Design and Validation of New Routing Protocol in MANET for Optimal Performance

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Summary
MANET network including mobile nodes, nodes can join and leave the network at random. MANET is also known as a decentralized network NRP is a more efficient routing protocol because the route is pre-calculated in an optimal way (e.g. shortest path). Thus, it stands as an upper bound of performance in all routing protocols,. The other big benefits are that routing messages are suppressed, and link loss are also ignored. In this work, we add a new routing protocol to the network simulator, and a detailed analysis of the characteristics and models of wireless networks; Discussed based on the simulation process of the wireless network and the implementation, and on the NRP protocol personalized wireless network and a reactive protocol. Nam is used to display the simulation process. Network simulator is designed for communication network simulation tool.
Key words:
Network simulation; NRP protocol; Ad Hoc network; protocol validation

1. Introduction

Wireless networks have seen explosive consumer interest in recent years, as they are used in the mobile and personal communications. Mobile notebooks and mobile computing devices continue to provide the processing capacity of smaller, more and better application of part of the population growth in the hands of the abnormal increase. Therefore, the future of wireless networks is the ability to adapt, and there is no significant infrastructure. Therefore, Ad hoc network is the key technology of the future system. Mobile ad hoc networks are interconnected wireless technologies between various network nodes. Today, this technology is very popular as these devices are used in the current world arena for PDAs, mobile phones, TCs and so on. A node of this type of representation of the network acts as a router [1] capable of generating routes to packets transmitted over the network over the network. The nodes are not in static mode where the network can be moved, so the infrastructure is also updated frequently during communication. As a result, the path is disconnected and reformed regularly. This type of network is useful in a variety of conditions in the world.

2. MANET Protocols

2.1 Proactive Protocol

Proactive protocols are characterized by temporarily active transmission paths that may be transmitted. The protocol follows an algorithm that helps to update the list of all possible destinations in the routing table, also referred to as routing tables, so it is called the protocol-driven routing table. Examples are DSDV and OLSR.

2.2 Reactive Protocol

The reagent protocol has the function of allowing any action on a particular network to be used for transmission to reactivity. As the request is initiated, the algorithm generates a protocol that discovers the specific processing of the routed data, a process known as the route discovery process [3]. This process generates a useful path that will only generate a new route again for the current transaction and other transactions. It makes all the required tasks only by the so-called according to the requirements of the routing protocol. Examples are AODV and DSR.

2.3 Hybrid Protocol

The hybrid protocol has the capability of being locally and globally forward-looking and it is inherently passive. In this protocol, the nodes maintain routing tables, their neighbors, and when they need to send documents out of the current ZRP on the network to generate routing discovery processes.

3. AODV Protocol

Ad hoc on-demand distance vector is specially designed for reactive or on-demand protocols ad hoc mobile networks [4]. Based on the AODV network protocol nodes, these particular routes are invalidated if they find any link failure due to mobility. The AODV does not maintain frequent routes from source to destination. The free ring is a good function of the AODV specified by using a specific

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number called the target sequence number. To use and update, from the source to the destination of the route to the latest AIDS node. The details of the AODV protocol in the routing table include the destination address and next hop address from the source node to the destination node to obtain the required node. The sequence number of the target closer to the table is associated with the destination and the time interval specifying route to the destination. The specific entries of the routing table are discarded when not in use during the time interval.

4. AODV Architecture

The AODV protocol performs the tasks of each session, so starting the discovery process at the start of the transmission session, setting the path from the source to the destination, the entire task is done only in the transmission path, using the new process route until the session [14] And then the end will start again. The AODV architecture relies on an algorithm for some of the following goals.

• Only issue a discovery packet for routing only if you feel it is necessary to set the path for network transmission.

• Whether differences between connected tasks, such as local nodes, neighbor discovery, and topology maintenance, can be made.

• Disclose information about the nodes that are required for any changes to the connection.

5. NRP protocol

NRP is a more efficient routing protocol because routing is best calculated. Therefore, it serves as an upper bound on the performance of all routing protocols, and the other major benefit is that the loss of messages and links that the message was deleted is also ignored. Therefore, the basic and fair provides a platform to compare the performance of the MAC protocol with the effective path. The destination node creates the sequence number and associated metric. In the transmission process, routing does not often save energy and time. All nodes can send inputs to your neighbors on your desk. This exchange of tickets can be accomplished by updating the path metrics to the entire topology. Keep up-to-date updated routes. If they accept a better or updated route, the nodes that get the data can update their tables. Updates are performed periodically if a new event in the topology is dispatched immediately. If topology changes are repeated, full communication of the table will be favored, with fewer incremental traffic updates. Routing is performed on metrics and serial numbers. The sequence number is the time signal sent by the destination node. It allows updates to the table process, as if the similar route is known, stays and uses entries with the best sequence number, while the other is eliminated, and what is considered obsolete.

