Chapter 3
Performance of Enterprise Architecture in Utility Computing

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ABSTRACT

In traditional computing, hardware and software resources are configured to meet the single user's requirements. Utility computing model assist to maximize utilization of resource, hence, minimize the cost associated with it. This approach allows a utility to gradually modernize computing service by enabling existing legacy applications and adopting standard interfaces. The Enterprise Architecture comprises the resource associated in felicitating services domain for Hardware and Application Monitoring via shared services. This chapter discusses about the several architecture that have been presented by different researchers and experts into field of utility computing.

1. INTRODUCTION

Utility computing has emerged as a movement in last few years. Utility computing allows organizations to make use of shared platforms, infrastructure or software as a service for its computing purpose. By moving to utility computing, service consumer not only enjoys significant savings but also extensibility in service. This technology of providing IT solutions as utility to consumers/clients is analogous to the way water or electricity are provided and charged as per demand. Since multiple consumers/clients shares services, they can't be personalized, but a highly standardized configuration and service functionality is provided to consumers. IT departments of various organizations started converting into concatenator of IT services supplied from domestic as well as outside suppliers. These organizations must have the technology for shared and utilization of resources. (Mohan V., 2008)

Discussion by Sriraman et al. (2005) defines - Utility computing as a turning point in Information Technology advancement, it shows how in future consumers/clients would be serviced. This technology is analogous to supply of resources like electric power, water and gas to consumers in real world.

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Customers use these resources as per their requirement and pay for it. The resource allocation model of utility computing is based on it's real world analogy. It is also the technology of allocating computational resources like processing power, memory, network bandwidth etc. to consumers as per their demand, and they will pay for it as per use of allocated resources.

It is likely to be believed that few leading providers with heavy data centers will be merged on the basis of cloud services. Customers get the chance to switch over the providers on the basis of budget, price and quality match.

Both the service providers and consumers receive considerable benefits provided by utility computing model. Service provider is able to configure actual hardware and software as a shared resource between multiple consumers/clients, unlike single personalized solution as was in case of conventional computing. Physical resources are first virtualized and then dynamically allocated between multiple consumers/clients, when needed. Service providers have ability to reschedule on re-utilization of allocated resources according to some priority scheme. This makes service provider to maximize number of consumers/clients served and minimize operational investment. Utility computing makes service provider to gain better Return on Investment (ROI) with better resource management. For example; Total cost of Ownership (TCO) because of ability to achieve maximum positive return within limited time with the help of elastic infrastructure that expands with demands. (Ouyang et al., 2007)

The work in Soldatos et al. (2012) specifies the abstraction and minimum possible investment are the most outstanding features of utility computing. The consumers/clients don't need to worry about complexities of the maintenance of IT resources and can get rid of heavy investment. The cost of computation depends only on the way the consumers are going to use resources, unlike the case of traditional computing in which cost depends on purchasing resources and keeping staff for managing resources. In utility computing, since consumers/clients don't need to manage resources, they don't need to worry about overuse and underuse of IT resources during high and low usage periods. Unlike, the conventional computing, utility computing doesn't bound consumers/clients with single vendor's specific technology. Consumers /clients receive computing power from multiple vendors dynamically as per their requirements. There are certain consumers/clients, whose computing requirements would vary frequently during resource provisioning. Utility computing model is quite beneficial for such consumers /clients.

The demands of consumers/clients may vary frequently with uncertainty; it makes appropriate allocation of resources a mind storming problem. If providers allocate less resources they will suffer loss in its business and if allocate too much of its resources, then will be underutilized and again it will suffer loss. The utility computing provide solution for this problem by giving ability to service provider through which it can allocate resources with flexibility of expandability in capacity of resources to be delivered to consumers. The utility computing model can effectively meet gross demand of resources for multiple applications by dynamically allocating resources across multiple applications and thus assuring considerable benefits to service providers (Madkour et al., 2007).

Qian et al. (2007) discovered that a service provider can reduce its resources requirements by dynamically allocating resources. Responding quickly to fluctuating demands of resources is an outstanding property of utility computing. This important attribute is termed as agility of utility computing platform.

Utility computing platform architecture consists of multiple data centers containing huge and distributed number of servers in it and a global DNS server shown in Figure 1. The work done by Sriraman et al (2013) explains the depending on requirements, servers termed as physical machines are allocated to consumers/clients and if needed multiple virtual machines are created over these physical machines and then these virtual machines are allocated to consumers/clients. DNS resolution spreads user requests