Monitoring GSM Call Status via Telnet

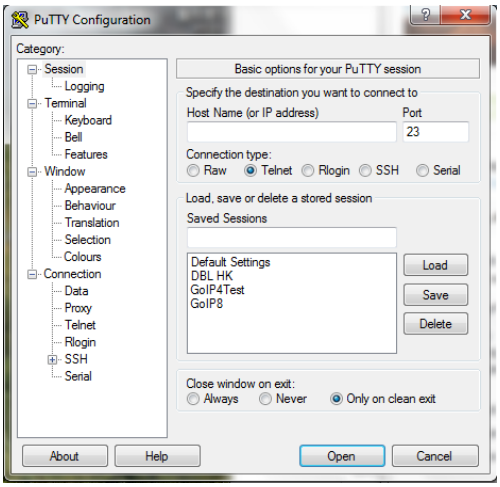
Overview

This paper is intended to introduce a way to monitor and analyze the calls made by a GoIP. In order to enable the GoIP to achieve high ACD (Average Call Duration) and high ASR (Answer / Seizure Ration), it is important to understand the progress of a call including the hang up reason.

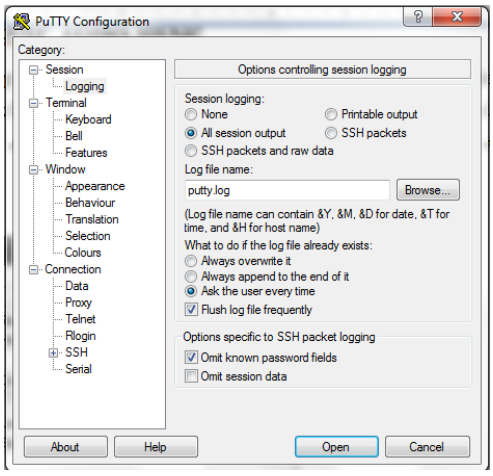
GoIP has a special telnet mode which allows users to monitor the messages generated by one or all GSM modules. The messages are in the format of AT commands as described in the G610 AT Command User Manual (the document file name is *G610 GPRS Module AT Command User Manual_V1.3.4_20111228.pdf*). Please refer to this User Manual for more information.

Accessing the GoIP via Telnet mode

After the GoIP is setup and working properly, you can then access the device via telnet mode. PuTTY is a free utility which offers a telnet client to access the GoIP. Please download PuTTY from http://www.putty.org/ and then install it. After executing PuTTY and you will get to the window shown below.

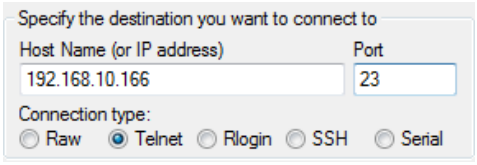


It is recommended to first enable data logging so that you can review the data log later. Click on ***Logging*** to display the page below and then select ***All session output***. The default log file name is "putty.log". Change it if required.



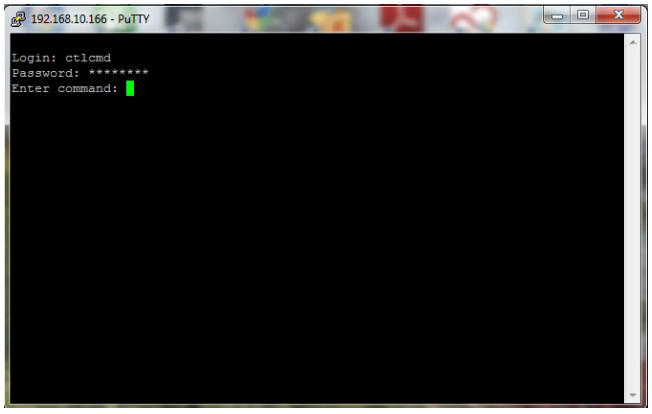
Now go back to the default screen by clicking ***Session***. To access the GoIP, you first need to know its IP address. If the

GoIP is located in the same network segment of your computer, you can just enter its IP address (example IP here is 192.168.10.100) and select the ***Telnet*** as the connection type.



If the GoIP has a public IP, you can just enter its IP here.
If the GoIP has a private IP and located in a different network, you need to setup the network router or gateway first so that port 23 of the network is mapped to the GoIP port 23. Different telnet port can be used by modifying the Port number in PuTTY.
Click on ***Open*** to display the window shown below when everything is ready.

Enter the login ID as "**ctlcmd**" and the password as the admin password for webpage login access the GoIP as shown below.



The telnet commands supported are listed in the table below.

