The role of TTCN-3 within the TETRA Certification process

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Contact:

Harald Ludwig
Chairman TETRA Technical Forum

harald.ludwig@arico-tech.eu
phone: +43 699 17 18 45 67

Contact:

Theofanis Vassiliou-Gioles
CEO, Testing Technologies

vassiliou@testingtech.com
phone: +49 30 726 19 190

Agenda

- TETRA Association
- Why TTCN-3
- How has TTCN-3 been applied
- Outlook

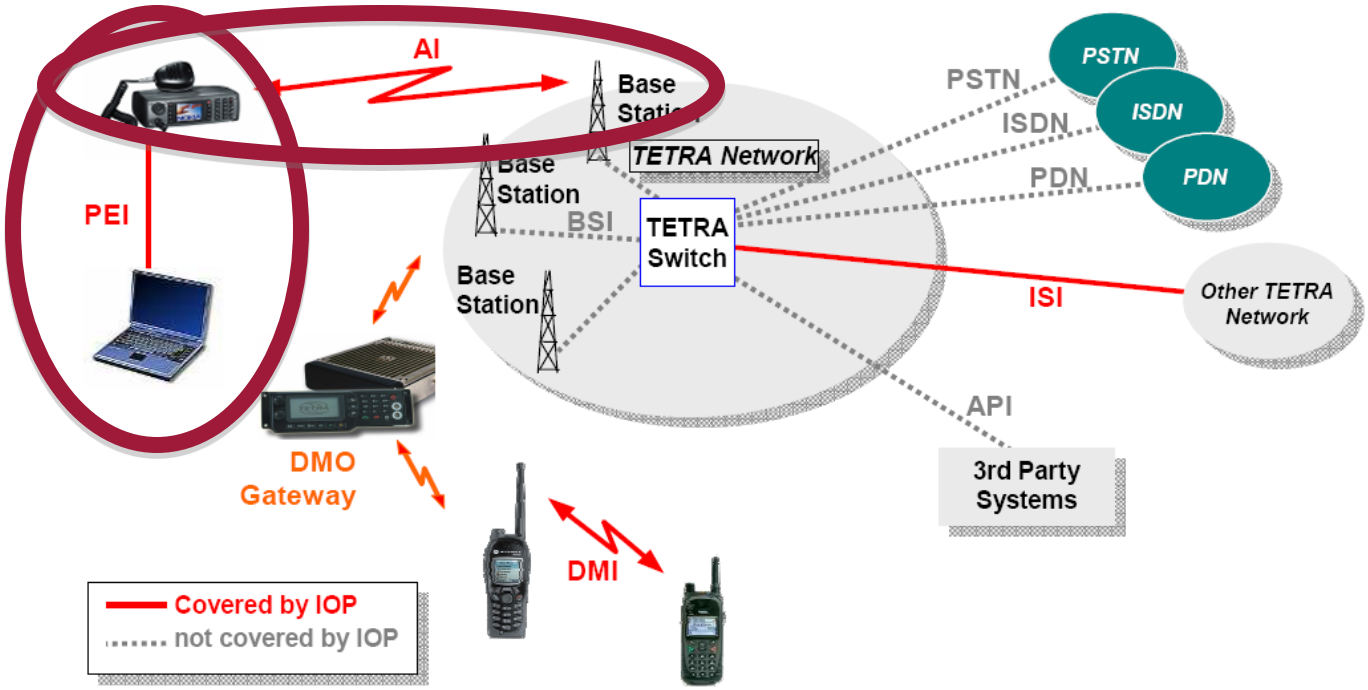
What is TETRA?