6. NRP Architecture

NRP is an Ad Hoc network with a positive attitude. A routing policy is based on a programmed path that is associated with, or can be, all possible routes that may be associated with the destination and next hop. NRP basically depends on some components such as connectors, class proxy class routing, and routing tables. The connector is one of the most basic classes in NS-2. There is a "TARGET_" object that manages the "receive", "send", and "drop" activities. The proxy is a secondary class connector. Basically, a routing agent will override the "recv" functional agent. The default "receive" proxy behavior is to invoke the "receive" function of the application. However, since the routing agent is usually independent of the application, you must override the virtual function "receive". In the NRP by a new agent with two additional auxiliary class routes, the routing agent also defines two new classes. One for the routing table, one for the entry in the routing table. Routing Table Entry Storage Level Routing Table. Each entry must have at least <DST, Next Hop and Metric> and has a sequence number to determine whether a message is up-to-date or not. In almost all of the routing protocols designed, packet queues are used to store valid routes with valid targets but still valid. It is not necessary to design this static route. Therefore, the router will no longer queue for each output port, eliminating the IP layer's tail variable at the class "end of the package". Level routing proxy. Detects link metrics and signaling messages for special routes, such as newspaper updates routing tables. The startup function is invoked by starting the nrprt command, one of which is named makeRoutingtable (). The routing information will be "fscanf" in the file and added to the table. Here, we will use "fscanf" to read the parameters of the type "Int32" and "UINT16" to represent the <DST, Jump, Metric>. Different nodes read different parts of the file from the routing table. The special format of the file is: such as <source> <DST> <next hop> <hop> means this will be 0 3 1 3 .. Therefore, only those entries where "SRC" addr is equal to its address will be One node reads out. The self-generation of the routing table can be easily implemented using an algorithm topology file. The other is the Forwarding Capability Packet: Actually, according to the routing table, the proxy needs to process both "broadcast" and "unicast" packets. "Forward" means determining the next hop of a unicast packet. Once this header field becomes. On NRP, the problem only occurs locally. The MAC interface is a bit complicated: the first is the message interface: the packet will be MAC next hop set, ready for Layer 2 transmission, and the second is the

interface function: a link loss, "(reported) The corresponding.

7. Validation of NRP Protocol for optimal performance

7.1 Simulation environment

This work has been done using a well-known package to create a simulation environment that is an NS2 network simulator [8]. It helps to create a virtual environment in which you can simulate the required network design. In this software, you can use some of the virtual items related to various types of network elements to design a complete network topology. This NS2 [5] helps to simulate both wired and wireless network simulators, they also provide simulation results and some evaluation tools to calculate and draw conclusions. It is NS and Nam [9] of the two basic tools. The first and second simulators both encourage the visualization of the help network.

7.2 Traffic model

The work in the model continues at a constant bit rate [9]. It is the kind of traffic that is used to complete the transmission [7] in the analog network used in the transmission source. In the network topology there are several pairs of packets serving as source and destination, and network nodes using the size of 512 bytes for distribution. The packet transmission rate varies at some time intervals due to changes in the network load.

7.3 Mobility model

The random dot pattern has been used in satellite network simulation for the desired design [5]. The configuration of the 500 and 500 Wide Design Platforms has been used for simulation. The radio model is used for bi-directionally with the CBR as a source of traffic, where the packet size is 512 bytes and the network speed is 10 meters per second. To simulate multiple nodes for analysis for 50, 75, and 100 with variable time simulations of 20, 40, 60, 80, and 100 being used.

7.4 Performance evaluation

The final task is to evaluate the performance depends on the performance matrix of the calculated results, such as packet transfer rate and delay end to end [10]. Conclusion Charts and tables are taken, as shown in the following figure.

There are three general methods of validating the protocol through performance evaluation [8]:

(1) Prototype: Build it (or its simplified version) and see how it works;

(2) Analytical modeling: building a mathematical model of it and using it to analyze the system; and

(3) Simulation: the establishment of a model system software.

Prototypes are often infeasible or time-consuming, especially for large-scale systems; it also provides limited controllability and observe ability

The establishment of special components can be required by the specific applications, business processes, agents, links and routing nodes model [9]. These components are required to be tested and compiled to ensure correct use if used [10].

