

Guest editorial

Feature Interactions in Telecommunications Systems

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Imagine commuting home from work one day, driving past the downtown stores toward the grocery store when you receive a call on your mobile phone. It's your daughter, asking you to pick up milk on the way home. Now imagine that the call is from your refrigerator. This vision is not so far-fetched with today's computing and communications technologies. The communications network already provides messaging services, and these can easily be extended to support such automated messaging. Global positioning systems can determine where you are. Such devices are already installed in cars to provide directions to the drivers. Determining that you are about to pass the grocery store is just a small step from this. Finally, many appliances already use chips for various functions. It's not much of a stretch for appliance manufacturers to add distributed objects to enable their appliances to communicate. Perhaps the most far-fetched idea is trusting electronic appliances to manage our lives to this extent!

This current issue of *Computer Networks* addresses the interworking of services that the above vision requires. Feature interactions are a major hindrance to proper interworking of different kinds of services, such as messaging services with location detection systems and appliance services. Billing issues could be a hindrance, too. Suppose

that the wireless provider, the wireline provider, and the messaging service provider are all different companies, as they might well be in a competitive marketplace. Different approaches to billing could make it impossible to use the services together, even if they function together exactly as they should.

In 1998, the Fifth International Workshop on Feature Interactions [1] sponsored the first-ever Feature Interaction Detection Contest. The goal of the contest was to compare different automated tools for detecting feature interactions from the feature requirements. This special issue of *COMNET* contains a paper by the contest committee explaining the contest and papers from four of the contestants on their tools for detecting feature interactions. The contest represents a significant advance in the understanding of what is a feature interaction and in the methods for feature interaction detection evaluating tools. It also gave us a greater appreciation of what remains to be done.

In this guest editorial, we briefly describe the contest and then spend some time discussing the contest results and ongoing issues.

1. The contest

The contest provided the requirements for 12 features and challenged each contestant to detect feature interactions using an automated tool. The features were presented in two phases. In phase

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Feature Interactions In Telecommunications Systems

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Feature Interactions In Telecommunications Systems:

Feature Interactions in Telecommunications Systems, III Kong E. Cheng, Tadashi Ohta, 1995 In an information society heavily dependent on communications and distributed systems feature interactions are likely to become an even more important problem than they are today A particularly interesting issue given the current work on agents is whether feature interactions will be more likely in systems with many autonomous agents performing tasks The current demand for better and more convenient communications requires development of a variety of new services as quickly as possible As the number of services becomes larger however feature interactions create incompatibilities between the various functions needed to implement them In developing telecommunication systems we now spend huge numbers of person hours on software modifications and testing whenever a new function is added Much of this time is spent on detecting and eliminating problems arising from feature interaction In the future as ever more services are offered feature interactions will become a major bottleneck in the development of software for telecommunications systems This book presents opinions on the technical problems involved in feature interactions and definitions of features and feature interactions *Feature Interactions in Telecommunications and Software Systems* V K. Kimbler, L. G. Bouma, 1998 The LabManual is a valuable tool designed to enhance your lab experience Lab activities objectives materials lists step by step procedures illustrations and review questions are commonly found in a Lab Manual Feature Interactions in Telecommunications and Software Systems VIII Stephan Reiff-Marganiec, Mark D. Ryan, 2005 Features additional services occur whenever organisations compete by differentiating their products from those of rival organisations Adding one feature may break another or interfere with it in an undesired way This phenomenon is called feature interaction This book explores ways in which the feature interaction problem may be mitigated **Feature Interactions in Software and Communication Systems IX**, 2008 This publication deals with the feature interaction problem in telecommunication systems In this domain an interaction occurs when one telecommunications feature service modifies or subverts the operation of another one Undesired interactions can both lower this quality and delay service provisioning Therefore the problem of feature interactions in telecommunications is of great importance In the past decade a lot of attention has been devoted to the development of methods for detection and resolution of feature interactions However this feature interaction phenomenon is not unique to the domain of telecommunications systems It can also occur in any large software system that is subject to continuous changes All the submitted papers in this publication have been peer reviewed by at least two reviewers drawn from industry or academia **Feature Interactions in Telecommunications Systems** L. G. Bouma, H. Velthuisen, 1994 Features are modifications to the control of telecommunications services A feature interaction occurs when the behaviour of another which can lead to unexpected or undesired behaviour which affects the quality of service The goal of this volume is to generate a combination of techniques through protocol engineering software testing formal techniques and AI and applications to telecommunications services

