Demonstration of the OPTIMIS Toolkit for Cloud Service Provisioning

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Abstract. We demonstrate the OPTIMIS toolkit for scalable and dependable service platforms and architectures that enable flexible and dynamic provisioning of Cloud services. The innovations demonstrated are aimed at optimizing Cloud services and infrastructures based on aspects such as trust, risk, eco-efficiency, cost, performance and legal constraints. Adaptive self-preservation is part of the toolkit to meet predicted and unforeseen changes in resource requirements. By taking into account the whole service life cycle, the multitude of future Cloud architectures, and a by taking a holistic approach to sustainable service provisioning, the toolkit provides a foundation for a reliable, sustainable, and trustful Cloud computing industry.

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1 Introduction

Contemporary Cloud computing solutions have mainly focused on providing functionalities at levels close to the infrastructure, e.g., improved performance for virtualization of compute, storage, and network resources, as well as necessary fundamental functionality such as Virtual Machine (VM) migrations and server consolidation. In the cases when higher-level concerns are considered, existing solutions tend to focus on functional aspects only. Furthermore, existing Platform as a Service environments are typically offered through proprietary APIs and limited to a single infrastructure provider. In order to move from a basic Cloud service infrastructure to an improved Cloud service ecosystem the European project OPTIMIS focuses on five higher-level concerns that we address for a wider adoption of Cloud computing: 1) Service life cycle optimization, 2) The non-functional Quality of Service parameters Trust, Risk, Eco, Cost, 3)Adaptive self-preservation, 4) Multi-Cloud architectures, and 5) Market and legislative issues.

2 OPTIMIS Innovations

The OPTIMIS toolkit supports the construction of multiple coexisting Cloud architectures. The focus of the toolkit is on Cloud infrastructure and service optimization throughout the service life cycle: *construction, deployment, and operation* of services. In the toolkit all management actions are harmonized by overarching policies that consider trust and risk assessment to comply with economical and ecological objectives without compromising operational efficiencies. The tools enable developers to enhance services with non-functional requirements regarding allocation of data and VMs, as well as aspects related to performance (elasticity), energy consumption, risk, cost, and trust. The toolkit incorporates risk aspects in all phases of the service life cycle and uses trust assessment tools to improve decision making in the matching of Service Providers (SPs) and Infrastructure Providers (IPs). Furthermore, the ecological impact of service provisioning is integrated in all relevant decision making. The toolkit also ensures that the desired levels of risk, trust, or eco-efficiency are balanced against cost, to avoid solutions that are unacceptable from an economical perspective. The tools enable SPs and IPs to compare different alternative configurations in terms of business efficiency. Legislative and regulatory aspects are also incorporated in the toolkit, e.g., to address data privacy legislation. The toolkit enables and simplifies the creation of a variety of provisioning models for Cloud computing, including Cloud bursting, multi-Cloud provisioning, and federation of Clouds.

3 Demonstration

– SP running a three tier Web-application in a private Cloud and adding more external Cloud resources dynamically when the local load exceeds a threshold

- SP simultaneously using resources offered by two independent Cloud providers for service deployment
- The non-functional Quality of Service parameters initially requested by the SP and their influence in decision making for all scenarios

The short video can be found here: www.optimis-project.eu