- **TE**rrestrial **T**runked **RA**dio
- Open ETSI Standard for Trunked Radio
  - Mobile Radio for Voice and Data
  - Group Communication, Encryption, Priorities
  - High Reliability and Availability
  - Multi-Vendor Market
- Nationwide Public Safety Networks
- Airports, Metros, On-site systems

- Goals:
  - support and promote the TETRA standard world-wide
  - provide a forum to share and exchange information and ideas
- 150 member organisations from 35 Countries
  - Manufacturers, Operators, Users, Applications Developers, etc.
- TETRA World Congress and TETRA Seminars
- TETRA Interoperability Tests
- www.tetra-association.com

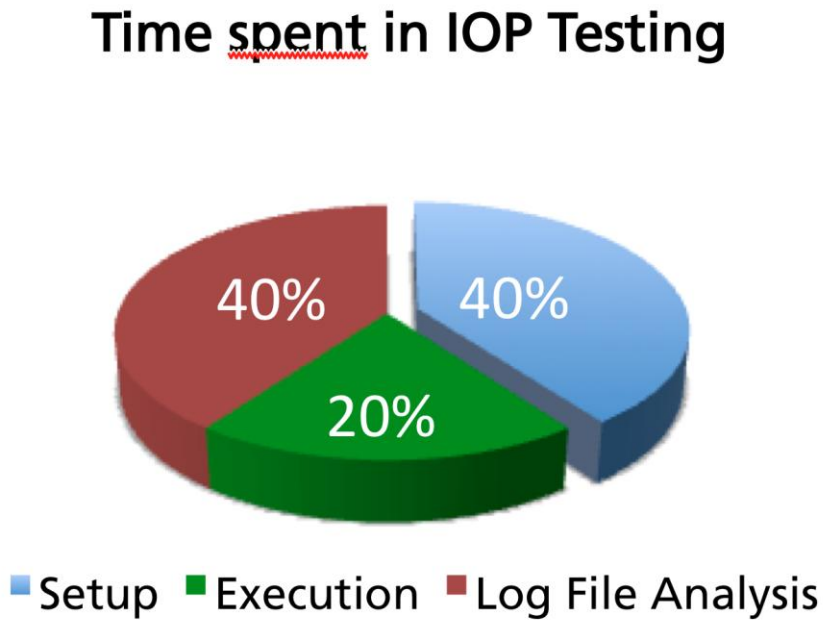
Interoperability (IOP) Tests

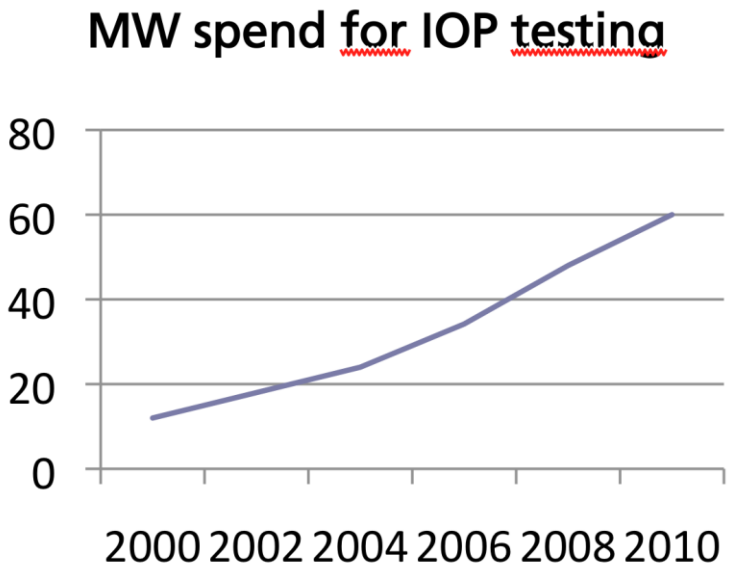
- Ensure, that equipment from one manufacturer is working with equipment from another manufacturer
- IOP ensures Open Standard and enables Multi-Vendor market



How is IOP Done Today?

