

Use of multicast routing protocols for Comparative performance analysis in Wireless Mesh Network

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Abstract: In recent years multicast routing in wireless mesh network has become adversary research, in the earlier protocols such as unicast routing considered hop count as path selecting metric where as recent protocols such as multicast routing considered link quality as path selecting metric. Hop count will not increase throughput, the main focus is to improve link quality and maximize the throughput. To achieve high throughput On Demand multicast routing protocol-High throughput(ODMRP-HT) protocol is used but nodes in wireless mesh network are incorporated to more attacks as nodes act as malicious nodes. This works gives the solution to defend against the attacks identified using Secure-On Demand Multicast routing protocol(S-ODMRP). In this paper gives a comparison of detailed simulation analysis of both the protocols. S-ODMRP protocol will give better performance than ODMRP.

Keywords: unicast routing, multicast routing, ODMRP-HT, S-ODMRP.

I. INTRODUCTION

A Wireless Mesh Network(WMN) is network in mesh topology consist of mesh clients, mesh routers and gateways. Mesh routers form self organized multi hop wireless network in which node are maintaining connection dynamically among themselves and with other nodes via unicast protocols and multicast protocols. Mesh clients connects mesh router though backbone network formed by mesh routers. In addition to this, through bridging and gateway functions of mesh routers WMN can be integrated with other networks such as internet, Wireless local area network(WLAN), wireless metropolitan area network (WMAN), wireless personal area network (WPAN). Compared to other network WMN is much economic and supports high bandwidth, network is more flexible, in case of disaster infrastructure of network may be destroyed in such cases by simply replacing mesh router at desired location WMN is easily established.

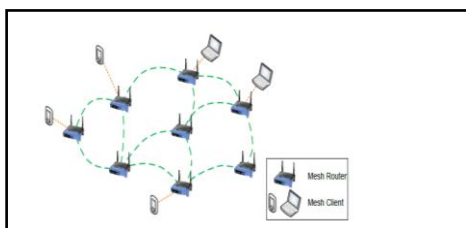


Fig 1 Wireless mesh network.

Unicast routing and Multicast routing:

These are two type of routing methods used to forward packets from source to destination. In unicast routing single source node sends packets to its destination node by selecting path depending upon the low cost. This is one to

one transmission. Where as in multicast routing protocol, source sends packet to several selected groups this is one to many transmission. An important thing here is end user is requested to be member of multicast group.

A. Problem Definition:

While creating mesh network, network is flooded with JOIN QUERY messages attacker can hack source node and give different JOIN QUERY messages which creates path towards attacker node instead of correct source node. Intruder may also drop JOIN QUERY messages and avoids involving in multicast routing protocol. All these results in mesh structure disturbance which causes to disturb data delivery paths.

Due to these there will be many packet loss problem here is to prevent this packet loss and increase throughput. A Problem is defined as introducing malicious nodes that causes packet drop and affect throughput of multicast protocol in wireless mesh network.

B. Objective:

To remove the drawback of ODMRP attacks S-ODMRP is used which gives security to mesh network by encryption decryption method of RSA algorithm.

The main objective of this project is to increase throughput in presence of malicious node that causes packet drop and affect performance analysis, here performance is analysed according to two multicast routing protocols they are On demand multicast routing protocol(ODMRP) and Secure-On demand multicast routing protocol(S-ODMRP). Comparison of both the methods is analysed.

II. RELATED WORK

In recent years, many routing protocols provide communication in wireless network. multicast routing protocols are preferred rather than unicast routing protocols to increase performance, however multicast routing protocols provide better performance but they are susceptible to failure of network by intruders. Intruders attack on network leads to packet loss and decreases throughput. MESHPT[1] used for reliable and efficient routing in WMN, it prevents flooding and problem of exposure when tree is constructed when nodes join and leave. SPT[2] resends the data packet by sending ICMP message when failure of network occurs. Reactive protocols like AODV,DSR,DYMO,[3] AODV performs better than other two.

III. EXISTING SYSTEM

On demand multicast routing protocol (ODMRP), protocol maintains connection between multicast sources and receivers. Path selection is based on metric design.

A. Join Query Messages

Source node recreates mesh network periodically to refresh the membership information of node and updates routes, the entire network is flooded with join query messages, the intermediate node which wants to join multicast group these nodes update the neighbouring nodes data.

B. Join Reply Messages

When receiver receives join query message it activates the path from itself to source node by constructing and broadcasting a Join Reply message that contains entries for each multicast group it wants to join; each entry has a next hop field filled with the corresponding upstream node. When an intermediate node receives a Join Reply message, it knows whether it is on the path to the source or not, by checking if the next hop field of any of the entries in the message.

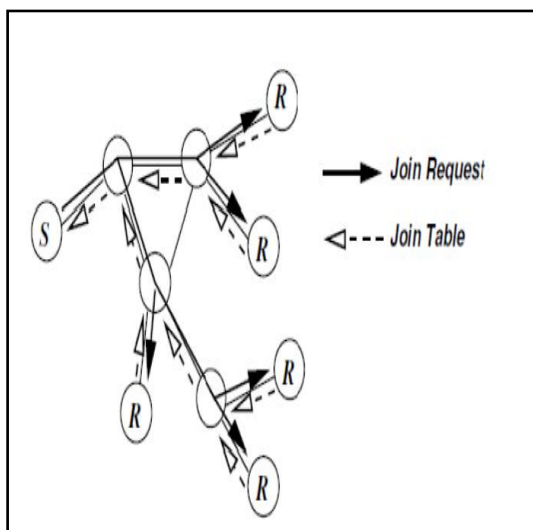


Fig 2 on demand route

IV. PROPOSED SYSTEM

Secure-On Demand Multicast Routing Protocol with High Throughput (S-ODMRP-HT) uses a combination of verification and rate limiting techniques against resource utilization attacks and a novel technique, Rate Guard, against the more demanding packet sinking and mesh structure attacks, as well as metric manipulations and JOIN REPLY dropping.

