Student Name: Abhishek Harsh
Student ID: 2021bcs0036

ICS 224 COMPUTER NETWORKS
Lab-10
Wireless sensor network

Indian Institute of Information Technology Kottayam

1 Create scenario and study the performance of Wireless Sensor Network in NS2

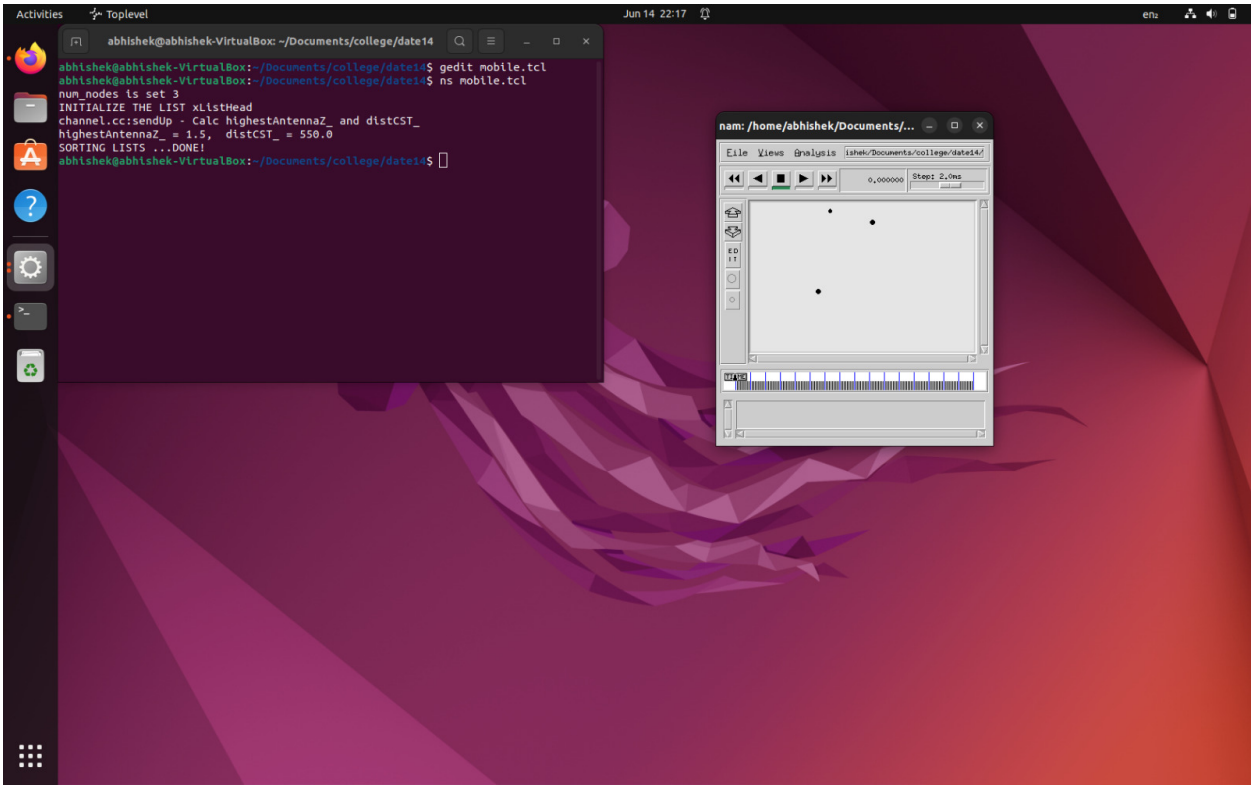
2 Code:

```
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) 50
set val(nn) 3
set val(rp) DSDV

set topo [new Topography]
$topo load_flatgrid 500 500

set ns [new Simulator]

set nf [open lab10.nam w]
$ns namtrace-all-wireless $nf 500 500

set nt [open lab10.tr w]
$ns trace-all $nt

proc finish {} {
    global ns nf nt
    $ns flush-trace
    close $nf
    close $nt
    exec nam lab10.nam &
    exit 0
}

set god_ [create-god $val(nn)]

set chan_ [new $val(chan)]

$ns node-config -adhocRouting $val(rp) \
     -llType $val(ll) \
```

