by implementation and results in Section 5 along with conclusion in Section 6.

II. RELATED WORK

Panagiotis Papadimitratos et al. [4] have presented a route discovery protocol that is considered one of the standard works.

John Marshall et al. [5] have proposed , the SRP algorithm for routing in ad hoc networks.

Oscar F. Gonzalez et al. [6] presented a mechanism that enables the detection of nodes that exhibit packet forwarding misbehavior.

Stephan Eichler et al. [7] have introduced a novel secure routing protocol based on AODV for infrastructure-based MANETs.

M. Rajesh Babu et al. [8] have proposed to develop an Energy Efficient Secure Authenticated Routing Protocol (EESARP) .

Steffen Reidt et al. [9] have introduced a trust metric in the cluster head selection process to securely determine constituting nodes in a distributed Trust Authority (TA) for MANETs.

Muhammad Nawaz Khan et al. [10] have proposed distributed-ID with, a smart agent in each mobile node that analyzes the routing packets.

Lu Jin et al. [11] have introduced on securing the delivery of routing packets and the strategy of determine the most secure routes. Panagiotis Papadimitratos et al. [12] have proposed the securing the delivery of routing packets and the strategy of determine the most secure routes. Shivasharanappa Allur et al. [13] have proposed a cross-layer design to achieve an unswerving data transmission in adhoc networks.

Venkat Balakrishnan et al. [14] they introduced Trust Enhanced security Architecture for MANET (TEAM), in which a trust model is overlaid on the namely security models key management mechanism, secure routing protocol, and cooperation model.

Kimaya Sanzgiri et al. [15] have introduced solution to one of the managed-open scenario where no network infrastructure is pre-deployed, but a small amount of prior security coordination is expected.

Poonam Yadav et al.[16] have examined on demand routing protocols AODV, DSR and DYMO based on IEEE 802.11 are examined and characteristic summary of these routing protocols is presented

Parma Nand et al. [17] has introduced on demand routing protocols AODV, DSR and DYMO.

David B. Johnson et al. [18] have presents a protocol for routing in ad hoc networks that uses dynamic source routing.

Xiaodong Lin et al. [19] have present a novel anonymous secure routing protocol for mobile ad hoc networks (MANETs).

Xu Su et al. [20] have proposed mechanisms to complement the existing secure routing protocols to resist the creation of in-band tunnels. Mohd Anuar Jaafar e.t.al [21] introduced some evaluation and performance comparisons of AODV, SAODV and A-SAODV routing protocols in MANETs.

Umang singh et al. [22] have introduced various existing routing protocols.

Julien Francq et al. [23] have proposed countermeasure providing a high level of fault detection.

Karim El Defrawy et al. [24] have presents the PRISM protocol which supports anonymous reactive routing in MANETs.

Satoshi Kurosawa et al. [25] have proposed an anomaly detection scheme using dynamic training method.

Amit N. Thakare et al. [26] have introduced an attempt for comparing the performance of two prominent on demand reactive routing protocols for MANETs.

Kimaya Sanzgiri et al. [27] have proposed a solution to the managed-open scenario where no network infrastructure is pre-deployed.

Claude Crrepeau et al. [28] have presented Robust Source Routing (RSR).

Liana Khamis Qabajeh et al. [29] have proposed a new model of routing protocol called ARANz, which is an extension of the original Authenticated Routing for Ad-Hoc Networks.

Feng He et al. [30] have proposed a novel secure routing protocol S-MAODV which is based on MAODV.

Arun Kumar Mondal et al.[31] have presented the analytical results for the probability of success of data transmission over the networks taking the probability of success or failure of individual paths different.

Pietro Michiardi et al. [32] have introduced a simulation study that identifies security issues that are specific to MANET. R. Kalpana et al. [33] have proposed to address anonymity and trust for a wireless network containing selfish and malicious nodes. Mike Burmester et al. [34] have shown that the security proof for endair A is awed, and that the proposed route discovery algorithm is vulnerable to a hidden channel attack.

