Chapter 10
Cloud Services Publication and Discovery

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ABSTRACT

Cloud computing is an information technology delivery model accessed over the Internet. Its adoption rate is dramatically increasing. Diverse cloud service advertisements introduce more challenges to cloud users to locate and identify required service offers. These challenges highlight the need for a consistent cloud service registry to serve as a mediator between cloud providers and users. In this chapter, state-of-the-art research work related to cloud service publication and discovery is surveyed. Based on the survey findings, a set of key limitations are emphasized. Discussion of challenges and future requirements is presented. In order to contribute to cloud services publication and discovery area, a semantic-based system for unified Software-as-a-Service (SaaS) service advertisements is proposed. Its back-end foundation is the focus on business-oriented perspective of the SaaS services and semantics. Service registration template, guided registration model, and registration system are introduced. Additionally, a semantic similarity model for services metadata matchmaking is presented.

INTRODUCTION

Cloud computing is exceptionally evolving due to its vast benefits. It provides flexibility, scalability, lower cost, faster time to market, and ease of use to its users (Ali & Soar, 2014). Beneficiaries vary from individual users and small business organizations to huge institutions and governments. As shown in Figure 1, the service delivery in cloud computing comprises three models (Liu et al., 2011). First, Infrastructure-as-a-Service (IaaS), where infrastructure-level resources are provided on demand in the form of Virtual Machines (VM). IaaS providers include Amazon EC2, GoGrid, etc. Second, Platform-as-as-Service (PaaS), where platform-level resources such as operating systems and development environments are provided on demand. Examples: Google App Engine, Microsoft Windows Azure, etc. Third,

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Software-as-a-Service (SaaS), where applications are made available to users on demand for business process operations. Example applications: Salesforce.com, Rackspace, Gmail, etc. Deployment models in cloud computing comprises four models: public, private, community, and hybrid cloud service usage.

Cloud service lifecycle includes the service design, publication, discovery, selection, negotiation, usage, and termination. In service design phase, the syntactic and semantic descriptions of the services are prepared for the service to be published. In service publication phase, the cloud providers may register their services to service repositories in addition to publish the service information on their portal. In service discovery phase, users search for and retrieve list of services that satisfy their requirements. In service selection phase, users select the most appropriate service for their functional and non-functional requirements. In service negotiation phase, users negotiate the Service Level Agreement (SLA) and billing with the provider. In service usage phase, users start using the service, the service key performance metrics is monitored and optimized. Finally, in service termination phase, services are withdrawn or deactivated and feedbacks are kept.

The major cloud players include the cloud users, cloud service providers, cloud brokers, cloud auditors, and cloud carriers (Liu et al., 2011). The cloud user is an individual or organization that requires a service that satisfy specific functional and non-functional requirements. The service usage is considered optimal for the cloud user when he receives the promised service quality with no extra effort. The cloud service provider is usually an organization that offers its services. The cloud broker works as an

Figure 1. Cloud service models
Source: (Liu et al., 2011).