Safe Composition of Software Services

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Composition of software is a crucial topic in many different computer science areas such as Software Architectures, Component-Based Software Engineering, Web services, cloud computing, Internet of Things, etc. Composition is however a difficult task for several reasons. There is a need first for models of the services to be composed and several levels of expressiveness can be considered at this level (signature, behaviour, semantics, quality of service). Each facet brings different issues from a composition perspective. Here we have a specific focus on behavioural models for service composition. Once a model of services is properly defined, one can design a composition by defining connections or bindings among the involved services. Building such a composition is error-prone and several kinds of mismatch can arise. So there is a need for analysis techniques in order to validate the composition and ensure that before the composition is deployed it works correctly. Beyond service models and automated verification techniques for validating service composition, we also present in this talk two different ways to develop composition of services, namely, top-down and bottom-up development processes. Last but not least, we illustrate these techniques for supporting the modelling and composition of services with a concrete approach developed in the context of the Internet of Things.