

Models for the Automated Integration of Service-oriented Software Systems

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Abstract—In the near future we will be surrounded by a virtually infinite number of software applications that provide services in the digital space. This situation radically changes the way software will be produced and used: (i) software is increasingly produced according to specific goals and by integrating existing software; (ii) the focus of software production will be shifted towards reuse of third-parties software, typically black-box, that is often provided without a machine readable documentation.

The evidence underlying this scenario is that the price to pay for this software availability is a lack of knowledge on the software itself, notably on its interaction behaviour. A producer will operate with software artifacts that are not completely known in terms of their functional and non-functional characteristics. The general problem is therefore directed to the ability of devising (architectural/component) models that will let the artifacts interact to reach the goal.

This talk focuses on models, techniques and tools for integration code and component interaction protocols which allow to deal with partial knowledge and automatically produce correct-by-construction service-oriented systems with respect to functional and non functional goals.

The research approach we propose builds around two phases: *elicit* and *integrate*. The first concerns observation theories and techniques to elicit functional behavioural models of the interaction protocol of black-box services. The second deals with compositional theories and techniques to automatically synthesize appropriate integration means to compose the services together in order to realize a service assembly (e.g., a choreography) that satisfies the goal.

I. SPEAKER'S BIOGRAPHY

Paola is professor at the Department of Information Engineering Computer Science and Mathematics at University of LAquila. Her research interests are in the field of the application of formal techniques to the (automatic) development of software systems. These include software specification and verification of concurrent and distributed systems, deduction systems, and Software Architectures. Paola is member of ACM Europe Council, of Academia Europaea, and received a Honorary Doctorate at Mälardalen University.