



Testing Communicating Systems: a Model, a Methodology, and a Tool *

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Abstract. This paper follows two main lines of research. The first line is related to the study of models for the description of systems. For this line, we introduce the model of *Communicating Systems* (CS), which defines a set of common resources, a set of entities, and a topology of communication. The second line focuses on testing methodologies adapted to protocol testing. For this line, we give a formal definition of a generic generation algorithm (GGA). We demonstrate that the CS model with a GGA supports various 1) test architectures, 2) test types: conformance, interoperability, embedded, component testing, and 3) test approaches: passive and active testing. The paper presents also the main characteristics of the TGSE tool (Test Generation, Simulation, and Emulation). TGSE is made-up of a test case generator, based on the CS model and implementing a GGA, a graphic simulator of the execution of a sequence generated by TGSE, and a real-time emulator of communicating specifications. In its current version, TGSE supports the passive and active testing of one or several components with data and temporal constraints.

1 Introduction

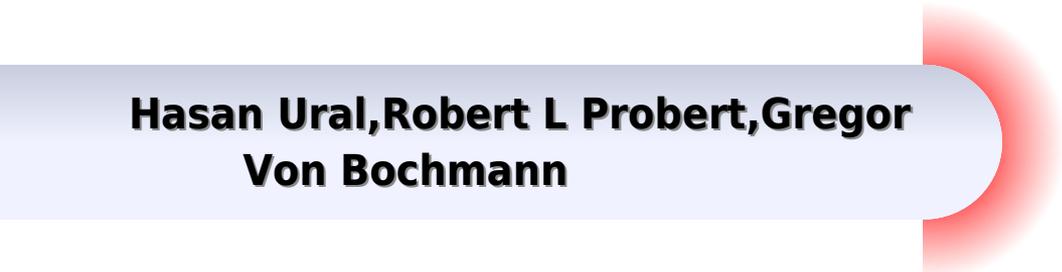
Protocol specifications are used to develop products and services. To ensure correctness of such products (implementations), testing, the process of checking that a system possesses a set of desired properties and/or behaviors, is one of the most used validation techniques.

Testing process is a hard work that is long, repetitive and which represents a potential source of errors. The use of formal specifications provides support for automating this process. Different models (FSM, EFSM, CEFSM, LTS, IOLTS, TIOA,...) and languages (SDL, Lotos, IF, UML,...) have been proposed to describe protocols and the desired behaviors about them in a formal way. Due to the nature of protocols/functions being tested, various test types are required. For example, in conformance testing, a single implementation is compared to relevant standards. In interoperability testing, two or more implementations are tested directly against each other, with the standard used primarily as a reference to adjudicate problems and incompatibilities, and secondarily as a guide

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Testing Of Communicating Systems

**Hasan Ural,Robert L Probert,Gregor
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Testing of Software and Communicating Systems Kenji Suzuki, Teruo Higashino, Andreas Ulrich, Toru Hasegawa, 2008-06-06 This book constitutes the refereed proceedings of the 20th IFIP TC 6 WG 6.1 International Conference on Testing Communicating Systems TestCom 2008 and the 8th International Workshop on Formal Approaches to Testing of Software FATES 2008 jointly held in Tokyo Japan in June 2008 The 18 revised full papers presented together with 2 invited talks were carefully reviewed and selected from initially 58 submissions to both events The papers cover new approaches concepts theories methodologies tools and experiences in the field of testing of communicating systems and general software They are organized in topical sections on general software testing testing continuous and real time systems network testing test generation concurrent system testing and applications of testing

Testing of Communicating Systems Dieter Hogrefe, Anthony Wiles, 2003-08-03 This book constitutes the refereed proceedings of the 15 IFIP International Conference on Testing of Communicating Systems TestCom 2003 held in Sophia Antipolis France in May 2003 The 19 revised full papers presented together with three invited contributions were carefully reviewed and selected from 53 submissions The papers are organized in topical section on next generation networks IP and UMTS TTCN 3 automata based test methodology and test design tools and methodology

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