Volume 4, Issue 2, February 2014 ISSN: 2277 128X

International Journal of Advanced Research in Computer Science and Software Engineering

Research Paper

Available online at: www.ijarcsse.com

Distributed Data Replication (DDR) in MANET

A. AKILA

Assistant Professor, Department of Computer Science & Engineering,
National Institute of Technology Puducherry, Karaikal, India

Abstract- Mobile ad hoc network (MANET) is an independent node which changes it location in on-the-fly manner. In MANET nodes change the location spontaneously due to this nodes failure occurs commonly, which points to network partition commonly. When the network is partitioned, one division of the nodes is in the case that they can't able to access the data hosted by some other division of the partitioned area, so the performance of accessing the data reduced. Data replication technique is a method which pacts with the smooth trade-off between data availability, data collision and query delay. Existing data replication techniques pact with any one of the following: reducing the query delay, improving the data accessibility and data collision. To overcome this problem, I propose distributed data replication technique. Simulation result shows the proposed replication technique which can achieve both query delay and data accessibility with higher performance when compared to the existing technique.

Keywords- Mobile ad hoc network (MANET), Data replication, data availability, and Query delay.

I. INTRODUCTION

Mobile ad hoc network (MANET) is a type of wireless ad hoc network that can change its positions automatically on-the-fly. MANET are mobile nodes, thus they can use wireless network to connect with various kinds of network topologies. In MANET, nodes can move spontaneously and dynamically. When a network is partitioned, one part of the mobile nodes cannot access the data hosted by the nodes in another part of the partition. In comparison with wired network, the data availability is less in wireless network. This is referred to as the number of successfully accessed data from the overall data accessed. Data replication is a widely used technique to improve data availability in wireless distributed system.

Data replication is the one which is used to duplicate the data to more number of isolated locations. By replicating data at movable nodes which are not the proprietor of only one of its kind data, the data availability can be augmented since there are numerous data replicas in the isolated network. Data replication can diminish the query delay when movable nodes can locate the data from the adjacent replicas. Though MANET is a form of ad hoc network, the movable nodes have partial communication range, partial memory space and bandwidth. Therefore it is unfeasible for one node to congregate and seize all the data which contains these restrictions.

Replicating the message from an elementary background to a glass subset is used for query processes or logical. When a single node replicates some part of data, there resolves some smooth trade-off between query delay and data availability. Therefore replication of data will diminish the total number of query delay; nevertheless it deduces the data availability, given that numerous nodes would end up duplicating the identical data in the vicinity, whereas some other data items may not be replicated by somebody. To augment the data availability, movable nodes might not able to duplicate the identical data which are nearest, previously. Though the result may augment the query delay where certain nodes cannot able to duplicate the most commonly rescued data. Even though the delay of rescuing the data from the neighbors are less than the data holder, which is much longer than rescuing nearby.

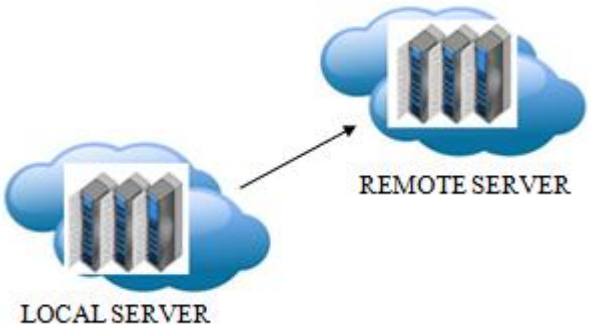

Fig 1 : Data Replication

Figure 1 shows the data replication that uses local server and remote server, where replication is copy of data from local server to remote server.

In this paper, we propose the distributed data replication technique to overcome query delay, data availability and data collision problems. This technique balances the smooth tradeoff between data availability and query delay. Simulation results show that the proposed method can achieve a balance among these metrics. The rest of the paper is organized as follows: The section 2, preliminaries of data replication. In Section 3, we describe the proposed data replication schemes in detail. Section 4 evaluates the performance analyzes and simulation result and Section 5, we conclude.

II. PRELIMINARIES

Greedy method employs negligible data items, which necessitate fewer memory sizes for replicating, by replicating the data we can hoard memory for any other data items. This method employs the following function $AF_i(k) = (a_{ik} / s_k)$. Each and every node allocate the data item in augmenting regulate of AF_i, so that no other data can be replicated by memory. In this method data that are accessed locally are the one which replicates frequently. It does not consider the node to work together with the other nodes.

One –To-One Optimization (OTOO) method employs each and every moving node which work together with their neighbor node to select which data has to be hosted. Each and every node N_i work out the Combined Access Frequency value of N_i *to* N_j to the data item D_k at N_i, represented as $CAFI_{ij}(k) = (a_{ik} + a_{jk} \times (1 - f_{ij})) / s_i$, it allocates the data item in augmenting order of CAFI so that no other data item should replicate. This method evolves the data accessibility, it may take place that node N_i should pack D_j , the node which packs D_j is not accessible to N_i due to the network partition.

In Reliable (R), this method which is used for the motion of node if the rights of entry between the nodes are same, most probably many nodes which collaborates with each other can progress data accessibility. In other words, each and every mobile node provides the partition of the memory to grasp data items for other dependable nodes, i.e. the possibility of link crash is less when compared to the given threshold value.

