SERVICE FEATURE INTERACTION
Extended Abstract

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The telecommunications market is witnessing an exponential growth. Deregulation has set the stage for an open and multiple-sided arena of vendors, network operators and service providers. Classical telephony has gained a new momentum through the Intelligent Network initiative. The popularity of internet based communications and of mobile systems has brought new business opportunities. There is, nevertheless, a ransom for the success of telecommunications systems: they are also growing in complexity, the management of which is a challenging issue that must be addressed. Service interaction is one manifestation of this complexity.

1. STATING THE PROBLEM

Simply stated: an interaction occurs when a newly introduced service changes the behavior of existing services. One may distinguish between positive and negative interactions depending on whether the resulting behavior is intended and useful or annoying and harmful. Services are themselves composed of elementary services, called features. Thus, the interaction problem may be revealed both at the service and feature levels.

Feature and service interaction is a complex problem. A large community of experts, from Telcos and academia, is actively working on this issue. A series of workshops is devoted to this topic and many research papers are being published in journals, conference proceedings and on web sites. The following are a few tokens that reflect the difficulty of the problem:

The original version of this chapter was revised: The copyright line was incorrect. This has been corrected. The Erratum to this chapter is available at DOI: 10.1007/978-0-387-35581-8_35

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- It is desirable to let users have control on their services: they may customize them and/or integrate them in their applications. This introduces a new dimension to the interaction problem.
- Interaction may occur between services of different users, subscribed to different providers, and deployed on different networks. The analysis phase cannot cover all existing services that are deployed world-wide. Third party mediators may be needed that are responsible for managing and resolving interactions.
- The conception of an interaction-free service is hard because new services added afterwards cannot be anticipated.
- The resolution of interactions between a set of services should not introduce new interactions elsewhere. If checking each combination of 20 features takes 20 seconds then it will take 2 years to resolve the interactions of 20 features.
- Feature interaction is not specific to switch-based architectures. Circular mailing lists (in e-mail) is an obvious example of interactions in internet-based applications. More generally, IP-based telecommunications will bring sophisticated multimedia services. Multimedia services are much more complex than telephony therefore harder will be the interaction problem.

2. DEALING WITH SERVICE AND FEATURE INTERACTION

The issue is dealt with along all the phases of the service development life cycle. First, at the marketing phase, telecom operators need to analyze if the newly introduced services will put their exiting offer in jeopardy (will customers get unsatisfied or confused ?). At conception phase, logical incompatibilities between services are sought and resolved. Detailed analysis phase, where network and computing resources are taken into account, will reveal new interactions, caused by distribution, non atomicity of operations, or resource sharing. Deployment of services should address also the issue: incompatible services should not co-exist on the same network. Subscription of a service by a user is also an occasion where incompatible services should be avoided. Some of the interactions can only be addressed at run-time: Feature Interaction Managers are added to handle the problem on-line.

Formal methods provide means to reason about feature interaction and to help solving the problem. They are endowed with tools that can be used along the development chain. Different formalisms and tools can be used in

different phases, going from the most abstract service models to network aware representations. Each service can be characterized by a set of abstract properties that should be satisfied in the model. Tools can help checking the validity of these properties.

3. CONCLUSION

Feature interaction is a complex problem that may hinder the objectives of standardization initiatives (IN, TINA, Corba, Parlay, ...): the rapid introduction, at reduced cost, of new services. It is a complex software composition problem in a specific context of telecommunications characterized by distribution, heterogeneity and multiplicity and variety of stake holders. Formal methods and associated tools provide some handles to solve the problem. Component-based architectures (Corba 3, EJB, ...) are expected to contribute to the settelment of the issue. A general satisfactory solution is still being actively researched.

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