

PCO

Features Overview

General Overview

Filtered Tracing

Structure Interpretation

Logging, Replay and Testcase Generation

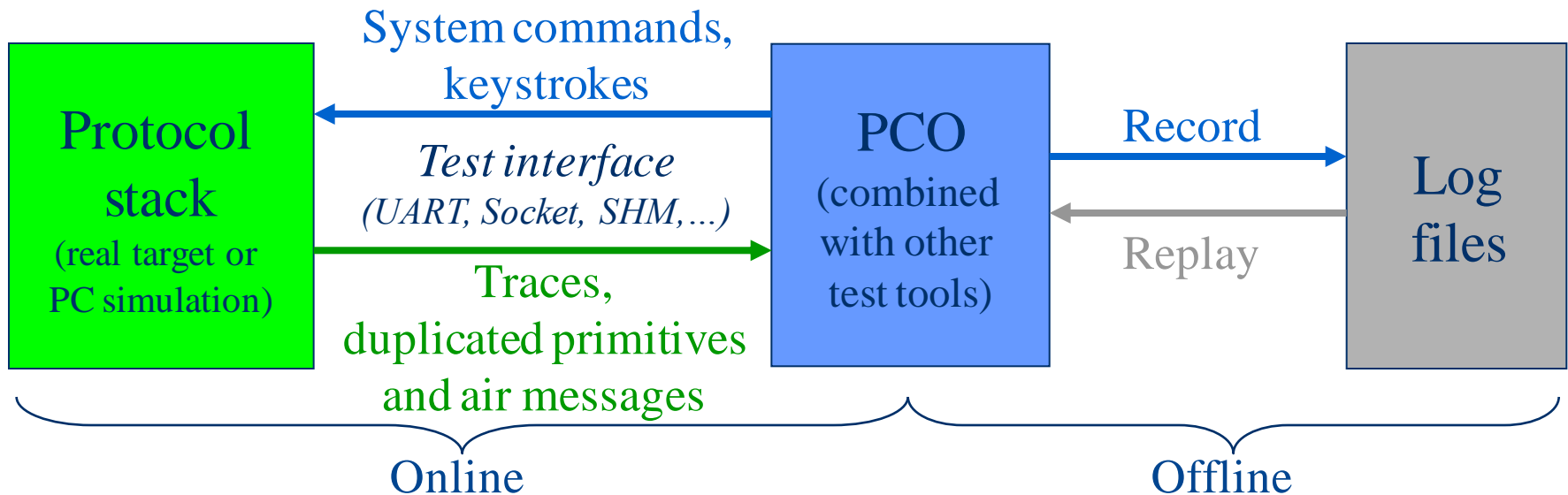
Integration with other Tools

Scripting

PCO ... features overview

General Overview

- **PCO – Point of Control and Observation**
 - ⇒ control of the PS behaviour and produced traces via system commands
 - ⇒ observation of all kinds of states and the data flow inside the PS
- **Online and offline mode available**
- **Freely combinable set of GUI applications and scriptable command line tools**
- **Open interface to derive customized viewers**
 - ⇒ e.g., a dedicated Engineering Mode Window is under development



PCO ... features overview

Filtered Tracing

- Traces, primitives and air messages can be watched ...
 - ⇒ in one or more customized windows
 - ⇒ synchronized among all layers (L1 and L2/3)
 - ⇒ distinguishable by colors
- Compression of traces at the test interface
- Observation of dedicated parameters
 - ⇒ e.g., neighbor cell count
- Various kinds of filters may be applied
 - ⇒ per SAP
 - ⇒ per entity
 - ⇒ per primitive/air message

The screenshot shows two windows from the PCO software. The 'main.svc - Live data stream' window displays a table of traces with columns T, Nr, Time, Snd, and Name. The 'syst.svc - Live data stream' window displays a table of system events with columns T, Nr, Time, Snd, and Content. Both windows show a list of traces and system events, with some entries highlighted in green and others in blue.

General	Traceclasses	Primitives
	GMM	MM
	MM	RR
	SMS	GRR
	GRLC	SM
	CC	
GMM		
MMI		
MM		
RR		
SMS		
GRR		
GRLC		

Watch:	Don't watch:
<input checked="" type="checkbox"/> TAP <input checked="" type="checkbox"/> TDC <input checked="" type="checkbox"/> CC <input checked="" type="checkbox"/> CCD <input checked="" type="checkbox"/> CST <input checked="" type="checkbox"/> DL <input checked="" type="checkbox"/> FAD <input checked="" type="checkbox"/> GMM <input checked="" type="checkbox"/> GRLC <input checked="" type="checkbox"/> GRR <input checked="" type="checkbox"/> L1 <input checked="" type="checkbox"/> L2R	<input type="checkbox"/> PAN <input type="checkbox"/> PCO <input type="checkbox"/> RCV <input type="checkbox"/> SYST <input type="checkbox"/> TST <input type="checkbox"/> SYST <input type="checkbox"/> TST

