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1
2
3
4 # 6. Set up 2-node wireless network. Analyse FTP performance
5 # for this scenario with DSDV protocol.
6
7 set val(chna) Channel/WirelessChannel
8 set val(prop) Propagation/TwoRayGround
9 set val(netif) Phy/WirelessPhy
10 set val(ant) Antenna/OmniAntenna
11 set val(mac) Mac/802_11
12 set val(ll) LL #Logical Link layer
13 set val(nn) 2
14 set val(x) 500
15 set val(y) 500
16 set val(ifq) Queue/DropTail/PriQueue
17 set val(ifqLen) 50
18 set val(stop) 60.0
19 set val(rp) DSDV #Destination Sequence Dist Vector
20
21 set ns_ [new Simulator]
22 set tracefd [open ex6.tr w]
23 $ns_ trace-all $tracefd
24 set namtrace [open ex6.nam w]
25 $ns_ nmatace-all-wireless $namtrace $val(x) $val(y)
26
27 set prop [new $val(prop)]
28 set topo [new Topography]
29 $topo load_flatgrid $val(x) $val(y)
30 create-god $val(nn) #General operations directory/discription
31
32 #Node configuration
33 $ns_ node-config -adhocRouting $val(rp) \
34                 -channelType $val(chan) \
35                 -propType $val(prop) \
36                 -phyType $val(netif) \
37                 -antType $val(ant) \
38                 -macType $val(mac) \
39                 -llType $val(ll) \
40                 -ifqType $val(ifq) \
41                 -ifqLen $val(ifqLen) \
42
43                 -topoInstance $topo \
44                 -agentTrace ON\
45                 -routerTrace ON\
46                 -macTrace ON
47
48 #Creating nodes
49 for {set i 0} {$i < $val(nn)} {incr i} {
50     set node_($i) [$ns_ node]
51     $node_($i) random-motion 0 #=> initially stagnant, not mobile

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52 }
53
54 #Initialising postions of nodes
55 for {set i 0} {$i < $val(nn)} {incr i} {
56     $ns_ initial_node_pos $node_($i) 40      #size of the node
57 }
58
59 #Topology Design
60         #for mobility      x      y      speed
61 $ns_ at 1.1 "$node_(0) setdest 310.0 10.0 20.0"
62 $ns_ at 1.1 "$node_(1) setdest 10.0 310.0 20.0"
63
64 #Generating Traffic
65 set tcp [new Agent/TCP]
66 set sink [new Agent/TCPSink]
67 set ftp [new Application/FTP]
68 $ns_ attach-agent $node_(0) $tcp
69 $ns_ attach-agent $node_(1) $sink
70 $ns_ connect $tcp $sink
71 $ftp attach-agent $tcp
72
73 $ns_ at 1.0 "$ftp start"
74 $ns_ at 20.0 "$ftp stop"
75
76 #Simulation termination
77 for {set i 0} {$i < $val(nn)} {incr i} {
78     $ns_ at $val(stop) "$node_($i) reset";
79 }
80
81 $ns_ at $val(stop) "puts \"NS EXITING...\"; $ns_ halt"
82 puts "Starting Simulation..."
83 exec nam ex6.nam &
84 $ns_ run
85
86
87
88 # 7. Set up 3-node wireless network with node N1 between N0 and N2.
89 # As the nodes N0 and N2 moves towards each other they exchange packets.
90 # As they move out of each other's range they drop some packets.
91 # Analyze TCP performance for this scenario with AODV, DSDV and DSR as routing protocols.
92
93 set val(chan) Channel/WirelessChannel
94 set val(prop) Propagation/TwoRayGround
95 set val(netif) Phy/WirelessPhy
96 set val(ant) Antenna/OmniAntenna
97 set val(mac) Mac/802_11
98 set val(ll) LL
99 set val(nn) 3
100 set val(x) 500
101 set val(y) 500
102 set val(ifq) Queue/DropTail/PriQueue

