, leading to large query delay. There are also some works addressing content caching in disconnected MANETs/ DTNs for efficient data retrieval or message routing. They basically cache data that are frequently queried on places that are visited frequently by mobile nodes. Both the two categories of replication methods fail to thoroughly consider that a node's mobility affects the availability of its files.

In spite of efforts, current file replication protocols lack a rule to allocate limited resources to files for replica creation in order to achieve the minimum average querying delay, i.e., global search efficiency optimization under limited resources. They simply consider storage as the resource for replicas, but neglect that a node's frequency to meet other nodes (meeting ability in short) also influences the availability of its files. Files in a node with a higher meeting ability have higher availability.

We introduce a new concept of resource for file replication, which considers both node storage and node meeting ability. We theoretically study the influence of resource allocation on the average querying delay and derive an optimal file replication rule (OFRR) that allocates resources to each file based on its popularity and size. We then propose a file replication protocol based on the rule, which approximates the minimum global querying delay in a fully distributed manner. Our experiment and simulation results show the superior performance of the proposed protocol in comparison with other representative replication protocols.

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## 2. EXISTING SYSTEM AND DISADVANTAGES

In existing there are three file replication protocols: static access frequency (SAF), dynamic access frequency and neighborhood (DAFN), and dynamic connectivity based grouping (DCG). In SAF, each node replicates its frequently queried files until its available storage is used up. SAF may lead to many duplicate replicas among neighboring nodes when they have the same interested files. DAFN eliminates duplicate replicas among neighbors. DCG further reduces duplicate replicas in a group of nodes with frequent connections by creating replicas for files in the descending order of their group based querying frequencies.

Though DAFN and DCG enable replicas to be shared among neighbors, neighboring nodes may separate from each other due to node mobility. Also, they incur high traffic load in identifying duplicates or managing groups.

Another method to let each node collect data access statistics from neighbors to decide the creation or relinquishment of a replica. To group nodes with stable connections and let each node checks its group members' potential possibility of requesting a file and their storage status to decide replicate the file or not. To cache popular files on the intersection nodes of file retrieval paths. Though it is effective for popular files, it fails to utilize all storage space on nodes.

**Disadvantage:**

Mobility of a node affects the availability of files or messages.

Slower search and hence time consuming.

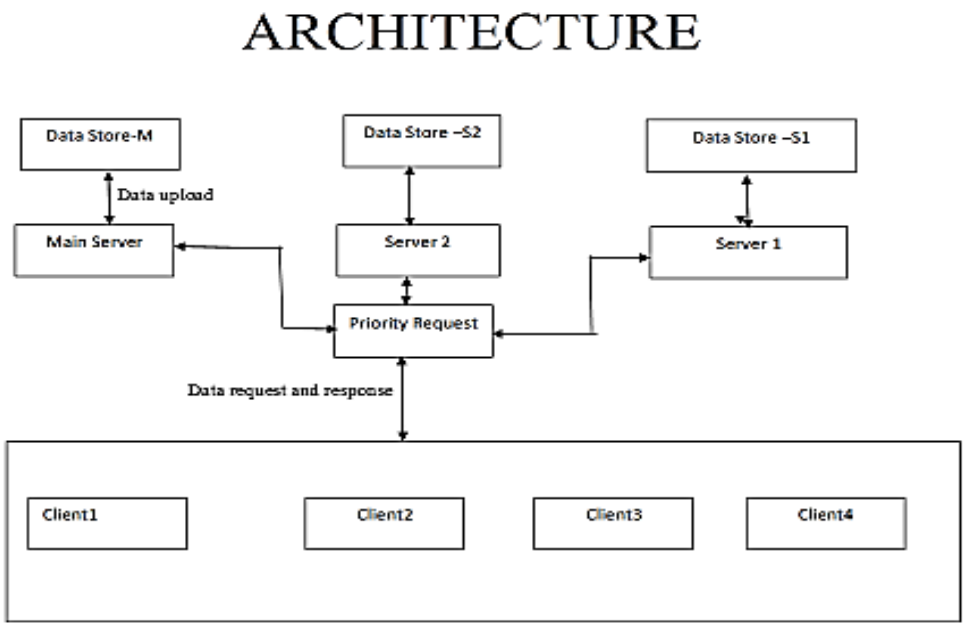
## 3. PROPOSED WORK

We introduce a new concept of resource for file replication, which considers both node storage and node meeting ability. We theoretically study the influence of resource allocation on the average querying delay and derive an optimal file replication rule (OFRR) that allocates resources to each file based on its popularity and size. We then propose a file replication protocol based on the rule, which approximates the minimum global querying delay in a fully distributed manner. Our experiment and simulation results show the superior performance of the proposed protocol in comparison with other representative replication protocols.

**Advantages:**

Time delay problem is solved

Higher hit rates



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The client sent request to the server.the request was satiesfied by nearesreplicationcopyof theserver.The replication copy was given by the server to its nearest and non moving neighbours.so the client easily get the data in time without delay.

## 4. MODULES

- Optimal File Replication
- File Replication Protocol
- Meeting Ability Distribution

**Optimal File Replication:**

In the RWP model, we can assume that the inter-meeting time among nodes follows exponential distribution. Then, the probability of meeting a node is independent with the previous encountered node. Therefore, we define the meeting ability of a node as the average number of nodes it meets in a unit time and use it to investigate the optimal file replication. Specifically, if a node is able to meet more nodes, it has higher probability of being encountered by other nodes later on.

Modeling Replication Optimization Problem We presents the general process to model the expected file querying delay with file replication. We let m^i be the probability that a node's newly met node in the coming time interval is node i, which reflects the meeting ability of the files on node i. We also use Xij to denote whether node i owns file j or its replication. Then, the average number of time intervals needed to meet a specific file, say file j, can be represented.

