Technical Document

GSM PROTOCOL STACK

G23

TCAL – TAPCALLER

USER GUIDE

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0 Document Control

0.1 Change History

Date	Changed by	Approved by	Version	Status	Notes
2001-Jan-31	JG et al.		0.1		1
2002-Sep-30	RK		0.2		2
2003-May-21	XINTEGRA		0.3	Draft	
2003-08-15	RK		0.4	Draft	3
2003-09-15	RK		0.5	Draft	2

Notes:

1. Initial version
2. updated
3. Official ID introduced

0.2 List of Figures and Tables

0.3 List of References

[TCC]	8415.028.99.201; March 15, 2000; Test Case Control – User guide
[PCO2]	8415.090.00.002, May 15, 2000, PCO2 – Tracing Environment (pco_userguide.doc)
[TC_INTRO]	Running test cases with TAPCaller (tapcaller_intro.ppt)
[TC_DESCR]	06-03-31-SLL, Tapcaller Developers Description (tapcaller_description.doc)

0.4 Abbreviations

PCO	Point of Control and Observation
PS	Protocol stack
TAP	Test Application Process
TST	TeST interface

0.5 Terms

Entity	Program which executes the functions of a layer
Message	A message is a data unit which is transferred between the entities of the same layer (peer-to-peer) of the mobile and infrastructure side. Message is used as a synonym to protocol data unit (PDU). A message may contain several information elements.
Preamble	Test case which is started before the actual test case.

Primitive	A primitive is a data unit which is transferred between layers on one component (mobile station or infrastructure). The primitive has an operation code which identifies the primitive and its parameters.
Service Access Point	A Service Access Point is a data interface between two layers on one component (mobile station or infrastructure).

1 Introduction

Test cases and suites are used in order to test the implementation of protocol stacks. The Test Application Process (TAP) is the real test tool. The actions performed by TAP can be described in simple words as follows: It sends primitives to an entity of the PS, waits for an reaction of the PS (i.e. waits for a primitve from the entity under test) and compares the received primitive with the expected one.
TAPCaller is graphical frontend for executing test cases. It should simplify the call of the TAP test tool. Besides, the user can easily access result files which were produced by the TAP and PCO (the logging tool) and it is possible to call MSCVIEW.
This documentation is meant for protocol stack testers that use TAPCaller.

2 Application Manual

2.1 Quick start

Before you can start the TAP using TAPCaller some configuration is necessary. Using the menu option "<Configuration><Settings>" the dialog box "Settings" is displayed. There the user has to specify the location of the appropriate TAP executable and the interface which stimulates the protocol stack (see document [TCC] for detailed information about the interface).
Additionally on the sheets "Test tools" and "General options" some viewer applications can be selected.

Then, of course, the user has to specify the test cases and the path of the protocol stack to be tested. The menu option "<Configuration><Selection>" shows a dialog box that can be used for this purpose.

If TAPCaller is started from an environment, where certain environment variables are set, most of the configuration is done automatically by the program. See 2.5 for more detailed explanations of the dialog boxes.

If using the old TAP (with old FRAME) the tap-executable has to be build with the appropriate CDG-files (created by makcdg). Logging while tests will be done by the TAP itself.
If using the new TAP (tap2.exe) the tap will expect a matching ccddata_dll.dll (created by makcdg). Logging while tests will be done by PCO, which can be disabled in "<Configuration><Settings><PCO>".

Finally the TAP can be started by e.g. clicking the menu options "<Control><Run Selected tests>" or "<Control><Run All Tests>".

