REVIEW ARTICLE

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REVIEW OF ROUTING PROTOCOLS USING VARIOUS PARAMETERS IN MANET SCENARIO

ANURADHA[1], NAVNEET VERMA[2],

[1]M.Tech(Pursuing) Computer Science & Engineering, Geeta Engg. College, Naultha panipat

[2] Assistant Professor, Computer Science & Engineering, Geeta Engg. College, Naultha panipat

ANURADHA

ABSTRACT

Manets are working in distributed environment and dynamically changing the network topology. Manet protocols can be table driven or on demand as per requirement . Such networks can be deployed anywhere and at any time or the fly. Because of the dynamic nature of MANETs, they are typically not very secure, so it is important to be cautious what data is sent over a MANET. AODV(adhoc on-demand distance vector) and DSDV(Destination Sequenced Distance Vector) Protocol first one is Reactive and second one is Proactive Protocol.NS2 tool will be used in comparing their performances under varying environment.
Index Terms—MANET,SECURITY,PROACTIVE,DSDV,AODV.

INTRODUCTION

Wireless networks can generally be classified as wireless fixed networks and wireless ad-hoc networks [1]. A **mobile ad-hoc network** (**MANET**) is a self-configuring ad- hoc network of mobile devices connected by wireless links. Each device in a MANET is free to move independently in any direction, and will therefore change its links to other devices frequently. Due to this dynamic nature topology changes frequently and unpredictably. Each node must forward traffic unrelated to its own use, and therefore be a router. The primary challenge in building a MANET is equipping each device to continuously maintain the information required to properly route traffic. Such networks may operate by themselves or may be connected to the larger Internet. MANETs are a kind of Wireless ad hoc network that usually has a routable networking environment on top of a Link Layer ad hoc network.

Types of MANETs

- Vehicular Ad hoc Networks (VANETs) are used for communication among vehicles and between vehicles and roadside equipment.

- Internet based mobile ad hoc networks (iMANETs) are ad hoc networks that link mobile nodes and fixed Internet-gateway nodes. In such type of networks normal ad hoc routing algorithms don't apply directly.

- Intelligent vehicular ad hoc networks (InVANETs) are a kind of artificial intelligence that helps vehicles to behave in intelligent manners during vehicle-to-

vehicle collisions, accidents, drunken driving etc.

A mobile ad-hoc network (MANET) is an ad-hoc network but an ad-hoc network is not a MANET.

Security Goals For MANETs

The security goals of mobile ad-hoc networks (MANETs) are not different as of other networks.

1.1. Confidentiality

Confidentiality ensures that only authorized persons can have access to certain classified information. Applications that use mobile ad-hoc networks like in military operations, certain information can be very sensitive. So, disclosure of such information can be very costly and turn into a devastating situation.

1.2 Availability

Availability ensures that the requested service should be available as and when requested. So, availability opposes Denial of Service (DoS). An adversary can launch a denial of service attack, by jamming the low bandwidth communication channel or by consuming energy power of low-energy mobile ad-hoc nodes. With denial of service attack an adversary can also break down important services like key management. So, availability is an important security goal that should be achieved in any kind of mobile ad-hoc networks application.

1.3 Integrity

Integrity implies that messages should be un-altered during its transmission from source to destination. Messages can be modified un-intentionally during transmission because of radio propagation impairment. A malicious attacker can also modify a message intentionally during its transmission.

1.4 Authentication

Authentication is the process of identification, that a receiving entity is assured that the message he receives come from a legitimate source. In a mobile ad-hoc network, mobile nodes are susceptible to compromise without proper authentication. The term MANET is used often in the literature to represent a mobile ad-hoc network. Attacker can impersonate to be an authenticated user and thus can have the full control of entire network.

1.5 Non-repudiation

Non-repudiation implies that once a message has been sent, the sender cannot deny afterwards that it was not he, who sent the message earlier. It is an important security service by which compromised nodes can be detected and isolated
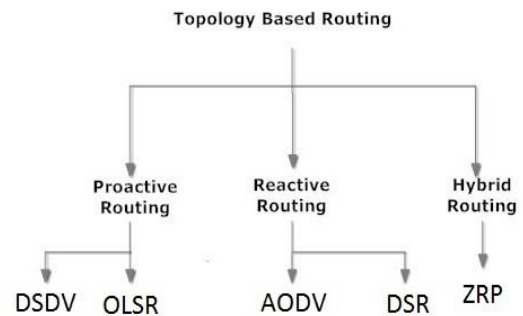
MANET Protocol Classification

Figure 1: Classification of Mobile Ad hoc Network Protocols

A. Reactive Protocols:- Reactive protocols seek to set up routes on-demand. If a node wants to initiate communication with a node to which it has no route, the routing protocol will try to establish such a route.

