Detection of Vampire Attack and Prevention for MANET

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Abstract-  
Mobile means able to move and ad hoc means transient without any fixed infrastructure so mobile ad hoc networks are a kind of transient networks in which nodes are able to move without any fixed infrastructure or centralized administration. Mobile ad hoc networks (MANETs) represent complicated dispersed systems that comprise wireless mobile nodes that can freely and actively self-organize into random and transient network topologies.  
"Vampire-attack" is a kind of denial of service. The vampire attack is made by duelist node which makes energy consumption between nodes thereby draining the battery-life. So, the communication can't be framed properly and the packet transmission may not attain the goal. Vampire attacks are not protocol-definitive, in that they do not depend on design properties or implementation faults of particular routing protocols, but instead misuse general properties of protocol classes such as link-state, distance-vector, source routing, and geographical and beacon routing. Neither do these attacks rely on flooding the network with large amounts of data, but instead try to send as little data as possible to achieve the largest energy drain, preventing a rate binding solution. Since Vampires use protocol-adaptable messages, these attacks are very difficult to detect and prevent.  

Keywords-Vampire attacks, Energy drain, MANET

I. INTRODUCTION

A mobile ad-hoc network (MANET) is a self-configuring structure less network of mobile devices connected by wireless. Ad hoc is Latin and means "for this purpose" Each device in a MANET is free to move autonomously in any direction, and will therefore change its links to other devices repeatedly. Each must forward traffic irrelevant to its own use, and therefore be a router. The primary challenge in building a MANET is preparing each device to cohesively maintain the information required to properly route traffic. A wide form of MANET applications have been created. For example, a MANET can be used in special situations, where installing structure may be complicated, or even infeasible, such as a battlefield or a disaster area.

The node's battery power decides the life span of a wireless adhoc network. In most of the applications, battery recharging or replacing is infeasible. Power drooping will leads to the failure of the node and it will affect the network also. Data loss will also occur. Therefore an skillful energy utilization scheme is required, that is, data packets should be send by using minimal units of energy. But some malicious packets called vampire packets may spend more energy for packet forwarding than that of actual packet forwarding. This will lead to power drooping of node and network breakdown. If we can detect and prevent these type of vampire packets, then we can increase the life of the node and thereby the network.

II. RELATED WORK
III. PROPOSED APPROACH

The proposed approach describes the method to detect and prevent the vampire attack in MANET. In this approach our main work is to search the malicious node during draining the battery life of the other nodes who are genuine and then deleting that malicious node for the sake of improving our network and saving other nodes battery life. To determine the vampire attack in the network first we form a secure MANET i.e. user authentication is required to interact with the other nodes. After user authentication is done the node can start the interact with the other users.

When the node want to interact with the other node it has to form a connection with that node by asking for the connection. When the node ask for the connection more that a particular count and the other node accepts the request within a particular session than the particular node is valid and the two nodes can communicate with each other. The node will send the request for connection to the other node for 3 times. For the first and second request it can directly accept the request. After that a response button will appear on the screen of the node which have to give the response to the node. If that node is busy then it can give response that "I am busy now" to the node than that node is true node.