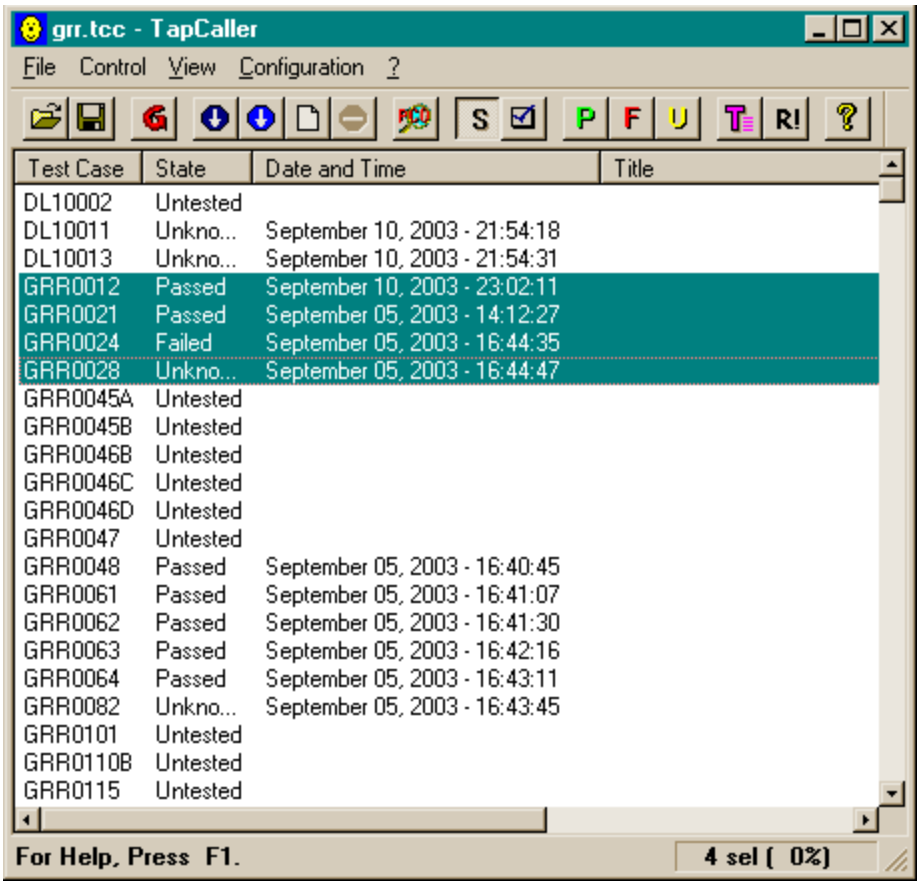
See [TC_INTRO] for a short introduction with screen shots.

2.2 Command Line Options

When starting TAPCaller via command line you may optionally specify one of the following options:

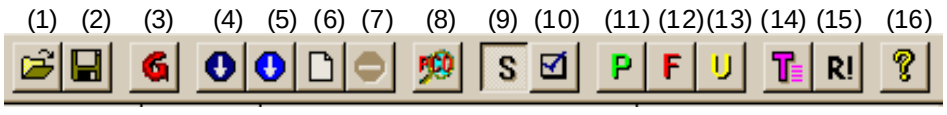
- -pco … automatically start PCO components
- -nopco … do not automatically start PCO components
- -impcfg <xml-config-file> … initially import configuration from specified xml-file
- <.tcc-file> … load configuration from specified TapCallerConfig-file
- -h … display all possible options

2.3 The Main Window



After the execution of some test cases the TAPCaller Main Window may look like this:
The first column contains the test case / suite name. The name of a test case consists of the name of the test document which the test case is produced from (e.g. "MCOMP"), three or four digits and optionally a letter. The name of a suite (e.g. "mcomp.SUI_SYS_INFO4") starts with the name of the test document ("MCOMP") followed by a dot and the actual suite name ("SUI_SYS_INFO4"). The test document name have to be included since suite names are not unique among the various test documents.
The following column shows the current state of the test case. In the given example the test case "MCOMP060C" is currently running, "MCOMP000" and "MCOMP009" have passed the TAP successfully, "MCOMP040C" has failed. If the test failed due to the failure of a preamble of this test case this preamble is added to the state (e.g. "MCOMP620" is failed because of "MCOMP020D").
The third column contains the time of the last execution of the test case. There is no entry for test cases, which have not been run yet.
Optionally the user can load titles from the according TDS-file (there exists a *.tds file for each test case) or directly from the TDC-Test-DLL. The titles can be seen in the last column of the main window (see chapter 0
Settings – More Viewing Tools for the needed configuration in this context).