B. Proactive Protocols:- In networks utilizing a proactive routing protocol, every node maintains one or more tables representing the entire topology of the network. These tables are updated regularly in order to maintain a up-to-date routing information from each node to every other node. To maintain the up-to-date routing information, topology information needs to be exchanged between the nodes on a regular basis, leading to relatively high overhead on the network. One the other hand, routes will always be available on request.

C. Hybrid Routing Protocol (HRP):- is a network routing protocol that combines Distance Vector Routing Protocol (DVRP) and Link State Routing Protocol (LSRP) features. HRP is used to determine optimal network destination routes and report network topology data modifications.

Protocols Working

A. DSDV (Destination Sequenced Distance Vector protocol)

DSDV protocol is proactive protocol and enhanced version of Bellman ford algorithm and DSDV keeps the simplicity of Bellman Ford algorithm, avoid looping problem and remain compatible in cases where a base station is available. And idea behind the DSDV is to modify the Bellman ford algorithm.

ANURADHA, NAVNEET VERMA

•DSDV Adds two things to distance-vector routing
– Sequence number; avoid loops
– Damping; hold advertisements for changes of short duration.

DSDV is a Proactive Algorithm and each node maintains routing information for all known destinations And Routing information must be updated periodically .In DSDV Traffic overhead even if there is no change in network topology and Maintains routes which are never used **.**This protocol maintains table that contains shortest path and with increasing sequence no. to avoid the loops in the network .Tables are exchanged between the nodes to keep neighbour node up to date to destination node..The tables are updated either using a "full dump" or an incremental update. A full dump send the full routing table to the neighbors and could span many packets whereas in an incremental update only those entries from the routing table are sent that has a metric change since the last update and it must fit in a packet. The route information broadcast by each node contain

a) Its new Sequence Number
b) Each route
c) The Destination's address
d) The number of hops required to reach the destination
 e)The Destination Sequence Number.

Each row of the update send is of the following form:

<Destination IP address, Destination sequence number,   Hop count>

After receiving an update neighboring nodes utilizes it to compute the routing table entries. To damp the routing fluctuations due to unsynchronized nature of periodic updates, routing updates for a given destination can propagate along different paths at different rates. To prevent a node from announcing a routing path change for a given estimation while another better update for that destination is still in route, DSDV requires node to wait a settling time before announcing a new route with higher metric for a destination. In DSDV, the sequence number of a source is increased periodically. A route becomes feasible again after the source increases its sequence number, and the new sequence number is propagated through the network, which may, in general, require a significant amount of time.

B. AODV(Ad-hoc On-Demand Distance Vector Routing) AODV is a reactive protocol that discovers routes on an as needed basis using a route discovery mechanism.It uses traditional routing tables with one entry per destination. Without using source routing, AODV relies on its routing table entries to propagate an RREP (Route Reply) back to the source and also to route data packets to the destination. AODV uses sequence numbers maintained at each destination to determine freshness of routing information and to prevent routing loops. All routing packets carry these sequence numbers. AODV maintains timer-based states in each node, for utilization of individual routing table entries, whereby older unused entries are removed from the table. Predecessor node sets are maintained for each routing table entry, indicating the neighboring nodes sets which use that entry to route packets. These nodes are notified with RERR (Route Error) packets when the next-hop link breaks. This packet gets forwarded by each predecessor node to its predecessors, effectively erasing all routes using the broken link. Route error propagation in AODV can be visualized conceptually as a tree whose root is the node at the point of failure and all sources using the failed link as the leaves . The advantages of AODV are that less memory space is required as information of only active routes are maintained, in turn increasing the performance, while the disadvantage is that this protocol is not scalable and in large networks it does not perform well and does not support asymmetric links.

Implementation Tool
 NS2
NS is an event driven simulation tool used for both wired as well as wireless networks
– Simulator maintains list of events and executes one event after another.
– Single thread of control: no locking or race conditions.
It supports Two Languages: C++, OTcl
A. OTcl: short for MIT Object Tcl,an extension to Tcl/Tk for object-oriented programming.
• Used to build the network structure and topology which is just the surface of your   simulation
• Easily to configure your network parameters;
• Not enough for research schemes and protocol architecture adaption.

B. C++: Most important and kernel part of the NS2

• To implement the kernel of the architecture of the protocol designs;

• From the packet flow view, the processes run on a single node;

• To change or "comment out" the existing protocols running in NS2;

• Details of your research scheme.
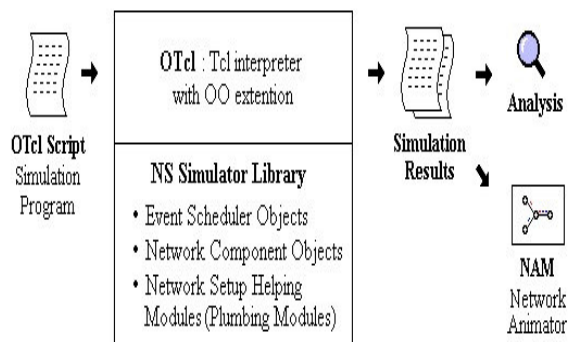
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