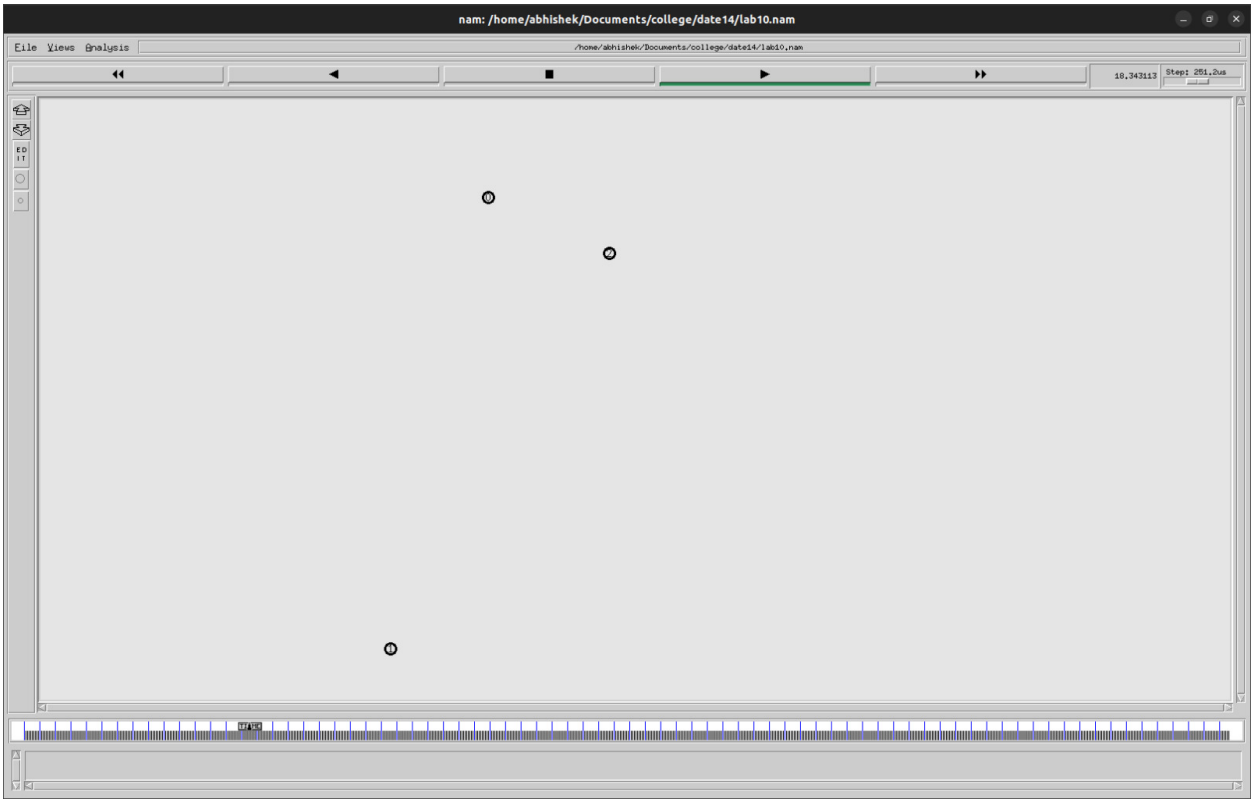
```
     -macType $val(mac) \
     -ifqType $val(ifq) \
     -ifqLen $val(ifqlen) \
     -antType $val(ant) \
     -propType $val(prop) \
     -phyType $val(netif) \
     -topoInstance $topo \
     -agentTrace ON \
     -routerTrace ON \
     -macTrace ON \
     -movementTrace ON \
     -channel $chan_

for {set i 0} {$i < $val(nn)} {incr i} {
          set node($i) [$ns node]
          $node($i) random-motion 0
          set xx_ [expr rand()*500]
          set yy_ [expr rand()*500]
          #$ns at 0.0 "$node($i) setdest $xx_ $yy_ 0.0"
          $node($i) set X_ $xx_
          $node($i) set Y_ $yy_
          $node($i) set Z_ 0.0
          $ns initial_node_pos $node($i) 10
     }

# Specify the generation of node movements
$ns at 4.0 "$node(1) setdest 25.0 20.0 15.0"
$ns at 8.0 "$node(0) setdest 20.0 18.0 6.0"
$ns at 12.0 "$node(2) setdest 85.0 230.0 15.0"
#$ns at 6.0 "$node(3) setdest 210.0 488.0 8.0"
#$ns at 2.0 "$node(4) setdest 395.0 320.0 15.0"

$ns at 61.0 "$node(0) setdest 20.0 80.0 50.0"
$ns at 75.0 "$node(1) setdest 10.0 210.0 15.0"
$ns at 68.0 "$node(2) setdest 434.0 40.0 4.0"
#$ns at 72.0 "$node(3) setdest 90.0 240.0 30.0"
#$ns at 94.0 "$node(4) setdest 378.0 333.0 72.0"

# Setup a TCP connection
set tcp [new Agent/TCP]
$ns attach-agent $node(0) $tcp
set sink [new Agent/TCPSink]
$ns attach-agent $node(1) $sink
$ns connect $tcp $sink
$tcp set fid_ 1

#Set a FTP over TCP connection
set ftp [new Application/FTP]
$ftp attach-agent $tcp
$ftp set type_ FTP
$ftp set packet_size_ 1000

$ns at 1.0 "$ftp start"
$ns at 95.0 "$ftp stop"
```

```
$ns at 100.0 "finish"
$ns run
```

