

WSN Assignment

Simulate the Destination-Sequenced Distance Vector(DSDV) routing protocol and evaluate the performance.

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AIM

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PROCEDURE

DSDV

Destination-Sequenced Distance-Vector Routing (DSDV) is a table-driven routing scheme for ad hoc mobile networks based on the Bellman–Ford algorithm. It was developed by C. Perkins and P.Bhagwat in 1994. The main contribution of the algorithm was to solve the routing loop problem. Each entry in the routing table contains a sequence number, the sequence numbers are generally even if a link is present; else, an odd number is used. The number is generated by the destination, and the emitter needs to send out the next update with this number. Routing information is distributed between nodes by sending full dumps infrequently and smaller incremental updates more frequently.

Routing Protocol

Each node in the network maintains a routing table that has entries for each of the destinations in the network and the number of hops required to reach each of them. Each entry has a sequence number associated with it that helps in identifying stale entries. This mechanism allows the protocol to avoid the formation of routing loops. Each node periodically sends updates tagged throughout the network with a monotonically increasing even sequence number to advertise its location. New route broadcasts contain the address of the destination, the number of hops to reach the destination, the sequence number of the information received regarding the destination, as well as a new sequence number unique to the broadcast. The route labeled with the most recent sequence number is always used. When the neighbors of the transmitting node receive this update, they recognize that they are one hop away from the source node and include this information in their distance vectors. Every node stores the “next routing hop” for every reachable destination in their routing table. The route used is the one with the highest sequence number i.e. the most recent one. When a neighbor B of A finds out that A is no longer reachable, it advertises the route to A with an infinite metric and a sequence number one greater than the latest sequence number for the route forcing any nodes with B on the path to A, to reset their routing tables.

CODE

```
set val(chan)      Channel/WirelessChannel      ;
set val(prop)      Propagation/TwoRayGround
set val(netif)     Phy/WirelessPhy              ;
set val(mac)       Mac/802_11                  ;
set val(ifq)       Queue/DropTail/PriQueue      ;
set val(ll)        LL                          ;
set val(ant)       Antenna/OmniAntenna         ;
set val(ifqlen)    10000                      ;
set val(nn)        3                          ;
set val(rp)        DSDV                       ;
set val(x)         800                        ;
set val(y)         800                        ;
set val(stop)      30                        ;
set val(R)         300
```

```
set opt(tr)        out.tr
```

```
set ns      [new Simulator]
set tracefd [open $opt(tr) w]
set windowVsTime2 [open out.tr w]
set namtrace      [open out.nam w]
```

```
Phy/WirelessPhy set CPTresh_ 10.0
Phy/WirelessPhy set CSTresh_ 3.65262e-10 ;
Phy/WirelessPhy set RXThresh_ 3.65262e-10 ;
Phy/WirelessPhy set Rb_ 2*1e6
Phy/WirelessPhy set Pt_ 0.2818
Phy/WirelessPhy set freq_ 914e+6
Phy/WirelessPhy set L_ 1.0
```

```
Mac/802_11 set dataRate_ 1.5e6
Mac/802_11 set RTSThreshold_ 4000
$ns trace-all $tracefd
$ns namtrace-all-wireless $namtrace $val(x) $val(y)
set topo [new Topography]
```

```
$topo load_flatgrid $val(x) $val(y)
```

```
create-god $val(nn)
$ns node-config -adhocRouting $val(rp) \
  -llType $val(ll) \
  -macType $val(mac) \
  -ifqType $val(ifq) \
  -ifqLen $val(ifqlen) \
  -antType $val(ant) \
  -propType $val(prop) \
  -phyType $val(netif) \
  -channelType $val(chan) \
  -topoInstance $topo \
  -agentTrace ON \
  -routerTrace ON \
  -macTrace ON \
```