Himani Yadav et al. [35] have introduced the survey on different existing techniques for detection of black hole attacks in MANETs with their defects is presented. Jiajia Liu et al. [36] have explores the capability of these networks to support multicast traffic. Stefaan Seys et al. [37] have proposed for wired networks such as the Internet often cannot be applied to mobile ad hoc networks (MANETs). Subash Chandra Mandhata et al. [38] has introduced in this paper they analyze the black hole attack in MANET using AODV as its routing protocol with dudha mathia(DM) theory.

Saikat Chakrabarti et al. [39] have proposed an efficient, single round multi signature scheme, CLFSR-M, constructed using cubic (third-order) linear feedback shift register (LFSR) sequences. K.Seshadri Ramana et al. [40] have proposed a routing protocol that is based on securing the routing information from unauthorized users. Sridhar Subramanian et

al. [41] have introduced, a trust based reliable protocol TBRAODV is proposed.

III. Problem Description

The delay inherent property of Mobile Adhoc Network is characterized by a very sparse node population and by the lack of full network connectivity at virtually every time. Given these features, eventual packet delivery to the destination can be achieved only through node mobility, which is indeed the main communication means in the network.

- Each node may act not only as a relay carrying and forwarding messages for other nodes, but also as a source trying to deliver out its locally generated message.
- Thus, a node may become more willing to forward its own message rather than that of others when it encounters some node.
- This kind of selfish behaviors may become much more significant when the nodes are operating under both QoS requirements (e.g., delivery delay requirements) and energy consumption constraints.
- These kinds of node selfishness in relay cooperation and analytically explore how it will influence the delivery performance of the two-hop relay routing in the challenging MANET networks.

The nature of adhoc networks poses a great challenge to system security designers due to the following reasons:

- Firstly, the wireless network is more susceptible to attacks ranging from passive eavesdropping to active interfering;
- Secondly, the lack of an online Certificate Authority (CA) or Trusted Third Party adds the difficulty to deploy security mechanisms;
- Thirdly, mobile devices tend to have limited power consumption and computation capabilities which makes it more vulnerable to Denial of Service attacks. Hence they are incapable to execute computation-heavy algorithms like public key algorithms;
- Fourthly, in MANETs, there are more probabilities for trusted node being compromised and then being used by adversary to launch attacks on networks, in another words, we need to consider both insider attacks and outsider attacks in mobile ad hoc networks, in which insider attacks are more difficult to deal with;
- Finally, node mobility enforces frequent networking reconfiguration which creates more chances for attacks.

MANET maximizes cumulative network throughput by using all available nodes for routing and forwarding. Therefore, the more nodes that participate in packet routing, the greater the aggregate bandwidth, the shorter the possible routing paths, and the smaller the possibility of a network partition. However, a node may misbehave by agreeing to forward packets and then failing to do so, because it is overloaded, selfish, malicious, or broken. An overloaded node lacks the CPU cycles, buffer space or available network bandwidth to forward packets. A selfish node is unwilling to spend battery life, CPU cycles, or available network bandwidth to forward packets not of direct interest to it, even though it expects others to forward packets on its behalf. A malicious node launches a denial of service attack by dropping packets. A broken node might have a software fault that prevents it from forwarding packets.

