TTCN-3 MOST Challenges

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Agenda

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- MOST Protocol Overview
- MOST Architecture Mapping to TTCN-3
- Code reusability. Test Case Patterns
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- Human Machine Interface stimulation via MOST for system tests
- Function Blocks simulation in TTCN-3 for development tests
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Automotive Infotainment

The modern automobile is a rolling office and entertainment center. In-vehicle infotainment refers to all the digital applications that can be used by all passengers:

- Internal connectivity
- Navigation and location-based services
- Entertainment
- External communications
- Tuner

Complex Automotive entertainment and information systems. TTCN-3 challenges shift towards concept creation, smart design and test strategy definition.

MOST Protocol Overview

Media Oriented System Transport (MOST) is a networking standard intended for optically interconnecting multimedia components in automotive industry.

Features:

- Network protocol
- Wide Application Range
- Ring Topology
- Asynchronous and Synchronous data transfer
- Plug and Play feature for adding and removing devices
MOST Architecture Mapping to TTCN-3

- MOST - good possibilities for type and codec generation
- TTCN-3 – provides the foreign type systems interface
- Allows to focus on test suite creation

MOST Properties and Methods follow well defined patterns.

We created:
- Structured library of functions to support MOST flow and specifications
- MOST patterns integrated in the functions library
- Function generator improved our development time

Code Reusability.
Test Cases Patterns

- Test Case design consists of combining the right function calls and controlling the test verdict and execution
- Maintenance is done mainly in the function library
- Changes are propagated automatically to a large sets of test cases
Test Approaches for MOST

- **Smoke Test** – boundary analysis and equivalence classes
- **Integration tests** - message sequence charts
- **System integration tests** – component interaction based tests

We apply concrete test strategies to design test scenarios and complete test suites.

Human Machine Interface Stimulation

- Send user actions to SUT via MOST specific function blocks
- Simulate the function blocks and spy at incoming messages from HMI
- Compare the HMI calls against the sequence charts
- Test how the HMI communicates with the function blocks
- Ensure the right data is sent through MOST on user action and the expected behavior is achieved
Function Blocks Simulation in TTCN-3

- TTCN-3 test cases will stimulate a controller (e.g. HMI) of the function blocks
- Verify if the expected application behavior is met
- In order to test our test system we chose to simulate the application layer of the SUT at the communication level
- TTCN-3 will encapsulate both communicating parties

Mixing MOST with Different Protocols and Layers

System Under Test design for testability can offer additional layers of verification.

MOST traces compared with messages in other system layers to verify correct behavior.

Defined ports and system architecture to handle multiple protocol.
Lessons Learned

- Good understanding of the SUT is necessary
- Quality of the test suite is very important
- Synchronize with the subcontractors regularly
- Involvement in requirements right from the beginning
- Test management tool integration eases reporting
- Coverage metrics very important

Conclusions

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There is a long way to consume it all but new possibilities lead us to search for the best solutions!

Thank you!

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