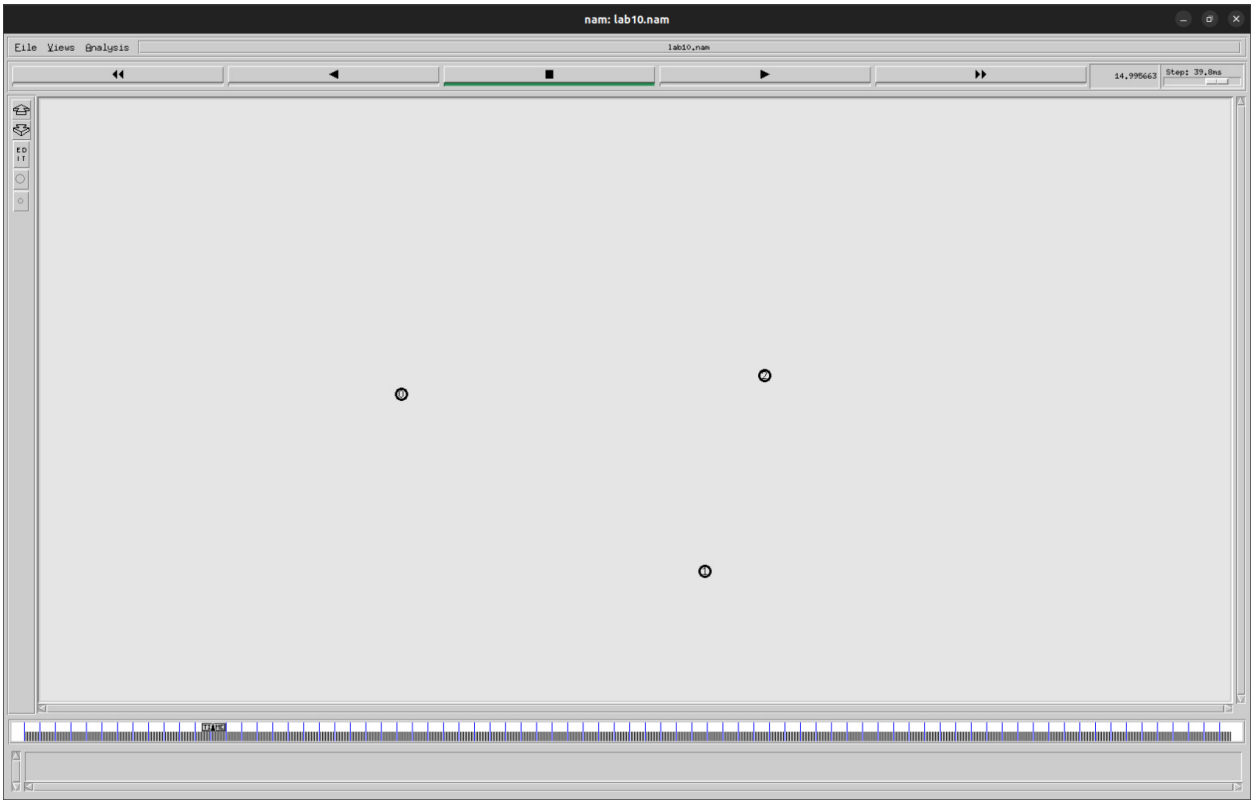
3 Terminal



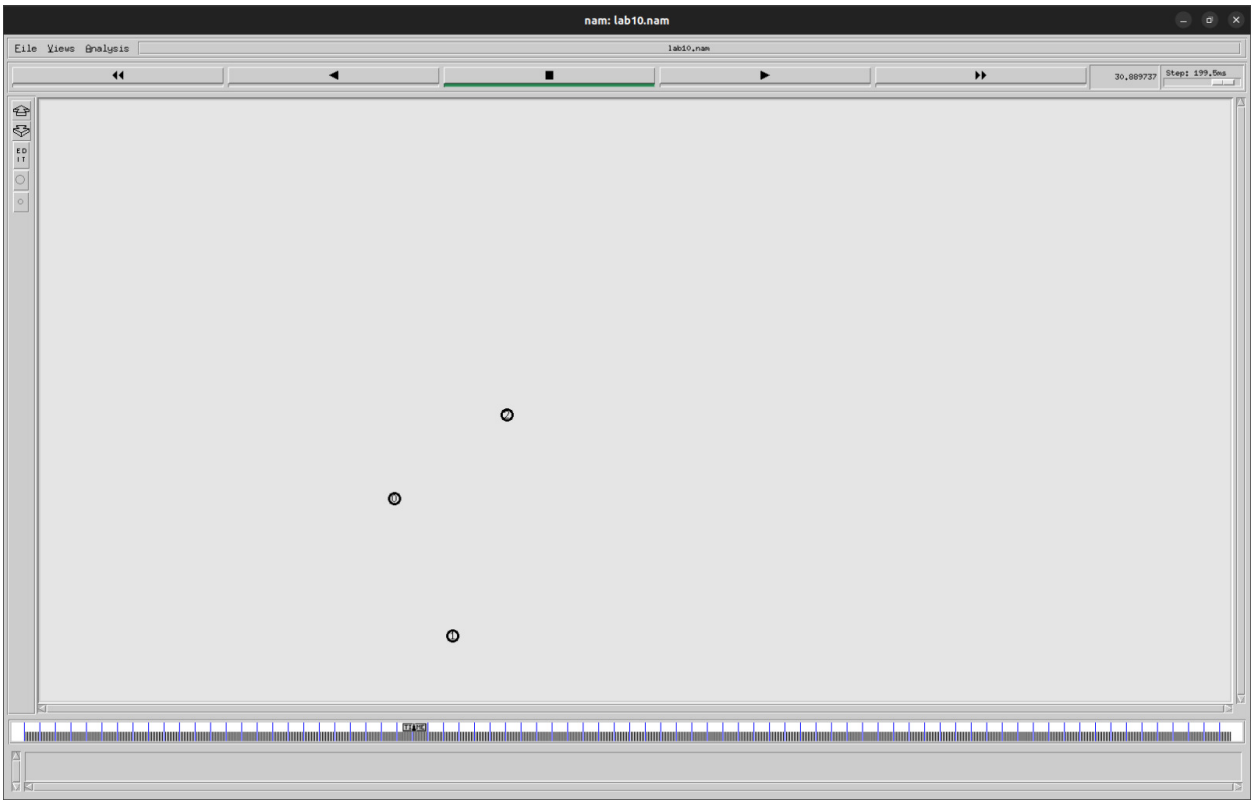
4 Nodes


nam: /home/abhishek/Documents/college/date14/lab10.nam
File Views Analysis
/home/abhishek/Documents/college/date14/lab10.nam
18.343113
Step: 251.2us