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103 set val(ifqlen) 50
104 set val(stop) 60.0
105 set val(rp) AODV           #Adhoc On demand Dist Vector
106
107 set ns_ [new Simulator]
108 set tracefd [open ex7.tr w]
109 $ns_ trace-all $tracefd
110 set namtrace [open ex7.nam w]
111 $ns_ namtrace-all-wireless $nmatrace $val(x) $val(y)
112
113 set prop [new $val(prop)]
114 set topo [new Topography]
115 set load_flatgrid $val(x) $val(y)
116 create-god $val(nn)
117
118 $ns_ node-config -adhocRouter $val(rp)\
119                 -channelType $val(chan)\
120                 -propType $val(prop)\
121                 -phyType $val(phy)\
122                 -macType $val(mac)\
123                 -llType $val(ll)\
124                 -ifqType $val(ifq)\
125                 -ifqLen $val(ifqlen)\
126
127                 -topoInstace $topo\
128                 -agentTrace ON\
129                 -routerTrace ON\
130                 -macTrace ON
131
132 for {set i 0} {$i < $val(nn)} {incr i} {
133     set node_($i) [$ns_ node]
134     $node_($i) random-motion 0
135 }
136
137 $node_(0) set x_ 5.0
138 $node_(0) set y_ 5.0
139 $node_(0) set z_ 0.0
140
141 $node_(1) set x_ 490.0
142 $ndoe_(1) set y_ 290.0
143 $node_(1) set z_ 0.0
144
145 $node_(2) set x_ 150.0
146 $node_(2) set y_ 240.0
147 $node_(2) set z_ 0.0
148
149
150 for {set i 0} {$i < $val(nn)} {incr i} {
151     $ns_ initial_node_pos $node_($i) 40
152 }
153

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154 #                2      1      0
155
156 $ns_ at 0.0 "$node_(0) setdest 450.0 290.0 30.0"
157 $ns_ at 0.0 "$node_(1) setdest 200.0 290.0 30.0"
158 $ns_ at 0.0 "$node_(2) setdest 1.0 290.0 30.0"
159
160 #                2      1      0
161
162 $ns_ at 25.0 "$node_(0) setdest 300.0 290.0 10.0"
163 $ns_ at 25.0 "$node_(2) setdest 100.0 290.0 10.0"
164
165 #                2      1      0
166
167 $ns_ at 40.0 "$node_(0) setdest 490.0 290.0 5.0"
168 $ns_ at 40.0 "$node_(2) setdest 1.0 290.0 5.0"
169
170 set tcp [new Agent/TCP]
171 set sink [new Agent/TCPSink]
172 set ftp [new Appliaction/FTP]
173 $ns_ attach-agent $node_(0) $tcp
174 $ns_ attach-agent $node_(2) $sink
175 $ns_ connect $tcp $sink
176 $ftp attach-agent $tcp
177
178 $ns_ at 10.0 "$ftp start"
179
180 for {set i 0} {$i < $val(nn)} {incr i} {
181     $ns_ at $val(stop) "$node_($i) reset";
182 }
183
184 $ns_ at $val(stop) "puts \"NS EXITING..\"; $ns_halt"
185 puts "Starting Simulation..."
186 exec nam ex7.nam &
187 $ns_ run
188
189
190
191 # 8. Set up a 26-node wireless network. Analyze TCO
192 # performance when nodes are static and dynamic
193
194
195 set val(chan) Channel/WirelessChannel
196 set val(prop) Propagation/TwoRayGround
197 set val(netif) Phy/WirelessPhy
198 set val(ant) Antenna/OmniAntenna
199 set val(mac) Mac/802_11
200 set val(ll) LL
201 set val(nn) 25
202 set val(x) 500
203 set val(y) 500
204 set val(ifq) Queue/DropTail/PriQueue

