**#General parameters**

set stop 100

set type gsm

**#AQM parameters**

set minth 30

set maxth 0

set adaptive 1

**#traffic generation**

set flows 0

set window 30

**#plotting statistics**

set opt(wrap) 100 set opt(srcTrace) is set opt(dstTrace) bs2

**#default downlink bandwidth in bps**

set bwDL(gsm) 9600

#**default propogation delay in sec**

set propDL(gsm) .500

set ns [new Simulator] set tf [open Mlab5.tr w]

$ns trace-all $tf

set nodes(is) [$ns node] set nodes(ms) [$ns node] set nodes(bs1) [$ns node] set nodes(bs2) [$ns node] set

nodes(lp) [$ns node]

proc cell\_topo {} {

global ns nodes

$ns duplex-link $nodes(lp) $nodes(bs1) 3Mbps 10ms DropTail

$ns duplex-link $nodes(bs1) $nodes(ms) 1 1 RED

$ns duplex-link $nodes(ms) $nodes(bs2) 1 1 RED

$ns duplex-link $nodes(bs2) $nodes(is) 3Mbps 50ms DropTail puts "GSM Cell Topology" }

proc set\_link\_params {t} {

global ns nodes bwDL propDL

$ns bandwidth $nodes(bs1) $nodes(ms) $bwDL($t) duplex

$ns bandwidth $nodes(bs2) $nodes(ms) $bwDL($t) duplex

$ns delay $nodes(bs1) $nodes(ms) $propDL($t) duplex

$ns delay $nodes(bs2) $nodes(ms) $propDL($t) duplex

$ns queue-limit $nodes(bs1) $nodes(ms) 10

$ns queue-limit $nodes(bs2) $nodes(ms) 10 }

**#RED and TCP parameters**

Queue/RED set adaptive\_ $adaptive

Queue/RED set thresh\_ $minth

Queue/RED set maxthresh\_ $maxth

Agent/TCP set window\_ $window

**#create topology**

switch $type {

gsm - umts {cell\_topo} }

set\_link\_params $type

$ns insert-delayer $nodes(ms) $nodes(bs1) [new Delayer]

$ns insert-delayer $nodes(ms) $nodes(bs2) [new Delayer]

**# set up TCP connection**

if {$flows == 0} {

set tcp1 [$ns create-connection TCP/Sack1 $nodes(is) TCPSink/Sack1 $nodes(lp) 0]

set ftp1 [[set tcp1] attach-app FTP]

$ns at 0.8 "[set ftp1] start"

}

proc stop {} {

global nodes opt tf

set wrap $opt(wrap)

set sid [$nodes($opt(srcTrace)) id]

set did [$nodes($opt(dstTrace)) id]

set a "Mlab5.tr"

set GETRC "../bin/getrc"

set RAW2XG "../bin/raw2xg"

exec $GETRC -s $sid -d $did -f 0 Mlab5.tr | \

$RAW2XG -s 0.01 -m $wrap -r > plot.xgr

exec $GETRC -s $did -d $sid -f 0 Mlab5.tr | \

$RAW2XG -a -s 0.01 -m $wrap >> plot.xgr

exec xgraph -x time -y packets plot.xgr &

exit 0 }

$ns at $stop "stop"

$ns run