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"An Analysis on AODV and DSDV Protocols in a Wireless Sensor Network"

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Abstract – This paper focuses on the development of the packet delivery ratio of Destination-Sequenced Distance Vector (DSDV) routing protocol in mobile ad hoc networks with high mobility, a communication swap scheme for its invalid route rebuilding is being used. Two protocols AODV (Ad-hoc on-demand distance vector) and DSDV replicated using package and were compared in terms throughput, end to end holdup and packet faction delivery varying number of nodes, speed and time. Imitation results show that DSDV compared with AODV, DSDV routing protocol consumes more bandwidth, since of the recurrent broadcasting of routing updates. While the AODV is better than DSDV as it doesn't uphold any routing tables at nodes which results in less in the clouds and more bandwidth.

Keywords: Destination-Sequenced Distance Vector, Ad-Hoc On-Demand Distance Vector, Package, Bandwidth, Routing, Protocol

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INTRODUCTION

AODV is a very simple, well-organized, and effectual routing protocol for Mobile Ad-hoc Networks which do not have fixed topology.

This algorithm was motivated by the limited bandwidth that is obtainable in the media that are used for wireless communications.

It borrows most of the beneficial concepts from DSR and DSDV algorithms. The on insist route detection and route maintenance from DSR and hop-by-hop routing, usage of node succession numbers from DSDV make the algorithm cope up with topology and routing in order. Obtaining the routes purely on-demand makes AODV a very useful and desired algorithm for MANETs.

Mobile Ad Hoc Networks (MANETs) are self-organizing, rapidly deployable and with no fixed communications [9–11]. They are composed of wireless mobile nodes that can be deployed anywhere, and help to animatedly establish infrastructure using limited network management and administration [12]. Nodes in an ad hoc network may be highly mobile, or stationary, and may vary widely in terms of their capabilities and uses [12, 13]. It is hoped that in the future, ad hoc networks will emerge as an effective complement to wired or wireless LANs, and even to wide-area mobile networking services, such as Personal Communication Systems (PCS). The successful completion of mobile ad hoc networking technology presents a sole set of challenges, which differ from customary wireless systems. These include effective multi-hop routing, MAC, mobility and data management, congestion control.

WORKING OF AODV

Each mobile host in the network acts as a dedicated router and routes are obtained as desirable, thus creation the network self-starting. Each node in the network maintains a routing table with the routing in sequence entries to its neighboring nodes, and two divide counters: a node sequence number and a broadcast-id.

When a node (source node 'S') has to converse with another (destination node 'D'), it increments its broadcast-id and initiates path discovery by broadcasting a route request packet RREQ to its neighbors. The (source-addr, broadcase-id) pair is used to identify the RREQ uniquely. Then the dynamic route table entry organization begins at all the nodes in the network that are on the path from S to D.

DESTINATION SEQUENCED DISTANCE VECTOR (DSDV) PROTOCOL

The destination sequenced distance vector (DSDV) routing protocol is a practical routing protocol which is a alteration of conventional Bellman-Ford routing algorithm. This protocol adds a new attribute, sequence number, to each route table entry at each node. Routing table is maintained at each node and

with this table; node transmits the packets to other nodes in the network.

This protocol was aggravated for the use of data swap along changing and arbitrary paths of interconnection which may not be close to any base station.

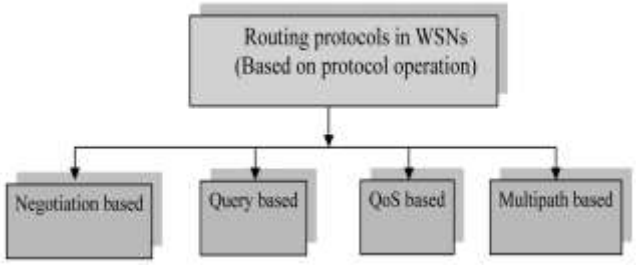
The data transmit by each node will enclose its new succession number and the following information for each new route:

- The destination address
- The number of hops required to reach the destination and
- The new sequence number, originally stamped by the destination

Many routing solutions that have been specifically designed for WSNs have been proposed [1, 2]. In these proposals, the unique properties of the WSNs have been taken into account. These routing techniques can be classified according to the protocol operation as negotiation based, query based, QoS based, and multi-path based, as depicted.

The **negotiation based** protocols have the objective to eliminate the redundant data by including high level data descriptors in the message exchange.

In **query based** protocols, the sink node initiates the communication by broadcasting a query for data over the network.



The **multipath based** protocols were initiated with objectives to provide reliability and to balance the traffic load in the network [3-5]. These protocols use multipaths in order to achieve better energy efficiency and network robustness in case of node failures. Multi-path routing protocols have been discussed in WSN literature for several years now [6].

QoS based protocols allow sensor nodes to balance between the energy consumption and certain pre-determined QoS metrics, such as delay, energy, reliability, bandwidth, etc., before they deliver the data to the sink node.

A routing protocol for ad hoc wireless networks should have the following characteristics [14]:

- It must be fully distributed.
- It must be adaptive to frequent topology changes caused by the mobility of nodes.
- Route computation and maintenance must involve a minimum number of nodes.
- It must be loop-free and free from stale routes.
- The number of packet collision must be kept to a minimum by limiting the number of broadcasts made by each node.
- It must optimally use scarce resources such as bandwidth, computing power, memory and battery power.
- It should be able to provide a certain level of QoS as demanded by the applications, and should also offer support for time-sensitive traffic

CONCLUSION:

DSDV routing protocol consumes more bandwidth, because of the frequent broadcasting of routing updates. While the AODV is better than DSDV as it doesn't maintain any routing tables at nodes which results in less overhead and more bandwidth. From the above, chapters, it can be assumed that DSDV routing protocols works better for smaller networks but not for larger networks. So, my conclusion is that, AODV routing protocol is best suited for general mobile ad-hoc networks as it consumes less bandwidth and lower overhead when compared with DSDV routing protocol.

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