2.3.1 The Tool Bar



The first two buttons of the tool bar are standard Windows buttons. They can be used to open an existing configuration (with binary settings and the selection of the test cases) produced by TAPCaller during former test sessions (1) – or to save the current configuration (2).
Button (3) can be used to reset the whole test environment, if you think one of the tools got stuck.
Clicking the following button (4) results in the execution of all selected test cases, (5) runs all testcases and (6) deletes the results of all test cases. With the next button (7) the user can stop the execution of test cases (the currently running test will most likely not be finished!).

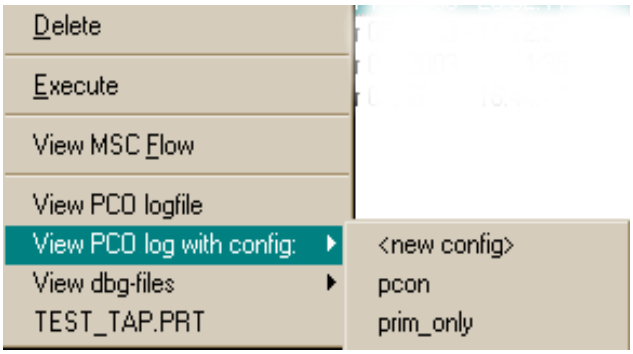
To view the content of the PCO logfile for the currently selected test case you may use button (8).

Button (9) can be used to quickly enable/disable the automatic start of the configured protocol stack - see also 2.5.2 where the Selection-Dialog is described, which can also be activated via button (10).
The buttons (11)-(13) may be used to select/deselect all passed, failed or unknown/untested cases.

If the T-button (14) is clicked the titles of the test cases are (re-)loaded from the according test definition script (*.tds) or directly from the TDC-Test-DLL.
By using the R-button (15) test results can be reloaded according to the current test-directory content.

The last button (16) displays copyright information.

2.3.2 Context Menu



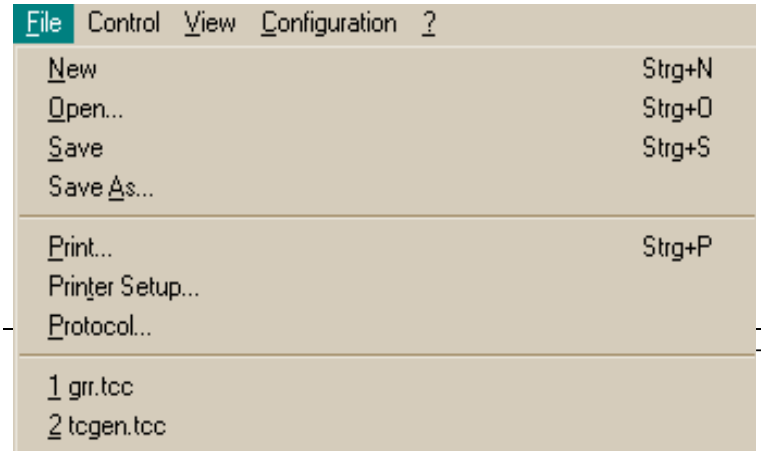
When clicking with right mouse button at a test case a context menu appears. For each test case it contains the items "Delete" which removes the test results, "Execute" and "View MSC Flow" (enabled if a MSC Viewer is specified).
If there are already log files for the currently selected test case the result (PCO logfile) can be viewed in a PCOViewer with the standard viewer configuration by selecting “View PCO logfile”. Moreover all other found PCOViewer configurations are added to a sub menu. When clicking at one of the latter a PCOViewer is started and the appropriate log file loaded so that the user can look at the results of the test session in a specially filtered way.
Another sub menu contains the available dbg-files.
The file TEST_TAP.PRT contains information the tap wrote while running.

Double clicking on an entry will have the same effect as selecting “View PCO logfile”. If no results are available the execution of the dedicated test case is started instead.

