Contracts for Security Adaptation[⋆,⋆⋆]

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Abstract

Security is considered to be one of the main challenges as regards the widespread application of Service Oriented Architectures across organisations. WS-Security, and its successive extensions, have emerged to fulfil this need, but these approaches hinder the loose-coupling among services, therefore constraining their reusability and replaceability. Software adaptation is a sound solution to overcome the incompatibilities in interface, behaviour and security constraints among stateful services. However, programming adaptors from scratch is a tedious and error-prone task where special care must be given to concurrency and security issues. In this work, we propose to use *security adaptation contracts* that allow us to express and adapt the security requirements of the services and their orchestration. Given a security adaptation contract and the behavioural description of the services (such as BPEL processes or Windows Workflows), we can generate the protocol of the orchestrator that complies with the security requirements (confidentiality, integrity and authenticity), while overcoming incompatibilities at the signature, behaviour and security QoS levels. The formalisation behind security adaptation contracts has other applications such as security policy negotiation and automatic security protocol verification.

Keywords: model-based adaptation, Web Service orchestration, security specification, adaptation contracts, WS-Security

⋆ This article was published in the Journal of Logic and Algebraic Programming, volume 80, issues 3-5, pp. 154-179, doi:10.1016/j.jlap.2010.07.001, Elsevier, 2011.

⋆⋆We thank the interesting comments made by Gwen Salaün, Javier Cámara and Javier Cubo to previous versions of this paper. This work has been partially supported by the project TIN2008-05932 funded by the Spanish Ministry of Education and Science (MEC), FEDER and project P06-TIC-02250 funded by the Andalusian local Government.

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This paper is electronically published in
Electronic Notes in Theoretical Computer Science
URL: www.elsevier.nl/locate/entcs