PaaSSOA: An Open PaaS Architecture for Service Oriented Applications

Claudio Guidi[1], Paolo Anedda[2], and Tullio Vardanega[1]

[1] Department of Mathematics, University of Padova, Italy
{cguidi,tullio.vardanega}@math.unipd.it
[2] CRS4, Technology Park, Pula (CA), Italy
paolo.anedda@crs4.it

Abstract. In this paper we present PaaSSOA, our vision for a next-generation PaaS layer intended for openness and federation for the support of service oriented applications in the Cloud. PaaSSOA provides for the design of service oriented applications into the Cloud. Its architecture follows a service oriented design style and facilitates interoperation between the PaaS and possibly heterogeneous IaaS layers. We describe the architecture of PaaSSOA and present the early results we have obtained from a first prototype implementation.

1 Introduction

In the context of the Cloud Computing paradigm, the Platform-as-a-Service (PaaS) layer operates as the connection tier between the Infrastructure-as-a-Service (IaaS) layer, where the computing, the storage and the networking infrastructures are multiplexed among the users through the use of virtualization technologies, and the Software-as-a-Service (SaaS) layer, where applications become available to the user. The PaaS provides all the functionalities required for the development, the deployment and the monitoring of services as seen from the standpoint of the SaaS. The PaaS also governs the resource requests that must be made to the underlying IaaS to meet the service level agreements separately defined at both the SaaS and the IaaS levels: the former between the user and the application provider; the latter between the application provider and the infrastructure owner.

The concept we present here is named PaaSSOA and it follows from work we started in [1]. PaaSSOA aims at establishing a proof-of-concept initial model, equipped with a prototype, for facilitating the development and the standardization of PaaS frameworks by capturing the main functions which characterize the Cloud from the PaaS perspective and the interactions the PaaS has to have with the two adjacent levels in the Cloud SPI stack. The use of a Service Oriented Architecture for designing a reference model for the PaaS has two main advantages: on the one hand, it allows for a standard and well-defined separation between PaaS and IaaS and between PaaS and SaaS; on the other hand it also guarantees high flexibility, adaptability and modularity within the PaaS itself, which

are very desirable qualities. The architecture of PaaSSOA is built upon some basic blocks that supply the basic services the PaaS level should provide. Tools offer the web production tools classically available for SaaS development; Functions provide the core resource management functionalities, such as for example monitoring and Service Level Agreement (SLA) negotiation; SaaS Gateway is in charge of publishing the deployed service for exploitation in the end-user space; and PaaS Gateway deals with PaaS federation. Finally, the Service Container block is in charge of hosting all the services deployed within PaaSSOA. The hosting task is achieved by means of a service called *SOABoot* which is executed in each Virtual Machine provided by the IaaS and it is able to receive service description and execute them.

2   PaaSSOA

Figure 1 depicts a representation of the layers needed for integrating PaaSSOA with the IaaS. Such an architecture is a fundamental facilitator to providing, at the level of the PaaS, the needed abstraction for managing services as basic resources without having to negotiate with the bare machines on which they will be run. Such an abstraction is obtained by means of two layers: *the virtual machines* and the *SOABoot*. As usual, the former is provided by the IaaS, whereas the latter is a specialized service, unique to PaaSSOA, which starts at the boot of every individual virtual machine and it is able to receive services to be deployed and executed.
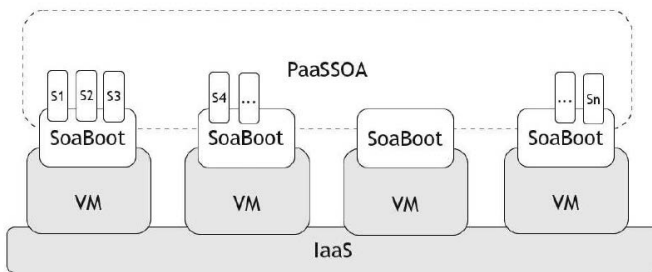
Fig. 1. PaaSSOA resources. Virtual machines (VM) are supplied by the IaaS layers, whereas SOABoots are PaaSSOA components executing services S_1, S_2, S_3, ..., S_n.

Reference

1. Guidi, C., Anedda, P., Vardanega, T.: Towards a new paas architecture generation. In: CLOSER 2012 - Proceedings of the 2nd International Conference on Cloud Computing and Services Science, Porto, Portugal, April 18-21, pp. 279–282. ScitePress (2012)