	Command	Syntax	Description
1	infosip	Infosip	Display SIP messages
2	infogsm	infogsm*x* *Where x is the gsm channel number.* *x = 1 to 4 for GoIP-4* *x = 1 to 8 for GoIP-8*	Display the debug / status message generated by the GSM module specified.
3	infogsmall		Display the debug / status message generated by all GSM modules.
4	kill	kill httpd	Restart goip built-in webserver
		kill ata	Restart all active GoIP routines
		kill sipcli	Restart SIP protocol routine
5	mupgrd		Upgrade GSM module firmware for G610 module Note: it takes about 15 minutes time to upgrade one gsm module firmware. Please be patient to wait. Don't be panic if there is a power failure or interruption. Just perform the upgrade procedures again.
		mugrad*x* *Where x is the gsm channel number.* *x = 1 to 4 for GoIP-4* *x = 1 to 8 for GoIP-8*	Upgrade the gsm module firmware for the channel specified.
		mugradall	Upgrade the gsm module firmware for all channels.
6	ping	ping <domain name or IP Address>	Issue this command to check network condition (delay, packet loss) between the GoIP and your server.
7	reboot	reboot	Force the GoIP to perform a cold boot.
8	upgrade	update <complete firmware url> Example: Upgrade ww.dbltek.com/udpate/GS-4.01-46.pkg	Perform GoIP firmware upgrade

To monitor the GSM call status of a channel, enter the command ***infogsm1*** for channel 1 and so on. To monitor all channels simultaneously, enter the command ***infogsmall***.

Analyzing Console Data Log

Once the inforgsmx or infogsmall command is executed, the console displays the communication messages to and from the GSM module(s) as well as some other system messages. The GSM messages are in the in the following format.

parse_tty_info:console.c:1221: ttyS1: x

where ttyS1 refers to GSM channel 1 and x is an AT command or a response. Let's first look at a few examples below. Please refers to the G610 AT Command User Manual for more information on AT commands. Comments are in Italic blue text starting with "*" and added for explanation purpose.

Note: Please contact technical support for assistance if needed.

Case 1:

1. Initiate GSM channel 1 to dial out the phone number 10086
2. Showing various calling states: Dialing, Alerting, and Active
3. The caller hangs up the call.

** Dial out the number 10086*
parse_tty_info:console.c:1221: ttyS1:len=11 ATD10086;
parse_tty_info:console.c:1221: ttyS1:len=3 OK
** GSM Call Status: Dialing in Progress*
parse_tty_info:console.c:1221: ttyS1:len=29 +CLCC: 1,0,2,0,0,"10086",129
parse_tty_info:console.c:1221: ttyS1:len=3 OK
** GSM Call Status: Alerting (ringback tones) in progress*
parse_tty_info:console.c:1221: ttyS1:len=29 +CLCC: 1,0,3,0,0,"10086",129
parse_tty_info:console.c:1221: ttyS1:len=3 OK
** GSM Call Status: Active (Call connected)*
parse_tty_info:console.c:1221: ttyS1:len=29 +CLCC: 1,0,0,0,0,"10086",129
** Caller hangs up the active call*
parse_tty_info:console.c:1221: ttyS1:len=5 ATH
** hang up successful*
parse_tty_info:console.c:1221: ttyS1:len=11 NO CARRIER
parse_tty_info:console.c:1221: ttyS1:len=3 OK
** GSM Call Status: Released (no active call)*
parse_tty_info:console.c:1221: ttyS1:len=29 +CLCC: 1,0,6,0,0,"10086",129

Case 2:

1. Same as Case 1 except that the callee hangs up.

** Dial out the number 10086*
parse_tty_info:console.c:1221: ttyS1:len=11 ATD10086;
parse_tty_info:console.c:1221: ttyS1:len=3 OK
** GSM Call Status: Dialing in Progress*
parse_tty_info:console.c:1221: ttyS1:len=29 +CLCC: 1,0,2,0,0,"10086",129
parse_tty_info:console.c:1221: ttyS1:len=3 OK
** GSM Call Status: Alerting*
parse_tty_info:console.c:1221: ttyS1:len=29 +CLCC: 1,0,3,0,0,"10086",129
parse_tty_info:console.c:1221: ttyS1:len=3 OK
** GSM Call Status: Active / Call Connected*
parse_tty_info:console.c:1221: ttyS1:len=29 +CLCC: 1,0,0,0,0,"10086",129
parse_tty_info:console.c:1221: ttyS1:len=3 OK
** Callee hangs up the call as indicated by receiving a NO CARRIER message.*
parse_tty_info:console.c:1221: ttyS1:len=11 NO CARRIER
** GSM call status: Released (no active call)*
parse_tty_info:console.c:1221: ttyS1:len=29 +CLCC: 1,0,6,0,0,"10086",129
parse_tty_info:console.c:1221: ttyS1:len=5 ATH
parse_tty_info:console.c:1221: ttyS1:len=3 OK

Case 3:

