Ad Hoc 망에서 AA-DSDV 라우팅 프로토콜

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Area Aware-DSDV Routing Protocol on Ad hoc Networking

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Abstract

Time goes on, Ad Hoc network is hot issues. So far, there are a lot of protocols have been proposed for Ad Hoc routing protocol to support the mobility. This paper presents an enhanced DSDV(Destination-Sequenced Distance Vector) routing protocol which nominates one node to take care of a specific area. Simply Area-Aware(AA) DSDV routing protocol has one nominee to take care of some area. It has two jobs. One is to take care of its neighbour and another is to transfer the routing table to its other node as it works. It is called as Area Nominee(AN). The new scheme extends the routing table to include the nominee in the area. The general node is the same as the previous DSDV routing protocol. In the other hands, the node which is nominated has two routing protocols. One is for Regional Routing(RR) table which is the same routing table in DSDV. Another is Global Routing(GR) table which is about the area round its area which it cares nearby. GR table is the table for the designated node like the nominee. Each area has one nominee to transfer between ANs. It has only nominee's information about every area. This concept decreases the topology size and makes the information of topology more accurate.

1. Introduction

Today, the popularity of smart phone and the smart interfaces to connect to the internet boosts the improvement of technology. People are eager to use internet everywhere. That's why the mobility is hot potato. The mobility is key issue to support these needs[1]. Mobile Ad Hoc Network(MANET) is the wireless network doesn't depend on any centralized management. Each node makes themselves as the router to transfer the data originated from other nodes, as the source to initiate the node send the packet and as the destination to receive the packet. According to the several reasons above, we need a reliable and well-worked routing protocol. In a routing protocol for MANET we can categorize that into two groups.

One is on-demand method and another is table-driven method[2]. We can infer the meaning from that name. The on-demand method is also known as reactive routing protocol. Whenever the topology changes, nodes exchange the current their information and broadcast it. If the node changes rapidly, it reduces the performance of routing process. The table driven method is the way to send the topology information regularly. It is so rapid when the node sends the information right away without the execution of algorithm to persue finding the path to send.

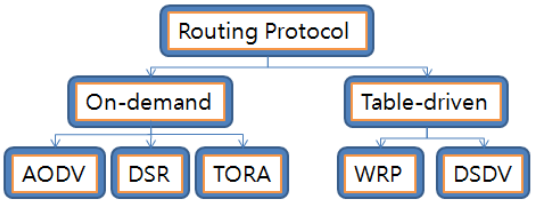

Figure 1. The Classification of Routing Protocol

Following is an overview of this paper. Section 2 briefly describes the routing operation of DSDV

routing protocol. In section 3 we will propose the AA-DSDV routing protocol. We will compare the performance of DSDV and AA-DSDV routing protocol. Finally, we will finalize the paper with brief explanation of overall paper.

2. DSDV Routing Protocol

In this chapter, we cover the functionality of DSDV routing protocol, the message exchanging between nodes and the method how to make the routing table.

2.1 DSDV Routing Protocol

DSDV routing protocol is the traditional routing protocol based on Bellman-Ford Routing Mechanism[3]. Every node in this topology exchanges the routing table information to know the topology. As the result of this procedure, every node in the network has the routing table about the destination which the source sends and hop information. This information is managed by the regular routing message. There are two types of messages to maintain the routing tables. One is full dump and another is updated information about the network. In general, we use the full dump when the node enter into network or the network are changed significantly.

2.2 The DSDV-Routing Protocol Message[4]

The table 1 shows the header information of message when nodes exchange. In DSDV routing protocol it calculates the distance based on hop counting. It doesn't consider the bandwidth or qualify of link. It only considers the condition of link state(connection or disconnection).

Classification	Context
Metric	The distance
Destination Address	The destination
Next Hop	Next node

Table 1. The header information of DSDV

2.3 Operation of DSDV Routing Protocol[5]

Table 2 and figure 2 are an example for the routing table. If there is the packet heading for 2, it is forwarded to node 3. It just needs to take two nodes to get through. In this table 2, destination 2 is the physical distance to get and metric is the hop counting for the destination.

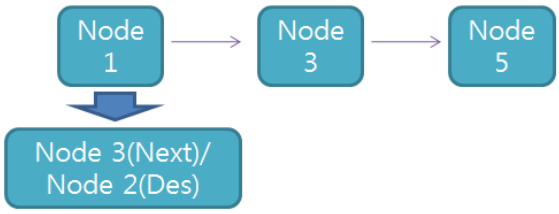

Figure 2. The example of topology

If the node 1 has something to send to node 2, it takes a look for the routing table to find the next hop to send the packet. If there is so, it sends the packet to node 3. Also node 3 takes a look for routing table to find the way to get the destination if the packet is not heading for me. It will forward the packet to the node 5. It will takes the same step when the packet is arrived where it is supposed to get.