IV. Proposed System

This prime aim of the work is to establish the fundamentals to implement in the future security so that mobile ad-hoc protocol can also thwart various attacks, which could be launched by certain malicious nodes that originate due to routing issue in MANET. The current work is addressed keeping dynamic topology in mind and all the possible security issues raised in the security protocol design of the mobile adhoc network. The proposed system provides a fair secure routing model in which malicious nodes in infected routes are stimulated to help forward data-messages with secure protocols. In the proposed model, in order to achieve routing security, if and only if the data-messages arrive at the destination node, the intermediate forwarding nodes can get acknowledged from the source node. Furthermore, for the failure of data-message forwarding, those intermediate forwarding nodes still can get good acknowledgement values from a trusted authority. Therefore, with this stimulation, the packet delivery performance of MANET can be improved. Moreover, in order to guarantee the feasibility of the fair secure routing model, the proposed system has a verifiably encrypted signature technique to provide authentication and integrity protection. In order to prevent the overall performance degradation, i.e., low delivery ratio and high average delay, due to the malicious nodes in infected routes in MANET, the node-to-node based secure routing and packet forwarding scheme is adopted. The basic strategy is to provide acknowledgement for intermediate forwarding nodes to faithfully forward packet. Generally, the intermediate nodes will get acknowledged for packet forwarding from the other nodes, and will take the same mechanism to acknowledge for their packet forwarding requests, by which the overall performance (i.e., high delivery ratio and low average delay) of the MANET can be assured. In the acknowledgement of node-to-node interaction phase if a packet is really relayed to the destination node, the source node will update the acknowledged routes to those intermediate nodes for forwarding. However, if the packet forwarding fails to reach the destination node, the source node won't acknowledge any nodes. Therefore, as far as it is fair to the source node. For the intermediate nodes, although they can't get better update points for their forwarding in case they still can increase their good reputation values from the trusted authority. When the gaining factor is large, those intermediate nodes still feel fair for packet forwarding. In addition, since the provably secure short signature schemes are employed, the authentications from the signatures can provide strong witnesses. If an intermediate node didn't participate in forwarding, it can't get any acknowledged points. Therefore, from the above analysis, the proposed node-to-node secure routing scheme can provide fair

security to the Mobile adhoc network. However, the updates are highly encrypted using public key from sender and private keys from destination node.

V. Implementation and Result Analysis

The proposed system is simulated on standard 32 bit Windows OS on Java Platform. Computer simulation is one of the most widely used way to evaluate the MANET routing protocols. Because it provides four main advantages – (i) it enables experimentation with large networks; (ii) it enables experiments with configurations that may not be possible with existing technology; (iii) it allows for rapid prototyping by significantly abstracting the complexity of the real system. Simulators enable the development and debugging of new protocols with reduced effort and (iv) it makes reproducible experiments in a controlled environment possible. The working of Secure Routing Protocol in MANET indicates that messages in ad hoc network must be authenticated to guarantee the integrity and non-repudiation so that the protocol and nodes can be prevented against several kinds of attacks.

Key Agreement Process between Neighbor Nodes: A node joining a network requires sending key agreement messages to its neighbors to negotiate a shared secret key.

Algorithm 1: For node-to-node authentication of the Network Model

1. Begin
2. Input: Set of number of nodes
3. Output: Node destination
4. Sender node broadcasts a message indicating the negotiation request with neighbor nodes <Key_agreement_req, request_id, sender_address, PK_S >
5. Sender node gets reply a message <Key_agreement_rep, request_id, sender_address, neighbor_address, PK_N >
6. Generate a key Ks by using a secure random number generator,
7. Encrypt Ks with PKB (node B's public key) = encrypt PKB (Ks),
8. Send an offer message <KEY_PASS, encrypt PKB (Ks)> to B,
9. Wait ACK (acknowledgement) from B and check message integrity to finish the negotiation
10. Let node B receives the key passing message; it decrypts "encrypt PK_B (Ks)" by its private key (pB) to get the shared key K. Then, node B sends the ACK message <KEY_ PASS_ ACK, request_id, $HASH_{Ks}$ (request_id)>
11. successful shared secret key negotiation,
12. END

Where PK_S and PK_N are the public keys of the sender node and replying nodes. Each node in a network has its own a pair of public key e and private key d following RSA Public-key Crypto-system. Each node contains a list of neighbor nodes with records containing the information of a neighbor node including neighbor address, neighbor public key, and a shared secret key. This information is formed after the key agreement between two neighbor nodes to negotiate a pair of keys and a shared secret key.

Route Request: Route request (RREQ) is initiated by a source node (S) and then propagated by intermediate nodes until the message reaches its destination node (D).

