

Automating Test Automation

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Initial situation

Substitute legacy solution with advanced test automation



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Possible Approaches

1. Implementation in standard programming language

- Tailored solution for problem at hand
- High effort for development
- In the past this approach was chosen

2. Implementation of test framework

- Reuse of test automation solution parts in other environments
- Generalization of test automation problem (WinRunner, Robot, ...)
- Existing solutions focus on GUI interface

3. Use of standardized test specification and implementation language (TTCN-3)

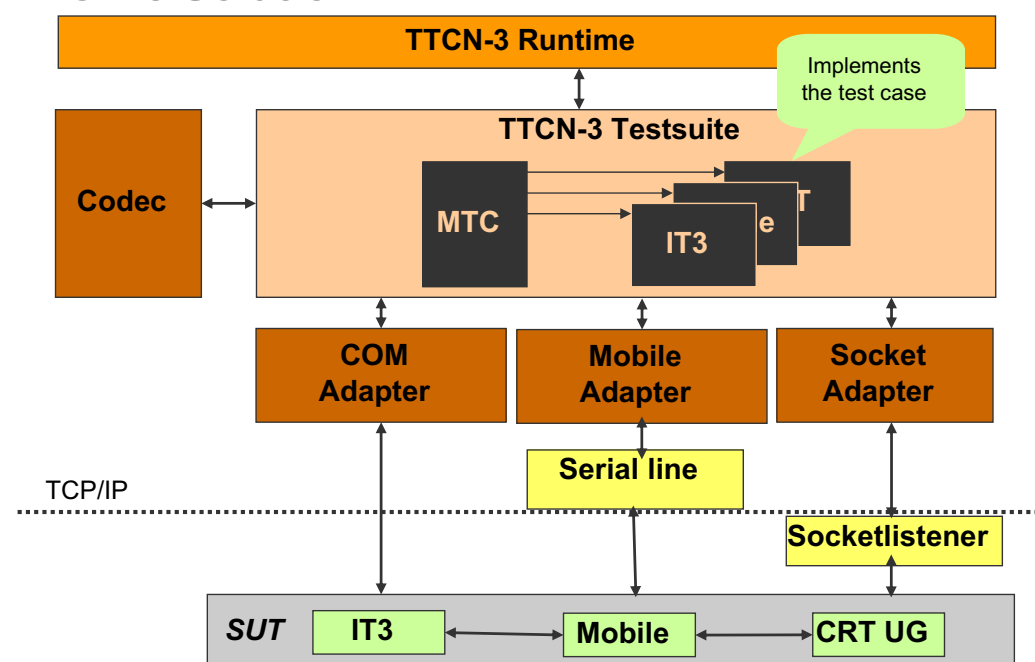
- Specify test in standardized language
- Create abstraction of test solution
- Use test framework at the fraction of the development costs



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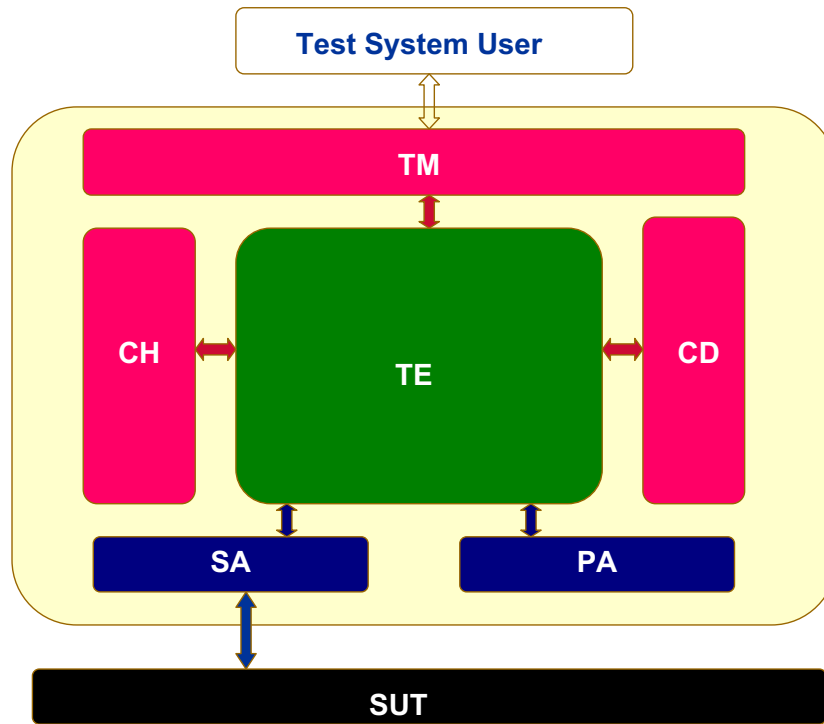
TTCN-3 Solution