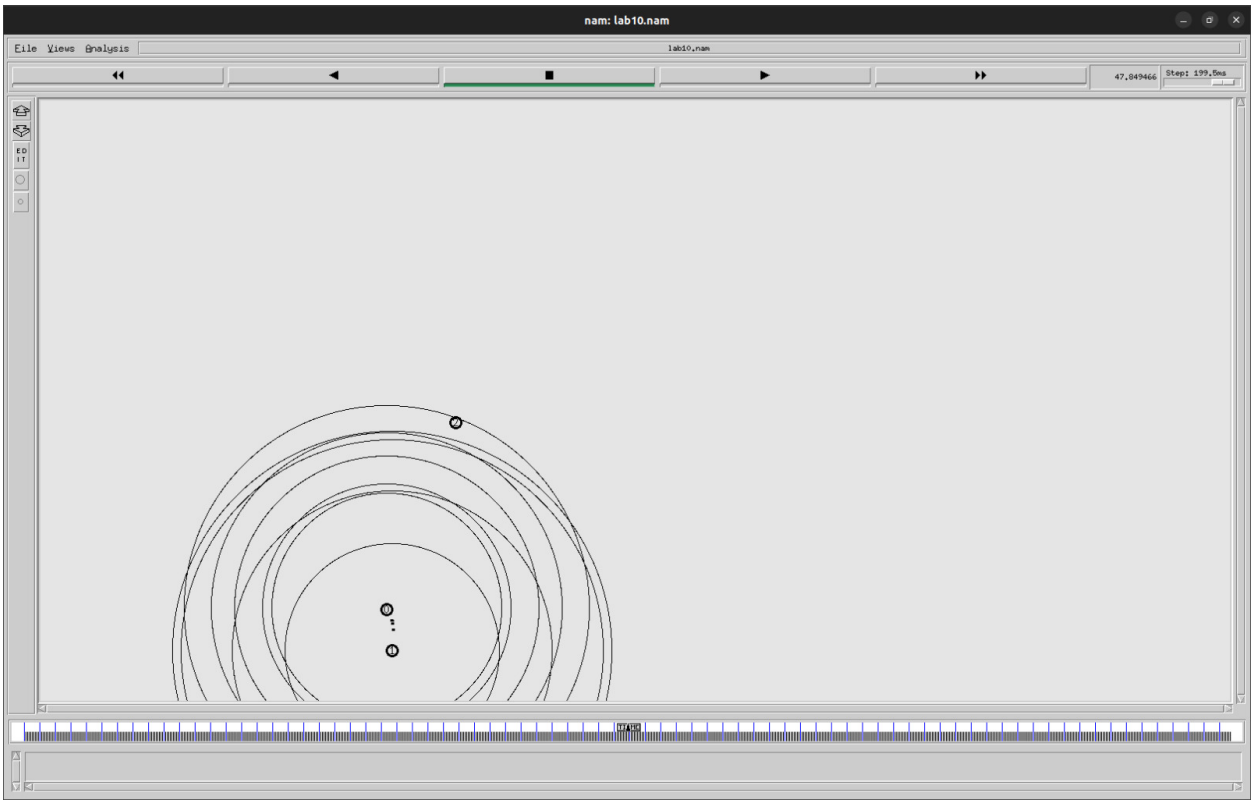
5 Nodes moving



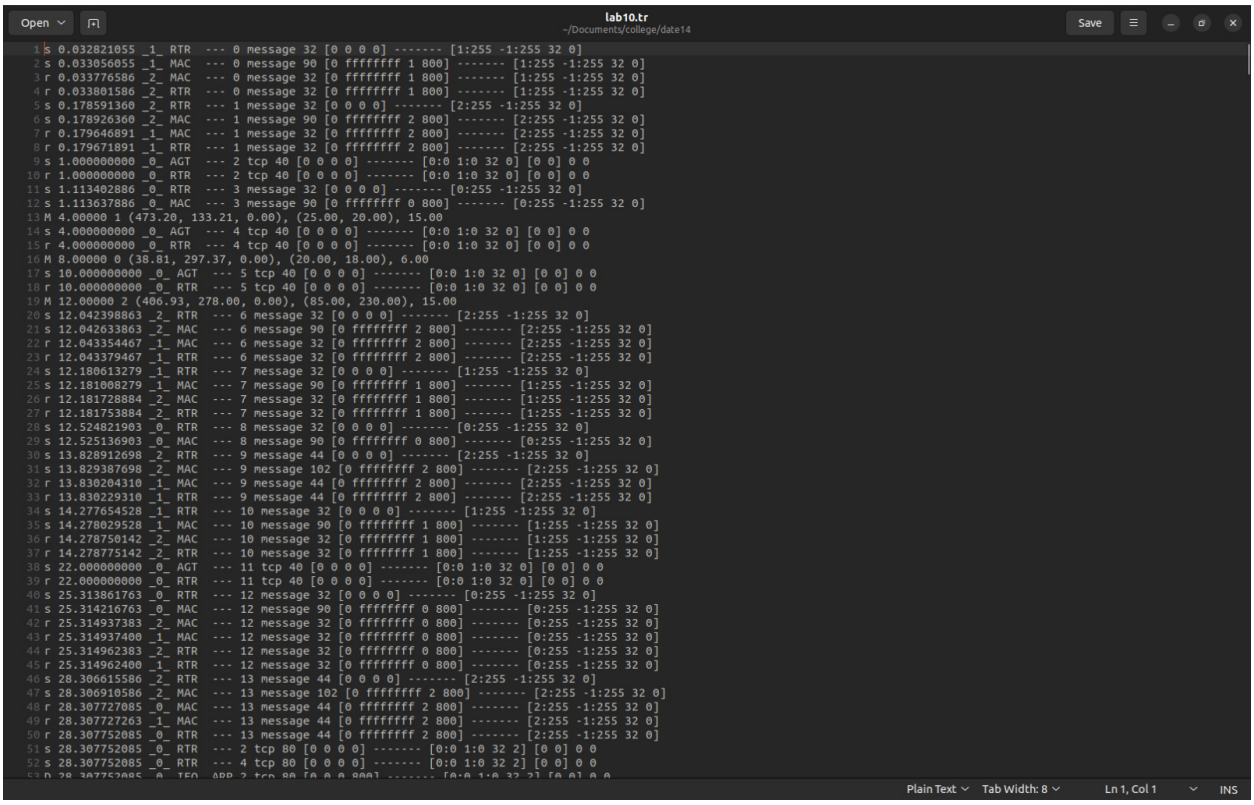
6 Nodes contract



7 Node data transfer



8 Trace file


Open
lab10.tr
~/Documents/college/date14
Save
s 0.032821055 _1_ RTR --- 0 message 32 [0 0 0 0] ------- [1:255 -1:255 32 0]
s 0.033056055 _1_ MAC --- 0 message 90 [0 ffffffff 1 800] ------- [1:255 -1:255 32 0]
r 0.033776586 _2_ MAC --- 0 message 32 [0 ffffffff 1 800] ------- [1:255 -1:255 32 0]
r 0.033801586 _2_ RTR --- 0 message 32 [0 ffffffff 1 800] ------- [1:255 -1:255 32 0]
s 0.178591360 _2_ RTR --- 1 message 32 [0 0 0 0] ------- [2:255 -1:255 32 0]
s 0.178926360 _2_ MAC --- 1 message 90 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
r 0.179646891 _1_ MAC --- 1 message 32 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
r 0.179671891 _1_ RTR --- 1 message 32 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
s 1.000000000 _0_ AGT --- 2 tcp 40 [0 0 0 0] ------- [0:0 1:0 32 0] [0 0] 0 0
r 1.000000000 _0_ RTR --- 2 tcp 40 [0 0 0 0] ------- [0:0 1:0 32 0] [0 0] 0 0
s 1.113402886 _0_ RTR --- 3 message 32 [0 0 0 0] ------- [0:255 -1:255 32 0]
s 1.113637886 _0_ MAC --- 3 message 90 [0 ffffffff 0 800] ------- [0:255 -1:255 32 0]
M 4.00000 1 (473.20, 133.21, 0.00), (25.00, 20.00), 15.00
s 4.000000000 _0_ AGT --- 4 tcp 40 [0 0 0 0] ------- [0:0 1:0 32 0] [0 0] 0 0
r 4.000000000 _0_ RTR --- 4 tcp 40 [0 0 0 0] ------- [0:0 1:0 32 0] [0 0] 0 0
M 8.00000 0 (38.81, 297.37, 0.00), (20.00, 18.00), 6.00
s 10.000000000 _0_ AGT --- 5 tcp 40 [0 0 0 0] ------- [0:0 1:0 32 0] [0 0] 0 0