2.4 The Menus

Some accelerator keys are defined within TAPCaller. They are displayed in the corresponding menus behind the items.

2.4.1 The File Menu



This menu can be used instead of the first two buttons in the tool bar.

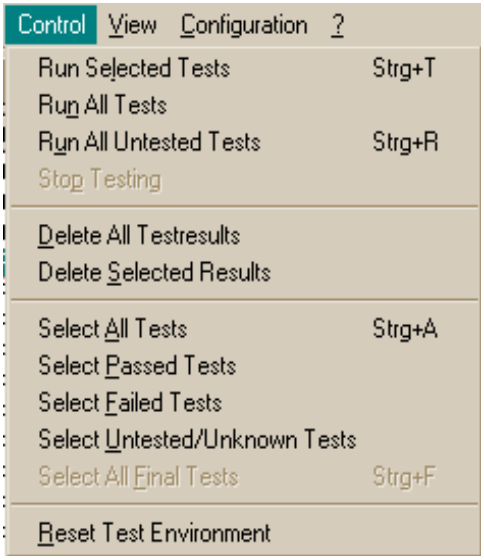
The second section contains entries for printing the current content of the TAPCaller window or export a protocol (see 2.5.3).

Additionally there are menu entries for the last saved configuration files.

This option is useful for loading configuration files quickly.
Configuration files will per default get the suffix ".tcc" (Tap Caller Configuration). Tapcaller will try to reload the lately used configuration on start up automatically. You may also specify a dedicated .tcc-file as parameter to tapcaller.exe.

2.4.2 The Control Menu

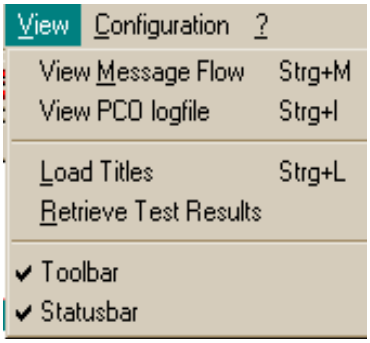
In the Control Menu there are items for executing test cases (e.g. "Run selected tests" and "Run All Test" which means execution of all test cases in the main window) and stopping the execution after the termination of the currently running test case ("Stop Testing").



The entries in the second section can be used to delete test results.
The third section contains items for selecting test cases from the main window ("Select all tests" …),

The last entry resets the whole test environment. Use it if you think one of the tools got stuck.

2.4.3 The View Menu

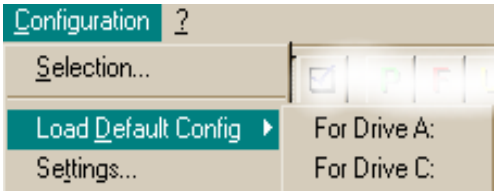


This menu contains commands for changing the current visual state of Tapcaller as well as for viewing more details of the currently selected testcase.

"View Message Flow" will start the MSC-Viewer (selectable in the settings dialog, see 0) and pass the current test case to it – either via the corresponding test definition script (*.tds) or by using the new tap with parameter '-n'.
"View PCO logfile" will open the logfile created during the last test execution in a PCO-Standard-Viewer using the configuration (.svc-file) set as default (also selectable in the settings dialog, see 2.5.1.2).
"Load Titles" tries to load the titles of the test cases in the main window and "Retrieve Test Results" reloads all test results according to the current test-directory content.

The two last commands can be used to show/hide the corresponding toolbars.

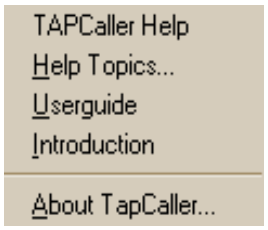
2.4.4 The Configuration Menu



This menu is important since most of its members are not in the Tool Bar and the user needs them to run TAP.
The menu item "Selection" is meant for calling the "Selection" dialog (see chapter 2.5.2 The Dialog Box "Selection"). There the user can search for test case dlls, test document dlls (test document dlls contain all test cases of a test document, test document dlls are produced with the batch file mkallin1.bat located in "<view>\Gpf\Bin") and suites. Furthermore the protocol stack which shall be tested can be selected there.
The entry "Settings" calls the dialog box "Settings" with its sheets "General options", "PCO" and "More Viewing Tools" (see chapter 2.5.1 The Dialog Box "Settings" for further information). Use "Load Default Config" to load standard settings for a specific drive (usually where your CC-view is mounted).

