

# **simSwitchPing: Configuring Switching SIMs Based on Pings to Network**

Issue: 1.3

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# 1 Introduction

The simSwitchPing script is designed for dual SIM hardware. It switches SIMs based on pings to target destinations. On consecutive failure to targets, the SIM is switched. The script can also optionally fall back to the main SIM periodically. The standard router SIM switching functionality works by checking connectivity status to the network. In certain scenarios, for example where roaming isn't enabled, a connection to a provider can be established but no data can be passed; in this scenario, this script can be used.

**Note:** this script is not designed to work with multiple default routes. If you need multiple default routes, you must add block filters to stop the pings from being routed out to another interface when the GSM interface is down.

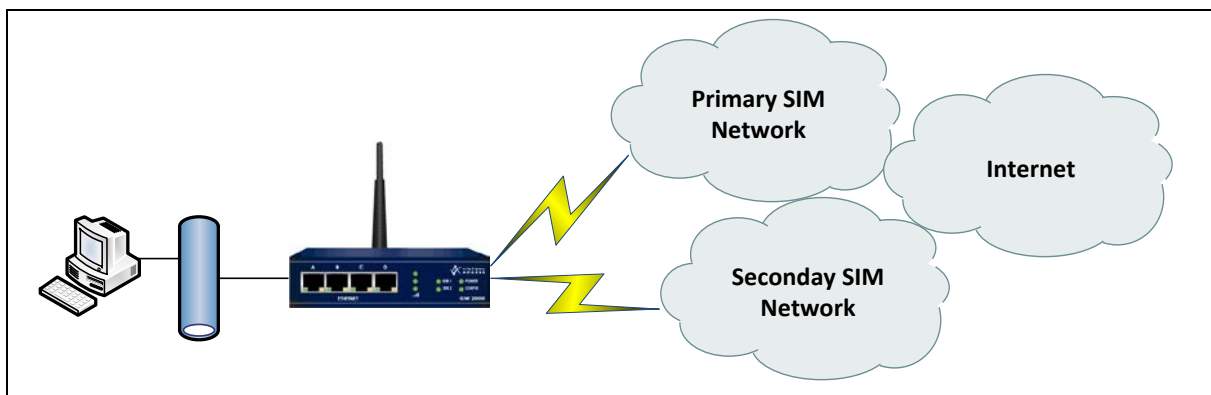


Figure 1: Network architecture

## 2 Configuring the simSwitchPing script

In this guide we use the terms 'main SIM' and 'alternate SIM' to distinguish between the two available SIMs.

### 2.1 Script overview

The script is designed to be run on boot. On boot, the script does the following:

- Disables firmware SIM switching to avoid conflict.
- Adds static routes for test pings at index 39 and 40.
- Waits 20 seconds before sending pings to target destinations at configurable durations. If only one target destination is configured then only one ping is sent to this target.
- A ping from either target signifies that a particular SIM is valid.
- When a number of configurable consecutive ping failures are detected over this SIM, the SIM is switched to the alternate SIM. An INFO event is generated for visibility of the SIM change and also to allow other scripts to fire where required.
- **Note:** if two ping targets are configured pings must fail to both targets consecutively to determine a SIM switch.
- Pings are now sent over the alternate SIM and the scenario is repeated.

### 2.2 Script requirements

If multiple default routes are configured then a block filter is required to stop pings from being routed out another interface when the GSM interface is down.

### 2.3 Script parameters

The script name is simSwitchPing and it takes in five required parameters and a further four optional parameters:

```
simSwitchPing [gsm ppp if] [target1] [target2] [ping_wait] [ping_threshold]  
              [ping_reply_wait] [fall_back_timer]
```

These parameters are described in the example and table below.

```
simSwitchPing ppp-1, 1.1.1.1, 2.2.2.2, 30, 5, 2, 0, eth-0
```