- Today: Manual Tests between Manufacturer A and Manufacturer B (1000+ Test Cases)
- IOP Test Automation to decrease testing time and costs
- TETRA Association facilitates its members to use test automation





The Selection Process

- Idea for a TETRA owned scripting engine more than 2 year old. Started in 2007
- Open tender for the technology and a solution
  - 104 requirements in the area: hardware (16), language (14), licensing (17), functionality (30), upgradeability (11), maintenance and support (8), training (8)
  - 10 qualified responses, five on the short list
  - TTCN-3/TTworkbench
- Implementation phases (so far)
  - September 2009 – December 2009
  - January 2010 – May 2010

TTCN-3 Usage within TETRA

At IOP testing terminals are communicating end-2-end while observing the message exchange at the air interface

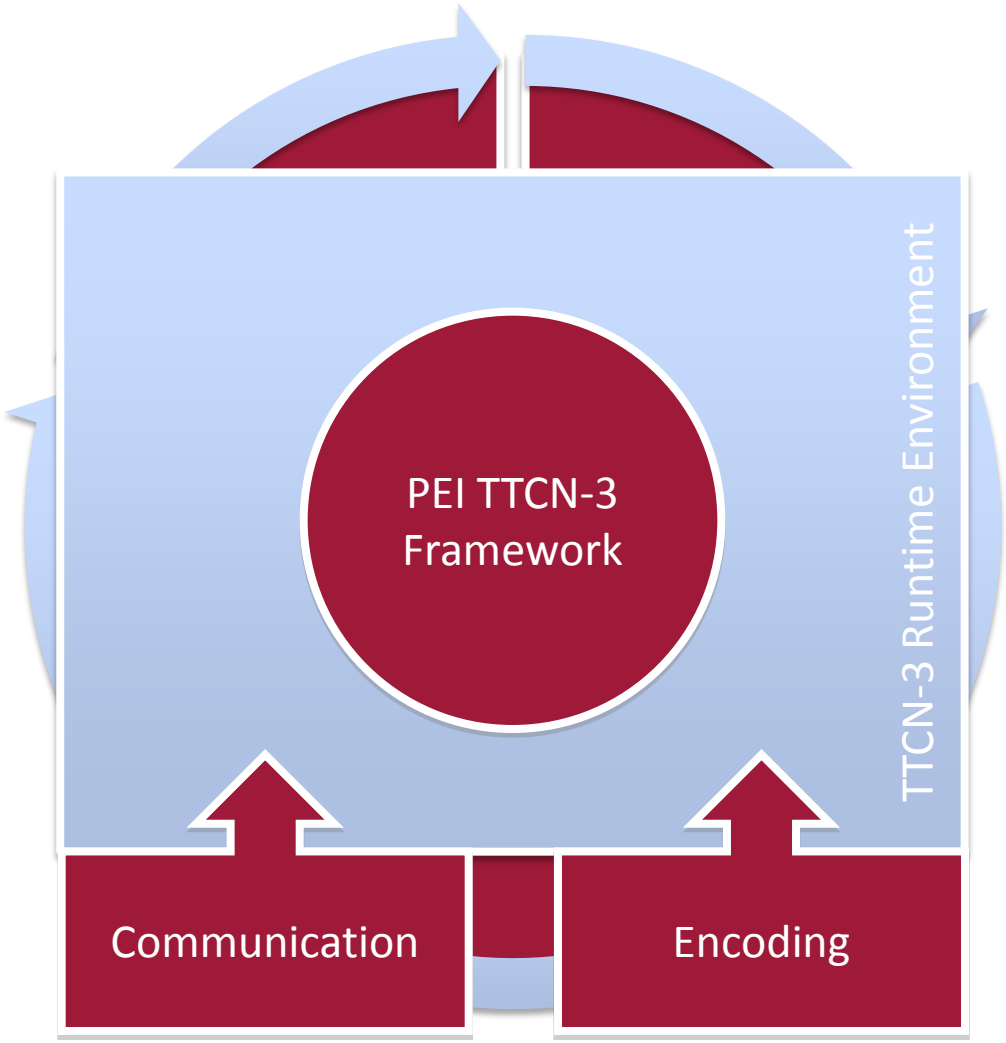
Scripting Engine

- Driving end-to-end tests at the terminals
- Standardized serial communication interface

