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HIGH SPEED MULTICAST DISTRIBUTION SCHEME FOR MOBILE ADHOC NETWORKS USING DATA MINING TECHNIQU

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***Abstract*—**To secure multicast communications, security services such as authentications data integrity, access control and group confidentiality are required The proposed algorithm several key distributions approaches proposed multicast clustering is dividing the groups in to several sub groups ,an entity called Local Controller (LC) manage each subgroup which is responsible for local key management within the cluster. Thus ,after Join or Leave procedures ,only members with in concerned cluster are affected by re-keying process ,the local membership dynamism of a cluster does not affect the other cluster of the group This concept is established in This paper by using one of the Data Mining Techniques Viz Clustering .

***Keywords*—**Mobile Adhoc network, Multicast reliability
Clustering, key Distribution,

I. INTRODUCTION:

THe security services rely generally on encryptions using traffic Encryptions keys (TEKs) and re-encryption using Key Encryptions keys (KEKs) . Each member holds a key to encrypt and decrypt the multicast data. When a member joins and leaves a group, the key has to be updated and distributed to all group members in order to meet the above requirements. The process of updating the keys and distributing them to the group members is called re-keying operation. Re-keying is required in secure multicast communication to ensure that a new member cannot decrypt the stored multicast data (before its joining) and prevents a leaving member from eavesdropping future multicast data.

Methods applied in this paper are as follows:

1) DSDV (Destination Sequenced Distance Vector) routing protocol to maintain routing table periodically and event-triggered exchanges the routing table for electing the cluster head and distributing the keys when a node joins and leaves. It sends acknowledgement for each transmission in order to reduce the retransmission.
2) MAC 802.11 for providing communication between nodes.
3) Channel bandwidth for minimization of congestion that occurs during transmission.
4) Congestion control mechanism to control flooding Message.

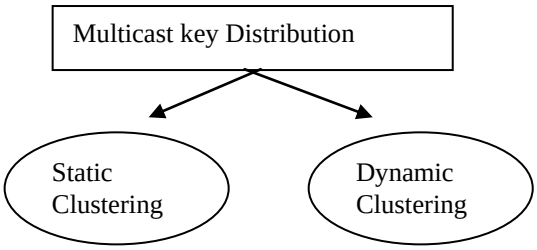
The main objectives of the paper is design secure multicast key distributions with proposed enhanced OMCT clustering algorithm with DSDV for mobile adhoc network.

members in the construction of the key distribution tree, which does not reflect the true connectivity between nodes. Based on the literature reviewed, OMCT is the efficient dynamic clustering approach for secure multicast distribution in mobile adhoc networks. However knowing the true connectivity between the nods in mobile adhoc networks simplifies the key distribution phenomenon due to the node mobility. Hence *the true node connectivity is taken into consideration for the cluster formation*

.

To overcome the above limitation another method called Optimized Multicast cluster Tree with Multipoint Relays (OMCT with MBR) [171] is introduced uses the information of Optimized Link State Routing protocol (OLSR) to elect the LCs of the created clusters. OMCT with MRSs assumes that routing control messages have been exchanged before the key distribution. It does not acknowledge the transmission and hence results in unreliable key distribution due to high packet loss rate in mobile adhoc networks.

Destination Sequence Distance Vector (DSDV) is a table Driven proactive routing protocol designing for mobile adhoc network this protocol maintained through periodically and event triggered exchange the routing table as a permanent storage. Routes are maintained through periodically and event triggered exchanges the routing table as the node join and leave. Route selection is based on optimization of distance vector. It avoids routing loops and each node has a unique sequence number which updates periodically. It is mainly used for intra cluster routing. It allows fast reaction to topology changes. It sends acknowledgement for each transmission in order to reduce the retransmission. Hence it reduces packet loss rate and increases high key delivery ratio in multicast key distribution which is the main issue of mobile adhoc networks. Therefore the existing OMCT algorithm is enhanced by integrating OMCT with DSDV routing protocol. The LCs are elected easily using periodic updates of node join and leave information. The Enhanced OMCT algorithm simulated with network simulator NS-allinone-2.33 and the performance is studied using the metrics namely packet loss rate and key delivery ratio in multicast key distribution.



