

# 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

**Michal Rosen-Zvi**



## **Testing Of Communicating Systems:**

## Embracing the Melody of Expression: An Mental Symphony within **Testing Of Communicating Systems**

In some sort of consumed by screens and the ceaseless chatter of immediate interaction, the melodic elegance and psychological symphony produced by the published word usually fade in to the backdrop, eclipsed by the relentless noise and interruptions that permeate our lives. But, nestled within the pages of **Testing Of Communicating Systems** a wonderful fictional value overflowing with natural thoughts, lies an immersive symphony waiting to be embraced. Constructed by an elegant musician of language, this charming masterpiece conducts readers on an emotional trip, well unraveling the hidden melodies and profound impact resonating within each carefully crafted phrase. Within the depths of the moving analysis, we will explore the book is central harmonies, analyze their enthralling publishing type, and submit ourselves to the profound resonance that echoes in the depths of readers souls.

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