r 10.000000000 _0_ RTR --- 5 tcp 40 [0 0 0 0] ------- [0:0 1:0 32 0] [0 0] 0 0
M 12.00000 2 (406.93, 278.00, 0.00), (85.00, 230.00), 15.00
s 12.042398863 _2_ RTR --- 6 message 32 [0 0 0 0] ------- [2:255 -1:255 32 0]
s 12.042633863 _2_ MAC --- 6 message 90 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
r 12.043354467 _1_ MAC --- 6 message 32 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
r 12.043379467 _1_ RTR --- 6 message 32 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
s 12.180613279 _1_ RTR --- 7 message 32 [0 0 0 0] ------- [1:255 -1:255 32 0]
s 12.181008279 _1_ MAC --- 7 message 90 [0 ffffffff 1 800] ------- [1:255 -1:255 32 0]
r 12.181728884 _2_ MAC --- 7 message 32 [0 ffffffff 1 800] ------- [1:255 -1:255 32 0]
r 12.181753884 _2_ RTR --- 7 message 32 [0 ffffffff 1 800] ------- [1:255 -1:255 32 0]
s 12.524821903 _0_ RTR --- 8 message 32 [0 0 0 0] ------- [0:255 -1:255 32 0]
s 12.525136903 _0_ MAC --- 8 message 90 [0 ffffffff 0 800] ------- [0:255 -1:255 32 0]
s 13.828912698 _2_ RTR --- 9 message 44 [0 0 0 0] ------- [2:255 -1:255 32 0]
s 13.829387698 _2_ MAC --- 9 message 102 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
r 13.830204310 _1_ MAC --- 9 message 44 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
r 13.830229310 _1_ RTR --- 9 message 44 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
s 14.277654528 _1_ RTR --- 10 message 32 [0 0 0 0] ------- [1:255 -1:255 32 0]
s 14.278029528 _1_ MAC --- 10 message 90 [0 ffffffff 1 800] ------- [1:255 -1:255 32 0]