III. PROPOSED WORK

In wireless ad hoc both the routing protocol networks supports the multimedia application. The important of the mobility forecast is extremely consequence. Node mobility will do the work of partitioning the network. In general, movable networks have partial communication range. If a movable node moves out over the range it will not be offered with any services thereafter. If the node suppleness is computed in higher order value, subsequently data can be replicated in a proper node to get better data accessibility. If the nodes are associated symmetrically, then the network will not be partitioned and each movable node frequently passes a sync message to their entire neighbor; the distance is evolved. Boundary value defines which is greater than least transmission range and less than the extreme transmission range between any two nodes say U and V. If V node moves away from the transmission region say R then it impossible to communicate with any other node.

The second major issue is power consumption. Mobile nodes require more power to access data items from other nodes. Each node must know about its own context information, i.e. source, neighboring node and destination require sending and receiving data. In the future, every node must contain information about its neighboring node, data item, location and distance etc. This information must provide effective way to increase the data availability.

Algorithm - DDR (Distributed Data Replication)

```
Begin
    Initialize web hosting server
     If a node U is not symmetric
      Then
        Remove the data item from the queue
      Return
     End if
     If (Reliability ratio< Boundary Value)
         Pointing the node to replicate the data item
         Search: Nodes higher order value
         Then
           Replicate the data
     End if
     Else
         Node V is out of boundary
     Then
         Discard
     End if
End
```

IV. PERFORMANCE ANALYSIS AND SIMULATION RESULT

Our proposed work, Distributed Data Replication (DDR) method achieves both reduction in the total number of query delay and increase in the data availability. To compute this result, we uniformly distribute the nodes in a dimension of size 1000 x 500 square meters. Figure 2 shows the performance evaluation for data query and figure 3 shows the analysis for data availability.

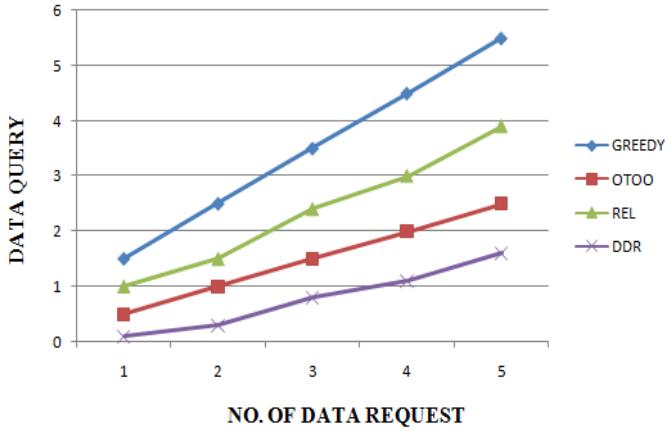

Fig 2 : Data Query Vs No. of Data Request

Fig 3 : Data Availability Vs No. of Data Request

V. CONCLUSION

MANET has autonomous node which changes the location itself on-the-fly. The replication techniques invent the replicated data item on the right of entry incidence of the data items. It augments the response time and maintains the uniformity. In this paper, I propose the Distributed Data Replication (DDR) with disseminated model which achieves minimum query delay and maximum data availability to the distributed movable node. My scheme determines the data replication which compose smooth trade-off between the query delay and data availability. From the simulated result, DDR method attains low delay and high data availability for all the requested nodes.

REFERENCES

[1] T. Hara and S.K. Madria, "Data Replication for Improving Data Accessibility in Ad Hoc Networks," IEEE Trans. Mobile Computing, vol. 5, no. 11, pp. 1515-1532, Nov. 2006.

[2] L. Yin and G. Cao, "Supporting Cooperative Caching in Ad Hoc Networks," IEEE Trans. Mobile Computing, vol. 5, no. 1, pp. 77-89, Jan. 2006.

[3] B. Tang, H. Gupta, and S. Das, "Benefit-Based Data Caching in Ad Hoc Networks," IEEE Trans. Mobile Computing, vol. 7, no. 3, pp. 289-304, Mar. 2008.

[4] I. Baev and R. Rajaraman, "Approximation Algorithms for Data Placement in Arbitrary Networks," Proc. 12th Ann. ACM-SIAM Symp. Discrete Algorithms (ACM-SIAM SODA), pp. 661-670, 2001.

[5] T. Hara and S. Madria, "Consistency Management Strategies for Data Replication in Mobile Ad Hoc Networks," IEEE Trans. Mobile Computing, vol. 8, no. 7, pp. 950-967, July 2009.

[6] T. Hara, "Replica Allocation in Ad Hoc Networks with Periodic Data Update," Proc. Int'l Conf. Mobile Data Management (MDM), 2002.

[7] J. Cao, Y. Zhang, G. Cao, and L. Xie, "Data Consistency for Cooperative Caching in Mobile Environments," Computer, vol. 40, no. 4, pp. 60-66, Apr. 2007.

[8] T. Hara, "Effective Replica Allocation in Ad Hoc Networks for Improving Data Accessibility," Proc. IEEE INFOCOM, 2001.

[9] H. Schwetman, "Csim19: A Powerful Tool for Building System Models," Proc. 33rd Conf. Winter Simulation, pp. 250-255, 2001.

[10] R. Kravets and P. Krishnan, "Power Management Techniques for Mobile Communication," Proc. ACM MOBICOM, pp. 157-168, 1998.