2.4.5 The Help Menu

The online help which can be requested via "TAPCaller Help" and “Help Topics” is very rudimentary and not up to date at the moment. This is a task for the near future.
“Userguide” will open this file, which is updated more regulary. By selecting “Introduction” a short PowerPoint presentation is started, which will introduce the main features of TAPCaller.
Finally copyright and version information can be obtained via "About TAPCaller".

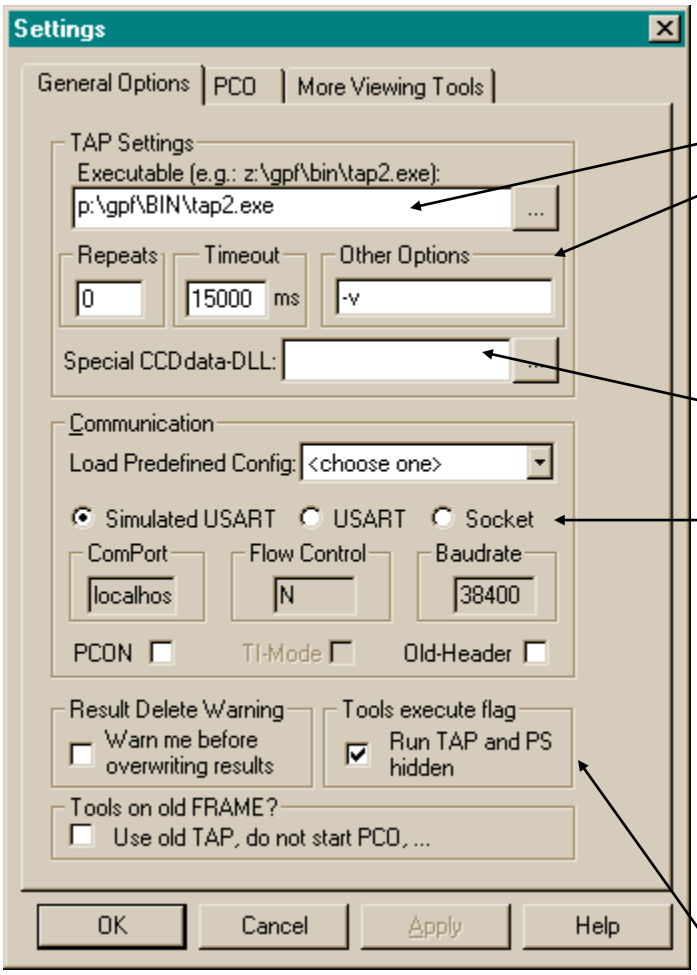


2.5 The Dialog Boxes

2.5.1 The Dialog Box "Settings"

This dialog box is divided into three sheets: "General Options", "PCO" and "More Viewing Tools".

2.5.1.1 Settings – General Options



The snapshot on the left shows the "General Options" sheet.
Before you can start the TAP you have to enter the location of the TAP executable.