Algorithm 2: Identification of the required data-message signature

1. Begin
2. Input: Set of number of data-message
3. Output: Identification of the required destination node and path to simulation the required data-message signature
4. Initialize the nodes, speed, radio range and data-message status
5. Get Encrypted data-message in array list
6. Set encrypted data-message in binary
7. Choose and get initial Personal credit account
8. Choose and set initial personal reputation account
9. Generate the create data-message
10. For {
    Determine the no. of data-message values
    Evaluate each signature of the nodes
    }
11. Generate the receive data-message
12. For {
    Unique id of the nodes
    Add the authorized nodes
    Remove the unauthorized nodes
    }
13. Generate the forwarded data-message
14. Trusted authority has forwarded from sender node to receive nodes
15. if (Current Time < = Received time + Holding time) then
    {
    Forwarded Data-message to receive nodes

}

Else

{

If (encrypted data-message = null) then

{Set the data-message status

}}

16. Return data-message status
17. END

After identification of the required data-message signature, the system will also provide the security Certificate authority and node is forwarded to destination.

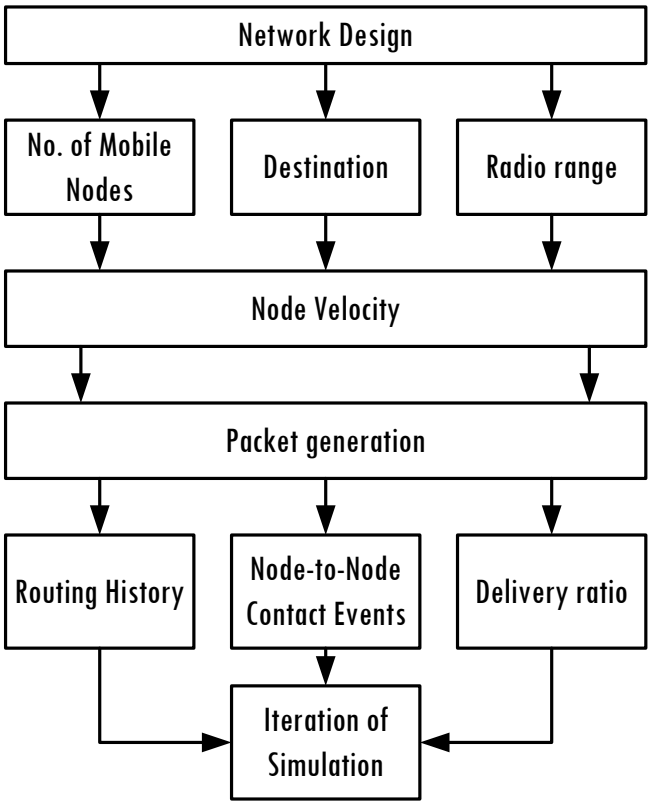

Figure2: Designing of the network model of proposed Mobile ad hoc network application

Once the application is run must be select the no. of node, source, destination, speed, simulation and start the protocol.

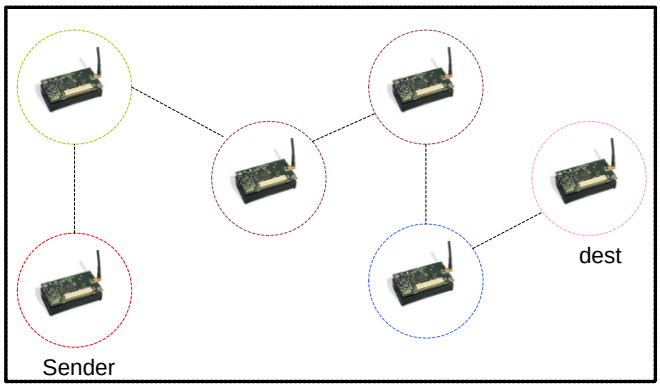

Figure 3 Visualization of Data-message generation

In the progress of the simulation, the framework will highlight the number of data-messages has selected manually that much of data-message generation is displayed like as above figure and must be selected source and destination nodes. Figure 4 shows the simulation result where the public key is highlighted to be in encrypted form along with location of the mobile nodes too. The result also highlights the encrypted data-message.