The elected Lcs covers the group members having 2-hops neighbors of the group source. This scheme iterates until LCs cover all the group members.

A. Enhanced OMCT with DSDV Algorithm:

Algorithm 1 Enhanced OMCT_with_DSDV (Cluster head)//STEP 1
ListLCs= Cluster Head
Listnodes={1,2,3….c} is the number of cluster members
//STEP 2
For(i=1 to List nodes) do
If (Listnodes ≠Φ)then
If(I multicast group) && (I has members Childs) then
ListCs = listLCsU {i};
//Add I to the local controllers list
Listnodes = listnodes/ {group members covered by i};
// remove members covered by i of the members list OMCT_ with _ DSDV (i);
//Execute recursively thealgorithm applied to I
end if
end if
end for
//STEP 3
if(listnodes≠ Φ)then
for (j=1 to Listnodesnumber)do
compute the reachability factor of j: number of members in List nodes, in 1-hop from the node
end for
while (listnodes =i)do
//group of child nodes provide reachability factor
ListLCs = listnodes{i};//LC joins the new member list
ListLCs ≠ listnodes {i};
//Remove from the members list
end while
end if

In the example the group source GC 0 collect its 1-hop neighbor by DSDV, and elects node 1 and 7 as LCs, which are group members and which have child group members as 2,3,4,5,6 and 8,9,10,11,12 respectively. According to the step 3 in the algorithm, if a new member 13 joins the group, based on the connectivity information using DSDV, this node is attached to a particular cluster 0. if the created clusters do not cover group members then the node is selected as local controller for the remaining group members. The major advantage of this solution is to minimize the overhead of decryption and re-encryption process for the local controllers. Hence local controller should only to decrypt and re-encrypt the TEK and not all the multicast flow which in turn makes the multicast key distribution as reliable one.

III. ANALYSIS OF RESULTS

This proposed scheme focuses on the analysis of key distribution scheme. It also evaluates its performance in terms of key delivery ratio and packet loss rate under varying network conditions. The numeric evaluation of the metrics is as follows.

1) Key Delivery Ratio (KDR): is defined as the number of received keys divided by number of sent keys. This metrics allows evaluating the reliability of the protocol in term of key transmission from the source to the group members.

$$KDR = \frac{\text{Number of received keys}}{\text{Number of sent keys}}$$

2) Packet Loss Rate (PDR): is obtained as subtracting number of packets received at the destination from number of packets send to destination. This metrics allows in evaluating the reliability of the protocol in term of packet loss rate in key transmission from the source to the group members.

PDR=No. of packets sent to destination -No. of packets received at the destination

This section presents analysis of numerical results which are used to compare the performance of Enhanced OMCT with DSDV and OMCT with MPR in varying density of cluster and network surface. The results are obtained in three different network surfaces as 1000*1000, 1500*1500 and 2000*2000 and also with different density of group members as 7,13and 28.

The numeric results of both the parameters are given in :

The proposed Enhanced OMCT is approach is also simulated under linux Fedora, using the network simulator NS2 version ns-allinone-2.33.

The following are the parameters considered.

- The density of group members within the adhoc network: group members number (7-13-28)
- Network surface (1000m*1000m, 1500m*1500m, 2000m*2000m).
- The mobility scenarios are generated by the automatic generator setdest provided by NS2
- The maximal speed of members is defined at 19km/h (2.77m/sec),
- The pause time is 20 seconds.
- The simulation duration is 200 seconds.
- Physical/Mac layer: IEEE 802.11.
- Mobility model: random waypoint model [20] with pause time equal to 20 sec and with maximum nodes movement speed equal to 3m/s.
- Routing protocol: DSDV

  Traffic: only unicast distribution keys traffic exists in the simulation. The source of the group sends the TEK to the LCS, which is forwarded to the local members.