Parameter	Type	Description
Ppp-1	Required	The PPP interface used by the GSM modem
1.1.1.1	Required	The first ping target
2.2.2.2	Required	The second ping target. Set to 0 to signify no second ping target.
30	Required	The wait between pings in seconds. Pings are sent to both ping targets at the same time.
5	Required	The number of consecutive pings failures to cause SIM switch
2	Optional	The time to wait for a ping reply in seconds (default: 2)
0	Optional	The time in seconds before switching back to Main SIM if using alternate SIM (default 0) (0 means no fall back)
eth-0	Optional	The interface or IP to source the pings from (default: eth-0; 0 to use outbound interface IP)

**Table 1: simSwitchPing parameter descriptions**

## 2.4 Configuring the script

This script was introduced into firmware in versions 9.09.21 and 10.00.15. To use the script on older firmware versions first paste the script from Section 5 'simSwitchPing script' into the script editor and then use the scheduler to run the script at boot up.

From the start page, click **Advanced** to open the Expert View menu.

### 2.4.1 Pasting the script into the script editor

If you are using 9.09.xx firmware, in the Expert View menu, click **system > scripts > script editor**. The Script Editor page appears

If you are using 10.00.xx firmware, in the expert view menu, click **system > management > scripts > script editor**. The Script Editor page appears.

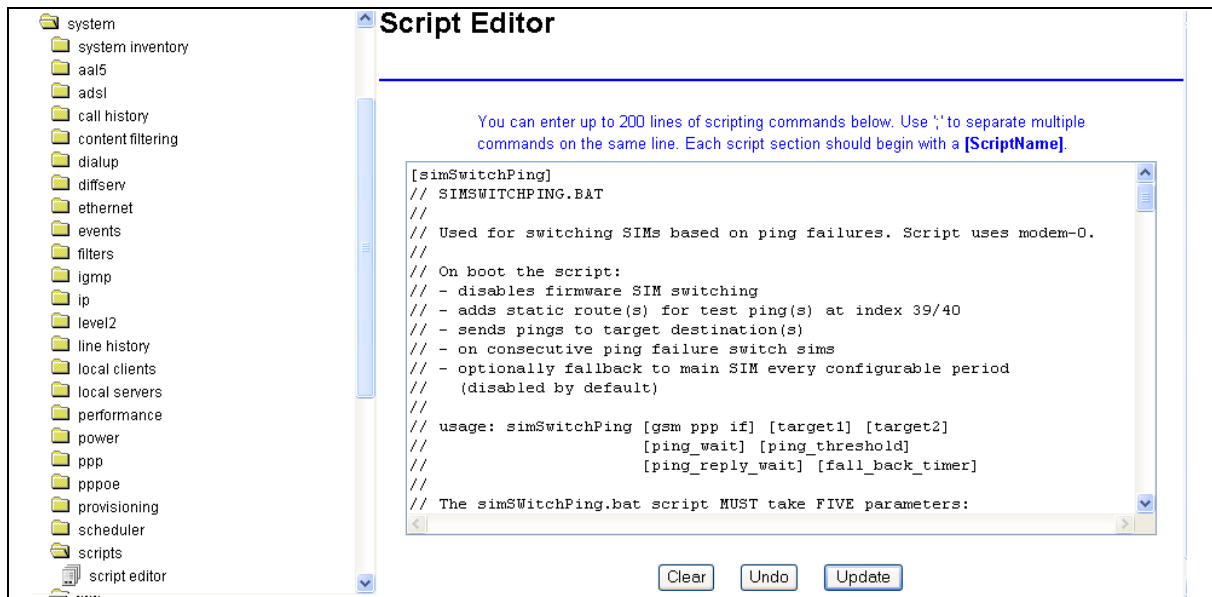


Figure 2: The script editor page in version 9.09.xx

Paste in the script from Section 5 'simSwitchPing script'. The first line of the script should begin with the script name in square brackets, [simSwitchPing]. This name will be used to call the script using the scheduler.

If the number of script lines needs to be reduced, you can omit any line beginning with // as this denotes a comment tag. Also you can enter multiple script lines onto the same script editor line separated by ';' (semi colon). When you have completed the script, click **Update**.