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205 set val(ifqlen) 50
206 set val(stop) 60.0
207 set val(rp) AODV           #Adhoc On demand Dist Vector
208
209 set val(st) "/home/student/ns-allinone-2.35/ns-2.35/indep-utils/cmu-scen-gen/static_8"
210 set val(mo) "/home/student/ns-allinone-2.35/ns-2.35/indep-utils/cmu-scen-gen/setdest/mobility_8"
211
212 set ns_ [new Simualtor]
213 set tracefd [open ex8.tr w]
214 $ns_ trace-all $tracefd
215 set nf [open ex8.nam w]
216 $ns_ namtrace-all-wireless $nf $val(x) $val(y)
217
218 set prop [new $val(prop)]
219 set topo [new Topography]
220 $topo load_flatgrid $val(x) $val(y)
221 set god_ [create-god $val(nn)]
222
223 $ns_ node-config -adhocRouter $val(rp)\
224                 -channelType $val(chan)\
225                 -propType $val(prop)\
226                 -phyType $val(phy)\
227                 -macType $val(mac)\
228                 -llType $val(ll)\
229                 -ifqType $val(ifq)\
230                 -ifqLen $val(ifqlen)\
231
232                 -topoInstace $topo\
233                 -agentTrace ON\
234                 -routerTrace ON\
235                 -macTrace ON
236
237 for {set i 0} {$i < $val(nn)} {incr i} {
238     set node_($i) [$ns_ node]
239     $node_($i) ranodm-motion 0
240 }
241
242 for {set i 0} {$i < $val(nn)} {incr i} {
243     set x [expr rand()*500]
244     set y [expr rand()*500]
245     $node_($i) set X_ $x
246     $node_($i) set Y_ $y
247 }
248
249 for {set i 0} {$i < $val(nn)} {incr i} {
250     $ns_ initial_node_pos $node_($i) 40
251 }
252
253 puts "Loading scenario file... -mobility"
254 source $val(mo)
255 puts "Loading scenario filw... traffic"

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256 source $val(st)
257
258 for {set i 0} {$i < $val(nn)} {incr i} {
259     $ns_ at $val(stop) "$node_($i) reset"
260 }
261
262 $ns_ at $val(stop) "puts \"NS EXITING..\"; ns_ halt"
263 puts "Starting Simulation..."
264 exec nam ex8.nam &
265 $ns_ run
266
267
268 ###
269 gedit ex8.tcl
270 cd ns-allinone-2.35/ns-2.35/indep-utils/cmu-scen-gen/
271 ls
272 ns static_8
273 ns cbrgen.tcl
274 ns cbrgen.tcl -type tcp -nn 25 -seed 1 -mc 20 -rate 50 > static_8
275 cd setdest
276 setdest -v 1 -n 25 -p 0.5 -M 40 -t 100 -x 500 -y 500 > mobility_8
277 cd #comes put of all dorectories
278 gedit ex8.tcl
279 ns ex8.tcl
280 ###
281
282
283
284 # 9. 6 nodes, moving within a flat topology of 700m x 700m.
285 # Initial node positions: n0(150,300),n1(300,500),n2(500,500),n3(300,100),n4(500,100),n5(650,300)
286 # A TCP connection - initiated between n0 (source), n5 (destination) thro' n3 and n4. Route: 0-3-4-5.
287 # At t = 3 secs, the FTP application runs over it.
288 # After time t = 4 seconds, n3(300,100) moves towards n1(300,500) with speed of 5.0 m/sec
289 # after some time the path breaks. The data - transmitted with a new path via n1 and n2 i.e.,
290 # the new route is 0-1-2-5. The simulation lasts for 60 secs.
291 # In the above said case both the routes have equal cost.
292 # Use DSR as the routing protocol and the IEEE 802.11 MAC protocol.
293
294 set val(chan) Channel/WirelessChannel
295 set val(prop) Propagation/TwoRayGround
296 set val(netif) Phy/WirelessPhy
297 set val(ant) Antenna/OmniAntenna
298 set val(mac) Mac/802_11
299 set val(ll) LL
300 set val(nn) 6
301 set val(x) 700
302 set val(y) 700
303 set val(ifq) CMUPriQueue
304 set val(ifqlen) 50
305 set val(stop) 60.0
306 set val(rp) DSR #Dynamic Sourec Routing Protocol

