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Performance Analysis of DSDV, I-DSDV Routing Protocol in Monile Ad Hoc Networks in IPv6 under Black Hole Attack

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Abstract

Mobile ad-hoc networks (MANET) they can be deploy simply in a few environment without any determination. A major point that affectssuch a networks that characterize by dynamic change in topologyis the performance where routing worth forcefulperformance is one of the key challenges in deploying MANET. Black hole attacks node false advertises that they have secured path source to destination. In this paper the performance of proactive routing protocols Destination-Sequenced Distance Vector (DSDV) and Improved Destination-Sequenced Distance Vector (I-DSDV) evaluated under Ipv6 environment using black hole attack under different performance metrics Packet delivery Fraction (PDF), Delay, Routing Overhead (RO). The study in MANET is done with network simulator version 2 simulator.

Keywords*: Mobile Ad Hoc Network (MANET), Routing Protocols, Black hole attack, IPv6, DSDV, I-DSDV.*

1. Introduction

The protocol routing is performing of information exchange the network form source to destination. They are classified into two routing protocols. In the proactive protocols (DSDV, I-DSDV)is the regular update of information to know about the current topology and in the reactive routing protocols (AODV) create a route to a destination on demand basis. The proactive protocols are DSDV, I-DSDV OLSR etc. The current ad hoc routing protocols may generally be classified classes into two protocols: periodic protocol and on demand protocol. In the destination-sequenced distance vector (DSDV) describe in a regular protocol based on the classical Bellman-Ford routing mechanism.

2. Routing in MANET

Inthe process of information exchange from one host to the other host in a network.

2.1 Reactive Routing Protocol

Each and every node in routing protocol keeps information of active path to the destination node. At any time if source wants to send message to receive then the protocol create path as soon as when demand for the route

Examples of Reactive Protocols are:

a) Ad Hoc On-Demand Distance Vector Routing (AODV)
b) Dynamic Source Routing (DSR)

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2.2 Proactive Routing Protocol

In proactive routingeach and every node frequently maintains whole routing data of the network. This is fulfilled by flooding network once in the while with network status information to find out any possible change in network topology.

Examples of Proactive Routing Protocols are:

a) Global State Routing
b) Destination Sequenced Distance vector Routing (DSDV)

2.2.1 Destination Sequenced Distance Vector (DSDV): In routing protocols for wireless ad-hoc networks are both proactive and reactive. Proactive routing protocol DSDV is a table driven protocol placed on the classic Bellman-Ford routing algorithm. The Sequenced number is used to qualifyold routes from new one ones and thus avoid the development of loops.

2.2.2 Improvement of Destination Sequenced Distance Vector Routing (I-DSDV): In DSDV the low packet delivery is due to the fact that it use stale route in case of burst links. In proactive DSDV the durationofrank route does not imply that there is no valid route to the destination. These packets can be delivered thru other lines that may have routes to the destination.

3. Internet Protocol

There are two version of the internet protocol (IP) are in used:IPv4 (Internet protocol version 4)and IPv6(internet protocol version 6). Each and every version define an IP address differently because of its prevalence the generic term IP address typically still refers to the addresses defined by IPv4.IPv4 is the 4thform of the IP and it is the 1st version of theip to be far and wide implemented.IPv6 is a version of the internet protocol planned to be successful IPv4 which is the protocol at this time used to direct only just all internet network .IPv6 bleachers for internet protocol version 6also called as Ipng is the 2ndversion of the IP to be used usually across the close world.

4. Black Hole Attack

MANET is susceptible for thedifferent attacks. Overall attack types are the threats against Physical and network layer which is a large amount of large layers that function forthe routing mechanism of the ad hoc network. A fundamental attack that an opponent can execute is to stop redirection the data packets. As a result when the opposite number is selected as a route it denies the behavioral to take place, in black hole attack the willfully node waits for the neighbors to initiate a RREQ packet. Node receives the RREQ packet it will as soon as send a false RREP packet with a change higher sequence number so that the source node suppose that node is having the another route in the direction of destination.

5. Simulation and Results of DSDV and I-DSDV under Black Hole Attack

For simulation we set the parameter as shown in Table 1. Random Waypoint Model is used is used as the mobility model of each node. In this simulation each and every node select irregular destination within the simulation area and a node moves to this destination with a random velocity. The simulation is done using NS2 to study the performance of the network by different number of nodes mobility.

Table 1.