Air messages:

- ☒ FAC (0x07)
- ☒ GMM (0x09)
- ☒ GRLC (0x0C)
 - ☒ D_GRLC_UL_ACK (0x09)
 - ☐ U_GRLC_CTRL_ACK (0x01)
 - ☐ U_GRLC_DL_ACK (0x02)
 - ☐ U_GRLC_RESOURCE_REQ (0x05)
 - ☐ U_GRLC_UL_DUMMY (0x03)
- ☒ GRR (0x0B)
- ☒ MM (0x02)

PCO ... features overview

Structure Interpretation

- Hexdumps of duplicated primitives are interpreted
 - ⇒ the individual values of elements are shown
 - ⇒ ... together with cleartext explanations
- Air messages are decoded
 - ⇒ and interpreted as well

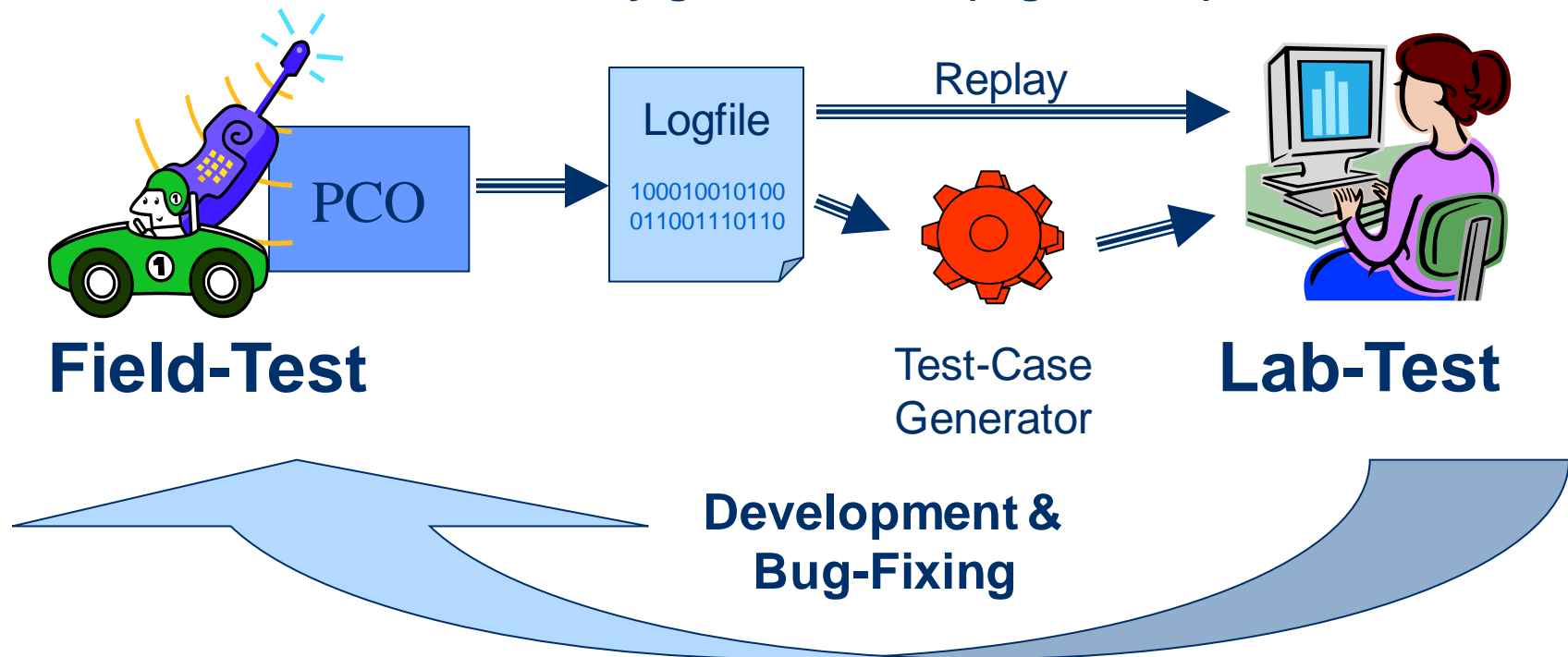
1023	13:00:01:209	RR	RR_DATA_IND	MM	02 00 01 01 30 00 18 00 00 00 00 83 01 1E 02 EA 88 6E 05 F5 52 C2 0E
1039	13:00:01:302	MM	MMCC_DATA_IND	CC	02 00 01 01 30 00 18 00 00 00 00 83 01 1E 02 EA 88 6E 05 F5 52 C2 0E

