Chapter 107
Dynamic Dedicated Server Allocation for Service Oriented Multi-Agent Data Intensive Architecture in Biomedical and Geospatial Cloud

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ABSTRACT

Cloud computing has recently received considerable attention, as a promising approach for delivering Information and Communication Technologies (ICT) services as a utility. In the process of providing these services it is necessary to improve the utilization of data centre resources which are operating in most dynamic workload environments. Datacenters are integral parts of cloud computing. In the datacenter generally hundreds and thousands of virtual servers run at any instance of time, hosting many tasks and at the same time the cloud system keeps receiving the batches of task requests. It provides services and computing through the networks. Service Oriented Architecture (SOA) and agent frameworks renders tools for developing distributed and multi agent systems which can be used for the administration of cloud computing environments which supports the above characteristics. This paper presents a SOQM (Service Oriented QoS Assured and Multi Agent Cloud Computing) architecture which supports QoS assured cloud service provision and request. Biomedical and geospatial data on cloud can be analyzed through SOQM and has allowed the efficient management of the allocation of resources to the different system agents. It has proposed a finite heterogeneous multiple vm model which are dynamically allocated depending on the request from biomedical and geospatial stakeholders.

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1. INTRODUCTION

Cloud computing is a new commercial infrastructure epitome. This new technology is used for providing shared information and communication technology services. The technology of virtualization and resource sharing from a pool of resources provides a variety of worthy properties. A huge number of clients with different necessities are served by clouds having a single set of physical resources. Thus, through geographically dispersed data centers clouds have the inherent capacity to furnish their owners the profits of scaling the hardware resources supporting a system with demand as well as rendering high availability. Cloud computing implicates a service-oriented architecture (SOA), reducing information technology overhead for the end-users. The new technology provides greater flexibility to the customers by cutting down the total cost of ownership by providing on demand services (Vouk, 2008). Distributed computing, grid computing and parallel computing have contributed platform virtualizations (Buyya et al., 2008) technology into the arena of high performance computing which is the primary evolution panorama of cloud computing. Through virtualization the system achieves flexibility, user isolation and security through custom user images. Because of the commercial need, a cloud provider normally has a proprietary where a custom user image runs only on the provider's site. Cloud computing adopts most of the cross-site technologies applied to grid computing. Comparing to the traditional computing epitomes cloud computing is scalable, it can be encapsulated as an abstract entity, and the services are dynamically configurable. Cloud Computing infrastructure allows users to achieve more efficient use of their IT hardware and software investments with super-user privileges on-demand. This is accomplished by analyzing the physical barrier inherent in isolated systems, automating the management of the group of the systems as a single entity.

The image analysis, protein folding, data mining and gene sequencing are the important tools for biomedical applications and researchers. These resource-intensive shared applications often involve large data sets, catalogs, and archives, under multiple owners, often with bur sty workloads. The biomedical association (often involving multiple institutions) has implemented their applications in distributed grid architecture on laboratory-hosted servers. To affirm such servers, laboratories require space, cooling, power as well as low-level system administration, negotiations, firewalls between institutions. Clouds shift the responsibility to install and maintain hardware and basic computational services way from the biomedical consortium to the cloud vendor. QoS is the standard which measures the expiration of cloud users using the cloud computing services. Cloud computing delivers four kinds of services: Infrastructure as a service (IaaS), Platform as a Service (PaaS), Database as a Service (DaaS) and Software as a Service (SaaS) (Foster et al., 2004, Rimal et al., 2009, Aysan et al., 2011; Schaffer et al., 2010). Figure 1 and Figure 2 give a graphical representation of the different service models, and their components. These services are available to users in a Pay per-use-on-demand model.

The paper is structured as follows. Section 2 presents the biomedical and geospatial computing. In Section 3, we discuss the service-oriented multi agent cloud computing architecture. The model description is carried out in section 4. The numerical results to demonstrate the effectiveness of the proposed model are presented in section 5. Section 6 concludes the paper.

2. BIO MEDICAL AND GEOSPATIAL COMPUTING

In biomedical and geospatial computing clouds have an important role such as to compute services, archival storage. Individual labs often include basic servers. Labs that engage in com-

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