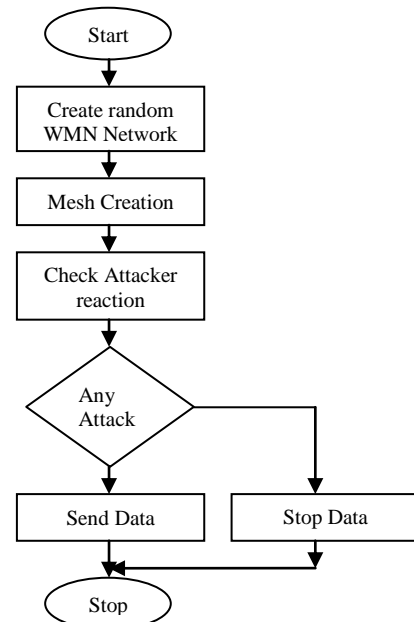


Fig 3 Flowcharts of proposed system

V. SIMULATION ENVIRONMENT

To increase throughput in presence of malicious node that causes packet drop and affect performance analysis, here performance is analysed according to multicast routing protocols they are On demand multicast routing protocol(ODMRP) and Secure-On demand multicast routing protocol(S-ODMRP). Comparison of both the methods is analysed.

Network structure is defined by the following attribute End to end delay: It is the time taken to transmit data packets from source to destination, Delay time is reduced by S-ODMRP protocol it provide security to network and mugger is blocked

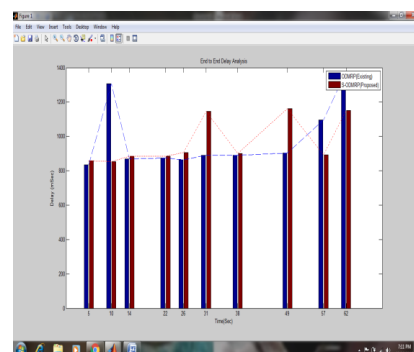


Fig 4 End to end delay analysis

Throughput: Average rate of data received over communication channel, measured as bits per second. Throughput of ODMRP decreases if it takes long time where as throughput of S-ODMRP increases.

overcome this problem network is enhanced with security by using S-ODMRP protocol and performance is compared with both methods.

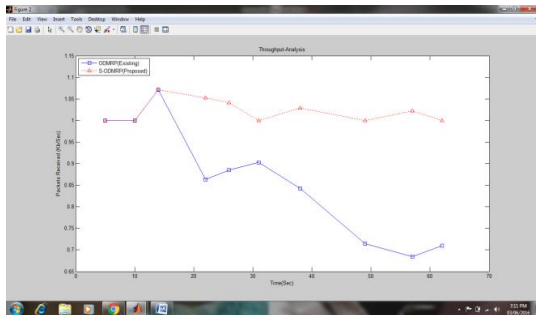


Fig 5 Throughput analysis

Packet drop: This is defined as total number of packets dropped while transmitting packets from sender to receiver, ODMRP increases packet drop while S-ODMRP will decrease packet drop because of secure transmission

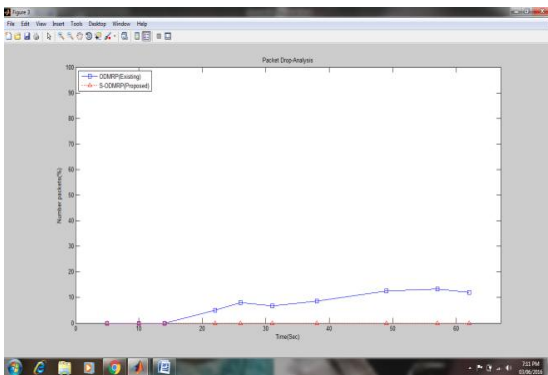


Fig 6 packet drop analysis

Packet delivery ratio: This is ratio of total number of packet transmitted to the total number of packets sent.

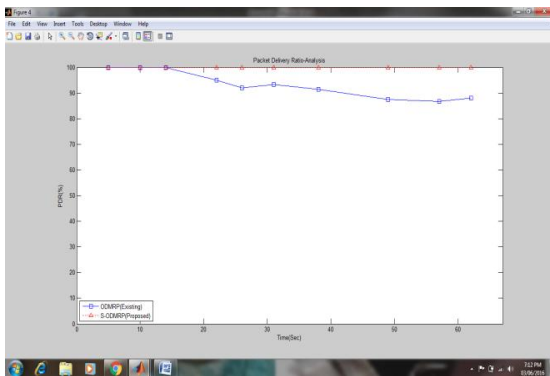


Fig 7 PDR analysis

VI. CONCLUSION

We considered security implication of multicast routing protocol in wireless mesh network, mesh network is created with 20 nodes and malicious node is introduced it causes some packet drop and affect throughput to

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BIOGRAPHIES



Ms. Vasundhakumari received BE degree in Computer Science Engineering from Visvesvaraya Technological University of Belgaum in 2014, Currently pursuing her M.Tech degree in Visvesvaraya Technological University of Belgaum, Her research interests include wireless network communication and image processing.



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