Simulator	Ns-2(version 2.32)
Simulation Time	500 (s)
Number of Mobile Nodes	5,15,25,35
Topology	1000* 1000 (m)
Routing Protocol	DSDV,I-DSDV
Traffic	Constant Bit rate
Pause Time	10(m/s)
Max Speed	20 (m/s)

5.1 Packet Delivery Ratio with Black Hole Attack

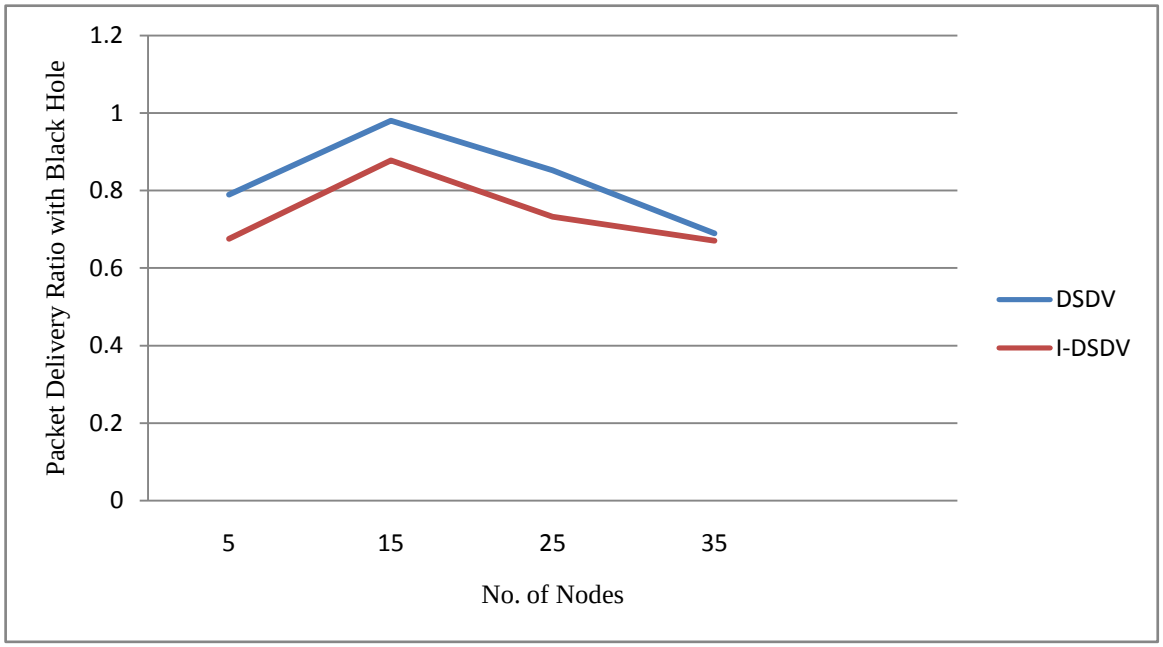

Figure 1.

It can be seen from the fig.1 that the behavior of I-DSDV is better than the regular DSDV in both the cases. It may as well be observed that the packet delivery fraction (PDF) of DSDV drops to almost 70% for 35 nodes. Whereas for I-DSDV it is more than 85% for the same scenario.