-movementTrace ON

```
for {set i 0} {$i < $val(nn)} {incr i} {  
    set node_($i) [$ns node]  
}
```

```
$node_(0) set X_ 0  
$node_(0) set Y_ 400  
$node_(0) set Z_ 0
```

```
$node_(1) set X_ 100  
$node_(1) set Y_ 450  
$node_(1) set Z_ 0
```

```
$node_(2) set X_ 300  
$node_(2) set Y_ 400  
$node_(2) set Z_ 0
```

```
for {set i 0} {$i < $val(nn)} {incr i} {  
    $ns initial_node_pos $node_($i) 30  
}
```

```
set tcp [new Agent/TCP/Newreno]
```

```
set tcp [new Agent/UDP]  
$tcp set class_ 2  
set sink [new Agent/Null]  
$ns attach-agent $node_(0) $tcp  
$ns attach-agent $node_(2) $sink  
$ns connect $tcp $sink  
set ftp [new Application/Traffic/CBR]  
$ftp attach-agent $tcp  
$ns at 0.0 "$ftp start"
```

```
$tcp set fid_ 1  
$ns color 1 blue
```

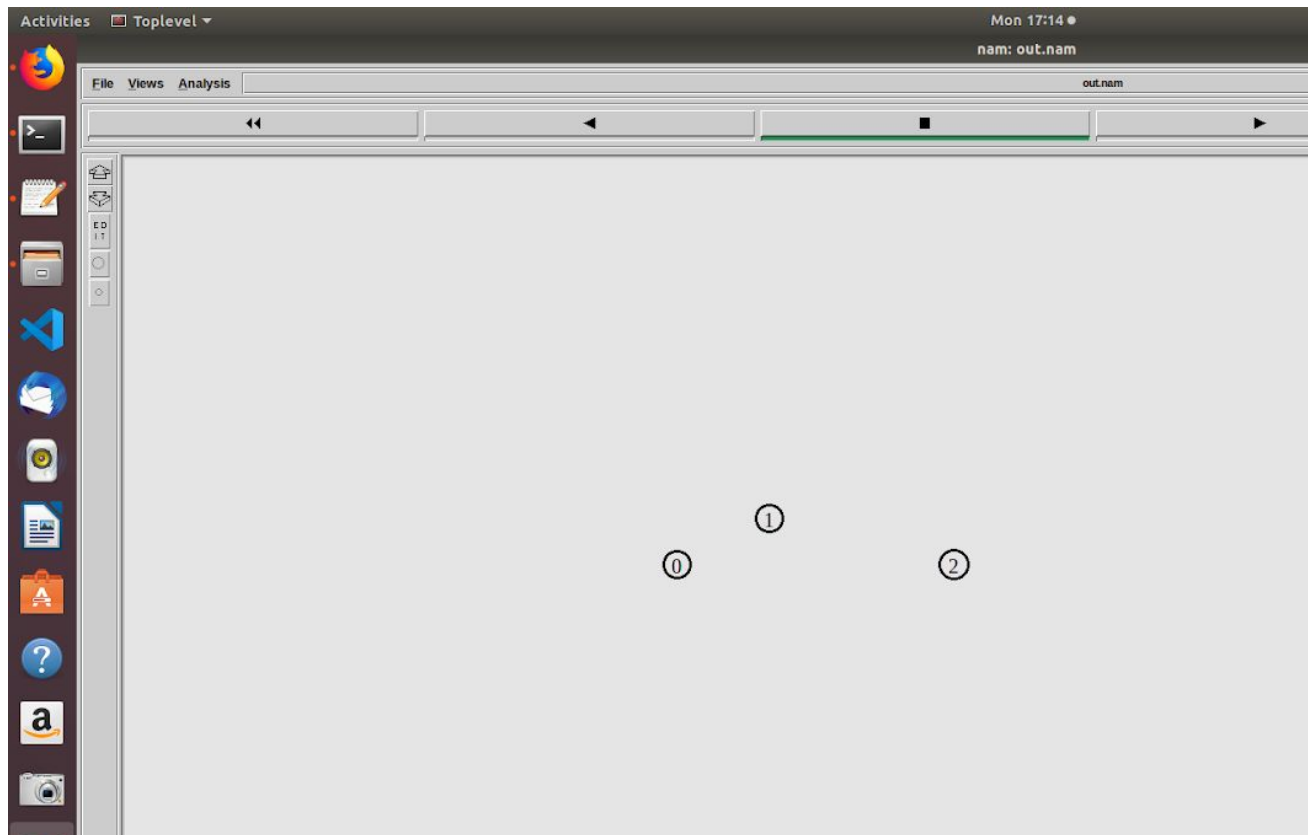
```
$ns at $val(stop) "$ns nam-end-wireless $val(stop)"  
$ns at $val(stop) "stop"  
$ns at $val(stop) "puts \"end simulation\" ; $ns halt"  
proc stop {} {
```

```
    global ns tracefd namtrace  
    $ns flush-trace  
    close $tracefd  
    close $namtrace  
    exec nam out.nam &  
    exit 0  
}
```

