

ETSI Testing Activities and the Use of TTCN-3

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Abstract. This paper provides an introductory overview of ETSI testing activities related to interoperability and conformance testing. It explains why testing is important and why languages such as TTCN-3 are considered to be key components in the development of ETSI testing specifications. This paper highlights the relationship and harmonization between TTCN-3, MSC, SDL and ASN.1.

1 About ETSI

ETSI, the European Telecommunications Standards Institute, develops a wide range of standards and other technical documents as Europe's contribution to world-wide standardization of telecommunications and associated domains. Based in the Sophia Antipolis science park in southern France, ETSI brings together well-over 800 companies and some 5000 technical experts from around the world.

2 ETSI and Testing

ETSI members have long recognized the important role that validation and testing play in the development of ETSI standards, and of the products based on those standards. Even in a climate where time-to-market is paramount, manufacturers are prepared to put time, effort and valuable expertise into testing in order to ensure interoperability.

ETSI has two permanent entities involved in testing activities. The PTCC (Protocol and Testing Competence Centre) and the Bake-off Service.

2.1 The PTCC

The PTCC provides support and services to ETSI Technical Bodies (TBs) on the application of modern techniques for specifying protocols and test specifications. The PTCC is also responsible for the technical management of the ETSI Specialist Task Forces (STFs) which develop conformance test specifications for ETSI standards. In the past 10 years test suites have been produced for many leading ETSI technologies, including 3G UMTS, GSM, DECT, TETRA, Hiperlan/2, TIPHON, INAP, B-ISDN etc.

While certain areas quite rightly require regulatory testing, the policy today is to keep this to a minimum. As a consequence, there has been a subtle but fundamental change in the development and application of ETSI test suites over the last few years. ETSI test specifications now concentrate on maximizing the chances of interoperability, for example by increased focus on critical functionality or error recovery behaviour. The test suites are not part of a bureaucratic testing program but are increasingly requested for by fora and manufacturers as an integral step in product development processes.

Note that the PTCC does not perform the actual testing but does have close contact with the companies and organizations that do. Neither is ETSI involved in certification.

2.2 The Bake-Off Service

The ETSI Bake-off service organizes bake-offs or interoperability events for ETSI members and non-members alike. It provides the logistical and organizational support (often at ETSI premises) for such events. Recent events include SynchFest, IPv6 InterOp, IMTC SuperOp and Bluetooth UnplugFest. The intention with bake-offs is to validate (debug) both the standards and early products or prototypes of those standards as they are developed. This activity is considered to be one of validation, rather than testing.

2.3 Testing for Interoperability

The fact that ETSI develops conformance test suites and provides bake-off services to its members shows that both approaches are considered valuable by the ETSI membership. In some cases only conformance testing is considered adequate, in others the reverse is true. It has been clearly demonstrated in GSM and 3G, for example, that conformance testing of mobile terminals provides a very high degree of confidence that handsets from different manufacturers will interoperate. So much so that with the reduction in regulatory testing for GSM in Europe, operators and manufacturers are co-operating to put in place a voluntary testing scheme for GSM terminals.

In the IP world, where the culture of bake-offs is well-established, it is obvious that this is an excellent way to develop and validate the base standards.

The trend, however, indicates that the industry realizes that it is often not a case of either-or but rather a combination of the two. A focused set of conformance tests can provide an excellent complement to bake-offs and/or interoperability testing. This is a view that is shared by other, non-ETSI bodies such as Bluetooth.

3 Conformance Testing Methodology

Generally, ETSI follows the testing methodology defined in ISO/IEC9646. The methodology defines precise test methods, architectures etc. The test specifica-