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Performance Improvement of Software as a Service and Platform as a Service in Cloud Computing Solution

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Abstract: The word cloud (also phrased as "the cloud") is used as a metaphor for "the Internet," so the phrase cloud computing means "a type of Internet-based computing," where different services -- such as servers, storage and applications -- are delivered to an organization's computers and devices through the Internet. Cloud computing that is providing computer resources as a service, is a technology Revolution offering flexible IT usage in a cost efficient and pay-per-use way. As for the evaluation of companies to whether which technology solution to use, it would be necessary to decide whether or not the evaluation of cloud computing would actually differ to the traditional way of IT outsourcing. In this paper, we compare PaaS and SaaS cloud computing solutions. Cloud computing provides three service models that provide different levels of control such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). Each service model can be seen as a layer with IaaS at the base allowing full control of resources and storage, PaaS in the middle allowing development on an existing platform and finally, SaaS providing limited development opportunities but having appeal to end-users. Each layer provides different development and/or deployment opportunities that can be matched to the resource requirements of individuals and businesses.

Keywords: Infrastructure as a Service, Platform as a Service, Software as a Service, Cloud Model

I. INTRODUCTION

Cloud computing refers to applications and services offered over the Internet. These services are offered from data centers all over the world, which collectively are referred to as the "cloud." This metaphor represents the intangible, yet universal nature of the Internet. The idea of the "cloud" simplifies the many network connections and computer systems involved in online services. In fact, many network diagrams use the image of a cloud to represent the Internet. This symbolizes the Internet's broad reach, while simplifying its complexity. Any user with an Internet connection can access the cloud and the services it provides. Since these services are often connected, users can share information between multiple systems and with other users. Examples of cloud computing include online backup services, social networking services, and personal data services such as Apple's Mobile Me. Cloud computing also includes online applications, such as those offered through Microsoft Online Services. Hardware services, such as redundant servers, mirrored websites, and Internet-based clusters are also examples of cloud computing. A cloud service has three distinct characteristics that differentiate it from traditional hosting.

Platform-as-a-service in the cloud is defined as a set of software and product development tools hosted on the provider's infrastructure. Developers create applications on the provider's platform over the Internet. PaaS providers may use APIs, website portals or gateway software installed on the customer's computer. Force.com, (an outgrowth of Salesforce.com) and GoogleApps are examples of PaaS. Developers need to know that currently, there are not standards for interoperability or data portability in the cloud. Some providers will not allow software created by their customers to be moved off the provider's platform.

In the software-as-a-service cloud model, the vendor supplies the hardware infrastructure, the software product and interacts with the user through a front-end portal. SaaS is a very broad market. Services can be anything from Web-based email to inventory control and database processing. Because the service provider hosts both the application and the data, the end user is free to use the service from anywhere.

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II. RELATED WORKS

Several computing models have been established for achieving efficient tasks for all services:

Information Retrieval through Multi-Agent System with Data Mining in Cloud Computing [1]: Problem solving solutions like Multi-Agent System (MAS) capitalizes on its multiple intelligent agents to receive precepts from the environment, process the information and produce the desired result for the environment. The wide scope of

capabilities of MAS permits the user to resolve functional, methodic, algorithmic or procedural query to explore and process the data. MAS are also referred as autonomous agents having the capability to resolve problems that are not possible for a single agent to handle.

Cloud Computing for Mobile World [2] Cloud computing in mobile platforms has invoked a new wave of evolution in the rapidly developing mobile world. Although several striking research work has been conducted in the high computing counterparts of mobile technology, the field of cloud computing for mobile world is vastly unexplored. In this paper, we introduce the concept of Mobile Cloud Computing (MCC), its inner workings and the various implementable architectures related to MCC.

Minimizing technical complexities in emerging cloud computing platforms [3] Cloud Computing is considered nowadays as the future of ICT systems leveraging new methodologies for developing, providing and consuming services. Even though many people believe that Cloud is just another buzzword for utility computing, this new computing paradigm is not only changing the design of modern computing plat- forms in technical level, but it also impels, from the market perspective, the creation of new value chains and business models. However, many technical complexities still remain, which disallow the wide adoption of Clouds to eventually address the new business trends and requirements of end-users. In this paper we identified and analyzed the key challenges for the emerging cloud platforms in order to minimize these technical complexities while various innovative approaches from European research activities are presented.

Dynamic job Scheduling in Cloud Computing based on horizontal load[4] Cloud computing is a latest new computing paradigm where applications, data and IT services are provided across dynamic and geographically dispersed organization. How to improve the global throughput and utilize Cloud computing resources proficiently and gain the maximum profits with job scheduling system is one of the Cloud computing service providers' ultimate objectives. The motivation of this paper is to establish a scheduling mechanism which follows the Lexi search approach to find an optimal feasible assignment. Task scheduling has been treated as general assignment problem to find the minimal cost. Here cost matrix is generated from a probabilistic factor based on some most vital condition of efficient task scheduling such as task arrival, task waiting time and the most important task processing time in a resource. The cost for assigning a task into a resource is probabilistic result considering the above criteria

Study on Recent Trends and Opportunities in Cloud Computing [5]

The emerging trend of cloud computing that delivers the computing as a service rather than a product whereby shared resources software and information that are provided to computers and other devices as the utility over the network. Cloud computing model is composed of three service models Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) and four deployment models Public, Private, Hybrid/mixed. In this paper Cloud computing system that consist of inter-connected computers and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on service-level agreements established through negotiation between the service provider and consumers. The introduction of hardware monitoring and software management that was proved to be effective tools for managing the data centers at different locations. This paper further deal with comparative study of data centre challenges of different cloud vendors.

