

Generation MSC and TTCN Descriptions for ISUP Supplementary Devices

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For improving ISDN quality and reliability, number of developed ISDN services increases progressively, and this process seems to continue for along time. As ISDN supports layered system architecture, these services are developed and implemented in bounds of ISDN User Part (ISUP) signalling protocol.

ISDN services within ISUP protocol are produced by European Telecommunication Standard Institute (ETSI) and realised in form of separate standards, that have common protocol specification, what makes their implementations easier. At current development and standardisation of ISUP basic services are actually finished, and now standardisation process is going on in frame of ISUP supplementary services. We chose 'Completion of calls to busy subscribers' (CCBS) ISUP supplementary service for generation descriptions.

Protocol engineering is the whole life-style of a protocol including the requirement specification, formal specification, validation and conformance testing so as in case of ISUP protocol. Conformance testing is a well-establishment testing methodology based on the multipart ISO 9646 international standard. In practice, its role is to increase confidence that a protocol conforms to the requirements stated in specification and to reduce the risk of malfunctioning when the protocol is implemented.

Protocol engineering is supported by Formal Description Techniques (FDTs). FDTs are used in requirement specification, formal specification, validation and testing, so as in case of ISUP protocol. Specification and Description Language (SDL), Abstract Syntax Notation One (ASN.1), Message Sequence Chart (MSC) and Tree and Tabular Combined Notation (TTCN) are the standardised language of ITU. MSC is a frequently used technique in requirement specification, SDL and ASN.1 in formal specification step of protocol engineering, TTCN is the notation defined by ISO, and used for specification of abstract test cases generated from formal specification in conformance testing. When implemented on a test tool, test cases assess a protocol. We used MSC and TTCN for description of ISUP CCBS.

TTCN describes the behaviour of the tester as a tree of events and actions, leading to verdict assignments (at the leaves).

A set of MSCs covers system behaviour since each MSC diagram represent one scenario of either a typical or an exceptional exchange of message between parts. MSC - as we have above mentioned - is a good tool for requirement specification, however it can be used for visualisation of a test case. To understand a test case behaviour in time is easier representing messages exchanged between tester and implementation.

Our experiences in this area have shown, that test specification should be generated semi-automatically in the appropriate language (e.g. TTCN) from protocol specification written in formal languages (e.g. MSC, ASN.1).