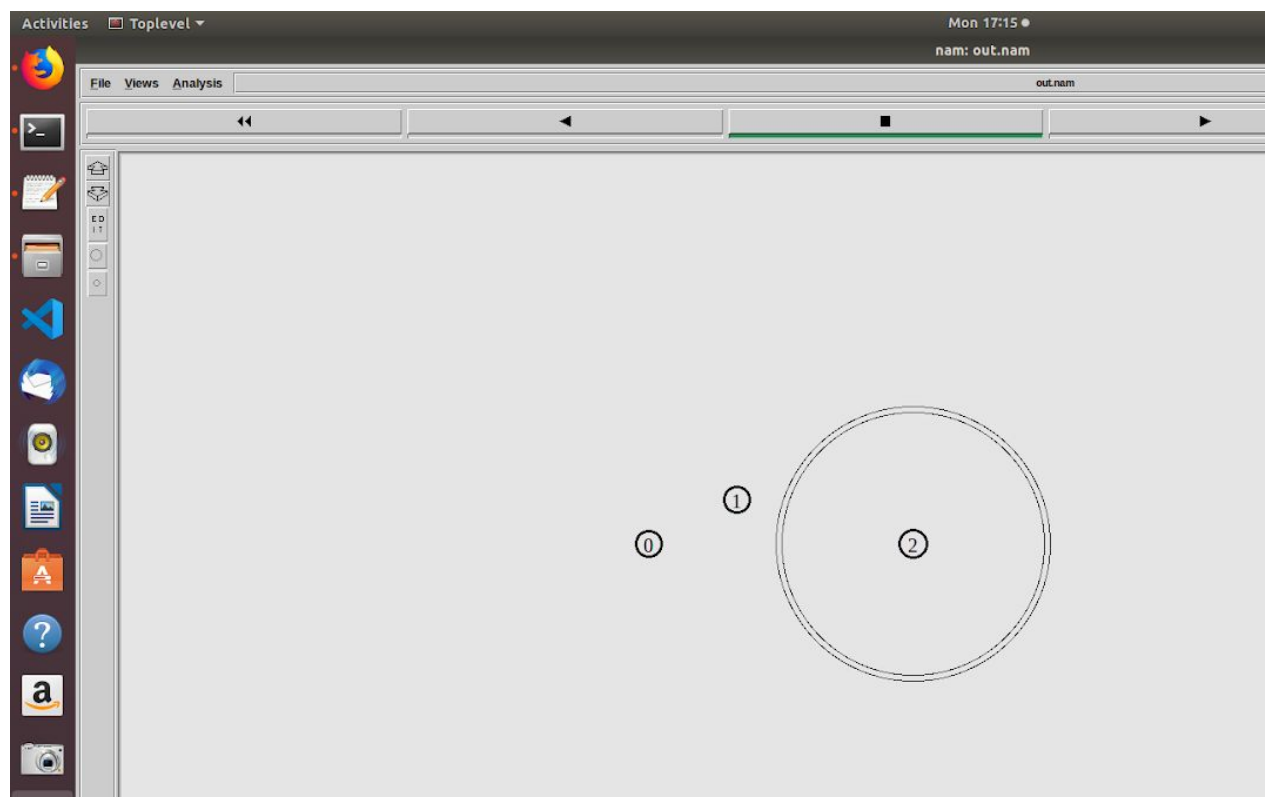
```
$ns run
```

EXPLANATION

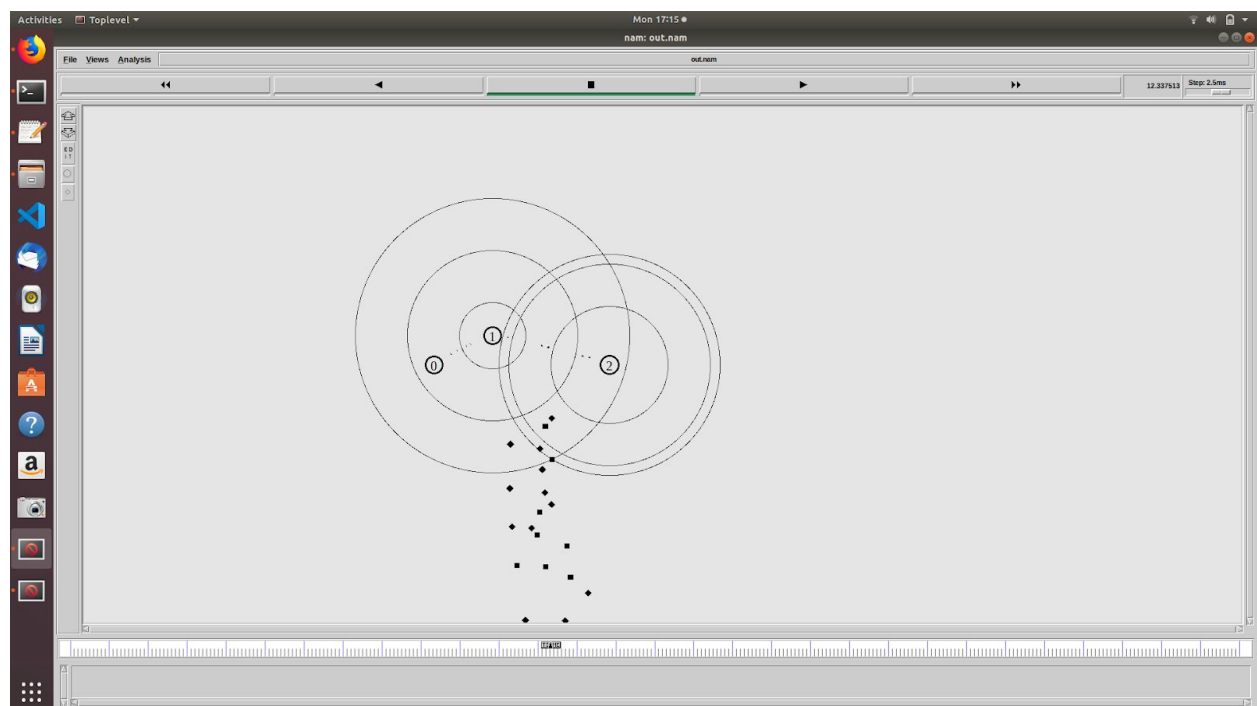
The topology looks as below:



Updation of routing tables:



Transfer of data:



RESULTS

On running the .awk script we get the following results:

```
uditi@uditi-Lenovo-ideapad-510-15IKB: ~/Desktop/wsn lab/lab8
File Edit View Search Terminal Help
onfigure and rebuild ns if this is a problem.
num_nodes is set 3
warning: Please use -channel as shown in tcl/ex/wireless-mitf.tcl
INITIALIZE THE LIST xListHead
channel.cc:sendUp - Calc highestAntennaZ_ and distCST_
highestAntennaZ_ = 1.5, distCST_ = 250.0
SORTING LISTS ...DONE!
uditi@uditi-Lenovo-ideapad-510-15IKB:~/Desktop/wsn lab/lab8$ awk -f ana.awk out.
tr
Before ARP :
Packet Sent:1134
Packet Received:0

After ARP :
Packet Sent:6866
Packet Received:4133
Packet Delivery Ratio:0.60

Total :
Packet Sent:8000
Packet Received:4133
Packet Delivery Ratio:0.52
uditi@uditi-Lenovo-ideapad-510-15IKB:~/Desktop/wsn lab/lab8$
```