Element	Value	Cleartext/Info
RR_DATA_IND	OPC: 0x80034006	
d1 (dummy, not used)	02	
d2 (dummy, not used)	00	
D_ALERT	01 (258*00) 01 01 03 01 0A 01 08 (142*00)	<AIR MESSAGE>
msg_type (Message Type)	01	
facility (Facility)		<element invalid/not present>
progress (Progress indicator)	01 03 01 0A 01 08 00 00	<Sub structure>
cs (Coding standard)	03	standard defined for the GSM PLMNS as
loc (Location)	0A	network beyond interworking point
progress_desc (Progress de..	08	In-band information or appropriate pat
user_user (User-user)		<element invalid/not present>
MMCC_DATA_IND	OPC: 0x80004007	
d1 (dummy, not used)	02	
d2 (dummy, not used)	00	
D_ALERT	01 (258*00) 01 01 03 01 0A 01 08 (142*00)	<AIR MESSAGE>

PCO ... features overview

Logging, Replay and Testcase Generation

- All data received via the test interface can be
 - ⇒ recorded into logfiles
 - ⇒ replayed, e.g., with different filter settings
 - ⇒ used to automatically generate new (regression) test cases

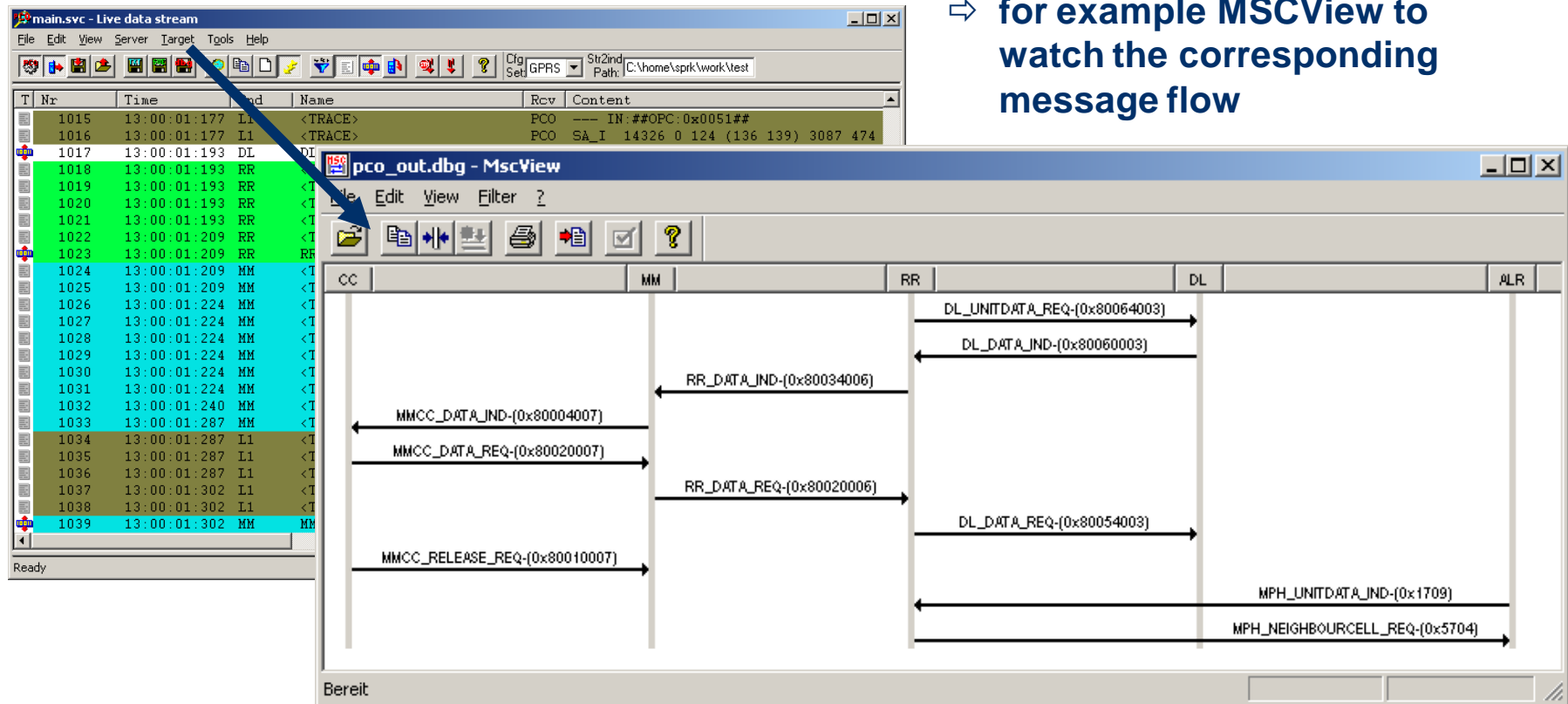


PCO ... features overview

Integration with other Tools (1)

- Export functions for various file formats (e.g., ASCII) exist
- Already a lot of tools can be directly used on the current viewer entries ..

