How to Increase Efficiency in Interoperability Testing by Using Test Automation Frameworks

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Speaker

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Agenda

- Motivation
  - Interoperability Testing – Who and Why
- How to increase the efficiency of interop testing
  - Where is the money spend
  - How can we spend the money more efficiently
- Conclusion

Different Types of Testing

- Development Tests (Unit, Module, Component, …)
- Standardized Functional Testing (Testing against a standard)
- Interoperability Tests (Implementation against each other, n x m testing)
- Performance Tests (High, long-lasting load)
Different Types of Testing

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Interoperability Testing Today

- Classical conformance testing, testing against a standard or specification, is losing ground
- Interoperability testing, pair wise testing, is accepted as a solution to improve interoperability
  - ETSI - Test Specifications, Plugtest
  - OMA – Test Specifications, Test Fest
  - SIP Forum – SIPit, SIMPLEt
  - NGN Forum – Plugfest
  - TETRA Association - Certification
  - Over 900,000 hits at Google and Yahoo, more than 4 million hits with Bing
- Majority of interop testing is performed manually
- Manual testing suffers from well known problems
  - Labor intensive
  - Non scalable
  - Error prone
  - Etc…
Test Efforts Break-Down
Current Situation

A Case-Study for IMS

IMS?
A Case-Study for IMS

IMS = IP Multi-Media Subsystems

Different Access Technologies

Different Transport Layers

Services in the telecommunication
Some Numbers of the IMS Interop event

- The setting
  - 6 vendors
  - 43 Interop test cases
  - 30 test sessions
  - Approx. 900 test runs
  - In 3 days

- The efforts
  - 150h of testing and (40%)*
  - 225h of validation (60%)*
  - Sums up to 375h! (100%)*

Test Efforts Break-Down

Current Situation

- Test Design
- Test Specification
- Test Verification
- Test Implementation
Test Efforts Break-Down

Favored Situation

Concentrate on what should be tested not how.

Test Design
Test Specification
Test Verification
Test Impl.

 HOW TO ACHIEVE THIS?

Concentrate on what should be tested not how.

!TEST AUTOMATION!

(continued on subsequent pages)
Concentrate on what should be tested not how.

Reusability
The Key to Efficiency Increase

- Reusability across types of testing
- Reusability of information between
  - System architects
  - Developers
  - Testers
  - Managers
- Reusability of test implementations
- Reusability of know-how

- Introduction of a common test language across the different phases aka TTCN-3
TTCN-3 – What is This?

- A testing technology
  - Telecommunication, Software Industry, Automotive
- A textual and graphical test scripting language
  - Familiar look-and-feel
- A test implementation language
  - You know today how your test system looks like
- A test and test implementation framework
  - Don’t reinvent the wheel, use existing resources

*TTCN-3 stands for Testing and Test Control Notation*

How to Profit from TTCN-3

- Development Tests
  - Test Cases
- Standardized Functional Tests
  - Test Cases
- Interoperability Tests
  - Test Cases
- Performance Tests
  - Test Cases

*TTCN-3 Environment*

- SW-Based Access
  - Module Under Tests
  - Global Players
- PC-Based Access
  - Device Under Test
  - ETSI, WiMAX, OMA, and Others
- Trace-Based Access
  - System Under Test
  - Plugfest Support
- Load Test Devices Access
  - Network Under Test
  - Native Test Devices Support
An Efficiency Increase Approach

- Automate the validation part at interoperability testing
  - Validation takes most of the time
- Reuse existing test frameworks
  - Profit from investments already done
- Use industrial grade test automation tools
  - Benefit from well accepted processes, workflows and tools

A TTCN-3 based trace analysis tool to minimize the validation effort at interoperability events

The Result

- 30 Configuration files to redefine the interop test scenarios
- Trace import and validation integrated in TTworkbench
- 43 TTCN-3 based test cases executable in TTworkbench
The Result
What do we gain?

- Manual Validation
- Automated Validation
- Automated Validation w Prep

- Total time for validation
- Total time for execution
- Total time for preparation
Conclusion

- Interoperability testing is an accepted way to reduce interoperability problems
- It is time consuming and error prone and therefore expensive
- Automation tools can reduce the costs of interoperability testing up to 50% by using standardized test framework and off-the-shelf tools like TTworkbench
- Standards, tools and the people are available today

THANK YOU!

Questions?