Destination	Next Hop	Metric
3	3	1
5	3	2
2	3	3

Table 2. Routing Table

3. AA-DSDV

The routing protocol which we propose is called "Area-Aware DSDV". Among nodes, there is an one node to take care of some area like a commander which we call AN. All nodes around it send the routing table to it. It will know the topology. if it receives the packet, it will forward. In figure 3, it describes the concept. AN-1 takes control of Area 1. AN-2 takes control of Area 2.

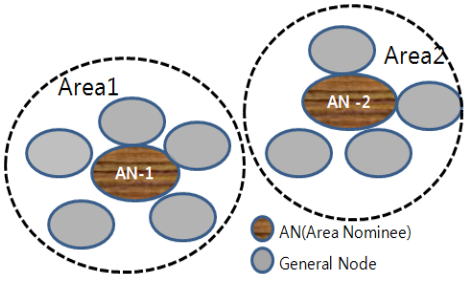

Figure 3. An in AA-DSDV

3.1 Routing Algorithm

The algorithm to get the best path is based on the area and hop counting. If there is the same area number, it works like normal DSDV routing protocol. However, node A-3 has something to send Node B-3, it will send the AN to node A-2 when it takes a look for routing table at first. Node A-2 has GR table and RR table, node A-2 found the packet is originated from area A to area B so that it try to finds way in the GR table. Node A-2 send the packet to node B-2 in area B so that node B-2 can forward the packet

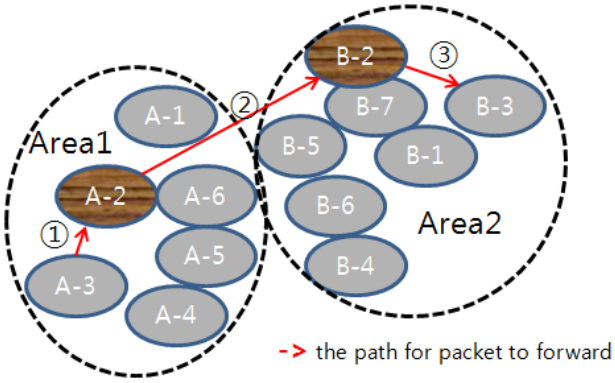

Figure 4. The example of topology

to the destination. When the node B-2 tries to look at the routing table, it finds the destination belongs the their own area. It will use the RR table to forward the packet to the node B-3. We compare the previous DSDV routing protocol and AA routing protocol. When we need to send the packet from A-2 to B-3, we will need to take 4 hops for DSDV routing protocol comparing to 3 hops for AA-DSDV routing protocol. Also it needs to time to make the full topology in order to send. But A-2 takes care of A area to make management much smaller and much more accurate.

3.2 Routing table

There are two types of routing tables in the AA-DSDV routing protocols. One is RR table and Another is GR table. RR table is almost same as the previous DSDV routing table. In the other hands, GR table is totally new concept.

Each node exchanges the routing table for the recent information of topology in the same area. The routing table's format is like table 3.

Destination	Next Hop	Metric	Area
3	3	1	A
5	3	2	A
2	3	-	B

Table 3. Regional Routing table of AA-DSDV

In the table 3, it's node 1's routing table from recent AA-DSDV routing protocol. Destination is the place where we aim to send the packet. Next hop is where we forward packet to intended for the destination. Metric is how many node the packet need to get through. If we need to get through two nodes, the metric value is 3. Area is the key point in this paper. It needs the area number to be part of. The node in the same area only communicates each other. They don't know the other nodes with different area number. Nodes advertise in the 2 cases below

* When the hop counter is less than 3 hop.
* When there is a change in topology.

All nodes have RR table, but the AN has only GR table and RR table. ANs are communicating each other like other normal Node do. They have routing table to forward the packet. Above the example of figure 4, node A-2 frequently communicates with B-2 by AN message. Also they have other backup node to save the GR table in case the AN dies. It makes the better performance even though AN dies. It makes the AN faster to transfer the packet faster not to reduce time for making topology again like traditional DSDV routing protocol.

4. Conclusion

According to this paper, we proposed new concept to manage the message between nodes. We verify that proposed new concept has several advantages such as reducing the messages between wireless nodes, reducing time to get the destination and construction the network much more faster than previous DSDV routing protocol. It also reduce the complexity to make the routing table in the big topology. In oder to do that, It

needs the high power consumption to do that. It is a significant problem. It is really critical in the AD-Hoc networking when they are mobile node. In many cases, we assume AA-DSDV have a really better advantages. The better performance could be got. Henceforth, we will have further study for several simulations and performance analysis into a variety at environment to evaluate accurately.

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