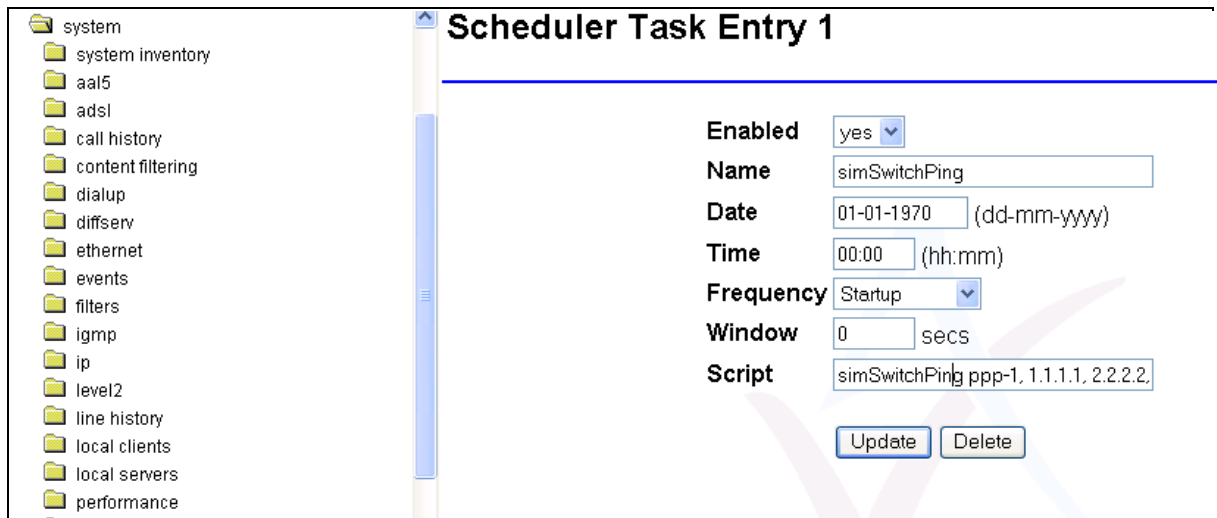
#### 2.4.2 Scheduling the script to run on boot

If you are using 9.09.xx firmware, in the Expert View menu, click **system > scheduler > scheduler tasks**. The Scheduler Task Entry page appears.

Click **add** in the Operation column of the list. The Scheduler Task form appears.

If you are using 10.00.xx firmware, in the Expert View menu, click **system > management > scheduler > scheduler tasks**. The Scheduler Task Entry page appears.

Click **add** in the Operation column of the list. The Scheduler Task form appears.



**Figure 3: The scheduler task entry page in version 9.09.xx**

Field	Description
Enabled	Enables or disables a particular schedule. Set to Yes.
Name	The name associated with the schedule. Enter a descriptive name
Date	The date the script initiates. This field is ignored when frequency is set to start up. Leave at default.
Time	The time the script initiates. This field is ignored when frequency is set to start up. Leave at default.
Frequency	Sets the frequency the script executes. Set to startup.
Window	This parameter sets how long the system will wait if it is busy before executing the script. For example if the script is set to execute at 10:00 and the window is set to 30 seconds, the system will try executing the script within this window only. Set to 30.
Script	The name of the script to be executed. Enter the script name, followed by the relevant parameters as shown in the above image. Separate the parameters by commas. Example: simSwitchPing ppp-1, 1.1.1.1, 2.2.2.2, 30, 5, 2, 0, eth-0

**Table 2: The scheduler task fields and their descriptions**

### 3 Debugging commands

Useful debug commands via command line are described in the table below.

Diagnostic Command	Description
Show tasks	Displays all running tasks.
Show task <tasknum>	Displays running task. Also indicates position task is currently at.
Show task vars <tasknum>	Displays variables and variable values associated with task.
Show modem interface status modem-0	Displays GSM modem information
Show modem interface gsm active sim modem-0	Displays active SIM
Show modem interface gsm main sim modem-0	Displays main SIM
show modem interface gsm sim status modem-0	Displays current SIM status
Show events	Displays event log.
Show change log	Displays recent configuration changes.
Dir scripts	Displays all scripts embedded in the firmware.
Show config script ALL	Displays all scripts in the script editor.
Show config script <scriptname>	Displays the <scriptname> script as configured in script editor. Includes line numbers.
Show config script -n <scriptname>	Displays the <scriptname> script as configured in the script editor. Does not include line numbers.