Trace Analysis

- Observation of message exchange at the air-interface
- Standardized message format

Scripting Engine Framework



TTCN-3 Usage within TETRA

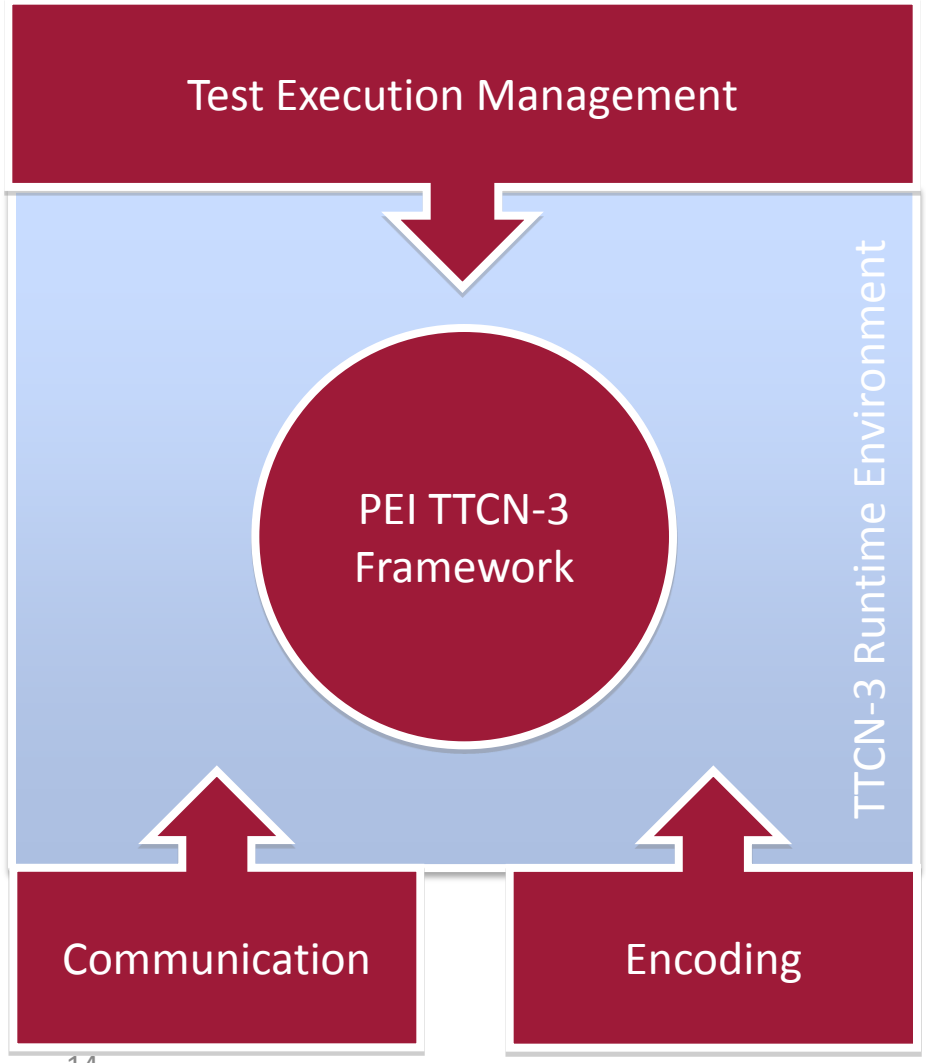
Demo Test Cases

Initial Test Cases

PEI Conformance

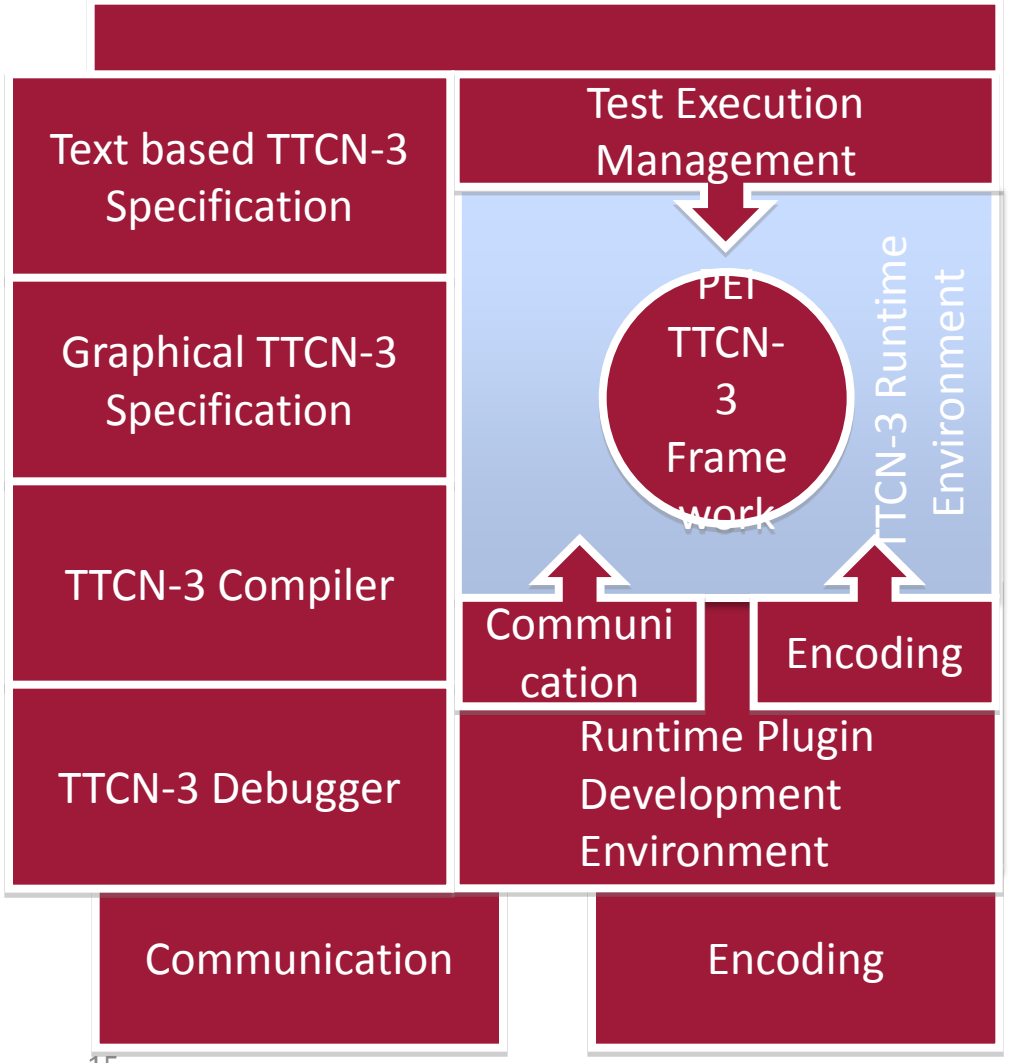
Scripting Engine

Basic License – TTworkbench Runner



- The light-weight command line execution environment for TTCN-3 test suites
- Execute released, pre compiled test suites
- Free of charge for TETRA members

Full License – TTworkbench Professional



- Graphical test development and execution environment based on TTCN-3
- Includes full range of features needed for
  - Text-based and graphical TTCN-3 specification
  - Compilation
  - Test case execution
  - Test result analysis and reporting
  - Debugging

TTCN-3 Usage within TETRA (II)