Investigation on Efficient Management of workflows in cloud computing Environment [6]: Cloud computing is an on-demand service model often based on virtualization technique and this paper explores the use of cloud computing for scientific workflows, focusing on a widely used application. The approach is to evaluate from the point of view of a scientific workflow the tradeoffs between running in a local environment, if such is available, and running in a virtual environment via remote, wide-area network resource access. Our results show that a workflow with short job runtimes, the virtual environment can provide good compute time performance but it can suffer from resource scheduling delays and wide area communications.

Public Cloud Computing vs. Private Cloud Computing[7]: Cloud computing has promised to enhance efficiency, flexibility, greater agility, less capital expenditure and to overcome geographic limitations to compete in a global market. If adopted and implemented, businesses would require not only new architectures, but also new ways to procure IT services. More and more companies are shifting to Cloud based services, but at the same time they are concerned about the security risks. One thing that is really unclear to many is the understanding of what a Cloud really is. Hopefully after the definitions and illustrations of Cloud computing is given you will understand it better. Much attention will be given to public and private Cloud computing issues; as more businesses today utilize Cloud services and architectures, more threats and concerns arise.

Cloud Computing for Standard ERP Systems [8]: Cloud Computing is a topic that has gained momentum in the last years. Current studies show that an increasing number of companies is evaluating the promised advantages and considering making use of cloud services. In this paper we investigate the phenomenon of cloud computing and its importance for the operation of ERP systems. We argue

that the phenomenon of cloud computing could lead to a decisive change in the way business software is deployed in companies. Our reference framework contains three levels (IaaS, PaaS, and SaaS) and clarifies the meaning of public, private and hybrid clouds. The three levels of cloud computing and their impact on ERP systems operation are discussed. From the literature we identify areas for future research and propose a research agenda.

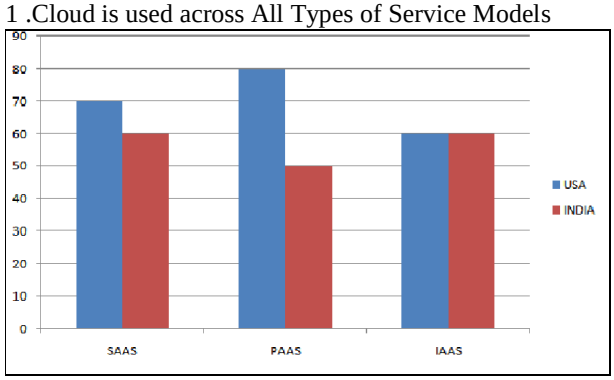
Platform-as-a-Service Private Cloud with Oracle Fusion Middleware [9]: Opportunities for improving IT efficiency and performance through centralization of resources have increased dramatically in the last few years with the maturation of technologies such as SOA, virtualization, grid computing, and management automation. A natural outcome of this is what has become increasingly referred to as "cloud computing", where a consumer of computational capabilities sets up or makes use of computing "in the cloud" (i.e. over a network) in a self-service manner, without direct involvement in how that computing is resourced. Initially referring to services provided by third-parties over the Web, cloud computing is now also evolving in a "private" variant whereby enterprises set up cloud-like, centralized shared infrastructure with automated capacity adjustment that internal departmental "customers" utilize in a self-service manner. Realization of efficiency, performance, and agility benefits is reinforcing this trend.

Analysis of cloud Services:

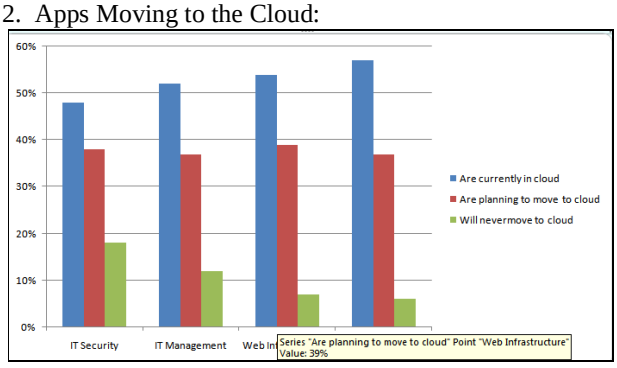
	SaaS	PaaS	IaaS
Type of Service Wise Popularity	SAAS (Software as a service) is more popular among with consumers, who bother about using the application such as email, social networking etc	IAAS (Infrastructure as a service) is more popular among users into research and high computing areas.	PAAS (Platform as a Service) is more popular among developers as they can put all their concentration on developing their apps and leave the rest of management and execution to the service provider.
Layer of Services	A layer on top on PAAS	A layer on top of IAAS	The Base layer
Application Wise Popularity	Applications like email (Gmail, Yahoo mail etc), Social Networking sites etc.	Runtimes (like java runtimes), Databases (like mySql, Oracle), Web Servers etc	Deals with Virtual Machines, Storage (Hard Disks), Servers, Network, Load Balancers etc
Company Wise Popularity	Google Apps	AWS Elastic Beanstalk, Heroku, Force.com, Google App Engine etc.	Amazon EC2, Windows Azure etc
Speed	Increased speed of innovation	Increased speed of innovation	Increased speed of innovation
costs	Reduced total costs	Reduced total costs	Reduced total costs

III. Comparison Based Result and Discussion

1 .Cloud is used across All Types of Service Models



2. Apps Moving to the Cloud:



IV. Conclusion

In this paper we have studied on Cloud computing model is composed of three service models Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) and four deployment models Public,

Private, Hybrid/mixed. We have also studied that Cloud computing system that consist of interconnected computers and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on service-level agreements established through negotiation between the service provider and consumers. The introduction of hardware monitoring and software management that was proved to be effective tools for managing the data centers at different locations. At the end we have carried out comparative study of data centre challenges of different cloud vendors such as Amazon EC2 and Rackspace cloud servers.

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