**Table 3: Debug command lines and their descriptions**

Useful trace commands via the command line are described in the table below.

Trace command	Description
++All 6	Traces all INFO events
++ip	Traces IP traffic
++modem	Traces modem events
++script	Traces script events
--script	Stops script event tracing
--	Stops all event tracing
Trace on <script_name>	Traces each line in a script as it executes
Trace off <script_name>	Turns off tracing for script

**Table 4: Trace command lines and their descriptions**



## 4 Script events

Severity	Class	Subclass	Text
INFO	49	40	simSwitchPing script error invalid ping targets<ping targets>
INFO	49	40	simSwitchPing modem-0 is not a valid sim switch interface
INFO	49	40	simSwitchPing target \$<ping targets> via <gsm ppp itf> every <time between pings> secs
INFO	49	40	simSwitchPing fallback to main sim
INFO	49	40	simSwitchPing switching to <sim number>

**Table 5: Script events**

## 5 simSwitchPing script

```
[simSwitchPing]
// SIMSWITCHPING.BAT
//
// Used for switching SIMs based on ping failures. Script uses modem-0.
//
// On boot the script:
// - disables firmware SIM switching
// - adds static route(s) for test ping(s) at index 39/40
// - sends pings to target destination(s)
// - on consecutive ping failure switch sims
// - optionally fallback to main SIM every configurable period
//   (disabled by default)
//
// usage: simSwitchPing [gsm ppp if] [target1] [target2]
//           [ping_wait] [ping_threshold]
//           [ping_reply_wait] [fall_back_timer]
//           [ping source]
//
// The simSwitchPing.bat script MUST take FIVE parameters:
// - the PPP interface used by the GSM modem
// - the first ping target
// - the second ping target (0 for no second target)
// - the wait between pings in seconds
// - the number of consecutive pings failures to cause SIM switch
//
// The simSwitchPing.bat script can take THREE optional parameters:
// - the time to wait for a ping reply in seconds (default: 2)
// - the time in secnds before switching back to Main SIM
//   (default: 0 (means no fallback))
// - the interface or IP to source the pings from
//   (def: eth-0, 0 to use outbound port IP)
//
// Configuration
// -----
```

```
// The script will automatically enabled and disable a static route
// at indexes 39/40 for the test pings
//
// EXAMPLES
// -----
// simSwitchPing ppp-2, 1.1.1.1, 0, 60, 5
// Configure a static route (index 39) to 1.1.1.1 via ppp-2. Test
// pings are sent to 1.1.1.1 every 60 secs. On 5 consecutive ping
// failures switch SIM. Stay with SIM until ping failures
//
// simSwitchPing ppp-2, 1.1.1.1, 0, 60, 5, 3600
// Configure a static route (index 39) to 1.1.1.1 via ppp-2. Test
// pings are sent to 1.1.1.1 every 60 secs. On 5 consecutive ping
// failures switch SIM. If using backup SIM fallback to main
// every 60 mins.
//

!arg pppIf, pingTarget1, pingTarget2, pingWait, pingThreshold

$pingReplyWait = $6
$fallbackWait = $7
$pingSource = $8

//defaults
$boot_wait = 20
$rt_index1 = 39
$rt_index2 = 40
$fall_back_timer = 0
$main_sim = `sh modem interface gsm main sim modem-0`
$active_sim = $main_sim
!if pingReplyWait = ``
    $pingReplyWait = 2
!endif
!if fallbackWait = ''
    $fallbackWait = 0
!endif
```

```
!if pingSource = ''
    $pingSource = eth-0
!endif
$i = 1
$ping_reply_wait_msec = 1000
!while $i < $pingReplyWait
