# ======================================================================

# Define options

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set opt(chan) Channel/WirelessChannel ;# channel type

set opt(prop) Propagation/TwoRayGround ;# radio-propagation model

set opt(netif) Phy/WirelessPhy ;# network interface type

set opt(mac) Mac/802\_11 ;# MAC type

set opt(ifq) Queue/DropTail/PriQueue ;# interface queue type

set opt(ll) LL ;# link layer type

set opt(ant) Antenna/OmniAntenna ;# antenna model

set opt(ifqlen) 1000 ;# max packet in ifq

set opt(nn) 4 ;# number of mobilenodes

set opt(adhocRouting) DSDV ;# routing protocol

set opt(x) 100 ;# x coordinate of topology

set opt(y) 100 ;# y coordinate of topology

set opt(stop) 10 ;# time to stop simulation

set num\_wired\_nodes 7

set num\_bs\_nodes 2

set size 500

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# create simulator instance

set ns\_ [new Simulator]

# set up for hierarchical routing

$ns\_ node-config -addressType hierarchical

AddrParams set domain\_num\_ 3 ;# number of domains

lappend cluster\_num 1 1 1 ;# number of clusters in each domain

AddrParams set cluster\_num\_ $cluster\_num

lappend eilastlevel 7 3 3 ;# number of nodes in each cluster

AddrParams set nodes\_num\_ $eilastlevel ;# of each domain

set tracefd [open out.tr w]

set namtrace [open out.nam w]

$ns\_ trace-all $tracefd

$ns\_ namtrace-all $namtrace

$ns\_ namtrace-all-wireless $namtrace $opt(x) $opt(y)

# Create topography object

set topo [new Topography]

# define topology

$topo load\_flatgrid $opt(x) $opt(y)

# create God

create-god $opt(nn)

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#set ns\_ [new Simulator]

set f0 [open wir7.tr w]

$ns\_ trace-all $f0

set namtrace [open out.nam w]

$ns\_ namtrace-all-wireless $namtrace $opt(x) $opt(y)

#=-=--=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-

#create wired nodes

set W1 [$ns\_ node 0.0.0]

set W2 [$ns\_ node 0.0.1]

set W3 [$ns\_ node 0.0.2]

set W4 [$ns\_ node 0.0.3]

set W5 [$ns\_ node 0.0.4]

set W8 [$ns\_ node 0.0.5]

set W9 [$ns\_ node 0.0.6]

# Configure for Basestation Node

$ns\_ node-config -adhocRouting $opt(adhocRouting) \

-llType $opt(ll) \

-macType $opt(mac) \

-ifqType $opt(ifq) \

-ifqLen $opt(ifqlen) \

-antType $opt(ant) \

-propType $opt(prop) \

-phyType $opt(netif) \

-channelType $opt(chan) \

-topoInstance $topo \

-wiredRouting ON \

-agentTrace ON \

-routerTrace ON \

-macTrace OFF

# Position (fixed) for base-station nodes (HA & FA).

set BS1 [$ns\_ node 1.0.0]

set BS2 [$ns\_ node 2.0.0]

# create a mobilenode that would be moving between HA and FA.

# note address of MH indicates its in the same domain as HA.

$ns\_ node-config -wiredRouting OFF

set R1 [$ns\_ node 1.0.2]

set R2 [$ns\_ node 1.0.3]

set R3 [$ns\_ node 2.0.2]

set R4 [$ns\_ node 2.0.3]

$R1 base-station [AddrParams addr2id [$BS1 node-addr]]

$R2 base-station [AddrParams addr2id [$BS1 node-addr]]

$R3 base-station [AddrParams addr2id [$BS2 node-addr]]

$R4 base-station [AddrParams addr2id [$BS2 node-addr]]

# position of the nodes

$R1 set X\_ 120.000000000000

$R1 set Y\_ 80.000000000000

$R1 set Z\_ 0.000000000000

$R2 set X\_ 160.000000000000

$R2 set Y\_ 40.000000000000

$R2 set Z\_ 0.000000000000

$R3 set X\_ 160.000000000000

$R3 set Y\_ 0.000000000000

$R3 set Z\_ 0.000000000000

$R4 set X\_ 160.000000000000

$R4 set Y\_ -40.000000000000

$R4 set Z\_ 0.000000000000

# create links between wired and BaseStation nodes

$ns\_ duplex-link $W1 $W3 2Mb 20ms DropTail

$ns\_ duplex-link $W2 $W4 2Mb 20ms DropTail

$ns\_ duplex-link $W8 $W3 2Mb 20ms DropTail

$ns\_ duplex-link $W9 $W4 2Mb 20ms DropTail

$ns\_ duplex-link $W3 $W5 5Mb 20ms DropTail

$ns\_ duplex-link $W4 $W5 5Mb 20ms DropTail

$ns\_ duplex-link $W5 $BS1 5Mb 20ms DropTail

$ns\_ duplex-link $W5 $BS2 5Mb 20ms DropTail

# set the layout of links in NAM

$ns\_ duplex-link-op $W1 $W3 orient right

$ns\_ duplex-link-op $W8 $W3 orient right-down

$ns\_ duplex-link-op $W2 $W4 orient right-up

$ns\_ duplex-link-op $W9 $W4 orient right

$ns\_ duplex-link-op $W3 $W5 orient right-down

$ns\_ duplex-link-op $W4 $W5 orient right-up

$ns\_ duplex-link-op $W5 $BS1 orient right-up

$ns\_ duplex-link-op $W5 $BS2 orient right-down

$ns\_ at 0.0 "$W1 label W1"