Demo Test Cases

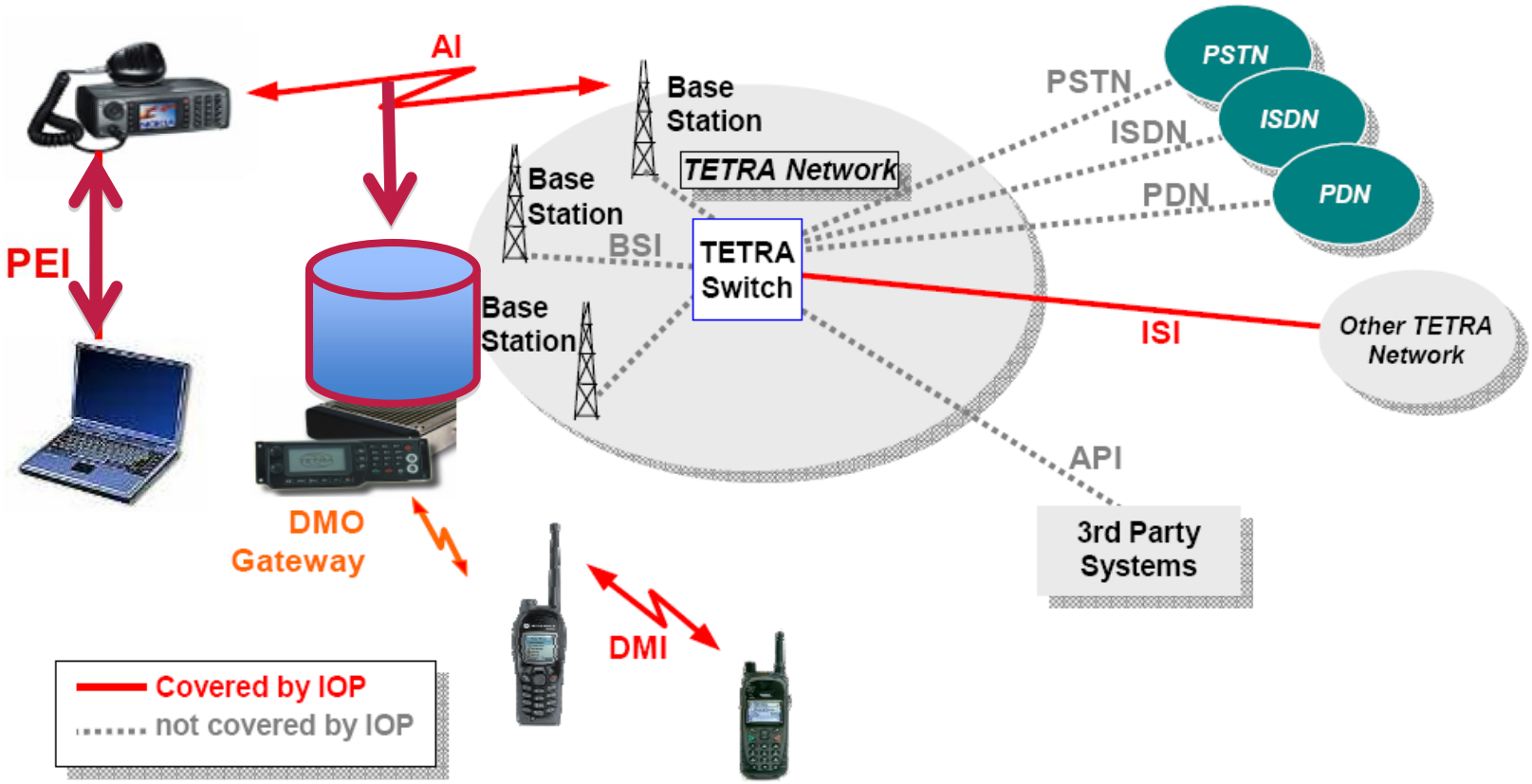
Initial Test Cases

IOP Test Cases

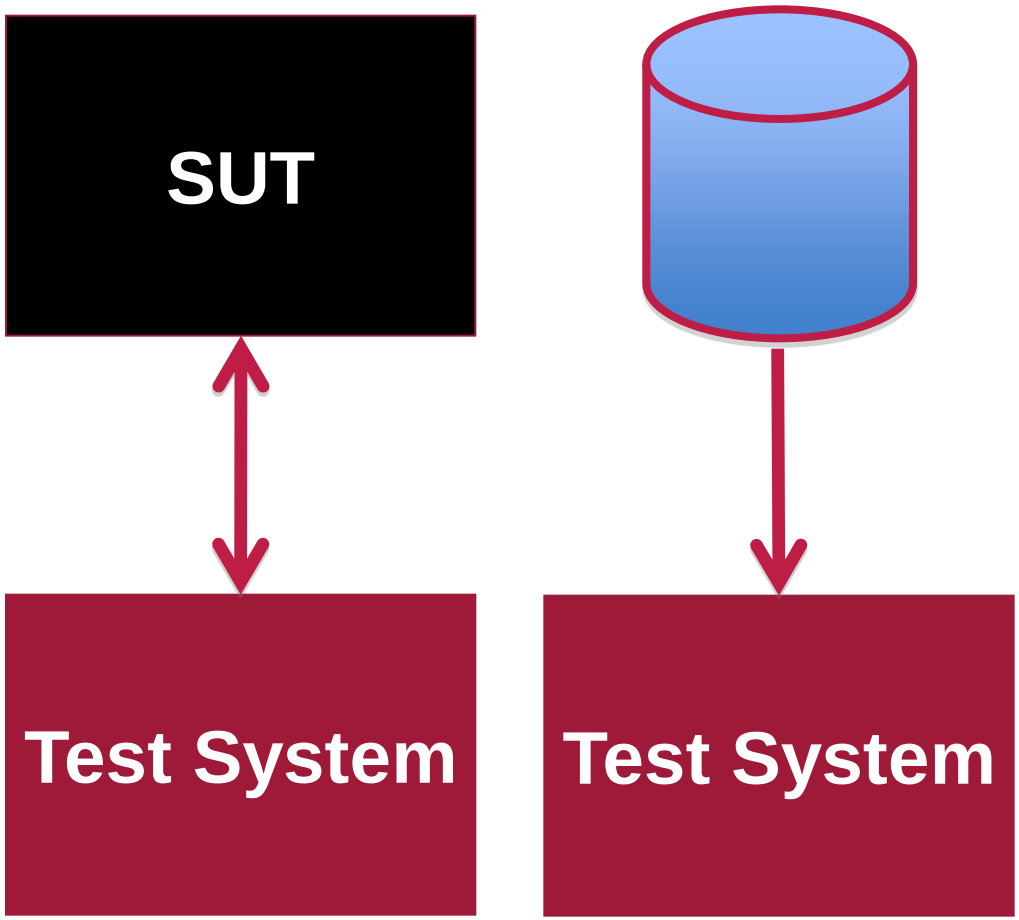
Scripting Engine

Air Traffic Trace Analysis

Trace Analysis in the TETRA Network



Trace-File Analysis



- Step 1: Execute PEI Scripts
  - Verdict based on observations at the PEI
- Step 2: Analyse “Air Log File”
  - Verdict based on observations at the air interface
- Overall verdict
  - Combination of both
- Future: Combine 1 and 2 in one test case

TTCN-3 Usage within TETRA

IOP Test Cases

Trace Analysis

Scripting Engine

Status

- Scripting Engine
  - Released to the TETRA Members
- Initial Test Cases
  - Validated and Released to the TETRA Members
- IOP Test Cases
  - Work in Progress
- Trace Analysis
  - Validated and released to TETRA Association

Demonstrated at the TETRA World Congress in Singapore

Outlook

- Test & certify the radio terminals PEI implementations
- Extending the test case basis for IOP testing
- Merging PEI tests with online “trace-analysis”
  →100% test automation for IOP test
- Embed test automation into the certification process
  – To be renewed in 2012

Summary

- TTCN-3 has been selected as test automation platform among other proprietary solution
  - Unmatched cost benefits taking requirements into consideration
- Implementation was efficient and highly flexible
- Benefits for members
  - Time and cost saving at the IOP testing
  - Introducing test automation
  - Extending the scripting engine platform to accommodate their company internal test requirements

Questions?

Thank you!