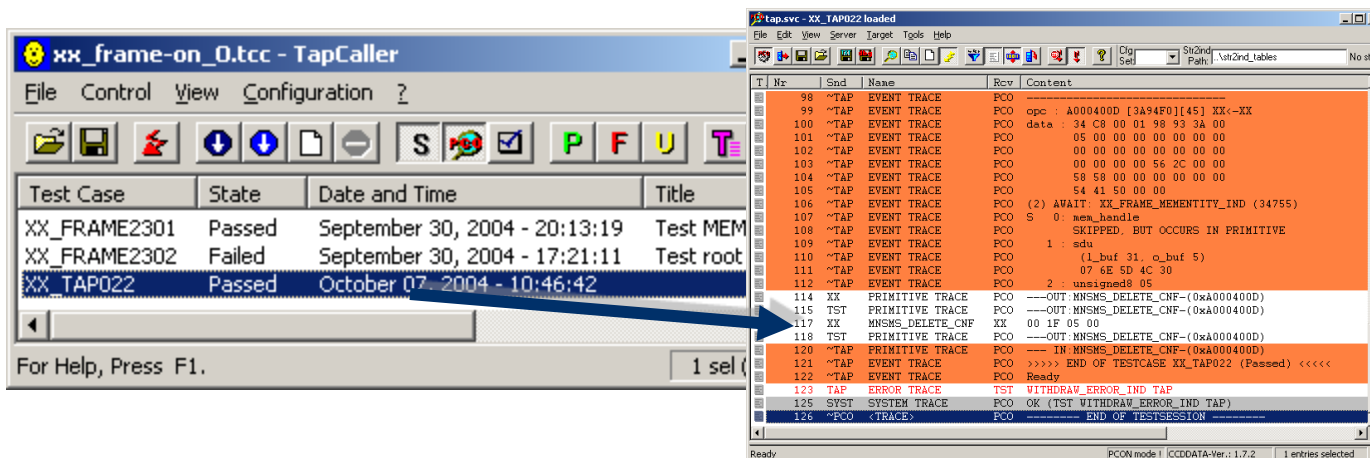
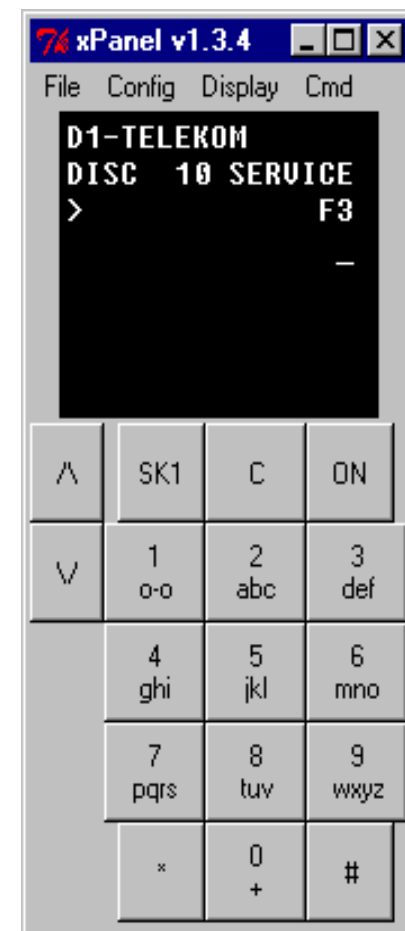
⇒ for example MScView to watch the corresponding message flow



PCO ... features overview

Integration with other Tools (2)

- Many tools exist which use the same framework as PCO
 - ⇒ ... and can, therefore, run in parallel as needed
- Some of them are usually started automatically by PCO
 - ⇒ ... for example the virtual mobile „xPanel“
- In further cases parts of PCO are started by other applications
 - ⇒ ... like the Test Application Process:



Scripting

- **PCO also comes with various command line tools ...**
 - ⇒ to control the logging/replay process
 - ⇒ to do converting
 - ⇒ to send system commands to the protocol stack
 - ⇒ ...
- **The PCO Reaction Viewer component ...**
 - ⇒ monitors incoming traces
 - ⇒ ... and starts actions triggered by rules defined in a dedicated XML file, e.g.:
 - ◆ sending of system commands
 - ◆ starting of applications

Live Demonstration

Thanx for your patience 😊