<table>
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<tr>
<th>Ref. No.</th>
<th>Papers</th>
<th>Basic Concept</th>
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<tr>
<td>1</td>
<td>Vampire Attacks: Draining Life from Wireless Ad Hoc Sensor Networks</td>
<td>PLGPa is the Sensor network routing protocol that bounds damage from Vampire attacks</td>
<td>Bandwidth overhead is minimum</td>
<td>PLGPa bounds damage from Vampire attacks by verifying that packets consistently make progress toward their destinations</td>
<td>The author has concentrated only in the network layer</td>
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<td>2</td>
<td>Detection and Control of Vampire Attacks in Ad-Hoc Wireless Networks</td>
<td>Vampire packet (malicious packet) monitoring is performed both in network layer (routing protocol layer) and application layer.</td>
<td>Efficient energy utilization</td>
<td>The proposed methodology can be implemented as four phases, network layer vampire detection, Application layer vampire detection, Vampire handling entropy and port scan details.</td>
<td>Consumption of memory is more in the proposed methodology.</td>
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<td>3</td>
<td>Vampire Attack : Detection and Elimination in Wsn</td>
<td>An energy constraint intrusion detection scheme is introduced along with clean state secure routing protocol</td>
<td>Efficient energy utilization</td>
<td>The proposed system describes some methods and alternative routing protocols solution that help to detect and eliminate vampire attack and thus make the network live.</td>
<td>Using the proposed system, the nodes can find its neighbours that is nodes within its transmission range</td>
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<td>4</td>
<td>Efficient Detection and Elimination of Vampire Attacks in Wireless Ad-Hoc Sensor Networks</td>
<td>Optimal energy boost-up protocol (OEBP) analyzes the routing table and verify the vampire attacks which permanently disable networks</td>
<td>Efficient energy utilization</td>
<td>This predicts the vampire attacks based on the existing behaviour and finds optimal path and optimal topology discovery.</td>
<td>Does not provide topology reconfiguration</td>
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<td>5</td>
<td>Detecting and preventing vampire attack in wireless sensor network</td>
<td>Explains two attack on stateless protocol in which first is Carousel attack &amp; second is Stretch attack.</td>
<td>Efficient energy utilization</td>
<td>Due to no backtracking property, the adversary cannot perform carousel or stretch attacks, no node may unilaterally specify a suboptimal path through the network.</td>
<td>Does not provide defences for topology discovery</td>
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Initially the battery level of the node is 100 units. When the node sends request, the battery level of that node will decrease by 10 units each time it will request for the connection. The node which request for the connection cannot communicate with the other nodes till the response does not come from the other node.

If that particular node does not accept that request in that particular session than that particular node is malicious node i.e it is not a honest node. When the node ask for connection to the malicious node, it will drain the battery life of that node till the battery becomes very low. The node will not be able to communicate with the other nodes when vampire attack will occur. The malicious node i.e the dishonest node will decrease the battery life of the node.

To prevent the network from the vampire attack we will detect the malicious node i.e the dishonest node and will remove the node from the network.

- **Proposed System Algorithm**
  
  The following is the algorithm of the proposed approach where Si denote the number of user, the threshold time considered is 10 units and count is the variable used to count the number of request.

  - **Detection Algorithm for vampire attack:**
    
    Step 1: Login with credential user s1.
    Step 2: Authentication from server if not stop.
    Step 3: Send request s2 where (s1,s2,s3……sN) users.
    Step 4: s1 waiting for reply from s2.
    Step 5: if waiting_time > threshold_time and count++;
    Step 6: repeat step 3;
    Step 7: else communication started
    Step 8: if count > threshold value attack detected
    Step 9: else communication started.

  - **Prevention Algorithm for vampire attack**
    
    Step 1: Detect the malicious node using the detection algorithm.
    Step 2: Remove the malicious node from the network.

**IV. IMPLEMENTATION**

We have implemented the approach using Android.

- Using the proposed approach we can detect the vampire attack in the network.
- We can prevent the vampire attack by deleting the node from the network.

The following figure shows the comparison of energy delay and throughput when there is an attack and after the prevention of vampire attack.

![Comparison of Energy](image1)

*Fig : Comparison of Energy*

The figure shows the comparison of energy when there is an attack and after the prevention of vampire attack.

![Comparison of Delay](image2)

*Fig : Comparison of Delay*

The figure shows the comparison of delay when there is an attack and after the prevention of vampire attack.

![Comparison of Throughput](image3)

*Fig : Comparison of throughput*
The figure shows the comparison of throughput when there is an attack and after the prevention of vampire attack.

V. CONCLUSION

Every technology has its impacts that include good impact as well as bad impact. It depends on the utility and use of the technology. By observing the whole networking scenario we get the idea that many malicious nodes are aiming to block the network so that no one can make a connection with the others and no one can interact with the others. They try to consume battery of the genuine nodes so that they can't be able to communicate with others. So for avoiding this we present this approach for identifying the malicious nodes and get such malicious node deleted from the network.

From the obtained results, we can conclude that, the proposed approach is efficient in terms of throughput and energy with the timely detection of vampire attacks in MANET.

VI. FUTURE SCOPE

In future the approach can be upgraded in various ways. Likewise by using this approach we can make Network traffic interpreter, network Jam cracker, Node identifier, it will be helpful for various telecommunication companies for maintaining their networks and for keeping their networks safe from the unauthorized access.

VII. ACKNOWLEDGMENT

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