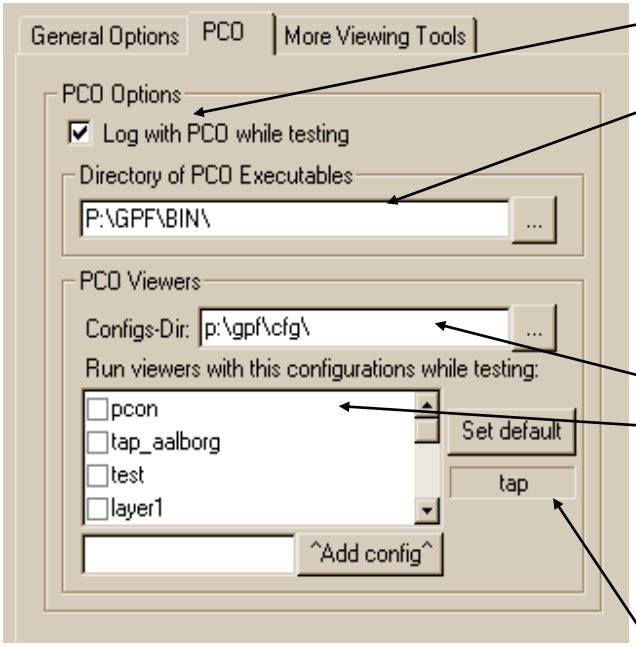
Below this path you may specify more options for the test session, like the number of repeats for each test case, the timeout the tap should apply before giving up waiting for incoming primitives and other options which will be passed directly “as is” to the tap.
Moreover it is possible to explicitly specify the path to the CCDData-DLL which shall be used.

In this section the user is able to specify the interface used for communication with the PS (see document [TCC] for detailed information about the interface) for a proper execution of TAP. Depending on the kind of interface the user can specify different parameters, e.g. the comport number for a USART interface or the name of the host for a socket interface. He can also specify whether PCON shall be used. For convenience the drop-down list on top contains several predefined configuration sets.

The bottom part of the dialog contains some more (self explaining) general options. Running TAP in background is advantageous if there are many test cases to be executed. In this case it is possible for the user to continue his/her work with no windows turning up and immediately disappearing as it is the normal way of TAP execution.
By selecting the old-FRAME-option you also have to specify a new tap-executable – the one you have build (e.g. tap2_gprs.exe).

2.5.1.2 Settings – PCO

This sheet is used to configure the PCO.



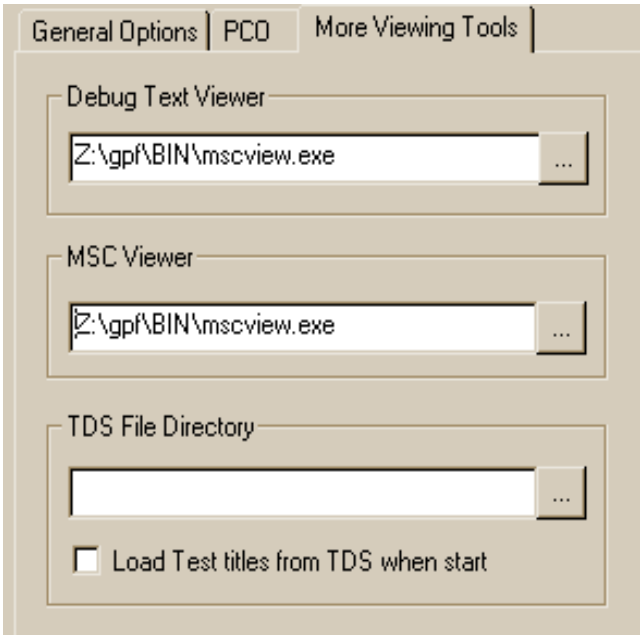
You may at first specify whether PCO shall be used for logging. (if using the old-FRAME-TAP PCO options are irrelevant)
The first edit box shows the directory of PCO executables. This directory should be equal to the directory of the TAP executable for proper communication between the two processes. Therefore TAPCaller assists the user: Whenever he or she wants to change the TAP directory he or she is asked whether the directory for PCO executables should be changed, too (it is recommended to click always "Yes").
The next edit box shows the location of the user's PCOViewers configuration files.
In the list below the user can choose one or more of the config-files found there to be started while testing.New configurations may be added by the “Add config”-button. Enabling one or more configurations will result in TAP-Caller automatically starting PCO-Viewer(s) during test execution.
The default configuration can be set via the “Set default”-button and is used e.g. if the user selects “View PCO logfile” from the context-menu (see 2.3.2). If "Log with PCO while testing" is set, TAPCaller tells PCO to create a log file of the test session for each test case.

