WELCOME
Alcatel-Lucent Enterprise
Model Based Testing applied to Video Testing
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AGENDA

1. Modeled Use Case description
2. Implemented tool chain
3. User oriented modeling approach
4. Model Extract
5. Test generation using pairwise testing
6. Automation strategy
7. Results and perspectives
8. Questions and answers session
**Alcatel-Lucent** myIC Video use case on OpenTouch™

*My Instant Communicator Use Case description*

Two users want to connect with next generation resources: audio and video. Both users own a Unified Communication Application (a.k.a. myIC) with the video feature enabled. They are identified as “local” and “distant”.

- Both myIC users (local and distant) can do a call to the other user, with or without video
- Both of them can accept the call with the video or only in audio
- In video call established, both users can: mute, play or drop the video (call becomes audio only)
- In audio-call-only established, both users can add the video
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Implemented tool chain

Model
- Test state chart
  - Beg
  - Act1
  - Act2
  - End

Test Scenarios
- TC 1.1: nominal
- TC 1.2: alternative
- TC 1.3: exception

Automatic Test Scripts
- TS 1.1: nominal
- TS 1.2: alternative
- TS 1.3: exception

Test Case
- Device
  - Alternative
  - Exception

Use Case 1

Rational software
- Rhapsody

Quality Center

Quick Test Professional

CONFORMIQ
Automated Test Design™
Black Box Approach: we are focusing on behavior of the system without worrying on how it works.

One single state chart for modeling this Black Box.

This use case description is easy to understand for all stakeholders (solution designers, developers, testers) of the project.

Design, development and test reviews are more efficient based on this modeling.

Customer guide can be produced from this modeling too.
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*User oriented modeling approach*

- Black Box Approach: we are focusing on behavior of the system without worrying on how it works

- One single state chart for modeling this Black Box

- This use case description is easy to understand for all stakeholders (solution designers, developers, testers) of the project

- Design, development and test reviews are more efficient based on this modeling

- Customer guide can be produced from this modeling too

- Our test result is done on the output of the black box
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Model extract

Simplified

**BOTH USERS IDLE**
- Local or Distant starts an audio call
- Audio call ringing
- Local or Distant starts a video call
- Audio call ringing
- User takes call in audio only
- User takes audio call
- User takes call in video
- User takes call in video
- Local or Distant drops video
- Video call ringing
- Local or Distant adds video
- Local or Distant Hang up audio call
- CALL ON HOLD
- BOTH USERS IDLE
- Local or Distant Hang up video call

**VIDEO CALL ESTABLISHED**
- **No Mute**
  - Local Mute
  - distant Mute
  -mute/ Unmute
  - User takes audio call
  - User takes call in audio only
  - User takes call in video
  - Video call ringing
  - Video call ringing
  - Unhold call
  - CALL ON HOLD
  - BOTH USERS IDLE
  - Local or Distant Hang up video call

**Out of Conformiq**

```
... Code snippets for Conformiq ...
```
Pairwise (a.k.a. all-pair) generated test suites cover all combinations of two factors: very effective in finding defects.

In the same idea than modeling approach (“Use Case” vs. “System” modeling), we less care about code coverage than what end-users will do:
- E.g.: during a video call, users can drop and then add video. During an audio call, users can add video and then hold ...

Default mode generation: 20 Test Cases generated
- Not satisfying vs. test strategy
- No guarantee to have a test with drop then add or with add then hold ...

All States combinations: 1000 Test Cases generated
- Really too many redundancies and impact on execution duration

Pairwise: 70 Test Cases generated
- Good coverage vs. test strategy. Good compromise regarding execution duration
- Guarantee to have a test with drop then add another with add then hold ...
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Automation strategy

- Model designed for automation but without execution information
- Functional high level description applicable to any automatic test framework
- 3 layers model: from User Action to System Under Test via a Translation layer

Test Cases generated from model and exported with the MBT tool plug-in

High level view / logical representation

Specific translation layer to adapt to each test environment

Concretize the logical TC by assigning real values for execution and by calling the generic test harness functions

Generic test harness for execution

Standards libraries that interoperate with the SUT (stimulation, supervision)
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Results and perspectives

• Presented case effort summary
  • Modeling and test generation: 2 men.week
  • Automation 4 men.week
    • Model vs. Scripts debug: 1 man.week
    • Test harness development (independent of MBT): 3 men.week

• Openness to future evolutions of the model
  • Addition of a third my Instant Communicator user for call evolution
    • Enquiry call, transfer
    • Conference
  • Re-use of the model for
    • future Alcatel-Lucent device supporting video
    • third party video equipment
Any question?
AT THE SPEED OF IDEAS
Backup slides
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Pairwise testing, what is it?

- Extract of our pairwise strategy:
  
  *Call Type = “Audio IN” or “Audio OUT” or “Video IN” or “Video OUT”*
  
  *Video action in audio = “local adds Video” or “distant adds Video” or “Nothing”*
  
  *Hold action in video = “local holds Call” or “distant Holds call” or “Nothing”*
  
  *Video action in video = “local drops video” or “distant drops Video” or “Nothing”*

- E.g. of pairs:
  
  - “Audio IN” and “local adds Video”
  - “Audio IN” and “distant Holds call”
  - “Video OUT” and “distant Holds call”
  - “local adds Video” and “distant Holds call”

- And in one test, we’ll cover several pairs (6 here):
  
  - “Audio IN” / “local adds Video” / “distant Holds call” / “distant drops Video”
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**Video automation methodology**

- Functional behavior simulation
  - Two Quick Test Professional synchronized through COM sockets
  - Synchronous action request from Master to Slave
  - Local check of actions and video continuity and OK or KO answer
- Video presence and continuity check
  - Two images alternated every 5 seconds sent on the screen by a virtual webcam
  - 3 captures in a 10 seconds timeframe by Quick Test Pro
  - QTP native check bitmap function for video presence assessment
AT THE SPEED OF IDEAS
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