The simulation trace file is completed and must be analyzed to obtain useful information after it is also used to monitor the network simulation process. The results of the simulation analysis can help you decide if you need to change the configuration topology and the business simulation triggers other simulations to simulate the results of the target [10].

Validation and performance evaluation process is performed through the simulations of well-known AODV protocol and NRP protocol, the relevant working information is demonstrated.

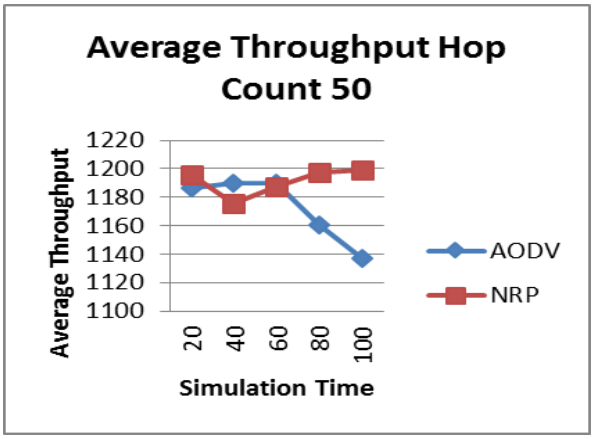

Figure 1: Average Throughput Hop Count 50

Table 1 Average Network Throughput Hop Count 50

Average Throughput Hop Count 50					
	20	**40**	**60**	**80**	**100**
AODV	1186.17	1189.91	1190.07	1160.26	1136.79
NRP	1195.89	1175.64	1187.27	1197.1	1198.76

Based on figure 1and table 1 we evaluated the performance of the algorithms in terms of network throughput by keeping the network node constant and varying the simulation time. Initially scenario has been setup for a small network of 20 for simulation time. As depicted in Figure 1all the two protocols AODV and NRP almost similar but NRP is somehow higher than AODV protocol. With 40 simulation time AODV protocol provide good throughput. Simulations with 60 simulation time

NRP provide throughput similar to AODV but it increase with simulation time of scenario. In simulation time 100 the AODV provides very less throughput. The NRP provides highest throughput with highest simulation time.

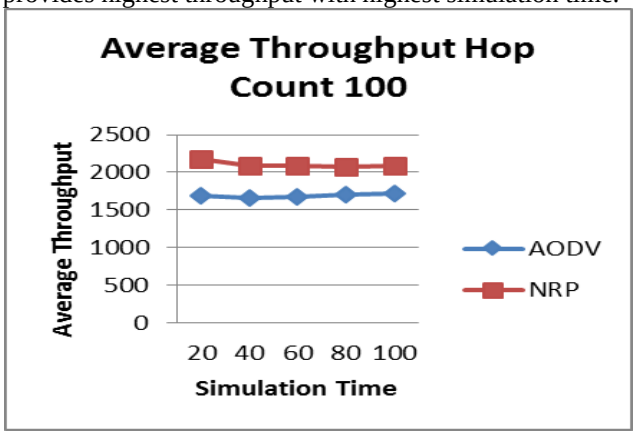

Figure 2 : Average Throughput Hop Count 100

Table 2 Average Network Throughput Hop Count 100

Average Throughput Hop Count 100					
	20	**40**	**60**	**80**	**100**
AODV	1689.44	1657.42	1678.31	1709.01	1725.93
NRP	2175.97	2090.05	2085.72	2078.01	2094.43

As shown in Figure2 the AODV protocol provide less throughput with less simulation time like in 20 simulation time it provide 1689.44 whereas NRP provide 2175.97 throughput which is much more than AODV. As simulation time increase as 40 AODV provide 1657.42 whereas NRP provide throughput 2090. NRP provide throughput 2085.72 whereas NRP provide 1678.31 with 60 simulation time. NRP provide 2094.43 throughput with highest simulation time with 100 and node count 100.

8. Conclusion

On the basis above, a number of different scenario and time for the simulation experiment and the results are accordingly. In aspects of network throughput, NRP protocol overwhelms AODV protocol. Especially in the aspect of network throughput, it is not like the traditional thought which considering that the proactive protocol provide better throughput in more traffic condition where network have more node count and more simulation time, this scenario has more network traffic so a suitable protocol should be capable to provide optimal performance in term of throughput of network. Simulations of wireless network with two different routing protocols are introduced to explain the simulation method of NS2 and the analysis of the simulation results is presented. NS2 is an object-oriented simulation tool to simulate and analyze network elements; it is also a powerful tool to develop new protocol and scheme. NAM is used to display the process of simulation.

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