ETSI Experiences in Testing and Interoperability

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What does Interoperability mean to ETSI?

- ❑ **Interoperability is the ultimate aim of ICT standardisation**
- ❑ **Interoperability is the red thread running through the entire standards development process**

- ❑ **Interoperability is not an isolated issue**
  - ➢ **it is not something to be somehow 'fixed at the end'**

- ❑ **ETSI approach**
  - ➢ **Base standards should be designed for interoperability**
  - ➢ **Profiles to reduce potential non-interoperability**
  - ➢ **Standards Validation**
    - • **walk-throughs, informal IOT, simulation etc.**
  - ➢ **Conformance testing**
  - ➢ **Interoperability testing (formal IOT)**

- ❑ **Unique resources available to ETSI Technical Bodies**
  - ➢ **TC MTS, Plugtests, PTCC**

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TC MTS

- ❑ **Methods for Testing and Specification**
  - ➢ **Horizontal committee (to other ETSI TBs)**
- ❑ **Development of Methodology and Techniques**
  - ➢ **IPv6 Testing Framework**
  - ➢ **IOP Testing Methodology**
  - ➢ **The test language TTCN-3 was developed by TC MTS/PTCC**
- ❑ **Guides to ETSI TBs on use of Methodologies and Techniques**
  - ➢ **Guides on use of languages such as UML, ASN.1, MSC etc.**
  - ➢ **Making Better Standards: http://portal.etsi.org/mbs**

- ❑ **Development of generic test suites (for adaptation)**
  - ➢ **Using PTCC services**

- ❑ **http://portal.etsi.org/mts**

Some MTS publications

- **ETR 142**
  - Guidance on the production and completion of System Conformance Statement (SCS) proformas
- **ETR 153**
  - Guidance on the production and completion of System Conformance Test Report (SCTR) and Protocol Conformance Test Report (PCTR) proformas
- **ETR 266**
  - Test Purpose Style Guide
- **ETS 300 406**
  - Protocol and profile conformance testing specifications; Standardization methodology
- **EG 201 058**
  - Implementation Conformance Statement (ICS) proforma style guide
- **ES 202 103**
  - Guide to the use of TTCN-2
- **TS 102 237-1 (EP TIPHON)**
  - Interoperability test methods and approaches; Part 1: Generic approach to interoperability testing
- **All can be downloaded for free from: http://pda.etsi.org/pda/queryform.asp**
- **Another useful list of documents: http://portal.etsi.org/ptcc/download.asp**

The ETSI Plugtests Service

- ❑ **Provides logistical and organisational support for hosting interoperability events**
- ❑ **Events can be a combination of conformance testing and interoperability testing**
- ❑ **For ETSI and non-ETSI technologies**
  - ➢ **Mobile Applications, OSA-Parlay, Triple-Play (over DSL, Powerline..), Human Factors, ITS, SMS/MMS**
  - ➢ **WiMax, UWB, DSL, RFID, NGN, Speech Quality, Powerline, Lawful Interception**
  - ➢ **Grid Computing, IPv6 and Mobile IPv6, MPLS, ebXML, Smart Card, SIGTRAN, SIP**

- ❑ **>60 events in 5 years, 3000 engineers, 900 Companies**
- ❑ **Complements the work of the ETSI PTCC**

- ❑ **http://www.etsi.org/plugtests/**

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The ETSI PTCC

❑ **Protocol and Testing Competence Centre**

❑ **In-house team of experts providing direct support to ETSI Technical Bodies**

❑ **Development of protocols and profiles and the application of modern specification techniques**

  ➢ **'Standards Engineering'**

❑ **Validation of standards**

❑ **Development of test specifications**

  ➢ **Conformance**

  ➢ **Interoperability**

  ➢ **NIT (Network Integration Testing)**

  ➢ **Others (PHY, Performance …)**

❑ **http://www.etsi.org/ptcc**

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The PTCC Uses STFs to Write Test Specifications