2.5.1.3 Settings – More Viewing Tools

In this dialog box the user is able to configure options needed for viewing test results and debugging. The first edit box ("Debug Text Viewer") specifies a text file viewer, which is started when the user wants to have a look at the results of a test case (default: notepad).

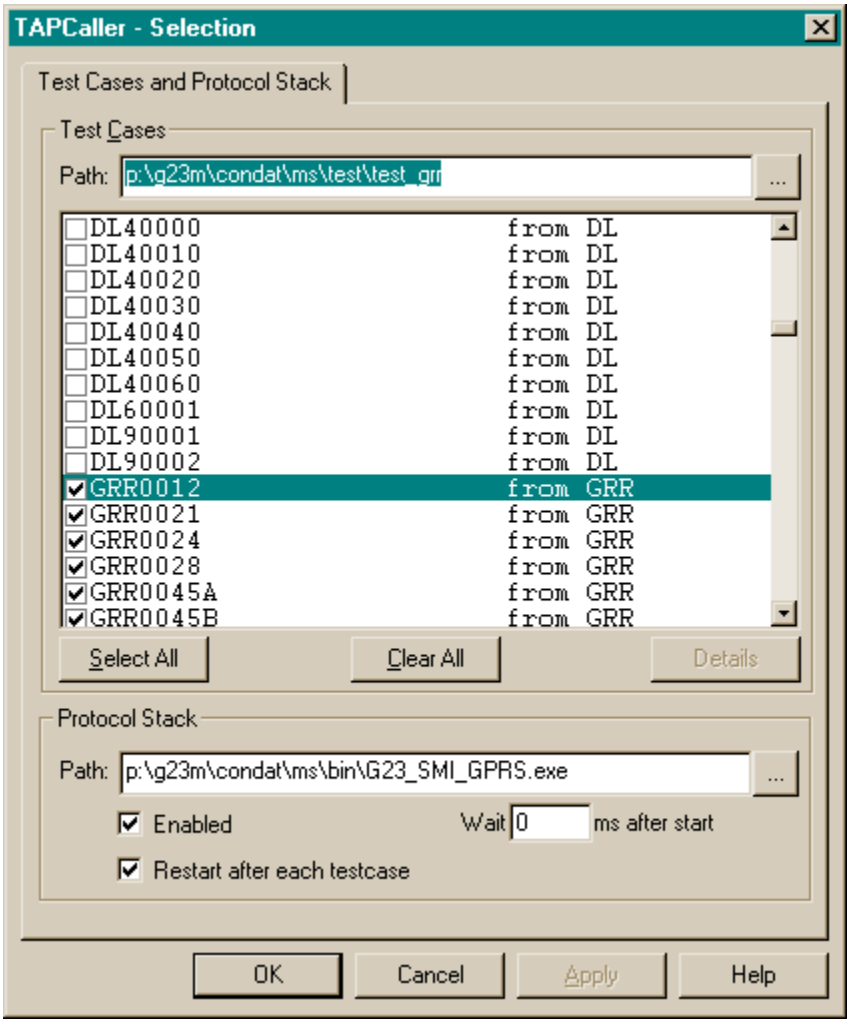
In the next edit box the user can enter the location of the TDS Flow Viewer "MSCView". The latest MSCView executable is in "<view>\Gpf\Bin\". MSCVIEW is a tool used to display the expected structure of the flow of messages/primitives.

The last edit box is used to specify the location of the test definition scripts (*.tds). The user cannot load titles, find the final tests or start MSCView unless he/she has entered this location.
This setting is not needed for TDC test cases anymore.



2.5.2 The Dialog Box "Selection"

Using the menu "<Configuration><Selection>" the user can access the selection dialog. There he/she marks the test cases he/she wants to run and specifies the PS to be tested.