1. Dial out a call unsuccessfully.

** Dial out the number 10086*
parse_tty_info:console.c:1221: ttyS1:len=11 ATD10086;
parse_tty_info:console.c:1221: ttyS1:len=3 OK
** GSM Call Status: Dialing in Progress*
parse_tty_info:console.c:1221: ttyS1:len=29 +CLCC: 1,0,2,0,0,"10086",129
** Channel lock is released*
gsm_write:atcmd.c:278: channel1 AT+GTBCCH=0
parse_tty_info:console.c:1221: ttyS1:len=3 OK
** Connection fails*
parse_tty_info:console.c:1221: ttyS1:len=11 NO CARRIER
** GSM Call Status: Released (no active call)*
parse_tty_info:console.c:1221: ttyS1:len=29 +CLCC: 1,0,6,0,0,"10086",129
gsm_write:atcmd.c:278: channel1 ATH
** Ask for extended error report for the last call setup*
parse_tty_info:console.c:1221: ttyS1:len=9 AT+CEER
** Reason for the failure is not available*
parse_tty_info:console.c:1221: ttyS1:len=40 +CEER: "No cause information available"

Remarks:

+CEER, Extended Error Report
This execution command returns an extended error report containing one or more lines of information text <report>, determined by the manufacturer, providing reasons for the following errors:

- Failure in the last unsuccessful call setup (originating or answering) or the in-call modification.
- Last call release.

Typically, the text consists of a single line containing the reason for the error according to information given by GSM network, in textual format.

Below are a list of the common error causes. For more information or the complete list, please refer to the ETSI Standard GSM 04.08.

Cause No.	Cause	Description
Normal Class		
1	unassigned (unallocated) number	This cause indicates that the destination requested by the Mobile Station (MS) cannot be reached because, although the number is in valid format, it is not currently assigned (allocated).
3	no route to destination	This cause indicates that the called user cannot be reached because the network through which the call has been routed does not serve the destination desired.
6	channel unacceptable	This cause indicates the channel most recently identify is not acceptable to the sending entity for use in this call.
8	operator determined barring	This cause indicates that the MS has tried to access a service that the MS's network operator or service provider is not prepared to allow.
16	normal call clearing	This cause indicates that the call is being cleared because one of the users involved in the call has requested that the call be cleared.
17	user busy	This cause is used when the called user has indicated the inability to accept another call. it is noted that the user equipment is compatible with the call.
18	no user responding	This cause is used when a user does not respond to a call establishment message with either an alerting or connect indication within the prescribed period of time allocated (defined by the expiry of either timer T303 or T310).
19	user alerting, no answer	This cause is used when a user has provided an alerting indication but has not provided a connect indication within a prescribed period of time.
21	call rejected	This cause indicates that the equipment sending this cause does not wish to accept this call, although it could have accepted the call because the equipment sending this cause is neither busy nor compatible.
22	number changed	This cause is returned to calling MS when called party number indicated by the calling Mobile Station is no longer assigned. The new called party number may optionally be included in the diagnostic field. If a network does not support this capability, cause No. 1 "unassigned (unallocated) number" will be used.
27	destination out of order	This cause indicates that the destination indicated by the MS cannot be reached because the interface to the destination is not functioning correctly. The team "not functioning correctly" indicates that a signaling message was unable to be delivered to the remote user, e.g., a physical layer or data link layer failure at the remote user, user equipment off-line, etc.
28	invalid number format (incomplete number)	This cause indicates that the called user cannot be reached because the called party number is not a valid format or is not complete.
29	facility rejected	This cause is returned when a facility requested by user cannot be provided by the network.
30	response to STATUS ENQUIRY	This cause is included in STATUS messages if the message is sent in response to a STATUS ENQUIRY message.
31	normal, unspecified	This cause is used to report normal even only when no other cause in the normal class applies.
Resource unavailable class		
34	no circuit/channel available	This cause indicates that there is no appropriate circuit/channel presently available to handle the call.
38	network out of order	This cause indicates that the network is not functioning correctly and that the condition is likely to last a relatively long period of time; e.g., immediately re-attempting the call is not likely to be successful.
41	temporary failure	This cause indicates that the network is not functioning correctly and that the condition is not likely to last a long period of time; e.g., the MS may wish to try another call attempt almost immediately.
42	switching equipment congestion	This cause indicates that the switching equipment generating this cause is experiencing a period of high traffic.
43	access information discarded	This cause indicates that the network could not deliver access information to the remote user as requested; i.e., a user-to-user information, low layer compatibility, high layer compatibility, or sub-address as indicated in the diagnostic.
44	requested circuit/channel not available	This cause is returned when the circuit or channel indicated by the requesting entity cannot be provided by the other side of the interface.
47	resource unavailable, unspecified	This cause is used to report a resource unavailable event only when no other cause in the resource unavailable class applies.