$ns\_ at 0.0 "$W2 label W2"

$ns\_ at 0.0 "$W8 label W3"

$ns\_ at 0.0 "$W9 label W4"

$ns\_ at 0.0 "$W3 label R1"

$ns\_ at 0.0 "$W4 label R2"

$ns\_ at 0.0 "$W5 label R3"

$ns\_ at 0.0 "$BS1 label BS1"

$ns\_ at 0.0 "$BS2 label BS2"

$ns\_ at 0.0 "$R1 label R1"

$ns\_ at 0.0 "$R2 label R2"

$ns\_ at 0.0 "$R3 label R3"

$ns\_ at 0.0 "$R4 label R4"

$ns\_ at 0.0 "$R1 add-mark m1 green circle"

$ns\_ at 0.0 "$R2 add-mark m1 red circle"

$ns\_ at 0.0 "$R3 add-mark m1 blue circle"

$ns\_ at 0.0 "$R4 add-mark m1 purple circle"

# setup TCP connections

set tcp1 [new Agent/TCP/Newreno]

$tcp1 set packetSize\_ $size

$ns\_ attach-agent $W1 $tcp1

set sink1 [new Agent/TCPSink]

$ns\_ attach-agent $R1 $sink1

$ns\_ connect $tcp1 $sink1

set ftp1 [new Application/FTP]

$ftp1 attach-agent $tcp1

$ns\_ at 1.0 "$ftp1 start"

$ns\_ at 1.0 "$ns\_ trace-annotate \"W1 Sends packets to R1 via Home

Agent(BS1). \""

set tcp2 [new Agent/TCP/Newreno]

$tcp2 set packetSize\_ $size

$ns\_ attach-agent $W8 $tcp2

set sink2 [new Agent/TCPSink]

$ns\_ attach-agent $R2 $sink2

$ns\_ connect $tcp2 $sink2

set ftp2 [new Application/FTP]

$ftp2 attach-agent $tcp2

$ns\_ at 2.0 "$ftp2 start"

$ns\_ at 2.0 "$ns\_ trace-annotate \"W3 Sends packets to R2 via Home

Agent(BS1). \""

set tcp3 [new Agent/TCP/Newreno]

$tcp3 set packetSize\_ $size

$ns\_ attach-agent $W2 $tcp3

set sink3 [new Agent/TCPSink]

$ns\_ attach-agent $R3 $sink3

$ns\_ connect $tcp3 $sink3

set ftp3 [new Application/FTP]

$ftp3 attach-agent $tcp3

$ns\_ at 3.0 "$ftp3 start"

$ns\_ at 3.0 "$ns\_ trace-annotate \"W2 Sends packets to R3 via Home

Agent(BS2). \""

set tcp4 [new Agent/TCP/Newreno]

$tcp4 set packetSize\_ $size

$ns\_ attach-agent $W9 $tcp4

set sink4 [new Agent/TCPSink]

$ns\_ attach-agent $R4 $sink4

$ns\_ connect $tcp4 $sink4

set ftp4 [new Application/FTP]

$ftp4 attach-agent $tcp4

$ns\_ at 4.0 "$ftp4 start"

$ns\_ at 4.0 "$ns\_ trace-annotate \"W4 Sends packets to R4 via Home

Agent(BS2). \""

# Define initial node position in nam

$ns\_ initial\_node\_pos $R1 10

$ns\_ initial\_node\_pos $R2 10

$ns\_ initial\_node\_pos $R3 10

$ns\_ initial\_node\_pos $R4 10

# Tell all nodes when the siulation ends

$ns\_ at $opt(stop).0 "$R1 reset";

$ns\_ at $opt(stop).0 "$R2 reset";

$ns\_ at $opt(stop).0 "$R3 reset";

$ns\_ at $opt(stop).0 "$R4 reset";

$ns\_ at $opt(stop).0002 "puts \"NS EXITING...\" ; $ns\_ halt"

$ns\_ at $opt(stop).0001 "stop"

proc stop {} {

global ns\_ tracefd namtrace opt f0

global ns\_ tcp1 tcp2 tcp3 tcp4

global sink

$ns\_ flush-trace

close $tracefd

close $f0

close $namtrace

# close $tracefd

# close $namtrace

exec nam out.nam &

exit 0

}

puts "Starting Simulation..."

$ns\_ run

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