r 14.278750142 _2_ MAC --- 10 message 32 [0 ffffffff 1 800] ------- [1:255 -1:255 32 0]
r 14.278775142 _2_ RTR --- 10 message 32 [0 ffffffff 1 800] ------- [1:255 -1:255 32 0]
s 22.000000000 _0_ AGT --- 11 tcp 40 [0 0 0 0] ------- [0:0 1:0 32 0] [0 0] 0 0
r 22.000000000 _0_ RTR --- 11 tcp 40 [0 0 0 0] ------- [0:0 1:0 32 0] [0 0] 0 0
s 25.313861763 _0_ RTR --- 12 message 32 [0 0 0 0] ------- [0:255 -1:255 32 0]
s 25.314216763 _0_ MAC --- 12 message 90 [0 ffffffff 0 800] ------- [0:255 -1:255 32 0]
r 25.314937383 _2_ MAC --- 12 message 32 [0 ffffffff 0 800] ------- [0:255 -1:255 32 0]
r 25.314937400 _1_ MAC --- 12 message 32 [0 ffffffff 0 800] ------- [0:255 -1:255 32 0]
r 25.314962383 _2_ RTR --- 12 message 32 [0 ffffffff 0 800] ------- [0:255 -1:255 32 0]
r 25.314962400 _1_ RTR --- 12 message 32 [0 ffffffff 0 800] ------- [0:255 -1:255 32 0]
s 28.306615586 _2_ RTR --- 13 message 44 [0 0 0 0] ------- [2:255 -1:255 32 0]
s 28.306910586 _2_ MAC --- 13 message 102 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
r 28.307727085 _0_ MAC --- 13 message 44 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
r 28.307727263 _1_ MAC --- 13 message 44 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
r 28.307752085 _0_ RTR --- 13 message 44 [0 ffffffff 2 800] ------- [2:255 -1:255 32 0]
s 28.307752085 _0_ RTR --- 2 tcp 80 [0 0 0 0] ------- [0:0 1:0 32 2] [0 0] 0 0
s 28.307752085 _0_ RTR --- 4 tcp 80 [0 0 0 0] ------- [0:0 1:0 32 2] [0 0] 0 0
Plain Text
Tab Width: 8
Ln 1, Col 1
INS