Handling Selfishness in Replica Allocation Over a Mobile Ad Hoc Network for Improving Data Accessibility

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Abstract

In a mobile ad hoc network, the mobility and resource constraints of mobile nodes lead to network partitioning. Several data replication techniques have been proposed to minimize network partitioning. All mobile nodes collaborate fully in terms of sharing their memory space. In reality, some nodes may selfishly decide only to cooperate partially with other nodes. The nodes which act selfishly to conserve their memory space are called selfish nodes.To over come these selfish nodes selfish node detection algorithm has been used which uses two techniques known as partial selfishness and novel replication allocation technique.

Key Words

Mobile Ad Hoc Networks, Degree of Selfishness, Selfish Replica Allocation.

I. Introduction

In Mobile ad-hoc networks they do not have any fixed infrastructure. These mobile nodes can move freely around the network.A MANET can be used in natural disasters or military conflicts. One such MANET application is Peer-to-Peer file sharing application where all the mobile nodes can share their data with each other. A node can access the data available with the other nodes by using queries. Network partitions can occur frequently, since nodes move freely in a MANET.To improve data accessibility, Data Reproduction techniques are used. Data are usually reproducted at nodes, other than the original owners, to increase data accessibility to cooperate with network partitions. A node act as selfishly, i.e., node uses limited resource only for their own benefit, such as battery and storage limitations. A node enjoy the benefits provided by the resources of other nodes, but it may not provide its own resource to help others nodes. Such selfish nodes can potentially lead a wide range of problems in a MANET.There are different methods has been proposed to identify the selfish nodes in a network. One such method is using SCF Tree. Each node detects the selfish nodes based on the calculated credit risk scores of the other nodes.Each node makes its own topology graph and builds its own SCF-tree by excluding selfish nodes. Based on SCF-tree, each node allocates replica in a fully distributed manner.

II. Existing System

In a network there are several nodes, One node act as a server and the rest of nodes act as a client. If a server wants to send a packet to any of the node and a node does not accept that packet even that node has a memory space to store that packet then such node is called as a selfish node and drop that packets. It is necessary to consider partial selfish behavior to handle selfish replica allocation. Therefore there are three types of nodes from selfish replica allocation perspective.

1. Type-1 node: The nodes are nonselfish nodes.The nodes hold replicas allocated by other nodes within their memory space.
2. Type-2 node:The nodes are fully selfish nodes. The nodes do not hold replicas allocated by other nodes,but allocate replicas to other nodes within their memory space.
3. Type-3 node: The nodes are partially selfish nodes.Their memory space is divided into two parts:selfish and public area.These nodes allocate replicas to other nodes for their accessibility.

The detection of type-3 node is complex,because they are not always selfish.some time type-3 node is considered as nonselfish, since the node shares part of its memory space.

III. Proposed System

It consists of three parts

1. Detecting selfish nodes
2. Building the SCF-tree
3. Allocating replica

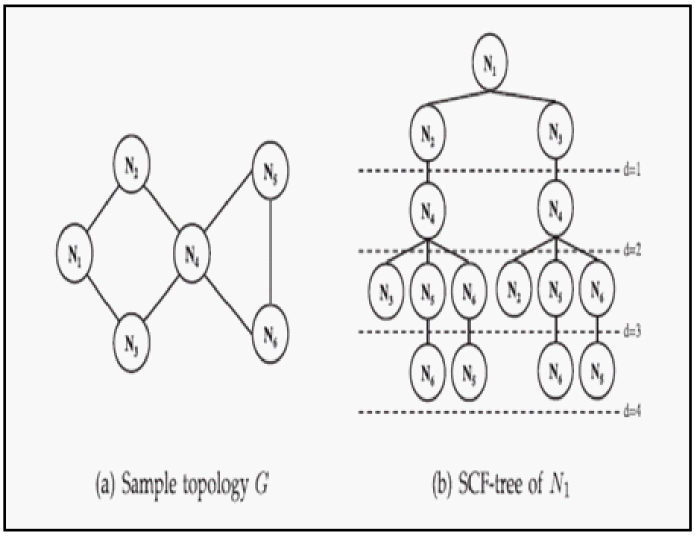
A. Detecting Selfish Nodes

Selfish nodes can be detected based on the credit risk score.Credit risk score can be given as follows
Credit Risk =expected risk/expected value

Each node estimate the “degree of selfishness” for all of its connected nodes based on the score.First describe the selfish node characterstics that may force the selfish replica allocation problem to determine both expected value and expected risk. Selfish characters are divided into two types node specific and query processing-specific.
Node-specific characterstic is a selfish node,this selfish node share part of its own memory space, or a small number of data items, like the partial selfish node. The size of shared memory space and/or the number of shared data items can be used to represent the degree of selfishness.

B. Building the SCF-Tree

The main objective of our novel replica allocation techniques is to reduce traffic overhead, To achieve the high data accessibility. If the novel replica allocation techniques can allocate replica without discussion with other nodes then the traffic overhead will decrease. Consider the simple SCF-tree topology G which includes nodes and its links ,which is given as G=(N,L).Where N is number of nodes and L is number of links.The SCF-tree includes only nonselfish nodes,need to measure the selfishness degree for the replica allocation in the MANET. The sample topology G is given as shown in fig.a. By making use of this sample topology G, the SCF-tree of node N1 can be constructed as shown in fig.b.

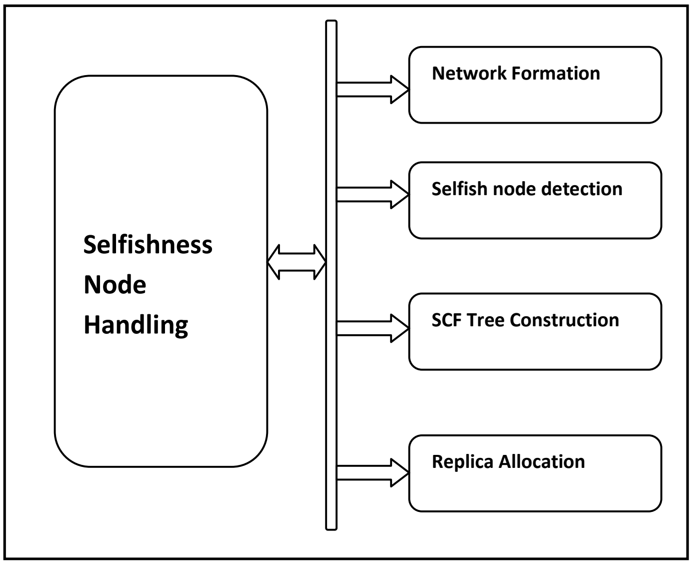


(a) Sample topology G (b) SCF-tree of N_1

C. Allocating Replica

After constructing the SCF-tree, at every relocation period a node allocates its replica.When the node does not have space to store its replica it asks nonselfish node to store the replica in its memory. Since the SCF-tree based replica allocation is performed in a fully distributed manner, each node determines replica allocation individually without any communication with other nodes.Every node has its own SCF-tree and it can perform replica allocation on its own decision.

D. System Architecture



IV. Conclusions

The problem in the existing system is selfish nodes from the replica allocation to overcome this problem two techniques has been used selfish node detection method and novel replica allocation technique .Every node in the MANET calculates the credit risk information to measure the degree of selfishness , by this selfish nodes can be detected and are not used in transferring the packets from one node to the other node.

V. Acknowledgement

This work was supported in part by the Mid-Career Researcher Program through an NRF grant funded by the MEST and with partial support from a VTU University Grant.

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