  The simulation results are tabulated and shown in Table II

Surface	Nodes	Key delivery ratio (%)		Packet loss rate (%)	
		OMCT with DSDV	OMCT with MPR	OMCT with DSDV	OMCT with MPR
1000* 1000	7	93	60	7	40
	13	96	60	4	40
	28	96	72	4	28
1500*1500	7	95	63	5	37
	13	96	69	4	31
	28	97	72	3	28
2000*2000	7	96	63	4	37
	13	96	70	4	30
	28	96	72	4	28

TABLE 1

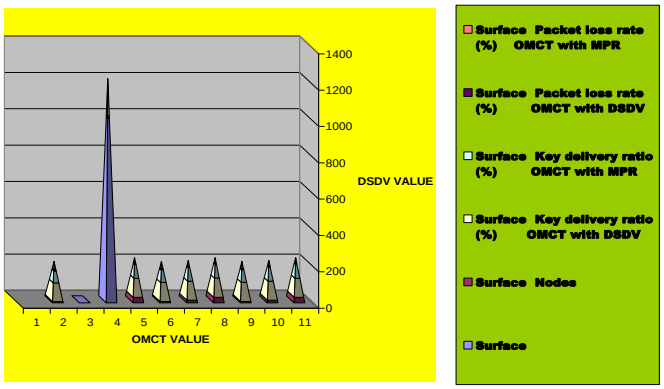
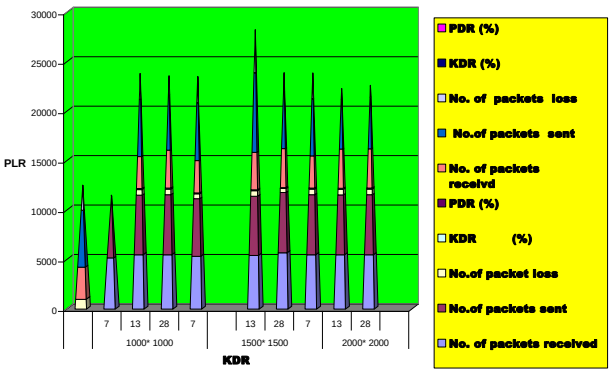


TABLE 2



Numerical Results:

Surface	No.of nodes	Enhanced OMCT with DSDV					OMCT with MPR				
		No. of packets received	No.of packets sent	No.of packet loss	KDR (%)	PDR (%)	No. of packets receivd	No.of packets sent	No. of packets loss	KDR (%)	PDR (%)
1000* 1000	7	5109	6091	982	90	7	3200	5700	2500	60	40
	13	5464	5976	564	96	4	3221	5741	2520	60	40
	28	5464	6028	564	96	4	3801	5602	1801	72	28
1500* 1500	7	5305	5787	482	95	5	3245	5805	2560	63	37
	13	5389	5951	562	96	4	3751	8002	4251	69	31
	28	5650	6055	405	97	3	3915	5731	1816	72	28
2000* 2000	7	5464	6026	562	96	4	3245	5746	2501	63	37
	13	5452	6016	561	96	4	3954	4977	1023	70	30
	28	5461	6023	562	96	4	3961	5187	1126	72	28

From the above two comparison tables, it can be observed that Enhanced OMCT gives better performances and achieves reliability in terms of key delivery ratio and packet loss rate compared to the OMCT with MPR algorithm under varying network conditions.

The simulation results are also shown in fig.

1) Authors must convince both peer reviewers and the editors of the scientific and technical merit of a paper; the standards of proof are higher when extraordinary or unexpected results are reported.
2) Because replication is required for scientific progress, papers submitted for publication must provide sufficient information to allow readers to perform similar experiments or calculations and use the reported results. Although not everything need be disclosed, a paper must contain new, useable, and fully described information. For example, a specimen's chemical composition need not be reported if the main purpose of a paper is to introduce a new measurement technique. Authors should expect to be challenged by reviewers if the results are not supported by adequate data and critical details.

IV. CONCLUSION

OMCT is tested and the entire experiments are conducted in a simulation environment using network simulator NS2. The results are formed to be desirable and the proposed method is reliable and more suitable for secure multicast key distribution dedicated to operate I n MANETs.

V.AUTHOR DETAILS

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