Introduction to the Fifth Workshop on Non-Functional Properties and Service Level Agreements Management in Service-Oriented Computing (NFPSLAM-SOC 2011)

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1 Aims and Scope

Nowadays businesses as well as the Web require information to be available in real-time in order to reply to requests, make effective decisions and generally remain competitive. This in turn requires data to be processed in real-time. In general in service-oriented architecture (SOA) one is less concerned with latency in data processing. Clearly, there are investigations of service-level agreements (SLA) and quality of service (QoS) to guarantee service delivery. Research around non-functional properties and service-level agreements for service-oriented computing has reached a level of maturity. There are approaches for describing properties, managing SLAs and even for selecting and composing services based on NFPs. Beyond these classical topics SOA inspired extensions are enabling new and creative domains like the Internet of Things, real-time business or real-time Web. These new domains impose new requirements on SOA, such as a huge data volume, mediation between various data structures and a large number of sources that need to be procured, processed and provided. Questions like how to pick the right service out of tens of thousands of services if we talk about sensor networks or how to provide results with almost near zero-latency describe actual questions and challenges we are currently facing. Therefore, we have to look into new ways for processing data, converting and composing data coming from various sources and for enabling an easy and lightweight way to impose it on various sets of devices.

This is further motivated by the recent evolution of the Web, which is changing radically the way data and services are shared, used, and combined. On the one hand, impelled by Web 2.0 technologies, services on the Web are increasingly shared openly based on REST principles and a light technology stack based largely on HTTP and XML or JSON. On the other hand, there is an ever

increasing amount of data available on the Web provided by RESTful services, social networks, open data initiatives, and even sensors. To cater for this increase in the quantity of data but also in the diversification of its nature, Linked Data principles are emerging as the best means for sharing data on the Web by exposing and interlinking information about any entity on the basis of URIs and RDF. These technologies are giving birth to a Web of Data about basically anything. Driven by the aforementioned trends, the emergence of a Web of Services capturing data about services and their relationship with other services and real-world entities such as people, organizations or products is gradually taking place, see for examples initiatives like GoodRelations and iServe. Finding, composing, invoking and enacting services effectively in this new context is thus increasingly becoming a matter of efficiently and effectively analyzing and combining large amounts of data to make informed and adaptive decisions.

The first four editions of the NFPSLA-SOC Workshop (nfpsla-soc07, second edition, nfpsla-soc09, nfpslam-soc10) were organized at the ICSOC 2007, ECOWS 2008, ICSOC 2009 and ECOWS 2010. They were focused on the management of Non-Functional Properties and Service Level Agreements in the context of Service Oriented Computing. While the general objectives of the workshop remain the same, for the current edition of the workshop we aim to create a forum where one can expose and discuss novel ideas on the use and management of non-functional properties and Service Level Agreements bearing in mind the aforementioned evolution in service technologies and related activities influencing the service world such as social networks, open data initiatives, and even sensors. The workshop aims to tackle the research problems around methods, concepts, models, languages and approaches for management, including finding, composing, invoking and enacting services informed by non-functional properties as well as by any other information related to services. This proposed workshop aims to bring together researchers and industry attendees addressing these issues, to promote and foster a greater understanding of how the management of NFP, QoS and SLAs can assist business to business and enterprise application integration. We are especially interested in new ways utilizing linked data, Web2.0 approaches to enable scalable service related tasks based on non-functional properties and SLA descriptions.

2   Contributions

The workshop was organized in three sections: a keynote and two sections with paper presentations and discussion arranged into two broad themes: "Quality-based service selection", and "Adaptive composition in dynamic environments". The workshop keynote was given by Darko Anicic, whose talk, "Intelligent Complex Event Processing: Opportunities and Challenges" provided a novel perspective for much of the work presented in the workshop papers. The talk focused on the core role of real-time data processing and its capability to support continual monitoring in high dynamic environments and facing data ambiguities. Reasoning about events and their context, and compact (several levels of abstraction) and contextualized way to present information were discussed as key elements to

support an efficient decision making process. The talk has generated interesting discussions on what are the requirements for the next generation of technological platforms and the crucial role of non-functional properties.

In the "Quality-based service selection" section, two papers were presented. The paper "Applying QoS-aware Service Selection on Functionally Diverse Services" proposes a clustering method to leverage background knowledge on the compatibility of the services, and enable heuristic algorithms to discover valid workflow configurations in shorter time. The approach is to integrate the proposed method into a genetic algorithm by performing repair operations on invalid genomes. The solution is compared with related heuristic algorithms that use the same guided target function but pick services in a random manner. The paper "Semantic matching of WS-SecurityPolicy assertions" proposes the transformation of WS-SecurityPolicy (WS-SP) into an OWL-DL ontology and the definition of a set of semantic relations between the provider and requestor security concepts to make the matching of security assertions effective. A discussion on how these relations lead to more correct and more flexible matching of security assertions is also provided.

Issues on "Adaptive composition in dynamic environments" have been discussed in two papers. The first one, "Quality Prediction in Service Composition Frameworks" proposes a novel service composition process that includes QoS prediction for composed services as an integral part. With this approach, systematic consideration of service quality during the composition process is naturally achieved, without the need for detailed knowledge about the underlying prediction models. The QoS prediction support was integrated in a large-scale SLA management framework and a service mashup platform to show how the process can be used in practice. The paper "ECMAF: An Event-Based Cross-Layer Service Monitoring and Adaptation Framework" addresses cross-layer issues in the context of monitoring and adaptation of Service-Based Applications (SBAs) by proposing a framework that adopts a series of techniques, such as event-pattern detection, event monitoring and logging, to support the definition of mappings between event patterns and appropriate adaptation strategies. A case study on Traffic Management is discussed to illustrate the proposed solution.