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# This is a network of 100 nodes which operate at 802.11
# and have one node as base station to which everybody tranmists.
# We want to analyze that as the number of the nodes
# increases and as the packet length become smaller
# utilization decreases dramatically and nodes spend most
# of their time contending to gain resources.
# =====

set cbr_size 500
set cbr_interval 0.002
set num_row 10
set time_duration 100
#set land_size 1000 #land side length

set val(chan) Channel/WirelessChannel ;# channel type
set val(prop) Propagation/TwoRayGround ;# radio-propagation model
set val(netif) Phy/WirelessPhy ;# network interface type
set val(mac) Mac/802_11 ;# MAC type
set val(ifq) Queue/DropTail/PriQueue ;# interface queue type
set val(ll) LL ;# link layer type
set val(ant) Antenna/OmniAntenna ;# antenna model
set val(ifqlen) 50 ;# max packet in ifq
set val(rp) DSDV ;# routing protocol

# Initialize ns
set ns_ [new Simulator]
set tracefd [open simple.tr w]
$ns_ trace-all $tracefd

# set up topography object
set topo [new Topography]
$topo load_flatgrid 10 10

create-god [expr $num_row * $num_row ]

$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) \
  -channel [new $val(chan)] -topoInstance $topo \
  -agentTrace OFF -routerTrace OFF\
  -macTrace ON \
  -movementTrace OFF

# CREATE 4*4 NODES
for {set i 0} {$i < [expr $num_row*$num_row]} {incr i} {
  set node_($i) [$ns_ node]
}

#ASSIGN COORDINATES
set k 0;
while {$k < $num_row } {
  for {set i 0} {$i < $num_row } {incr i} {
    set m [expr $i+$k*$num_row];
    $node_($m) set X_ [expr $i*10];
    $node_($m) set Y_ [expr $k*10+10.0];
    $node_($m) set Z_ 0.0
  }
  incr k;
};

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#CREATE 4 UDP SENDERS AND 1 NULL RECEIVERS (FOR UDP)
for {set i 0} {$i < [expr $num_row*$num_row]} {incr i} {
    set udp_($i) [new Agent/UDP]
}
#ONLY ONE RECEIVER (BASE STATION)
set null_(0) [new Agent/Null]

#ATTACH PROTOCOLS TO NODES (SENDERS)
for {set i 0} {$i < [expr $num_row*$num_row]} {incr i} {
    $ns_ attach-agent $node_($i) $udp_($i)
}
#ONLY ONE BASE STATION
$ns_ attach-agent $node_(50) $null_(0)

# CREATE THE ACTUAL FLOW
for {set i 0} {$i < [expr $num_row*$num_row]} {incr i} {
    $ns_ connect $udp_($i) $null_(0)
}

#CREATE 4 CBRs
for {set i 0} {$i < [expr $num_row*$num_row]} {incr i} {
    set cbr_($i) [new Application/Traffic/CBR]
    $cbr_($i) set packetSize_ $cbr_size #PACKET SIZE
    $cbr_($i) set interval_ 0.5 #BURST INTERVAL
    $cbr_($i) set rate_ 1mb
    $cbr_($i) attach-agent $udp_($i)
    $ns_ at [expr 11.0234 + 0.005] "$cbr_($i) start"
}

#START PACKET GENERATION
$ns_ at 11.0234 "$cbr_(0) start"
$ns_ at 10.4578 "$cbr_(1) start"
$ns_ at 12.7184 "$cbr_(2) start"
$ns_ at 12.2456 "$cbr_(3) start"

#TERMINATE THE SIMULATOR
# Tell nodes when the simulation ends
for {set i 0} {$i < [expr $num_row*$num_row]} {incr i} {
    $ns_ at [expr $time_duration +10.0] "$node_($i) reset";
}

$ns_ at [expr $time_duration +10.0] "finish"
$ns_ at [expr $time_duration +10.01] "puts \"NS Exiting...\"; $ns_ halt"

proc finish {} {
    global ns_ tracefd
    $ns_ flush-trace
    close $tracefd
}

puts "Starting Simulation..."
$ns_ run

```