

# Vehicular Ad Hoc Networks (VANET)

## Assignment-1

Name: Umang Barbhaya

Roll No: M20CS017

Course Instructor

Dr. Debasis Das

Indian Institute of Technology, Jodhpur

### A. Topology

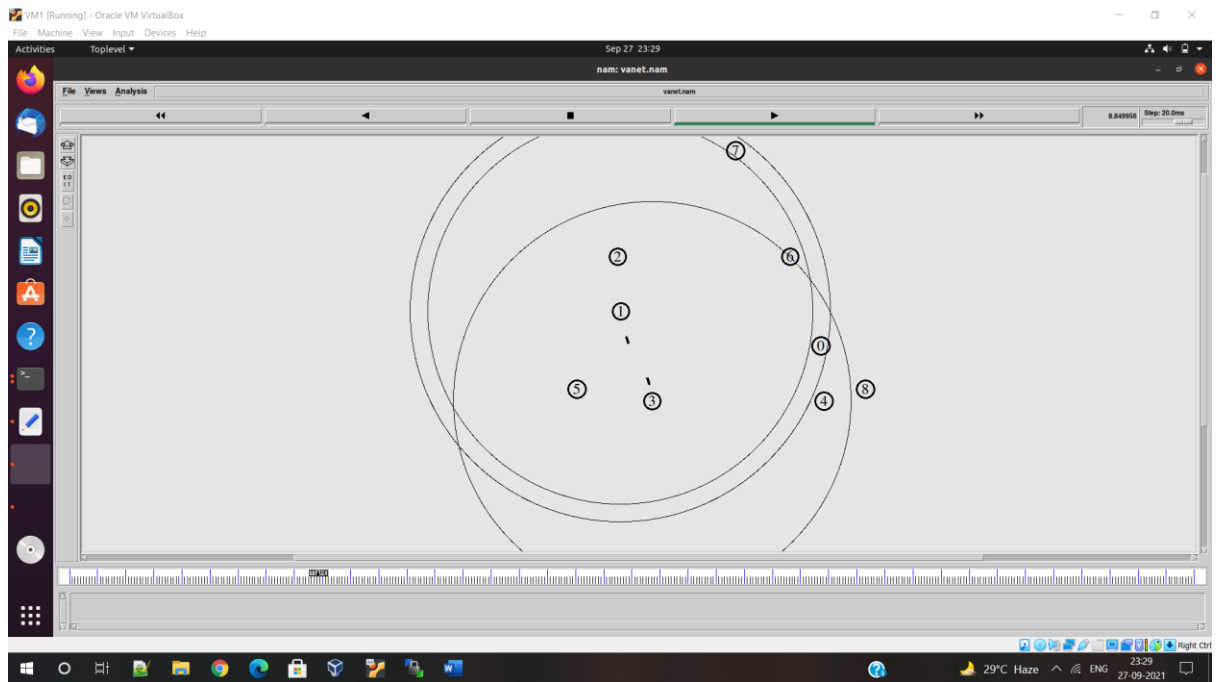
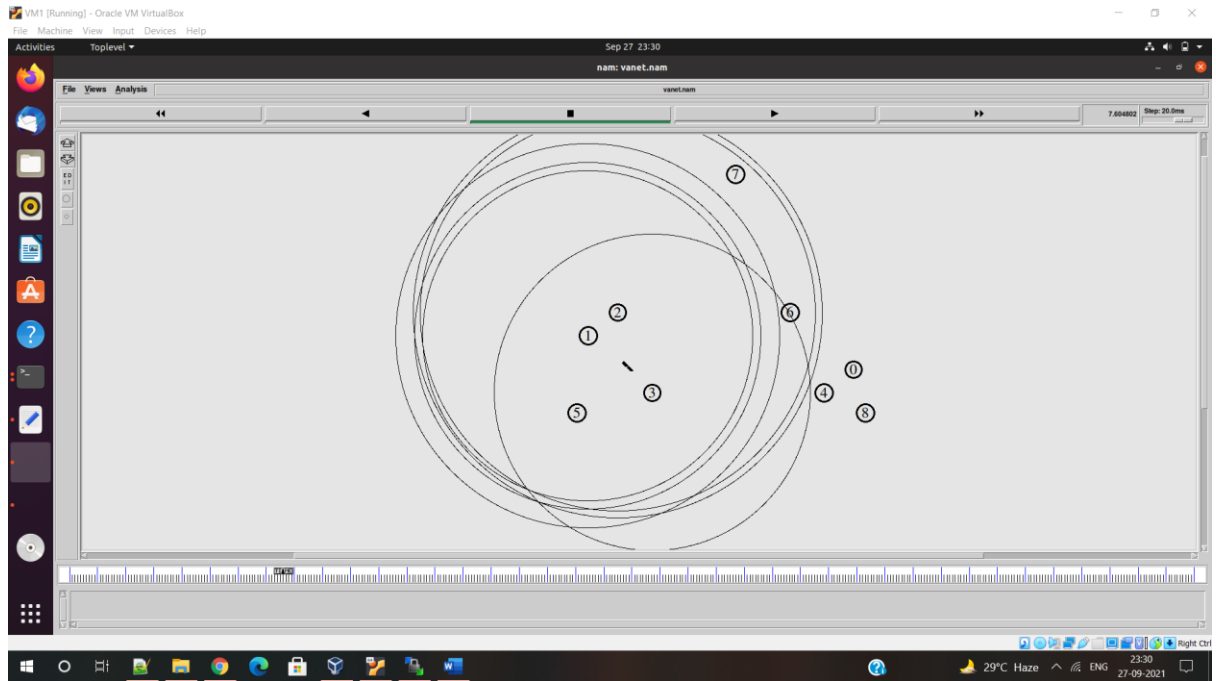
Below are the details of the topology

