Non-Functional Properties and Service Level Agreements in Service-Oriented Computing (NFPSLA-SOC '07) – Organizers' Workshop Summary

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The first workshop on Non-Functional Properties (NFP) and Service Level Agreements (SLA) in Service-Oriented Computing was held on September 17th, 2007 in Vienna, Austria in conjunction with the International Conference on Service Oriented Computing. This workshop aimed to bring together researchers and industry practitioners to foster a greater understanding of how the management of NFP and SLAs can assist businesses utilizing Service-Oriented Architectures (SOA) as well as to investigate the resulting research issues. These issues were felt to be highly relevant due to the increasing popularity of SOA and the fact that whilst the foundations of SOA functionality are now well understood, non-functional properties are not.

The workshop keynote was given by Jorge Cardoso, whose talk "Where do the Semantic Web and SOA Meet?" provided a context for much of the work presented in the workshop papers. The talk explored three research main issues that SOA brings: Semantic SOA, QoS for SOA and Quality Metrics for SOA.

A high quality of papers was submitted to the workshop, allowing 11 papers to be accepted. These were arranged into three broad themes: Non-Functional Properties (NFP), Semantics and Ontologies, and Service Level Agreement (SLA).

In the first theme four papers have been presented. The paper "Introducing preferences over NFPs into service selection in SOA" introduces a graphical language for specifying hard constraints, preferences and tradeoffs over NFPs as well as service level objectives (SLO). The TCP and UCP network formalisms are used to this end. Algorithms for selecting web services according to the hard constraints as well as for optimizing the selected web service and for configuration according to the specification are also presented. The paper "Non-Functional Property Driven Service Governance: Performance Implications" proposes a modelling approach for evaluation of

performance-related NFP impacts when mapping service governance to technical solutions using an ESB. The third contribution, "Service Selection based on Non-Functional Properties", proposes a method for automatic selection of the most relevant service for a composition based on NFPs. This is achieved by ranking services based upon soft requirements (and eliminating those that do not meet hard requirements). A method for obtaining and evaluating non-functional aspects is also proposed. Finally, "Managing Non-functional Properties of Inter-enterprise Business Service Delivery" suggests metamodels for the elaboration of NFPs, with advantages for their management during design-time and run-time.

The four papers in the area of semantics and ontologies present different application of semantic in the management of NFP and SLA. In particular, the paper "On User Preferences and Utility Functions in Selection: A Semantic Approach" proposes a method of semantically describing user preferences using utility functions. A method of performing discovery using Description Logic Reasoners, followed by selection, based upon user preferences, using Constraint Programming solvers is also presented. The paper "Non-functional Parameters as First Class Citizens in Service Description and Matchmaking - An Integrated Approach" presents a method for matchmaking of NFPs during automated service discovery. This is achieved by taking the novel approach of ignoring the distinction between functional and non-functional properties. An implementation of this concept in the DIANE framework is presented.

An ontology-based approach to design a query language that captures QoS requirements is proposed in "onQoS-QL: a query language for QoS-based service selection and Ranking". Finally, the paper "A Semantic QoS-based Web Service Discovery Engine for Over-Constrained QoS Demands" presents an extension of the OWL-Q ontology with SWRL rules and a related metric matching algorithm. Based upon this, an automated approach for semantic QoS-based WS discovery is proposed, which provides solutions even for over-constrained QoS-based WS demands.

Issues on management of SLA have been discussed in three different papers. The first paper, "A Framework for the Management of Dynamic SLAs in Composite Service Scenario", proposes an enhancement to the protocol encompassed in the WS-Agreement standard, enabling the parties involved to re-negotiate and modify its terms during the service provision. "Temporal-Awareness in SLAs. Why Should We Be Concerned?" is a position paper, which poses questions about the importance of temporality in SLAs. This is discussed in light of the authors' experience extending WS-Agreement with increased support for temporal expressions. Finally, the paper "Dynamic Service Provisioning Using GRIA SLAs" describes experience of managing SLA obligations from a service provider perspective in a scenario where dynamic deployment of services could be undertaken. The adopted solution, based on GRIA (a Service Oriented Architecture framework) is also discussed.