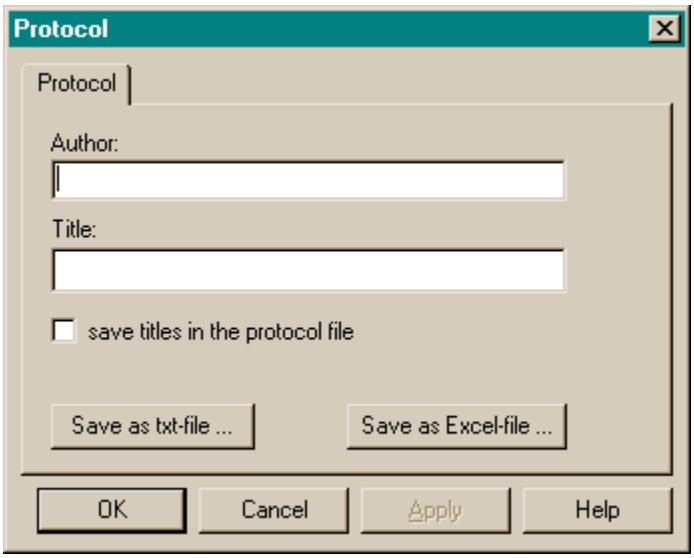
There are two sources of test cases at the moment: normal test case dlls and test document dlls, which contain all test cases of a test document. TDC test cases are also compiled into one big DLL.
In order to help the user selecting executable test cases TAPCaller distinguishes two kinds of dlls: test case dlls (dlls which match a certain name pattern) and other dlls which are possibly test document dlls. Test case dlls can be selected by clicking the check boxes at the left edge of the list box. Other dlls cannot be selected, but the "Details" button is enabled for these dlls. Clicking it (or just double clicking the DLL) results in listing all exported functions, who match the name pattern of test cases. The user can select these functions like normal test case dlls. If TAPCaller finds a dll with the same name as a function from a test document dll in the same directory, this function cannot be selected, since TAP searches for a DLL first and opens a test document dll when it does not find a test case dll.

Additionally, suites as a possibility of combining test cases with certain commands (for repetition, random choice, ...) are now available. The suite files contain several internal suites, which are used in other suites, and external suites, which are executable by TAP from the command line or via TAPCaller. As for test document dlls the "Details" button is enabled when a suite file is chosen. After clicking this button the external suites are added to the selection dialog and can be chosen.
In order to help the user distinguishing the several file types the second column of the list box contains the supposed kind of the file (e.g. "test case dll"). If a test document dll is opened the name of the test document is added to the test case functions (e.g. "MCOMP020 from MCOMP").

The second section of this dialog is for selecting the PS to be tested. The user can let Tapcaller start the protocol stack automatically a certain amount of ms before the execution of TAP by selecting the executable, checking the “Enabled”-box and specifying the milliseconds. (This is not necessary with the newest tap/frame anymore, since automatic synchronization is done).
If “Enabled” is not selected TAPCaller expects that the PS is already running.
Selecting “Restart after each testcase” will do exactly what it says ;-)

2.5.3 The Dialog Box "Protocol"

The protocol support of TAPCaller is currently very rudimentary and will be improved in upcoming versions.



In this dialog the user can specify his name and a title for the report to be created.
Enabling “Save titles in the protocol file” tells TAPCaller to include all test case titles in the exported files.

Via the two “Save as ..”-buttons the actual report can now be exported.

3 Known problems and future tasks

This paragraph is meant to show which bugs are already found (but not removed yet) and to provide an impression of future plans concerning this product.

3.1 Known bugs

•

3.2 „Soon implemented“

- Online-Help-update

3.3 „Nice to have “

•

Appendices

A. Acronyms

DS-WCDMA Direct Sequence/Spread Wideband Code Division Multiple Access

B. Glossary

International Mobile Telecommunication 2000 (IMT-2000/ITU-2000) Formerly referred to as FPLMTS (Future Public Land-Mobile Telephone System), this is the ITU's specification/family of standards for 3G. This initiative provides a global infrastructure through both satellite and terrestrial systems, for fixed and mobile phone users. The family of standards is a framework comprising a mix/blend of systems providing global roaming. <URL: http://www.imt-2000.org/>