3 RSU's (Node 5, Node 7 and Node 8)

6 Vehicles(Node 0, Node 1, Node 2, Node 3, Node 4, Node 6)

Both V2R and V2V communications are used with AODV as the protocol

There are two Junctions with four roads intersecting on each junction



The code are attached in the zip file

## B. Sub Questions

### a. Throughput

The throughput is given by  $(\text{recordCount}/(\text{stoppingTime}-\text{startingTime})*(8/1000))$

```
umang@vm1: ~/Desktop
umang@vm1:~/Desktop$ gawk -f M20CS017_Throughput.awk vanet.tr
Starting Time 1
Stopping Time 30
Record Count 1859
Throughput(kbps) 0.503487
umang@vm1:~/Desktop$
```

#### b. Efficiency

The Efficiency is given by  $(100 - ((\text{stoppingTime} - \text{startingTime}) / (((100 - ((\text{Packet\_Sent} - \text{Packet\_Received}) / \text{Packet\_Received}) * 100)) * \text{Packet\_Received}) / (\text{stoppingTime} - \text{startingTime}))))$

```
umang@vm1: ~/Desktop
umang@vm1:~/Desktop$ gawk -f M20CS017_Efficiency.awk vanet.tr
Efficiency : 99.995023
umang@vm1:~/Desktop$
```

#### c. Packet Loss Ratio

The Packet Loss Ratio is given by  $(\text{Packet\_Sent} - \text{Packet\_Received}) / \text{Packet\_Sent}$

```
umang@vm1: ~/Desktop
umang@vm1:~/Desktop$ gawk -f M20CS017_Packet_Loss_Ratio.awk vanet.tr
Packet Sent 1965
Packets Received 1859
Packet Loss Ratio is 0.053944
umang@vm1:~/Desktop$
```

#### d. Handoff

The handoff latency

```
umang@vm1: ~/Desktop
umang@vm1:~/Desktop$ gawk -f M20CS017_Handoff.awk vanet.tr
Total Handoff Latency : 0.278660
umang@vm1:~/Desktop$
```

#### e. Packet Transmission Rate

The Packet Transmission Rate is given by  $(\text{Packet\_Received}/\text{Packet\_Sent}) \times 100$

```
umang@vm1: ~/Desktop
umang@vm1:~/Desktop$ gawk -f M20CS017_Packet_Transmission_Rate.awk vanet.tr
Packet Sent 1965
Packets Received 1859
Packet Transmission Rate is 94.605598
umang@vm1:~/Desktop$
```