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307
308 set tracefd [open ex9.tr w]
309 $ns_ trace-all $tracefd
310 set namtrace [open ex9.nam w]
311 $ns_ namtrace-all-wireless $namtrace $val(x) $val(y)
312
313 set prop [new $val(prop)]
314 set topo [new Topography]
315 $topo load_flatgrid $val(x) $val(y)
316 set god_ [create-god $val(nn)]
317
318 $ns_ node-config -adhocRouter $val(rp)\
319                 -channelType $val(chan)\
320                 -propType $val(prop)\
321                 -phyType $val(phy)\
322                 -macType $val(mac)\
323                 -llType $val(ll)\
324                 -ifqType $val(ifq)\
325                 -ifqLen $val(ifqlen)\
326
327                 -topoInstace $topo\
328                 -agentTrace ON\
329                 -routerTrace ON\
330                 -macTrace ON
331
332 for {set i 0} {$i < $val(nn)} {incr i} {
333     set node_($i) [$ns_ node]
334     $node_(i) ranodm-motion 0
335 }
336 #Initial Positions of Nodes
337     1     2
338     0     5
339     3     4
340
341 $node_(0) set x_ 150.0
342 $node_(0) set y_ 300.0
343 $node_(0) set z_ 0.0
344
345 $node_(1) set x_ 300.0
346 $node_(1) set y_ 500.0
347 $node_(1) set z_ 0.0
348
349 $node_(2) set x_ 500.0
350 $node_(2) set y_ 500.0
351 $node_(2) set z_ 0.0
352
353 $node_(3) set x_ 300.0
354 $node_(3) set y_ 300.0
355 $node_(3) set z_ 0.0
356
357 $node_(4) set x_ 500.0

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```

358 $node_(4) set y_ 100.0
359 $node_(4) set z_ 0.0
360
361 $node_(5) set x_ 650.
362 $node_(5) set y_ 300.0
363 $node_(5) set z_ 0.0
364
365 for {set i 0} {$i < $val(nn)} {incr i} {
366     $ns_ initial_node_pos $node_($i) 40
367 }
368
369 $ns_ at 1.0 "$node_(0) stedest 160.0 300.0 2.0"
370 $ns_ at 1.0 "$node_(1) stedest 310.0 150.0 2.0"
371 $ns_ at 1.0 "$node_(2) stedest 490.0 490.0 2.0"
372 $ns_ at 1.0 "$node_(3) stedest 300.0 120.0 2.0"
373 $ns_ at 1.0 "$node_(4) stedest 510.0 90.0 2.0"
374 $ns_ at 1.0 "$node_(5) stedest 640.0 290.0 2.0"
375 $ns_ at 4.0 "$node_(3) stedest 300.0 500.0 5.0"
376
377 set tcp0 [new Agent/TCP]
378 set sink0 [new Agent/TCPSink]
379 $ns_ attach-agent $node_(0) $tcp0
380 $ns_ attach-agent $node_(5) $sink0
381 $ns_ connect $tcp0 $sink0
382 set ftp0 [new Application/FTP]
383 $ftp0 attach-agent $tcp0
384
385 $ns_ at 3.0 "$ftp start"
386 $ns_ at 60.0 "$ftp stop"
387
388 for {set i 0} {$i < $val(nn)} {incr i} {
389     $ns_ at $val(stop) "$node_($i) reset"
390 }
391
392 $ns_ at $val(stop) "puts \"NS EXITING...\"; $ns_ halt"
393 puts "Starting Simulation..."
394 exec nam "ex9.nam" &
395 $ns_ run
396
397
398
399 # 10. Mobile nodes. Induce 1 to 10% error using Uniform Error Model.
400 # Plot congestion window for TCP connection.
401
402 set val(chan) Channel/WirelessChannel
403 set val(prop) Propagation/TwoRayGround
404 set val(netif) Phy/WirelessPhy
405 set val(ant) Antenna/OmniAntenna
406 set val(mac) Mac/802_11
407 set val(ll) LL
408 set val(nn) 5

