

Custom-Made Cloud Enterprise Architecture for Small Medium and Micro Enterprises

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ABSTRACT

Small, Medium, and Micro enterprises (SMMEs) usually do not have adequate funds to acquire ICT infrastructure and often use cloud computing. In this paper, the authors discuss the implementation of virtual enterprises (VE) to enable SMMEs to respond quickly to customers' demands and market opportunities. The virtual enterprise model is based on the ability to create temporary co-operations and realize the value of a short term business opportunity that the partners cannot fully capture on their own. The model of virtual enterprise is made possible through virtualisation technology, which is a building block of cloud computing. To achieve a common goal, enterprises integrate resources, organisational models, and process models. Through the virtual business operating environment offered by cloud computing, the SMMEs are able to increase productivity and gain competitive advantage due to the cost benefit incurred. In this paper, the authors propose a virtual enterprise enabled cloud enterprise architecture based on the concept of virtual enterprise at both business and technology levels. The business level comprises of organisational models, process models, skills, and competences whereas the technology level comprises of IT resources.

Keywords: Cloud Computing, Cloud Enterprise Architecture, Small, Medium, and Micro Enterprises (SMMEs), Virtual Business Operating Environment, Virtual Enterprise

1. INTRODUCTION

In today's rapidly changing world, businesses are seeking greater agility in their decision-making and operational processes. The advent of cloud computing provides an extraordinary opportunity to deliver the IT agility that organi-

zations require. Cloud computing has changed and will keep on changing the role of IT in organisational structure. There are two major factors at play – the technology aspect and the organizational aspect (Schooff, 2009).

On the technology side, cloud computing represents a shift from highly specialised, isolated technologies to simpler, clustered on-demand technologies. This shift requires a

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corresponding change in the kinds of expertise that IT personnel possess, with less emphasis on technical knowhow and more emphasis on real-time service management, end-user communication and a basic understanding of the economics of cloud usage. On the organisational side of things, one can expect a shift from internal IT towards managed service provider (MSP), as well as an overall reduction in the need for personnel for the day-to-day running of IT.

SMMEs have been on the cloud for some time now, and are the main drivers of the largest and fastest growth curve surrounding cloud technology. Adopting SaaS early on, many SMMEs have contributed to the rapid expansion of SaaS providers like Salesforce.com. Now small and medium businesses are looking to put much of their IT into the cloud, if only for the sole reason of saving money. SMMEs also typically have less existing infrastructure, more flexibility, and smaller capital budgets for purchasing in-house technology. Similarly, SMMEs in emerging markets are typically unburdened by established legacy infrastructures, thus reducing the complexity of deploying cloud solutions.

Unfortunately, many cloud computing providers and cloud application vendors are overlooking the emerging SMME market and just concentrating on the big players.

In the current e-business environments, individual enterprises, including SMMEs cannot survive on their own. It is crucial that SMMEs can engage effectively with their partners and customers. Some larger enterprises require a certain way of e-business interaction with their partners. We believe that virtual enterprise is one of the business models that can facilitate cloud computing for SMMEs.

It is clear that emerging technologies including cloud have the potential of transforming and automating the business processes of SMMEs and enable them to engage with trading partners and customers in global networks (Dai, 2009).

Identified characteristics of cloud computing are massive scale, homogeneity, resilient computing, low cost software, virtualization,

geographic distribution, service orientation, advanced security technologies, resource pooling (Mell & Grance, 2009). In cloud computing, dynamically scalable and often virtualized resources are offered as a service (Behnia, 2009). Therefore, SMMEs do not need to have knowledge of, be experts in, nor have control over the technology infrastructure in the cloud that supports them (Menken & Blokdiijk, 2009). In addition, cloud computing applies a model to enable available, convenient and on-demand network access to a shared pool of configurable computing resources that can be provisioned and released on a fly with minimal management effort or service provider interaction (F5 Networks, 2009). The development and success of cloud computing is due to the maturity reached by virtualisation, web 2.0, grid computing, service oriented architecture technologies and some other technologies.

Cloud computing offers IT infrastructure as an Internet service. Ongoing advances in ICT infrastructure and far more sophisticated applications provide individuals and organizations with the ability to connect to data anywhere and anytime. Cloud computing is powerful in that it is based on modularity system. The use of virtualization and cloud platform allows organizations to break down services and systems into smaller components, which can function separately or across a widely distributed network. The cloud services are possible through any devices that have Internet access (Greengard, 2010). Virtualization is a vital enabling technology for many cloud computing environments. Much of the power of virtualisation comes from the platform independence that virtual machines afford (Matthews, Garfinkel, Hoff, & Wheeler, 2009). IT computing becomes a utility, similar to power, and organizations are billed either based on usage of resources or through subscription, this is achieved through virtualization (Menken & Blokdiijk, 2009).

Cloud computing as a service delivered over the network adopts a service driven operating model, therefore it places a strong emphasis on service management. A business has a different language and vocabulary from

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