Feature Interactions in Software and Communication Systems X Masahide Nakamura, Stephan

Reiff-Marganiec, 2009 Tenth International Conference of Feature Interactions in Software and Communications Systems ICFI 2009 held in Lisbon Portugal 11 12 June 2009 Pref *Detecting Feature Interactions in Telecommunications Systems*

Designs Mohammed Faci, 1995 A basic telephone service is used to establish a communication session between two users A telephone feature such as call waiting call forwarding and three way calling is defined as an added functionality of the basic telephone service A feature interaction is the interference of the functionality of one telephone feature with the functionality of another telephone feature meaning that the invocation of the first feature modifies the functionality of the other active feature or even prevents its functionality altogether This problem has become a major obstacle for the extension of telephone systems with new services Our contributions in this thesis are the following 1 define a model for specifying telephone systems and their services 2 formalize the notion of feature interaction and 3 develop a design methodology for detecting feature interactions at the specification level In the first part of the thesis we define a model for structuring the components of telephone specifications In this model a specification is expressed as a set of communicating processes representing three types of constraints local constraints end to end constraints and global constraints Each of these constraints is defined and used in our specifications In the second part of the thesis we develop a methodology for detecting feature interactions Central to our methodology is the formalization of the notion of feature interaction Intuitively we say that an interaction exists between n features if one of the features cannot exhibit its behaviour when integrated into POTS in combination with other features We formalize this concept by defining the composition and integration of features Composition expresses the synchronization of features on their common actions with POTS and their interleaving on their independent actions Integration expresses the extension of POTS with the n features such that each feature is able to execute all of its actions which are allowed in the context of POTS when the other features are disabled Then we reason about interactions in terms of the conformance relation studied in testing theory in the following way An interaction exists between n features if their integration does not conform to their composition A set of concrete telephony examples is used to show the applicability of the methodology The specification language used is LOTOS which turns out to be ideally suited to express our methodology However our method is general enough to be adapted to other specification languages with similar constructs *Feature Interactions in Telecommunications and Software Systems VI* Muffy Calder, Evan Magill, 2000 Typically telecommunications services are implemented in software Feature interaction is the term used to describe interference between services or features most attention is given to cases where the interference is undesirable ie there is an incompatibility In telecommunications control and data is distributed and on such a large scale that software development is by numerous disjoint teams by its nature therefore this software experienced the feature interaction problem first But while the workshop focuses on communications services the subject has relevance to any domain where separate software entities control a

shared resource **Feature Interactions in Software and Communication Systems IX** Lydie Du Bousquet, Jean-Luc Richier, 2008 Deals with the feature interaction problem in telecommunication systems **Feature Interactions in Telecommunications and Software Systems VII** Daniel Amyot, Luigi Logrippo, 2003 Feature interaction is a phenomenon known to the designers of modern telephone switching systems This phenomenon occurs when one feature modifies or subverts the operation of another one This work brings together representatives of the telecommunications industry and the software industry Encyclopedia of Software Engineering Three-Volume Set (Print) Phillip A. Laplante, 2010-11-22 Software engineering requires specialized knowledge of a broad spectrum of topics including the construction of software and the platforms applications and environments in which the software operates as well as an understanding of the people who build and use the software Offering an authoritative perspective the two volumes of the Encyclopedia of Software Engineering cover the entire multidisciplinary scope of this important field More than 200 expert contributors and reviewers from industry and academia across 21 countries provide easy to read entries that cover software requirements design construction testing maintenance configuration management quality control and software engineering management tools and methods Editor Phillip A Laplante uses the most universally recognized definition of the areas of relevance to software engineering the Software Engineering Body of Knowledge SWEBOK as a template for organizing the material Also available in an electronic format this encyclopedia supplies software engineering students IT professionals researchers managers and scholars with unrivaled coverage of the topics that encompass this ever changing field Also Available Online This Taylor E mail e reference taylorandfrancis com International Tel 44 0 20 7017 6062 E mail online sales tandf co uk Encyclopedia of Computer Science and Technology Allen Kent, James G. Williams, 1999-05-14 An Approach to Complexity from a Human Centered Artificial Intelligence Perspective to The Virtual Workplace **Intelligent Networks and Intelligence in Networks** Jorgen Norgaard, Villy Baek Iversen, 2013-03-20 The IFIP International Working Conference on Intelligent Networks 95 was held at the Technical University of Denmark DTU in Copenhagen The conference was organised jointly by the Center for Tete Information at DTU and Tele Danmark Research during August 30 31 1995 and was hosted by the Center for Tete Information The conference was sponsored by IFIP TC6 The papers contained in this book are edited versions of the papers from the conference and some of the tutorial presentations that were arranged prior to the conference The mixture of tutorial papers and conference papers gives a broad and yet thorough coverage of activities and central areas of development in the IN world at this point in time Future developments especially in the area of extended mobility support and multimedia capabilities are also pre sented BACKGROUND The theme of the conference was the two major trends in Intelligent Networks IN develop ment ITU and ETSI based IN standards such as CS 1 and the upcoming CS 2 and long term development as undertaken by for example the TINA consortium and the Euro pean RACE and ACTS programmes The present IN technology based on capability sets is on its way into the networks and opera tors are pushing for open platforms

