A Cloud Portal Architecture for Large-Scale Application Services

Jun-Jang Jeng, IBM, USA

Ajay Mohindra, IBM, USA

Jeaha Yang, IBM, USA

Henry Chang, IBM, USA

ABSTRACT

Application services entail multi-billion dollars of market in IT industry. However, to construct an application service is a labor- intensive and error-prone process. Application services developed through traditional development methods expose the same pitfalls witnessed in most development processes of enterprise applications such as late delivery, over budget, unpredictable quality, lack of reuse and so forth. We have leveraged clouds in developing application services within the context of large corporate with the magnitude of thousands of application services being built, delivered and used. Instead of using cloud simply for a better runtime engine, it is being used as the development platform to accelerate and optimize the solution development process based on large scale application services. This article will focus on the portal architecture of this framework—coined as Cogito-C that contains four spaces: (a) infrastructure space; (b) application space; (c) business space; and (d) presentation space. This article illustrates Cogito-C by scrutinizing the models in the aforementioned spaces. This article will focus on the descriptive models of this framework. Examples are used to explain how this framework is organized and exploited for large-scale application services.

Keywords: *Application Service, Cloud Computing, Portal Development, SOA*

1 INTRODUCTION

Application services entail multi-billion dollars of market in IT industry. As such, application service providers and consumers continue investing considerable amount of time and efforts to develop application services-based solutions. Prepackaged business applications such as enterprise resource planning and customer relationship management offer significant benefits for businesses and are critical for business success. In this direction, leading package application ser-vice providers such as HP, IBM and SAP (IBM, 2009a), exploit domain-specific skills to help their clients excel competitors through cost reduction and risk mitigation. However, current approach is quickly encountering its very own limitation. First, the project planning and implementation for application services are still time-consuming

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and costly. It usually requires a variety of skills and expertise that many companies do not possess. There are also high cost associated with the ongoing management and maintenance of these applications. Second, because packaged applications are often tightly integrated with existing systems, the clients typically require a broad range of technical expertise to run them, which is usually hard or expensive to obtain from other parties. Third, with major concern about cost, both service providers and consumers fall into the vicious cycle—more cost reduction leads to more efficiencies which raise the expectation of more cost reduction. Consequently, no one is the winner because service quality is overlooked in this cycle. No room is left in the delivery process for considering quality—not to mention to improve it.

Application services pertain richer functionality and content than normal specialized services. They scale up the concepts of service-oriented computing to business-level so that service-oriented computing concepts became more receptive to business professionals. Technically, application services can be composed and configured to different but similar domains. An application service hides the implementation detail from its users and, by itself, can be also a composite of other services. To construct an application service is a labor-intensive and error-prone process. Moreover, application services developed through traditional development methods expose the same pitfalls that are witnessed in most development processes of enterprise applications such as late delivery, over budget, unpredictable quality, lack of reuse and so on.

Clouds are the next generation of infrastructure, bestowing the mechanism of virtualization technologies such as virtual machines. Clouds are able to dynamically provision services on demand as a personalized resource collection to meet a specific service requirement, which is established through negotiation and accessible as a service via network (Herssens, Faulkner, & Jureta, 2008a, 2008b). We have leveraged clouds in developing application services within the context of large corporate with the magnitude of thousands of application services being built, delivered and used. Instead of using cloud simply for a better runtime engine, it is being used as the development platform to accelerate and optimize the solution development process based on large scale application services. This article will focus on the portal architecture of this framework - coined as *Cogito-C* that contains four spaces: (a) infrastructure space; (b) application space; (c) business space; and (d) presentation space. This article illustrates *Cogito-C* by scrutinizing the models in the aforementioned spaces. This article will focus on the descriptive models of this framework. Examples are used to explain how this framework is organized and exploited for large-scale application services.

The rest of this article is organized as follows. Section 2 presents the overall architecture of *Cogito-C* with emphasis on market viewpoint. Section 3 presents briefly the cloud platform being used for realizing *Cogito-C*. Section 4 shows how applications are provisioned and deployed to *Cogito-C* and made ready for use by users. Section 5 describes the space that provides business services to service consumers. Section 7 contains related research efforts. Section 8 concludes this article with future work of *Cogito-C*.

2 CLOUD SERVICE ARCHITECTURE

Cloud computing is claimed by many to be the next generation of computing paradigm. Cloud computing is more a style of computing than a set if disruptive technologies. Cloud computing comes into prime time when most information systems need a new way of increasing capacity, adding capabilities dynamically without investing in new infrastructure, training new knowledge-intensive staff, and/or licensing new software. Cloud computing also covers the capabilities of utility computing such as subscription-based or pay-per-use service that, in real time over the Internet, to extend IT's existing capabilities (Knorr & Gruman,