5.2 End to End Delay with Black Hole Attack

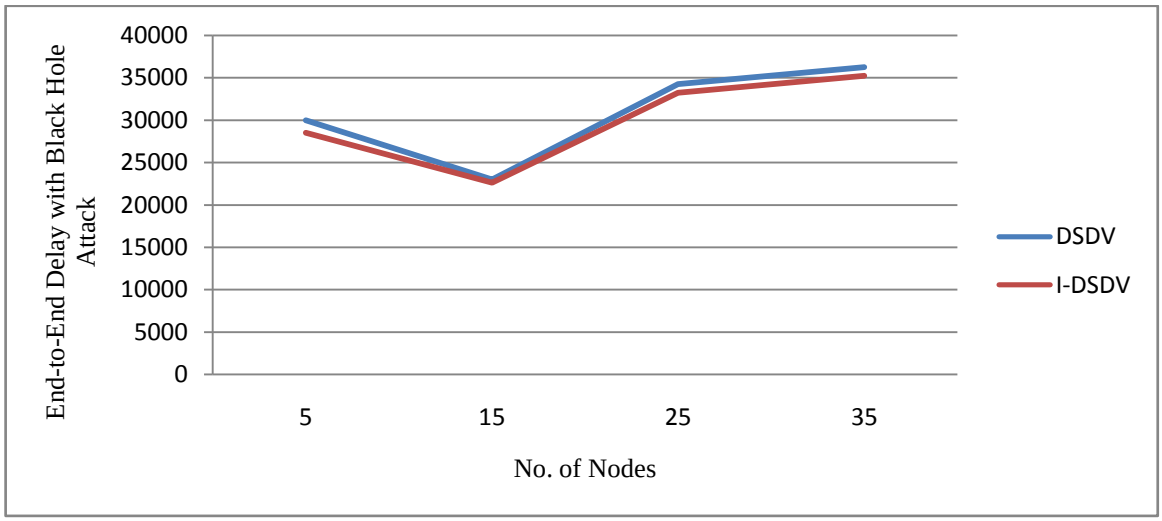

Figure 2.

The delay feels by a packet from the time it was send by a source till time it was received at the destination. The performance of I-DSDV is better than DSDV protocol varying number of nodes especially between 15 and 35 nodes.

5.3 Routing Overhead with Black Hole Attack

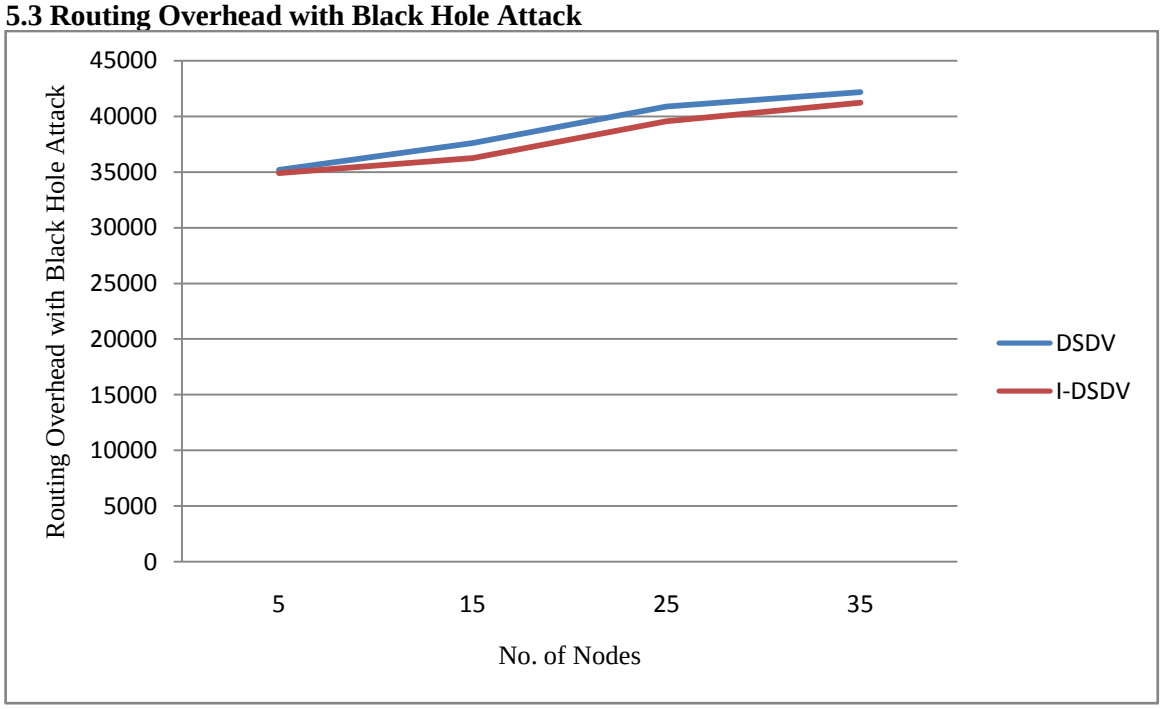

Figure 3.

The number of control packets produced per mobile node. The routing overhead of I-DSDV is found to be slightly higher than the regular DSDV protocol as expected. This increase is expected to the fact that the extra routing control messages are generated in the case of broken link

6. Conclusions

The performance of wireless ad hoc routing protocols was examined using the NS-2 simulator on DSDV and I-DSDV protocols using IPv6 under Black Hole Attack. Considered complete simulation results of current metrics of Packet Delivery Ratio, End-to-End Delay, Routing Overhead over the DSDV and I-DSDV by varying number of nodes. Minimal routing load is also verified via DSDV protocols for different simulation environment.

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