to be deployed in the networks in the near future in order to obtain greater freedom in selecting platforms for service provisioning

Language Constructs for Describing Features Stephen Gilmore, Mark Ryan, 2012-12-06 A feature is a small modification or extension of a system which can be seen as having a self contained functional role such as Call Forwarding Automatic Call back and Voice Mail in telephone services to which users can subscribe Feature interaction happens when one feature modifies or subverts the operation of another and this problem has received a great deal of attention from industry and academics especially in the field of telecommunications where new services are constantly being developed and deployed This volume contains refereed papers resulting from the ESPRIT FIREworks working group The papers focus on the language constructs which have been developed describing features and advocate a feature oriented approach to software design including requirements specification languages and verifications logics 1992, 00000000 000000 000000 **Mobile Agents for Telecommunication Applications** Samuel Pierre, Roch Glitho, 2003-06-30 This book constitutes the refereed proceedings of the Third International Workshop on Mobile Agents for Telecommunication Applications MATA 2001 held in Montreal Canada in August 2001 The 26 revised full papers presented were carefully reviewed and selected for inclusion in the volume Among the topics addressed are network management mobile applications nomadic computing feature interaction Internet applications QoS management policy based management interactive multimedia tele learning and computer telephony integration

Management of Multimedia Networks and Services Alan Marshall, Nazim Agoulmine, 2003-08-28 This book constitutes the refereed proceedings of the 6th IFIP IEEE International Conference on the Management of Multimedia Networks and Services MMNS 2003 held in Belfast Northern Ireland in September 2003 The 39 revised full papers presented were carefully reviewed and selected from numerous submissions The papers are organized in topical sections on stream control and management management and control of multicast communications ad hoc and sensor networks QoS and mobility management in wireless networks traffic engineering and routing differentiated network services on demand networking issues and policies multimedia QoS management security management and corresponding to an associated workshop end to end monitoring techniques and services

Feature Interactions in Telecommunications Networks IV Petre Dini, Raouf Boutaba, L. Logrippo, 1997

ZB 2000: Formal Specification and Development in Z and B Jonathan P. Bowen, Steve Dunne, Andy Galloway, Steve King, 2003-06-26 This book constitutes the refereed proceedings of the First International Conference of B and Z Users ZB 2000 held in York UK in August September 2000 The 25 revised full papers presented together with four invited contributions were carefully reviewed and selected for inclusion in the book The book documents the recent advances for the Z formal specification notion and for the B method the full scope ranging from foundational and theoretical issues to advanced applications tools and case studies is covered

Formal Methods for Open Object-Based Distributed Systems V Bart Jacobs, Arend Rensink, 2002-03-31 Formal Methods for Open Object Based Distributed Systems V brings together research in three important and related fields Formal methods Distributed systems

Object based technology Such a convergence is representative of recent advances in the field of distributed systems and provides links between several scientific and technological communities The wide scope of topics covered in this volume range in subject from UML to object based languages and calculi and security and in approach from specification to case studies and verification This volume comprises the proceedings of the Fifth International Conference on Formal Methods for Open Object Based Distributed Systems FMOODS 2002 which was sponsored by the International Federation for Information Processing IFIP and held in Enschede The Netherlands in March 2002

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