

Computer Assignment 2 – AODV Operation

Due: 18 Khordad 1396 with 10% Bonus

The goal of this assignment is to check the operation of AODV in wireless networks. The sample file with name aodv.cc is placed on the cecm. Download it and put it into your virtual machine, folder: “/ns-allinone-2.26/ns-3.26/scratch”. You need to make some changes to achieve the goals of this assignment. There are enough comments placed in the file to understand its structure.

To compile this file, open a terminal, go to folder “/ns-allinone-2.26/ns-3.26” and first type

```
./waf
```

Then type:

```
./waf --run scratch/aodv
```

You should be able to see “build finished successfully”.

In this example, there are five wireless nodes (nodes: 0, 1, 2, 3, 4) placed on a line with distance 70 meters originally.

Node 0 sends one packet to node 4 and node 4 replies back every 10 seconds. The whole simulation ends after 200 seconds. Due to packet loss, some packets may get lost. Some packets are shown twice which is because of de-queuing at a node.

Originally, node 0 is placed at location (0,0,0). After 25 seconds, move the location of node 0 to (110,0,0). Then, at time 75, move node 0 to (180,0,0). Then, at time 125 move the location to (250,0,0). Make necessary changes to implement this scenario.

As you run the program, one output file is generated which contains the routing tables of the nodes based on your configuration in folder “/ns-allinone-2.26/ns-3.26”. Note that IP address 127.0.0.1 is the local address of a device in the routing table and 10.255.255.255 is the broadcast address of a node. Note that if the flag for a routing entry is down, it means that entry is invalid.

Another set of files generated in folder “/ns-allinone-2.26/ns-3.26” are “*.pcap” files for each node. To watch these files, you need to open them via Wireshark program. If you click on one of these files on Ubuntu, it will guide you to install Wireshark. Wireshark allows you to investigate the packets sent or received by a node. Since the number of packets are a lot, you need to filter the packets you need. You need to investigate two types of packets for each node in its pcap file with Wireshark.

- The first set belong to UDP traffic of port 9. To filter those packets, type “udp.port==9” on the box on top of the Wireshark program and press enter. You should be able to see just the UDP packets.
- The second set of packets are AODV packets. There are lots of AODV packets in the file but you need to filter out those which has node 4 (fifth node) as destination since this is the only destination in this assignment. To do so, you can type “aodv.dest_ip==10.0.0.5”.

You need to answer the following questions:

Question 1:

Describe the evolution (changes) of the routing tables of all the nodes over the time.

Question 2:

Investigate the UDP packet transmissions in all nodes (packets on port 9). If there is a packet loss, report it.

Question 3:

Describe the operation of AODV packets sent in all the nodes to find destination 10.0.0.5. How many AODV packets are transmitted per wireless device to find the destination?

What to deliver:

- All the codes including the codes used to analyze the result file if any.
- A report file which includes full answer to questions 1 and 2.