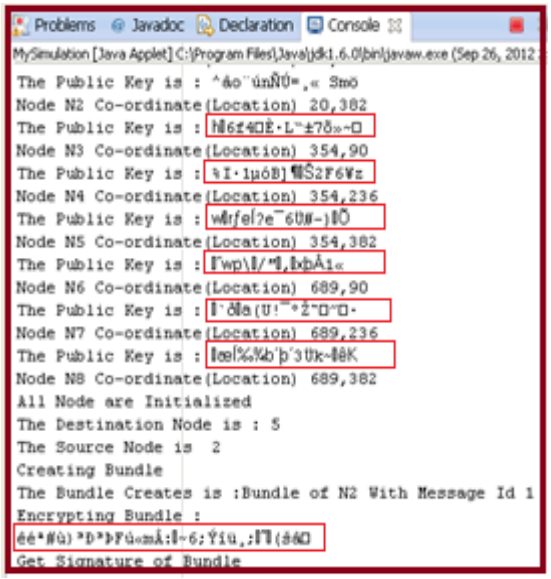

Figure 4 Message authentications of Encrypted keys

Once run the application node message authentication of encrypted keys of certificate authority is providing for data-message signatures.

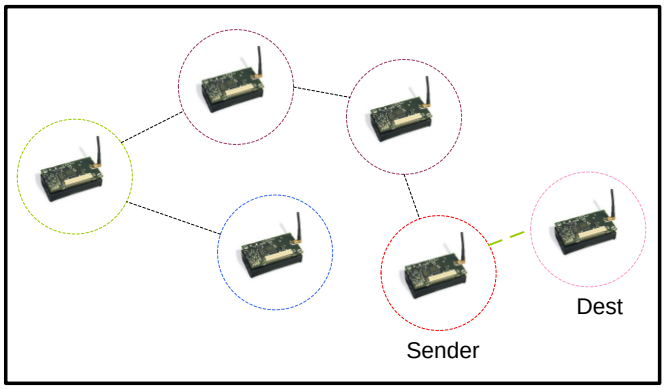

Figure 5 Forwarded Data-messages

After selecting the source and destination data-message nodes, the nodes must be forwarded one node to one node finally will reach the destination of the data-message signature. The above simulation shows highly secured communication with extremely less communication or network overhead, which is normally found in implementing complex cryptographic protocols. Different from the conventional protocol, the proposed protocol focuses on the fairness issue in Mobile adhoc networks. Specifically, we propose a hybrid node-to-node interaction model with verifiably encrypted signature technique to stimulate the selfish mobile nodes to help forward packet. To achieve fairness, if and only if the packets arrive at the destination node, the intermediate forwarding nodes can get acknowledgement from the source node. Furthermore, for the failure of packet forwarding, those intermediate mobile nodes still can get good acknowledgement values from the trusted authority. Therefore, mobile nodes will be more confident in participating in packet forwarding.

VI. CONCLUSION

As the available wireless networking and mobile computing hardware is now capable of fulfilling the promise of this technology. It is the need of the hour to design and develop routing protocols which should support the performance with endurance. The correct execution of these routing protocols is mandatory for smooth functioning of a MANET. A variety of protocols have been proposed targeted at securing MANETs but no performance comparison between these protocols has previously been available. In the presented work we have compared these protocols by highlighting their features, differences and characteristics. It can be summed up that each protocol has definite advantages and disadvantages, and can be appropriate for a particular application environment. From the discussion of the above results, we can safely conclude that the mobile ad hoc network is insecure by its nature: there is no such a clear line of defense because of the freedom for the nodes to join, leave and move inside the network; some of the nodes may be compromised by the adversary and thus perform some malicious behaviors that are hard to detect; lack of centralized machinery may cause some problems when there is a need to have such a centralized coordinator; restricted power supply can cause some selfish problems; and continuously changing scale of the network has set higher requirement to the scalability of the protocols and services in the mobile ad hoc network. As a result, compared with the wired network, the mobile ad hoc network will need more robust security scheme to ensure the security of it. In our future work , we will survey several security solutions that can provide some helps to improve the security environment in the ad hoc network.

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