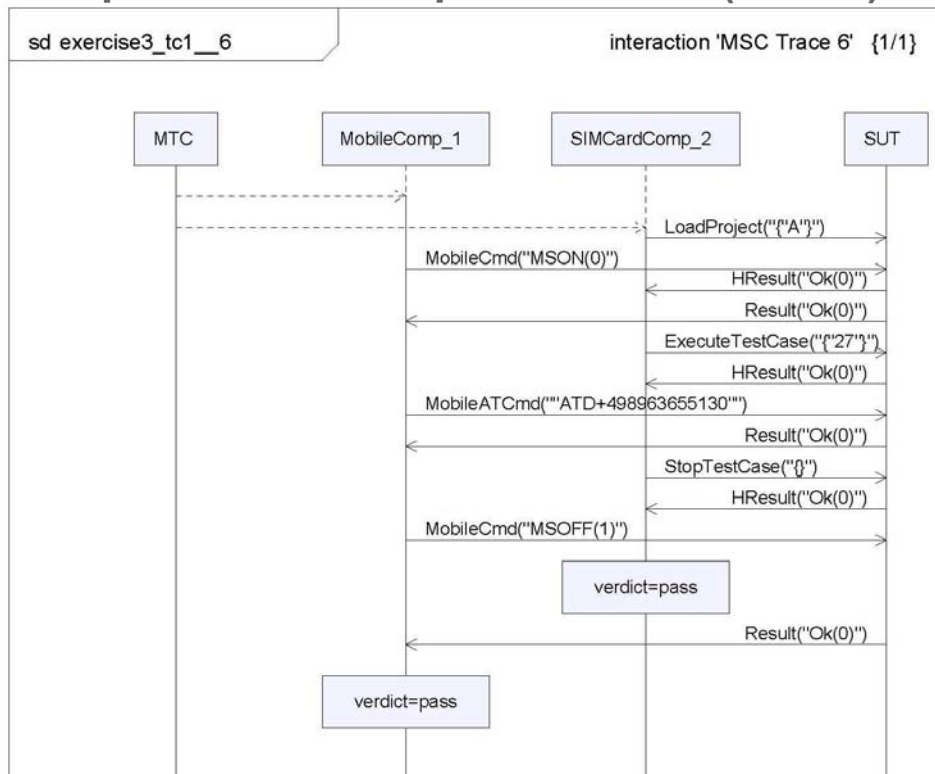
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Structure and Synergies of TTCN-3



Test Specification / Implementation (UML 2)



Test Specification / Implementation (TTCN-3 Sequence)

```

function SIMCardTest() runs on
    SIMCardComp {

    simcard.send(LoadProject:{"A"});
    t.start(3.0);
    SIMcardDefault(); // Reuse
    simcard.send(ExecuteTestCase:
{"27"});
    t.start(3.0);
    SIMcardDefault();
    sync(); // Synchronization
    sync(); // Synchronization
    simcard.send(StopTestCase:{});
    t.start(3.0);
    SIMcardDefault();
    setverdict(pass);
}

function MobileTest() runs on
    MobileComp {

    mobile.send(MobileCmd:MSON);
    t.start(3.0);
    MobileDefault(); // Reuse
    sync(); // Synchronization
    mobile.send(MobileATCmd:
"ATD+498963655130");
    t.start(3.0);
    MobileDefault();
    sync(); // Synchronization
    mobile.send(MobileCmd:MSOFF);
    t.start(3.0);
    MobileDefault();
    setverdict(pass);
}

```



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Test Plan Specification (TTCN-3 Control)

```

execute(tMSON_AnyPIN_MSOFF_End("27.11.1.1"));
execute(tMSON_AnyPIN_MSOFF_End("27.11.1.2 (min)"));
execute(tMSON_AnyPIN_MSOFF_End("27.11.1.2 (max)"));
execute(tMSON_AnyPIN_MSOFF_End("27.11.1.3a.1 (N=0)"));
execute(tMSON_AnyPIN_MSOFF_End("27.11.1.3a.2 (N=255)"));
execute(tMSON_Wait_MSOFF_End("27.11.1.3a.3 (N=35)"));
execute(tMSON_AnyPIN_MSOFF_End("27.11.1.3b"));
execute(t27_11_1_3c("27.11.1.3c"));
execute(tMSON_AnyPIN_MSOFF_End("27.11.1.4"));
execute(tMSON_AnyPIN_MSOFF_End("27.11.1.5"));
execute(tMSON_AnyPIN_MSOFF_End("27.11.2.2"));
execute(tMSON_AnyPIN_MSOFF_End("27.11.2.3 (direct)"));
execute(tMSON_AnyPIN_MSOFF_End("27.11.2.3 (inverse)"));

```



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Challenges

- **Recreating all protocols is commercially not viable**
 - Integration only solution
 - Can be used to substitute solutions gradually
- **Commercial test equipment is not meant to be integrated**
 - No proper interface
 - Existing interfaces do not provide enough functionality
 - Buffering of messages might need to be extended
 - *Cooperation with manufacturer*
- **Neither are proprietary test automation solutions**
 - *Get hold of the developer ;-)*
- **No TTCN-3 type system exists, neither do codec nor adapter**
 - *Is easily implemented if good approach is chosen*



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Relevance of TTCN-3 to Business

- **TTCN-3 is a universal test notation**
 - Supports test of a large variety of systems (distributed, RT, embedded)
 - Supersedes any proprietary solution
 - Carries high potential for cost reductions
 - Test tool development
 - Adaptations to different systems under test
 - Test suite design
 - Test tool and test suite maintenance
 - Interfaces with model-based test generation tools
- **TTCN-3 is standardized**
 - Test notation is independent from tool providers
 - Test notation keeps pace with arising new technology trends
 - Growing TTCN-3 user community
 - Test suites for standard protocols become available
 - E.g. for SIP, IPv6, Hiperlan/2, WiMAX, etc.
- **Standardized TTCN-3 interfaces**
 - Providing quick adaptation to large variety of systems with *predictable costs*
 - Facilitating reuse of TTCN-3 test suites



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Summary

- **Legacy test automation exists!**
 - Often these solutions cater for a specific need and include hardware components
- **TTCN-3 can be a good choice for implementing a future-oriented solution with a higher degree of test automation!**
 - However recreating all of the existing parts in TTCN-3 might not be a feasible solution from a business perspective.
 - *Advice:* use those existing parts to substantially reduce the effort necessary to introduce an improved test automation solution.

***User statement:* A Standardization of testcases including the implementation in TTCN (e.g. Open Mobile Alliance, OMA) would result in reliable cross-system-boundaries (including network) test results on a large scale. This project has shown the path to this *vision* in an *impressive* way.**



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**Thank you for your
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