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```

409 set val(x) 500
410 set val(y) 500
411 set val(ifq) Queue/DropTail/PriQueue
412 set val(ifqlen) 20
413 set val(stop) 50.0
414 set val(rp) AODV           #Adhoc On demand Dist Vector
415
416 set ns_ [new Simulator]
417 set tf [open ex10.tr w]
418 $ns_ trace-all $tf
419 set nf [open ex10.nam w]
420 $ns_ namtrace-all-wireless $nf $val(x) $val(y)
421
422 set prop [new $val(prop)]
423 set topo [new Topography]
424 $topo load_flatgrid $val(x) $val(y)
425 create-god $val(nn)
426
427 $ns_ node-config -adhocRouter $val(rp)\
428                 -channelType $val(chan)\
429                 -propType $val(prop)\
430                 -phyType $val(phy)\
431                 -macType $val(mac)\
432                 -llType $val(ll)\
433                 -ifqType $val(ifq)\
434                 -ifqLen $val(ifqlen)\
435
436                 -topoInstace $topo\
437                 -agentTrace ON\
438                 -routerTrace ON\
439                 -macTrace ON
440
441
442 proc uniformErr {} {
443     set err [new ErrorMode]
444     $err unit pkt
445     $err set rate_ 0.01
446     rteurn $err
447 }
448
449 for {set i 0} {$i < $val(nn)} {incr i} {
450     set node_($i) [$ns_ node]
451     $node_($i) random-motion 0
452 }
453
454 for {set i 0} {$i < $val(nn)} {incr i} {
455     $ns_ initial_node_pos $node_($i) 40
456 }
457
458     1         2
459         4

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```
460         0         3
461
462 $ns_ at 1.0 "$node_(0) setdest 10.0 10.0 50.0"
463 $ns_ at 1.0 "$node_(1) setdest 10.0 100.0 50.0"
464 $ns_ at 1.0 "$node_(4) setdest 50.0 50.0 50.0"
465 $ns_ at 1.0 "$node_(2) setdest 100.0 100.0 50.0"
466 $ns_ at 1.0 "$node_(3) setdest 100.0 10.0 50.0"
467
468 set tcp0 [new Agent/TCP]
469 set sink0 [new Agent/TCPSink]
470 $ns_ attach-agent $node_(0) $tcp0
471 $ns_ attach-agent $node_(2) $sink0
472 $ns_ connect $tcp0 $sink0
473 set ftp0 [new Application/FTP]
474 $ftp0 attach-agent $tcp0
475
476 $ns_ at 1.0 "$ftp0 start"
477 $ns_ at 50.0 "$ftp0 stop"
478
479 set tcp1 [new Agent/TCP]
480 set sink1 [new Agent/TCPSink]
481 $ns_ attach-agent $node_(1) $tcp1
482 $ns_ attach-agent $node_(2) $sink1
483 $ns_ connect $tcp1 $sink1
484 set ftp1 [new Application/FTP]
485 $ftp1 attach-agent $tcp1
486
487 $ns_ at 1.0 "$ftp1 start"
488 $ns_ at 50.0 "$ftp1 stop"
489
490 for {set i 0} {$i < $val(nn) } {incr i} {
491     $ns_ at $val(stop) "$node_($i) reset";
492 }
493
494 $ns_ at $val(stop) "puts \"NS EXITING...\"; $ns_ halt"
495 puts "Starting Simulation..."
496 exec nam "ex10.nam" &
497 $ns_ run
498
499
500
501
502
503
504
505
```