- ❑ **Specialist Task Forces (STFs)**
  - ➢ **Led/managed by PTCC**
  - ➢ **Funded by ETSI Members (usually)**
- ❑ **Experts are seconded from the ETSI membership**
  - ➢ **Work at ETSI**
- ❑ **Produce test specifications**
  - ➢ **Maintenance, validation of tests etc.**
- ❑ **Short projects**
  - • **e.g., 2 man-months for maintenance of SIP test suite**
- ❑ **Long projects**
  - • **e.g., €1m per year over 5 years for UMTS tests**
- ❑ **15 – 19 man-years anticipated for 2006 test specification development projects**

Typical Outputs

- ❑ **ETSI conformance test specifications comprise**
  - ➤ **PICS (protocol Implementation Conformance Statement)**
  - ➤ **Test Purposes (TSS&TP)**
  - ➤ **Test Suites written in TTCN**
    - • **See a movement towards TTCN-3 as protocols become more 'IP'-oriented**
- ❑ **ETSI Interoperability test specifications comprise**
  - ➤ **IFS (interoperable Functions statement)**
    - • **Interop version of the PICS**
  - ➤ **Test Purposes (TSS&TP)**
  - ➤ **Test Suites written in tabular format**
    - • **'Structured' English content)**
    - • **Potential to automate with TTCN-3**
- ❑ **New developments**
  - ➤ **Complement to the PICS - Requirements catalogue**
  - ➤ **MTS putting test specifications on-line**
- ❑ **Validation reports (of test suites)**
  - ➤ **Offsite but in cooperation with the STF (e.g., UMTS)**
  - ➤ **Onsite e.g., IPv6 testbed, SIP testbed**

Typical ETSI Conformance Test Specifications

- **Cellular:** GSM and 3G (UMTS) terminals
- **WiFi:** HiperMAN, HiperACCESS, WiMax
- **VoIP:** H.323 (ITU), SIP (IETF), SIGTRAN
- **Service Creation:** OSA/Parlay (API, IDL)
- **IPv6:** Core, *Security, Mobility, v4-v6*
- **Cordless phones:** DECT
- **Radio communications:** TETRA, DMR
- **Access terminals:** FSK, SMS
- **Broadband:** ISDN, DSL
- **Smartcards:** Readers, cards, security modules
- **Intelligent Transport Systems (ITS):** DSRC
- **Future:** More Security, IMS, more ITS ...

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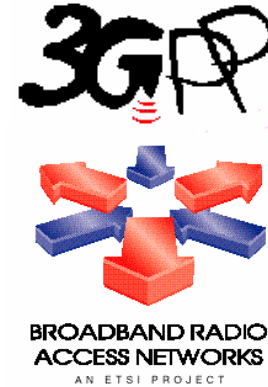
Typical ETSI Interoperability Test Specifications

❑ **Demand is recent**
  ➢ **IPv6 Core, *Security, Mobility, v4-v6***
  ➢ **H.323 – SIP Interworking**
  ➢ **More anticipated (NGN/IMS)**

❑ **Written in well-structured prose (tabular format)**
  ➢ **Based on IOT methodology developed by TC MTS**

❑ **Automation using TTCN-3 possible**
  ➢ **Depends on industry's willingness to implement test driver interfaces**

❑ **ETSI has IOP Test Development process but there is no standardised process for the actual testing**
  ➢ **scheduling, gathering results, feedback to standards, assignment of verdicts, resolution testing etc.**

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Conformance and Interoperability Testing are Complementary

- ❑ **ETSI experience**
  - ➢ **As you move up a system stack the emphasis should change from conformance to IOT**
  - ➢ **Moving from component testing, to more complex interoperability issues**

- ❑ **Lower layer protocols, infrastructure**
  - ➢ **Emphasis on conformance**
- ❑ **Middleware, enablers**
  - ➢ **Combination of Conformance + IOT**
- ❑ **Services, applications, systems**
  - ➢ **Emphasis on IOT**

- ❑ **Conformance testing as a pre-requisite to IOT**
  - ➢ **Ensure interoperability through standardised interfaces**
- ❑ **IOT not a cheap solution**
  - ➢ **Cost of developing good IOT specification can be significant**

Thank you!

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