**Meeting Ability Distribution:**

The meeting abilities of all nodes and ranked them in decreasing order. We see that in all three traces, node meeting ability is distributed in a wide range. This matches with our previous claim that nodes usually have different meeting abilities. Also, it verifies the necessity of considering node meeting ability as a resource in file replication since if all nodes have similar meeting ability, replicas on different nodes have similar probability to meet requesters, and hence there is no need to consider meeting ability in resource allocation.

**File Replication Protocol:**

In this section, we propose a distributed file replication protocol that can approximately realize the optimal file replication rule with the two mobility models in a distributed manner. since the number of nodes met by a file owner is limited, a single file owner cannot distribute replicas efficiently and quickly. Propose a replication protocol to realize OFRR and analyze the effect of the protocol.

**Pseudo code**

**i.createReplicasOn (k)**

**k.createReplicasOn (i)**

**ProcedurecreateReplicas on (node)**

**nCount <- 0**

**this.orderFilesByP ()**

**For (eachfile f in current node)**

**If (node.compete3File (f) =true)**

**Node.createAReplica2 (f)**

**Else**

**nCount <- ncount+1**

**If nCount >=k**

**End procedure**

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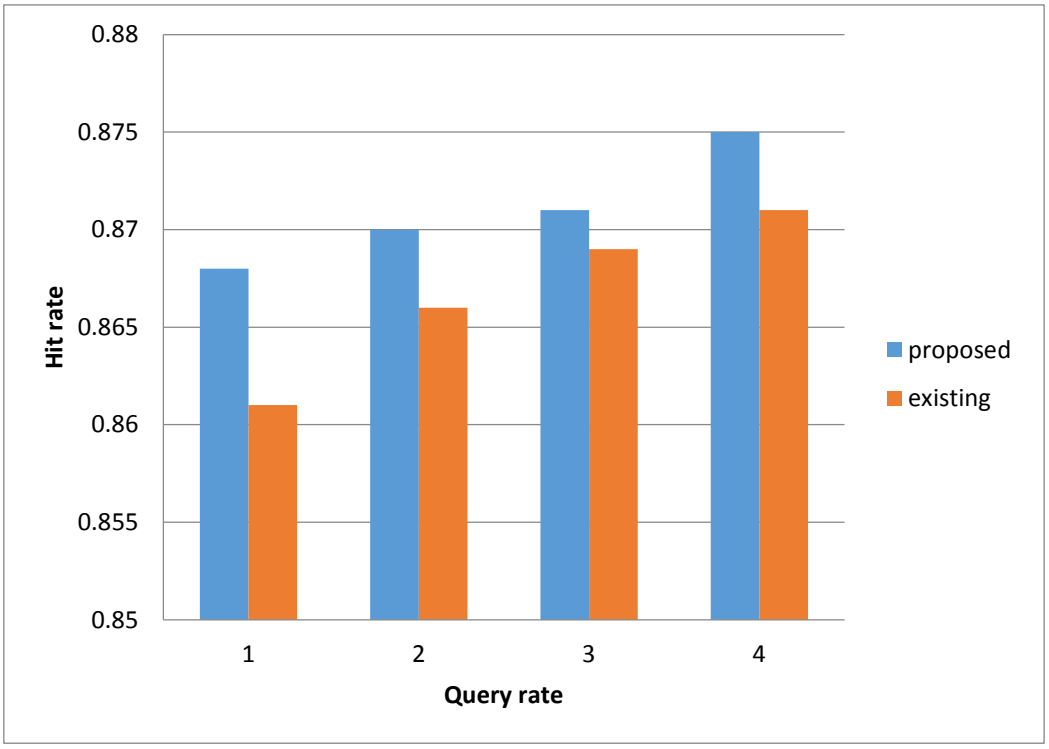
## 5. PERFORMANCE EVALUATION

**Hit Rate:** It is the percent of requests successfully resolved by either original files or replicas.

$$\text{HITRATE} = \frac{\text{Number of file requested}}{\text{Number of file received by a time}}$$

**Average Delay:** This is the average delay of all requests. This is the average delay of all requests. To make the comparison fair, we included all requests in the calculation. For unresolved requests, we set their delays as the TTL.

$$\text{AVERAGE DELAY} = \frac{\text{Number of files received}}{\text{Given time}}$$




## 6. RELATED WORK

**File Sharing in Normal MANETs:**

The topic of file replication for efficient file sharing applications in MANETs has been studied recently. An individual node or a group of nodes decide the list of files to replicate according to file querying frequency. Hara proposed three file replication protocols: static access frequency (SAF), dynamic access frequency and neighborhood (DAFN), and dynamic connectivity based grouping (DCG). In SAF, each node replicates its frequently queried files until its available storage is used up. SAF may lead to many duplicate replicas among neighboring nodes when they have the same interested files. DAFN eliminates duplicate replicas among neighbors. DCG further reduces duplicate replicas in a group of nodes with frequent connections by creating replicas for files in the descending order of their group based querying frequencies. Though DAFN and DCG enable replicas to be shared among neighbors, neighboring nodes may separate from each other due to node mobility. Also, they incur high traffic load in identifying duplicates or managing groups. Proposed to let each node collect data access statistics from neighbors to decide the creation or relinquishment of a replica. Duong and proposed to group nodes with stable connections and let each node checks its group members' potential possibility of requesting a file and their storage status to decide replicate the file or not. Yin and Cao proposed to cache popular files on the intersection nodes of file retrieval paths. Though it is effective for popular files, it fails to utilize all storage space on nodes.

## 7. CONCLUSION

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.

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