Utility Computing and Its Applications

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ABSTRACT

Utility Computing (UC) is an on demand delivery of enterprise applications and business process in a shared, secured and scalable standards based environment over the Internet. Though many service oriented architectures have failed before to deliver on their promises of remote delivery of IT services, the ubiquitous nature of computing which is now present is the motivating factor for computing to be seen in a "Utility model". This paper also elaborates on how we could accommodate such a system using a mobile interface.

1. INTRODUCTION

As service oriented model is becoming more popular Utility Computing (UC) is becoming more acceptable. Many businesses are not aware about the productivity it could increase by using this model. However some business has already adopted this model partly, by using services provided by an external vendor to augment their existing Information Technology (IT) infrastructure.

The problem currently the industry is facing is that there is no established framework about how to adopt these changes strategically for the organization to effectively utilize its IT services. Many organizations are moving away from the current licensing model to use software IT services, provided by an external vendor to suit their specific business needs, and focus on their core business. The chief benefit from moving away from the licensing model gives the company more flexibility in the way it can use the software upon its need not because they have to buy everything what a software vendor pushes the user to buy. Most people would not imagine having a cow in their back yard for a cup of milk. It is easier to go to the super market to buy a specific quantity for consumption. The electricity is another example of how we pay for what we use, and not buy in bulk. Computing has become ubiquitous in nature by which if there was a remote device that could deliver services through a network to any device which could access it could become very popular.

Utility Computing is going to impact on the IT-Infrastructure of any organization and how IT services will be delivered in the future. In most business services are provided by specific components for example to support a Unix application, a UNIX based server has to be installed. These components by themselves may not be compatible with each other leading to data inconsistencies or IT resource duplication. The creation of many independent data centers, all of them running on same hardware and for the most part running similar software has imposed several penalties on many firms[1], which could lead to problems in integration, and compatibility of the software with the hardware are some issues organizations face today. Regular updates are to be made at regular intervals to support the applications organizations use. The update software is not tested for every individual application on board, which may lead to unreliable systems. Such a fragmented system may not provide good use of the existing infrastructure. Though the present systems are profitable in a vendor's perspectives such that the vendor can push the new hardware technology on to the consumers. This leads to Organizations over investing in their IT resources; this trend may not provide sustainable growth in the IT industry.

The advances in the network technology are enabling it to extend and reach out to other business across the supply chain and in many instances, directly to the consumer [2]. According to the recent Gartner study, the Application Service Model (ASP) goes beyond savings on technology, and includes savings associated with hiring, and rapid implementation of projects, and the ability to scale up the system and benefits related to business process enhancement [5]. Thus the concept of providing IT resources from a remote location is becoming more acceptable. Early forms of UC are already happening as some companies have outsourced their backup and recovery process to corporations like IBM and HP. These remote data centers could be maintained remotely by expert organizations that have the skills and resources to be able to look after stored corporate data. This is now becoming very acceptable; this demonstrates that very complicated network intensive applications like backup of data could be implemented using the Utility model.

2. ADOPTION OF UTILITY COMPUTING BY ORGANISATIONS

Organizations are actively investigating cost of effective alternatives such as IT outsourcing and the use of application services delivered over the Internet by external providers. Utility computing is software on demand service and is likely to have a major impact by providing IT solutions to the end user organizations.

It could be debated about how such a model could be established using an existing IT infrastructure and study the impact of Utility computing architecture in many small to medium organizations. I have chosen a mobile architecture, because it can easily demonstrate the ubiquitous nature of today's computing environment.

It could support my argument for adopting UC in a grand scale by enhancing specific hardware and software technologies. Most mobile devices like mobile phones are able to access the Internet remotely and use many day-to-day applications remotely through the device, usually a mobile phone.

IT vendors are eager to establish partnerships with the organizations to deliver service-oriented model such as the UC model to deliver IT services. Delivery of such services is possible because of the advancement of Internet technologies like broadband i.e. 3g network from Telstra and dedicated VPN. The granularity of the service depends on which model is being adopted. Application Service Model " ASM " provides applications to organizations remotely. The "Business Process outsourcing model" is responsible for providing parts of the IT services remotely.

The impact on productivity is limited by the amount of expert resources required to configure, install and operate enterprise applications and the fast rate of technology change, which require periodic maintenance. [4] From the service consumers point of view it is a challenge how to integrate different services provided by multiple organizations, another issue is what architecture model to follow to allow such an integrated scalable of IT services customized to different users in the same organization. One could only imagine the complications in customizing applications remotely to serve one particular person in an organization. It is also debatable on what architecture to be followed in order for business to use Utility Computing model.

As most current available software has proprietary architectures it makes it difficult to integrate with other applications. In order to provide interoperability among applications, it is vital to allow different applications to share date and business process. The question then is how to adopt an architecture which addresses the needs from a end user perspective and how to make them compatible with the clients view of effectively managing IT resources which needs to be addressed.

An attempt is made by me to integrate a mobile architecture to suit the Utility model.

3. UNIQUE MOBILE ARCHITECTURE TO SUPPORT UTILITY COMPUTING

Mobile computing is becoming popular because it provides data and voice access remotely. A mobile device needs to interact with several heterogeneous components in order to fulfill its task. XML standards exist to make data non-platform specific. For example the World Wide Web can serve as a best resource in locating the best price for any product. It is very difficult to catalog and send contents in the public domain, in order to provide a semantic access to the data. However agents

independent of the browser application do the task of locating the best price for a product. The problem quickly becomes multifaceted when a combination of contents and catalogs has to be transmitted and received from various sources from the web in order to provide dynamic access to the data.

Here we can clearly see that the UC based applications are only feasible if many different heterogeneous entities cooperate with each other as a federated system.

The Utility approach could bring about a scalable implementation maximizing its use of hardware and software resources. The current ongoing development of SOAP (Simple Object Access Protocol), WSDL (Web Service Description language) and others promises to provide substantial advantages to problems in software integration [6].

However in order to support multiple data sources which can deliver customized information to many end users using a utility model requires a semantic integration of data sources. However Semantic Web has much broader implications upon data access. The semantic solution is to provide descriptions of information on the Web to allow, "Machine understanding" of information. This could allow intelligent agents to automate many information-processing tasks [7]. This also enables dynamic service discovery and composition for a Utility Based Model (UBM). Therefore the service provider is transparent to the end user.

An optimal infrastructure to best suite the Utility Computing paradigm is a server which has integrated components such as a Web Server, a business logic layer and a database to support Ansi Sql query standards. This database could be used to facilitate storage and retrieval of large files with media content. (Unstructured data) In addition to the existing layers an added layer which could support semantic data integration which can communicate with the mobile device is ideal to generate personalized content remotely from an integrated server approach to support Utility Computing model.

CONCLUSION

Utility Computing is a new paradigm shift in the way computing could be done in the future. As computing is becoming ubiquitous in nature, soon people would see that there is no rational in adding more hardware to increase productivity. The advancement in network infrastructure and the power of the internet are the impetus for developing a model, which treats computing power as a form of utility, such that an organization can pay only for what it uses, and not what the vendor wants to sell. Organizations like IBM would become powerhouses which would enable smooth and efficient use hardware technology and provide scalable IT-Services to its end users.

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