    !add ping_reply_wait_msec, 1000
    !inc i
!endwhile

//checking
!if pingTarget1 = ''
    $pingTarget1 = 0
!endif
!if pingTarget2 = ''
    $pingTarget2 = 0
!endif

//logging
$logpingstr = $pingTarget1
!if $pingTarget2 <> 0
    $logpingstr = $logpingstr/$pingTarget2
!endif

!if $pingTarget1 = 0
    !if $pingTarget2 = 0
        !log simSwitchPing script error invalid ping targets $logpingstr
        !exit
    !else
        $pingTarget1 = $pingTarget2
        $pingTarget2 = 0
    !endif
!endif

!if $pingTarget2 = 0
    $rtIndex2 = 0
```

```
endif

z = `find v90|invalid|unknown modem interface type modem-0`
if z <> ''
    !log simSwitchPing modem-0 is not a valid sim switch interface
    !exit
endif

//disable firmware sim switch
if "`sh modem interface gsm main sim modem-0`" = "yes"
    z = `set modem interface gsm main sim modem-0 no`
endif

//create static routes but leave unconfigured
z = `set IP Route Static Configured $rt_index1 yes`
z = `set IP Route Static Numbered $rt_index1 no`
z = `set IP Route Static Target $rt_index1 $pingTarget1`
z = `set IP Route Static Mask $rt_index1 255.255.255.255`
z = `set IP Route Static Next Hop Interface $rt_index1 $pppIf`
z = `set IP Route Static Metric $rt_index1 1`
if $pingTarget2 <> 0
    z = `set IP Route Static Configured $rt_index2 yes`
    z = `set IP Route Static Numbered $rt_index2 no`
    z = `set IP Route Static Target $rt_index2 $pingTarget2`
    z = `set IP Route Static Mask $rt_index2 255.255.255.255`
    z = `set IP Route Static Next Hop Interface $rt_index2 $pppIf`
    z = `set IP Route Static Metric $rt_index2 1`
endif
z = `commit`
z = `set ip rt reconfigure`

!log simSwitchPing target $loggingstr via $pppIf every $pingWait secs

!pause $boot_wait
```

```
!while 1
  $ping_fail = 0

  !while $ping_fail < $pingThreshold
    $z = `st ping results reset`

    !if $pingSource <> 0
      $z = `quiet ping $pingTarget1 -s $pingSource -w
$ping_reply_wait_msec`
      !if $pingTarget2 <> 0
        $z = `quiet ping $pingTarget2 -s $pingSource -w
$ping_reply_wait_msec`
      !endif
    !else
      $z = `quiet ping $pingTarget1 -w $ping_reply_wait_msec`
      !if $pingTarget2 <> 0
        $z = `quiet ping $pingTarget2 -w $ping_reply_wait_msec`
      !endif
    !endif
    !pause $pingReplyWait

    $result = `sh ping replies`
    !if $result = 0
      !inc ping_fail
    !else
      $ping_fail = 0
    !endif

    //check fallback timer
    !if $active_sim <> $main_sim
      !if $fallbackWait <> 0
        !add fall_back_timer, $pingWait
        !add fall_back_timer, $pingReplyWait

        !if $fall_back_timer > $fallbackWait
          $fall_back_timer = 0
        !endif
      !endif
    !endif
  !log simSwitchPing fallback to main sim
```

```
        !goto SIMSWITCH_CHANGE
    !endif
!endif
!endif

!pause $pingWait
!endwhile

!label SIMSWITCH_CHANGE
!if $active_sim = 'sim1`
    $z = `set modem interface gsm active sim modem-0 sim2`
    !log simSwitchPing switching to SIM2
    $active_sim = sim2

!else
    $z = `set modem interface gsm active sim modem-0 sim1`
    !log simSwitchPing switching to SIM1
    $active_sim = sim1
!endif
!endwhile
```

## 6 Script history

Version	Changes	Firmware version changes introduced
1.3	Addition for optional configuration for the interface or IP address to source the pings from	9.08.29 10.00.25